third edition

DEVELOPMENTAL PSYCHOPATHOLOGY

VOLUME 4

RISK, RESILIENCE, AND INTERVENTION

EDITED BY **Dante Cicchetti**

DEVELOPMENTAL PSYCHOPATHOLOGY

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THIRD EDITION

Volume Four: Risk, Resilience, and Intervention

Editor

DANTE CICCHETTI

WILEY

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of her great vision and staunch support of the field
of developmental psychopathology.

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Preface to Developmental Psychopathology, Third Edition

A decade has passed since the second edition of *Developmental Psychopathology* was published. The two prior editions (Cicchetti & Cohen, 1995, 2006) have been very influential in the growth of the field of developmental psychopathology. The volumes have been highly cited in the literature and have served as an important resource for developmental scientists and prevention and intervention researchers alike. In the present third edition, we have expanded from the three volumes contained in the second edition to four volumes. The increased number of volumes in this current edition reflects the continued knowledge gains that have occurred in the field over the past decade.

A not insignificant contributor to this growth can be found in the very principles of the discipline (Cicchetti, 1984, 1990, 1993; Cicchetti & Sroufe, 2000; Cicchetti & Toth, 1991, 2009; Rutter & Sroufe, 2000; Sroufe & Rutter, 1984). Theorists, researchers, and prevention scientists in the field of developmental psychopathology adhere to a life span framework to elucidate the numerous processes and mechanisms that can contribute to the development of mental disorders in high-risk individuals as well as those operative in individuals who already have manifested psychological disturbances or who have averted such disorders despite their high-risk status (Cicchetti, 1993; Masten, 2014; Rutter, 1986, 1987, 2012). Not only is knowledge of normal genetic, neurobiological, physiological, hormonal, psychological, and social processes very helpful for understanding, preventing, and treating psychopathology, but also deviations from and distortions of normal development that are seen in pathological processes indicate in innovative ways how normal development may be better investigated and understood. Similarly, information obtained from investigations of experiments of nature, high-risk conditions, and psychopathology can augment the comprehension of normal development (Cicchetti, 1984, 1990, 1993; Rutter, 1986; Rutter & Garmezy, 1983; Sroufe, 1990; Weiss, 1969).

Another factor that has expedited growth within the field of developmental psychopathology has been its ability to incorporate knowledge from diverse disciplines and to encourage interdisciplinary and translational research (Cicchetti & Gunnar, 2009; Cicchetti & Toth, 2006). In keeping with its integrative focus, contributions to developmental psychopathology have come from many disciplines of the biological and social sciences. A wide array of content areas, scientific disciplines, and methodologies has been germane. Risk and protective factors and processes have been identified and validated at multiple levels of analysis and in multiple domains.

The increased emphasis on a multilevel, dynamic systems approach to psychopathology and resilience, the increased attention paid to gene–environment interplay in the development of psychopathology and resilience, and the application of a multiple levels of analysis developmental perspective to mental illnesses that have traditionally been examined nondevelopmentally (e.g., bipolar disorder, schizophrenia, and the personality disorders) not only have contributed to a deeper understanding of the dysfunctions but also have educated the public about the causes and consequences of mental disorder (see Cicchetti & Cannon, 1999; Cicchetti & Crick, 2009a, 2009b; Miklowitz & Cicchetti, 2006, 2010; Tackett & Sharp, 2014).

Advances in genomics, GxE interactions, and epigenetics; growth in our understanding of neurobiology, neural plasticity, and resilience; and progress in the development of methodological and technological tools, including brain imaging, neural circuitry, hormone assays, immunology, social and environmental influences on brain development, and statistical analysis of developmental change, pave the way for interdisciplinary and for multiple levels of analysis research programs that will significantly increase the knowledge base of the development and course of maladaptation, psychopathology, and resilience. Moreover, randomized control prevention and intervention trials are being conducted based on theoretical models and efforts to elucidate the mechanisms and processes contributing to developmental change at both the biological and psychological levels (Belsky & van IJzendoorn, 2015; Cicchetti & Gunnar, 2008).

Despite the significant advances that have occurred in the field of developmental psychopathology, much important work lies ahead. Undoubtedly these future developments will build on the venerable contributions of the past; however, as work in the field becomes increasingly interdisciplinary, multilevel, and technologically sophisticated, it is essential that even more emphasis be directed toward the process of development (Harter, 2006; Sroufe, 2007, 2013). It is not only genes and environments but also the cumulative developmental history of the individual that influences how future development will unfold (Sroufe, 2007, 2013).

Developmental psychopathologists have incorporated concepts and methods derived from other disciplinary endeavors that are too often isolated from each other, thereby generating advances in knowledge that might have been missed in the absence of cross-disciplinary dialogue. The continuation and elaboration of the mutually enriching interchanges that have occurred within and across disciplines interested in normal and abnormal development not only will enhance the science of developmental psychopathology but also will increase the benefits to be derived for individuals with high-risk conditions or mental disorders, families, and society as a whole.

Dante Cicchetti, Ph.D.
Minneapolis, MN
January 2015

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CHAPTER 1

Childhood Adversity and Adult Physical Health

KATHERINE B. EHRLICH, GREGORY E. MILLER, and EDITH CHEN

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A consensus in the developmental psychopathology literature is that the experience of early adversity—particularly the experience of chronic, uncontrollable stress—is a risk factor for a diverse set of poor outcomes across development (e.g., Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Poulton et al., 2002; Shonkoff et al., 2012). In the last three decades, a growing number of studies have provided convincing evidence to conclude that adversity in childhood has a lasting influence on adult physical health, particularly chronic diseases associated with aging, like cardiovascular disease, diabetes, arthritis, and some cancers (Gluckman & Hanson, 2006; Miller, Chen, & Parker, 2011; Repetti, Taylor, & Seeman, 2002). This susceptibility to the chronic diseases of aging resulting from early adversity has been identified in diverse samples with a range of adverse risk factors, including socioeconomic disadvantage, maltreatment, and chaotic family environments. These findings suggest that these early stressful experiences leave a "biological residue," manifesting in physical health problems in adulthood.

This chapter provides a review of the current knowledge linking childhood adversity to adult physical health. We first provide a discussion of childhood adversity and the varied ways that children encounter stressful experiences in their daily lives. Then we review evidence for links between childhood adversity and chronic diseases of aging, with a focus on cardiovascular disease and metabolic disorders, where most of the research to date has occurred. We then describe conceptual models that help guide empirical investigation of the processes through which early adversity influences later health. We also review biological mechanisms that might play an intermediary role in translating psychosocial stress into health problems, which can help explain how early adversity "gets under the skin" and influences the onset of disease in adulthood. Our goal is to highlight the advantages and limitations in the conclusions

we can draw from research on these biological processes. Finally, we end this chapter with a series of important research questions that should be a focus in the next generation of empirical investigation on early adversity and adult physical health.

DEFINING CHILDHOOD ADVERSITY

There are a number of ways that children could experience significant adversity. In this chapter, we focus on adversity that is both chronic and severe in nature. We define *chronic* adversity as one that remains present in the child's life over a significant period of time (e.g., lack of material resources due to poverty). Adversity can also be chronic when children experience lingering threat over the possibility of a repeated stressful experience (e.g., stress resulting from a traumatic experience, such as abuse, that could reoccur) or aftereffects of adversities that create severe disruptions to daily life (e.g., long-term displacement resulting from a natural disaster). Adversity is considered *severe* when it results in a profound unsettling of normative childhood experiences and threatens the well-being of the child (e.g., exposure to gang violence while living in poverty).

Studies that have attempted to estimate the prevalence of adverse life experiences in childhood have found that these stressors actually are fairly common. Kessler and colleagues (Kessler, Davis, & Kendler, 1997) categorized early-life adversities into four domains, including (a) interpersonal traumas (e.g., rape, physical attacks); (b) loss events (e.g., death of a parent); (c) parental psychopathology (e.g., parental depression, antisocial personality disorder); and (d) a miscellaneous category of stressful life events (e.g., life-threatening accidents, man-made disasters). Using the National Comorbidity Survey, a nationally representative sample of families in the United States, Kessler et al. found that by the age of 16, nearly 75% of children have experienced at least one significant adversity and approximately 50% of children have experienced multiple adversities. In this sample, the most frequent adversities that children faced were maternal depression, paternal verbal abuse, paternal substance abuse, and parental separation or divorce.

Further, a startling number of children currently face adversity in impoverished or economically stressed conditions. According to the Children's Defense Fund (2012), 22% of children in the United States were living in poverty in 2010, meaning that a family of four earns less than $22,350 a year (U.S. Department of Health and Human Services, 2011). An additional 22% of children live in low-income families, defined as less than 200% of the federal poverty level (or less than $44,700 for a family of four). Children in low-income families may be exposed to many of the same stressors that children living below the poverty line face, including dangerous neighborhoods, material deprivation, parental underemployment, and familial mental health problems, all contributing to strained family relationships.

Overwhelmingly, research on the links between early adversity and later physical health has focused on two types of adversity: child maltreatment and socioeconomic disadvantage. Although these experiences of early adversity fall under the definition of adversity proposed above, they differ from each other in some critical aspects, including the *nature* and *source* of threatening experiences; the duration, frequency, and severity of those experiences; and the opportunities for coping. Yet maltreatment and socioeconomic disadvantage share several overlapping qualities, which may include cold, insensitive parenting; harsh discipline; exposure to conflict and violence; limited access to resources; and uncertainty of future environmental stability (Repetti et al., 2002). Next we take a closer look at several forms of adversity that are thought to be particularly detrimental for later physical health.

Child Maltreatment

A fundamental component of attachment theory is the notion that individuals develop representations (or internal working models) that reflect the extent to which a caregiver serves as a *secure base* for exploration and as a *safe haven* when needed for comfort and support (Bowlby, 1969/1982, 1973). These representations are experience-based, and they are developed over the first year of life in response to repeated interactions with a caregiver. When these caregiving experiences include neglect or abuse, children learn that their caregiver is not an available secure base or safe haven. Further, these children may develop unusual behaviors, characterized by odd, fearful, and disorganized patterns of interactions with a caregiver—characteristics that emerge when the caregiver becomes their primary source of fear *and* support (Lyons-Ruth & Jacobvitz, 2008). These behavioral responses reflect the child's inability to cope with a chaotic environment. Importantly, children who are maltreated by caregivers grow up without the experience of knowing that a reliable caregiver is available when needed—an aspect of the family emotional climate that plays a fundamental role in children's abilities to regulate distress and cope with negative emotions (Bowlby, 1988).

Child maltreatment is a serious public health concern that poses significant mental and physical health burdens on its victims (Cicchetti & Toth, 2005) as well as substantial economic burdens on society as a whole (Fang, Brown, Florence, & Mercy, 2012). Estimates suggest that almost 700,000 children were victimized in the United States in 2011, almost half of whom were under 6 years old at the time of the abuse (U.S. Dept. of Health and Human Services, 2011). Of course, because a large number of cases are unreported and a third of reported cases are not investigated (Cicchetti & Toth, 2005), the actual rate of child maltreatment may in fact be higher. The vast majority of cases (78%) included children suffering from neglect, but each year, hundreds of thousands of children are also victims of physical, sexual, or psychological abuse. Alarmingly, childhood maltreatment is perpetrated most often by primary caregivers, with over 80% of cases involving abuse by one or more parents.

Explanations for the causes of child maltreatment widely recognize that the phenomenon is multiply determined. Attempts to characterize the contexts of maltreatment have cited parental factors (e.g., mental illness, substance abuse), child factors (e.g., difficult temperament, disruptive behavior), interactional factors—that is, the dynamic transactions that take place between parents and children that might incite abuse (e.g., a child's aggressive behavior elicits physical punishment from parents that subsequently escalates to abuse), and environmental factors (e.g., cultural attitudes, poverty; Belsky, 1993; Cicchetti & Toth, 2005).

Socioeconomic Disadvantage

Children growing up with socioeconomic disadvantage have a higher probability of being exposed to stressful conditions across virtually every domain of daily life. Many of these stressful conditions center on the lack of security for basic resources, such as food and housing. For example, over 10% of children live in "food-insecure" families who struggle to provide enough food to meet children's daily nutritional needs, and over 20 million children receive free or reduced-cost lunches at school—meals they are eligible to receive because of their family's scarce financial resources (Children's Defense Fund, 2012). Children in poverty often do not have adequate access to medical care, resulting in infrequent visits to the doctor and risk for serious complications from untreated illnesses. Children growing up in poverty are at risk for low educational attainment, meager job success, and incarceration (Duncan, Kalil, & Ziol-Guest, 2008). Notably, children in poverty also face neighborhood stressors, and they are at increased risk for becoming victims of violence, theft, and other crimes (Ross & Mirowsky, 2001). Further, their caregivers are burdened by numerous demands, such as multiple part-time jobs, unaccommodating schedules, and psychosocial stress brought on by their lack of resources, making it more difficult for them to serve as sensitive sources of support for their children. The accumulation of deficits in resources—both material and psychological—cluster to create an environment that is ill-equipped to foster children's healthy development. Children living in disadvantaged families can face daily threats to their basic needs and be exposed to additional stressors that can jeopardize their mental and physical well-being.

Presumably, other adverse experiences in childhood (including many of the factors that Kessler et al. [1997] identified) have repercussions for adult health. To date, however, these links between exposure to other early adversities besides poverty and maltreatment and adult health have not been a primary focus in the literature. For example, with the exception of a handful of studies, we know very little about how the loss of a parent, the experience of severe interparental conflict, or exposure to neighborhood stress plays a role in shaping chronic disease outcomes in adulthood. Children are exposed to a wide array of adverse experiences, and it will be important to understand the extent to which each of these adversities is associated with long-term physical health outcomes.

Summary

Chronic adversity is a problem for many children in the United States. So far, the literature on health consequences has focused mainly on maltreatment and disadvantage. But an important question for future studies to consider is the impact of other significant adversities (e.g., interparental conflict, long-term separations from parents, natural disasters) on adult physical health. One challenge to this line of research, however, is that many forms of adversity—and socioeconomic disadvantage and maltreatment in particular—co-occur more often than would be expected by chance alone (Crouch, Hanson, Saunders, Kilpatrick, & Resnick, 2000), thus creating a unique challenge to parsing out the effects of different forms of adversity on later physical health outcomes. The use of a variety of statistical techniques (e.g., variable-centered and person-centered approaches to data analysis) as well as comprehensive models (described in more detail later in this chapter) offer opportunities to circumvent the

challenges associated with identifying the complex connections between early adversity and adult physical health.

DEFINING HEALTH OUTCOMES

Studies documenting the link between early adversity and adult physical health have assessed everything from the frequency of minor physical symptoms like headaches and constipation to rates of disorders and death from various conditions. As much as possible we focus on disease morbidity (the diagnosis of a disease or a clinical manifestation of it) and mortality rather than symptom reports. The advantages of focusing on disease endpoints and death are that they can be ascertained objectively and are viewed as reflecting differences in an underlying disease process. Further, these outcomes are much simpler to interpret than symptoms reported by patients, which tend to be heavily shaped by individual differences in symptom perception, labeling, and reporting (Feldman, Cohen, Doyle, Skoner, & Gwaltney, 1999).

Our focus in this chapter rests on the major chronic diseases associated with aging, including studies of risk for cardiovascular disease, stroke, cancer, diabetes, and metabolic syndrome, which is a precursor of cardiovascular disease and diabetes (Grundy et al., 2005). These diseases account for the vast majority of suffering and disability in the United States (and well over 1 million deaths in the United States each year; Murphy, Xu, & Kochanek, 2012). Further, the economic burden associated with health care costs for treating these chronic diseases—which amounts to more than three-quarters of the nation's health care spending—accounts for approximately $300 billion annually (DeVol & Bedroussian, 2007).

CHILDHOOD ADVERSITY AND LATER DISEASE: EPIDEMIOLOGICAL EVIDENCE

Mounting evidence suggests that early childhood adversity is associated with a number of chronic health problems later in life, including cardiovascular disease, diabetes, cerebrovascular disease, and even some cancers (Adler & Rehkopf, 2008; Gluckman & Hanson, 2006; Shonkoff et al., 2012). This quickly growing body of research has implicated psychosocial stress as a primary mediator of adversity's association with morbidity and mortality from chronic diseases of aging (Matthews & Gallo, 2011; Shonkoff, Boyce, & McEwen, 2009). In the sections that follow, we review epidemiological evidence for the role of early adversity in contributing to later disease. We focus mainly on the role of maltreatment and socioeconomic disadvantage, two forms of adversity that have been studied extensively in relation to later health problems. Where applicable, we review available literature documenting other forms of early adversity that have been linked to chronic diseases of aging. When possible, we selected studies that used nationally representative studies with large sample sizes, assessment of possible confounds, prospective study designs, and objective measures of health outcomes in adulthood. In some domains, these criteria could not be met within any single study, so we review available evidence and note the methodological concerns. Further, our discussion is restricted to studies that link childhood adversity to *adult* physical health. Although a growing body of research has documented links between exposure to stress in childhood and childhood disease outcomes, these studies are beyond the scope of this chapter.

Maltreatment and Later Disease

Studies of the long-lasting sequelae resulting from maltreatment in childhood have identified robust links between childhood abuse and chronic diseases of aging, including cardiovascular disease and diabetes. Evidence for these links comes from studies that focus on different forms of maltreatment, including physical abuse, sexual abuse, and neglect (e.g., Anda et al., 2006; Goodwin & Stein, 2004). The vast majority of these studies used retrospective reports about maltreatment, which presents some methodological concerns about the accuracy of the reports. Next we review a selection of studies that have examined links between maltreatment and specific disease outcomes.

Maltreatment and Cardiovascular Disease

Links between early maltreatment and cardiovascular disease are well documented (e.g., Batten, Aslan, Maciejewski, & Mazure, 2004; Dong et al., 2004; Draper et al., 2008; for meta-analytic findings, see Irish, Kobayashi, & Delahanty, 2010; Wegman & Stetler, 2009). For example, using data from the National Comorbidity Survey, Goodwin and Stein (2004) found that recalled sexual abuse in childhood was associated with increased risk for cardiovascular disease, including heart attacks. Similarly, findings from the Nurses' Health Study revealed links between women's recollections of childhood physical and sexual abuse and cardiovascular disease (Rich-Edwards et al., 2012). In this study, severe physical abuse was associated with a 46% greater risk of having a cardiovascular

event (e.g., heart attack, stroke). Similarly, sexual abuse was associated with 56% increased odds of having a cardiovascular event.

Links between maltreatment and cardiovascular disease have been found even in complex analyses that include possible alternative explanations, including adult health risk behaviors (e.g., smoking), stressors in adulthood (e.g., daily stress, low educational attainment), depression, and childhood stressors other than maltreatment (e.g., parental divorce). Even after accounting for these potential confounding variables, Fuller-Thomson, Brennenstuhl, and Frank (2010) found that recalled childhood physical abuse was associated with 45% greater likelihood of being diagnosed with heart disease. Felitti and colleagues (1998) have suggested that some of these confounding variables may serve as mediating mechanisms in the progression of heart disease (e.g., the experience of maltreatment may lead individuals to engage in unhealthy lifestyles), but the findings from many of these studies indicate that maltreatment still accounts for some of the risk for cardiovascular disease even after accounting for health behaviors, which may point to other mechanisms linking early maltreatment to cardiovascular disease.

Several investigations have identified gender-specific links between maltreatment and cardiovascular disease (e.g., Batten et al., 2004; Draper et al., 2008; Fuller-Thomson, Bejan, Hunter, Grundland, & Brennenstuhl, 2012; Goodwin & Stein, 2004). For example, Fuller-Thomson et al. (2012) found that childhood sexual abuse was associated with a greater risk for heart attacks for men but not for women. In contrast, in the National Comorbidity Survey, Goodwin and Stein (2004) and Batten et al. (2004) found connections between maltreatment and cardiovascular disease for women but not for men. Unfortunately, insufficient evidence exists currently to make broad conclusions about gender-specific risk for cardiovascular disease resulting from early maltreatment. Nevertheless, it will be important for future research to examine whether the link between maltreatment and cardiovascular disease differs for men and women. It may be that certain forms of maltreatment (e.g., sexual abuse or neglect) are associated with unique risk outcomes for men versus women.

These findings suggest that exposure to early maltreatment is linked to adult cardiovascular disease, but the studies' methodological limitations make it difficult to conclude that maltreatment *causally* contributes to heart disease. For example, these studies rely exclusively on retrospective self-reports of maltreatment (often with a single question about whether participants were ever abused or neglected), which calls into question the accuracy of the assessment due to possible memory errors or informant biases. In addition, most of these studies use participant reports about their medical diagnoses, which are less trustworthy than medical records. These study weaknesses are not easily discounted, and they limit our ability to make strong conclusions about the role of maltreatment in contributing to disease outcomes. To address these concerns, future studies will need to identify and control for factors that could give rise to spurious associations between maltreatment and subsequent cardiovascular disease (e.g., neuroticism). The use of strong methodological designs, including studies from administrative databases that can utilize objectively verified records of maltreatment and cardiovascular disease, would help assuage skepticism about the link between child maltreatment and adult cardiovascular disease.

Maltreatment and Metabolic Risk

Childhood maltreatment has been found to be predictive of diabetes and other metabolic abnormalities in adulthood (e.g., Danese et al., 2009; Felitti et al., 1998; Goodwin & Stein, 2004; Rich-Edwards et al., 2010; Thomas, Hyppönen, & Power, 2008). In recent investigations, researchers have examined a cluster of metabolic abnormalities known as the metabolic syndrome (Cornier et al., 2008; Grundy et al., 2005; previously known as Syndrome X). Metabolic syndrome is increasingly viewed as a precursor to cardiovascular disease and diabetes and reflects sedentary lifestyles and overnutrition. Its connection to potentially fatal cardiac events (e.g., heart attacks, strokes) and high prevalence in modern society (estimates suggest that around 30% of adults in the United States meet criteria for metabolic syndrome; Cornier et al., 2008) make it a promising predisease marker for individuals who have not yet developed chronic diseases.

In the first study of links between early maltreatment and diabetes, Felitti et al. (1998) found that diabetes was more prevalent when individuals reported four or more indicators of childhood risk (including maltreatment and family dysfunction). Similarly, in a community sample of women in New Zealand, Romans, Belaise, Martin, Morris, and Raffi (2002) found that childhood abuse was associated with increased diabetes prevalence. Further evidence for a link between maltreatment and metabolic risk comes from the National Comorbidity Survey (Goodwin & Stein, 2004). In this sample, recalled childhood neglect (but not physical or sexual abuse) was associated with increased odds of having diabetes. Despite variations in definitions of maltreatment (e.g., neglect versus abuse), these studies suggest that the experience of poor caregiving conditions

in childhood is a risk factor for diabetes in adulthood. Interestingly, Goodwin and Stein's (2004) findings of the specific type of maltreatment experience that was associated with metabolic risk suggests that certain types of maltreatment may be particularly influential in shaping diabetes onset.

To date, only a handful of studies have examined whether maltreatment in childhood is a predictor of prediabetes metabolic risk in adulthood, but preliminary evidence provides some support for this link. Midei, Matthews, Chang, and Bromberger (2013) examined connections among emotional, physical, and sexual abuse and the onset of metabolic syndrome in a sample of women in middle adulthood. In this study, childhood physical abuse, but not sexual or emotional abuse, was associated with the onset of metabolic syndrome over a 7-year span.

In one of the only prospective studies of maltreatment and metabolic risk, Danese et al. (2009) examined the separate predictive roles of child maltreatment, social isolation, and socioeconomic status (SES) as well as the cumulative exposure to adversity across these domains. Using the Dunedin Multidisciplinary Health and Development Study, Danese et al. grouped participants into three categories according to their exposure to maltreatment in childhood: (a) no maltreatment; (b) probable maltreatment—meaning that children experienced one out of five indicators of maltreatment; and (c) definite maltreatment, wherein children experienced two or more indicators of maltreatment. Although low SES and social isolation were independently predictive of metabolic risk, child maltreatment was not reliably associated with higher rates of metabolic risk factors. Somewhat surprisingly, adults who were categorized as "probable maltreatment" had elevated risk for metabolic abnormalities, but adults who were categorized as "definite maltreatment" were not at increased risk. This finding is particularly noteworthy, as it is the only study to our knowledge that has multiple informant ratings of maltreatment assessed when participants were children and does not rely on retrospective reports. Given that participants were still relatively young (32 years old) and healthy at the time of assessment of metabolic indicators, it is not entirely surprising that maltreatment was not a reliable risk factor for metabolic disruptions. It may be the case that maltreatment takes longer to manifest itself in metabolic disruptions that will be seen when these participants are older. Yet it is also possible that other studies that have used retrospective self-reports of maltreatment have overstated the link between early maltreatment and adult metabolic risk. Thus, although it appears that early maltreatment is a risk factor for both diabetes and prediabetes metabolic risk, additional research with multiple informants and prospective study designs will be important for shedding light on the extent to which harsh caregiving experiences and maltreatment are predictive of later metabolic disruptions.

Maltreatment and Cancer

Compared to the well-established literature that examines early maltreatment and cardiovascular disease and diabetes, much less is known about the extent to which maltreatment in childhood confers additional risk for cancer. A handful of studies have studied this link using retrospective study designs, with mixed findings (e.g., Brown et al., 2010; Draper et al., 2008; Felitti et al., 1998; Fuller-Thomson & Brennenstuhl, 2009; Morton, Schafer, & Ferraro, 2012). In the first reported examination of this link, Felitti et al. (1998) found that individuals were at increased risk for cancer when they experienced four or more adverse childhood risk factors. Similarly, in the National Survey of Midlife Development in the United States (MIDUS), Morton and colleagues (2012) examined links between childhood abuse and cancer and found that emotional and physical abuse were associated with increased risk of cancer at midlife. These links remained significant even after controlling for potential confounding variables, including age, race, SES, and health-related behaviors (e.g., smoking). Additional evidence for a link between childhood maltreatment and cancer comes from a sample of over 13,000 Canadians who took part in the Canadian Community Health Survey (Fuller-Thomson & Brennenstuhl, 2009). In this sample, recalled physical abuse was associated with 47% higher odds of cancer, even when adjusting for risk factors, such as childhood stressors, adult health behaviors, and adult SES. Morton et al. and Fuller-Thomson and Brennenstuhl (2009) relied on studies that used self-reports of abuse and cancer, which raises interpretational ambiguities, as we noted earlier. However, self-reports about cancer diagnosis may be less subject to false reports than other disease outcomes or symptom reports. Prospective studies and studies utilizing administrative databases with objective measures of maltreatment and disease diagnoses will bolster support for the notion that child maltreatment is a risk factor for adult cancer diagnosis.

Other studies, however, have not found links between early maltreatment and later cancer risk. In a sample of over 21,000 older adults, Draper et al. (2008) examined links between childhood physical and sexual abuse and adult mental and physical health outcomes. In this study, although adults who had been abused reported worse

mental and physical health, abused participants were not at greater risk for experiencing cancer in adulthood. Similarly, Korpimäki, Sumanen, Silanmäki, and Mattila (2010) did not find a link between maltreatment and cancer in a large epidemiological study in Finland. A number of factors could account for these inconsistent findings. For one, researchers vary in their definitions of maltreatment: Some studies include a range of harsh parenting indices, whereas other studies take a more explicit approach by asking participants if they had been abused as children. Moreover, there is considerable variability across studies in sample characteristics and analytical approaches (e.g., the extent to which possible confounding variables are included in statistical models, whether maltreatment is considered as a continuous or binary variable). Another difficulty is that cancer prevalence rates are lower than the rates of heart disease and diabetes, thus making it a more difficult outcome to predict. Further, cancer is a much more heterogeneous disease compared to diabetes and cardiovascular disease; this heterogeneity may explain some of the inconsistent findings, particularly if studies vary in their focus on particular cancers versus all cancer diagnoses. Additional investigation into the connections between maltreatment and cancer risk will provide insight into whether the experience of maltreatment in childhood is a risk factor for later cancer diagnosis.

Summary of Research on Early Maltreatment and Later Disease

Consistent with the notion that early exposure to adversity is linked to many of the chronic diseases of aging, preliminary evidence suggests that maltreatment in childhood may be a risk factor for poor health outcomes in adulthood. In the vast majority of these studies, however, researchers have relied on retrospective reports of maltreatment, which are subject to significant reporting biases. Moreover, these reporting biases might not be random: It is possible that individuals with poor health remember their prior experiences in negatively biased ways. Further, many of these studies use self-reports of physician diagnoses of diseases. Although we prefer these markers of physical health over informants' own symptom reports, these assessments are nevertheless vulnerable to inaccurate reports.

Additional research will be useful for shedding light on the specific contexts in which maltreatment is likely to be a serious risk for later health problems. For example, it is possible that certain forms of maltreatment are more likely to contribute to health problems for women but not for men, or for people from particular racial or ethnic backgrounds. Another lingering question concerns the relative weight of various forms of maltreatment in the progression of long-term health problems: Do all forms of maltreatment pose risk for health problems, or are certain forms of abuse or neglect especially likely to have a negative effect on later physical health? Moreover, the experience of a particular type of maltreatment (e.g., physical abuse) and its impact on later health may depend, in part, on the cultural context in which it occurs. For example, in cultures that condone corporal punishment, links between childhood physical abuse and later health may be less identifiable. These research questions await empirical examination.

Socioeconomic Disadvantage and Later Disease

The literature on the role of childhood socioeconomic disadvantage in shaping risk for later disease and mortality risk is extensive and suggests that, like early maltreatment, it is a risk for poor health outcomes in adulthood. In particular, low SES in childhood is a risk factor for early mortality, cardiovascular disease, diabetes, and some cancers (Cohen, Janicki-Deverts, Chen, & Matthews, 2010; Galobardes, Lynch, & Smith, 2004, 2008; Kumari, Head, & Marmot, 2004).

When studying the long-term health outcomes associated with childhood socioeconomic disadvantage, an important factor to consider is that SES tends to be stable across the lifespan (Hertzman, 1999). Such stability makes attempts to disentangle the effects of early versus adult SES on health particularly difficult. Given that adult SES is a robust predictor of morbidity and mortality from chronic diseases of aging (Adler & Rehkopf, 2008; Lynch & Smith, 2005), many studies of early childhood SES statistically control for adult SES in analyses, thus allowing for better insight into the role that early-life experiences play in influencing the risk for later disease. In order to avoid multicollinearity issues associated with highly stable childhood and adult SES estimates, recently researchers have developed statistical modeling techniques to better account for early and adult SES (e.g., Nandi, Glymour, Kawachi, & VanderWeele, 2012).

Socioeconomic Disadvantage and Cardiovascular Disease

In their systematic review of the literature on SES and cardiovascular disease, Galobardes, Smith, and Lynch (2006) concluded that low SES in childhood is a significant risk for cardiovascular disease in adulthood. Even when adult SES was controlled in statistical analyses, the link between childhood SES and disease risk was still significant, accounting for 20% to 40% of the risk for cardiovascular

disease. In a large-scale investigation of socioeconomic disadvantage and cardiovascular disease, Claussen, Smith, and Thelle (2003) found that cardiovascular disease-related mortality was associated with childhood SES. Similarly, researchers found evidence for the role of early socioeconomic disadvantage in predicting cardiovascular disease in the British Whitehall II study (Singh-Manoux, Ferrie, Chandola, & Marmot, 2004). Another study tracked the onset of coronary heart disease over a period of 40 years in a sample of physicians who graduated from medical school at Johns Hopkins University (Kittleson et al., 2006). Even among these educated, affluent physicians, childhood adversity was associated with worse health in adulthood. The rates of cardiovascular disease by age 50 were 2.4 times higher in physicians who were raised in households that were low versus high in SES. These findings offer dramatic evidence in support of a link between socioeconomic disadvantage and cardiovascular disease.

Socioeconomic Disadvantage and Metabolic Risk

A number of studies have examined the role of early socioeconomic disadvantage and risk for metabolic abnormalities, including the metabolic syndrome and diabetes (e.g., Agardh et al., 2007; Brunner et al., 1997; Kumari et al., 2004; Parker et al., 2003). Support for this link has been somewhat mixed, although the majority of studies have found at least some evidence of a link between early low socioeconomic standing and greater risk for metabolic disruptions later in life. For example, in the British Whitehall II Study, Kumari and colleagues (2004) found that low SES predicted higher incidence of diabetes relative to individuals with higher social standing. Using the same sample, Brunner and colleagues (1997) identified a link between SES and the metabolic syndrome. Similarly, in the Panel Study of Income Dynamics, a nationally representative prospective longitudinal study in the United States, Johnson and Schoeni (2011) found that poverty in childhood was predictive of diabetes almost 40 years later.

In one of the few prospective studies of socioeconomic disadvantage and metabolic risk, Melchior, Moffitt, Milne, Poulton, and Caspi (2007) found that low SES in childhood was associated with a cluster of risk factors at age 32 (e.g., elevated blood pressure, adiposity, glycated hemoglobin). This finding remained significant, even when accounting for familial liability, childhood IQ, adolescent health behaviors, and adult SES.

Recently researchers have incorporated sophisticated analytical techniques to separate the effects of early versus adult SES in the prediction of metabolic disorders. Using prospective data from the Health and Retirement Study, Nandi et al. (2012) used marginal structural models, a statistical approach that allowed them to estimate (a) the direct effect of early SES, (b) the direct effect of adult SES, (c) effects of early SES that are mediated by risk factors (e.g., blood pressure, smoking, alcohol consumption), and (d) the effect of early SES that is mediated by adult SES (referred to as a social trajectories model). By separately estimating these effects, Nandi and colleagues were able to test the relative contributions of early and adult SES on adult diabetes. Using this modeling approach, Nandi et al. found that early-life SES was associated with adult diabetes—an effect that was not accounted for by adult SES. Interestingly, when Nandi et al. used traditional regression analyses to compare the role of early and adult SES on later diabetes, the effects of early status were largely attenuated by adult SES. In other words, comparison of the findings across the two statistical strategies suggests that studies that employ commonly used regression-based approaches for estimating effects (e.g., Agardh et al., 2007) may have significantly underestimated the effects of early-life SES. Future studies should take advantage of these advancements in analytic techniques in order to more accurately estimate the relative contributions of childhood and adult risk factors.

Although these studies offer convincing evidence for a link between low SES and metabolic abnormalities, recent evidence suggests that certain protective factors might play an important role in buffering children from the deleterious effects of early-life adversity. For example, low SES in childhood was associated with higher prevalence of metabolic syndrome at midlife in the MIDUS sample (Miller, Lachman, et al., 2011). However, for individuals who recalled high levels of maternal support, low SES was not associated with metabolic syndrome at midlife. Interestingly, this pattern was not explained by upward social mobility, suggesting that maternal nurturance, and not the addition of material resources, served as a buffer against low SES. These findings are encouraging, as they suggest that early adverse experiences might be offset by protective factors; continued examination of protective factors will be an important area for future research.

Socioeconomic Disadvantage and Cancer

A small but growing body of evidence suggests that early-life socioeconomic disadvantage may play a role in the development of cancer in adulthood (e.g., Lawlor, Sterne, Tynelius, Smith, & Rasmussen, 2006; Power, Hyppönen, & Smith, 2005; Pudrovska, Anishkin, & Shen, 2012). In the Wisconsin Longitudinal Study, which prospectively studied individuals over the course of 50 years, low early-life

SES was associated with breast cancer. Similarly, in a prospective study of women in Great Britain (Power et al., 2005), trend-level associations between childhood social class and lung and stomach cancers emerged, even after controlling for health behaviors and adult social class. Additional research will be important to add further insight into the extent to which low SES in childhood is a predictor of cancer diagnosis in adulthood.

Summary of Research on Early Socioeconomic Disadvantage and Later Disease

The studies of socioeconomic disadvantage on later health outcomes have notable strengths compared with the maltreatment literature. They make use of large and representative samples across countries, use prospective designs, often have objective indicators of SES, and measure outcomes through medical records and health care databases (rather than self-report measures). Many of these studies control for plausible alternative differences in lifestyle factors, such as smoking, diet and exercise, and adiposity. The consistency of findings across countries suggests some universalism in the phenomenon and makes it unlikely that culture-specific factors (e.g., class-related differences in access to health care) are driving the findings.

Despite these more rigorous study designs, the literature linking early SES with adult physical health has some weaknesses that complicate interpretation and conclusion. For instance, these studies largely make use of observational data, which is understandable, given that individuals cannot be randomly assigned into poor environmental conditions. Further, the possibility remains that the observed links are due to unmeasured confounds, such as a common genetic liability that predisposes offspring to low SES and poor health. An additional limitation is that most of the studies are not fully longitudinal in that they do not assess childhood health during exposure to low SES (Cohen et al., 2010). Given that many of these disease endpoints (e.g., cardiovascular disease, stroke) are not observed in young children, assessment of the same health measures would not add incremental value to the study designs. Nonetheless, assessment of general physical health would help address the possibility that poor children start out life sicker than more affluent children, affecting both their parents' earning potential and their own long-term health.

A handful of studies have capitalized on naturally occurring fluctuations in societal economic conditions to examine the impact of early-life resources on later physical health outcomes (e.g., van den Berg, Doblhammer, & Christensen, 2009; van den Berg, Doblhammer-Reiter, & Christensen, 2011). One advantage of these naturalistic experiments is that researchers can be fairly confident that a genetic liability is unlikely to be the cause of any observed connections between the adverse experience and physical health outcomes. Further, these studies still can be useful in documenting links between adverse experiences and later health problems, particularly when there are children from the same cohort who were not directly affected by the event (e.g., Heijmans et al., 2008). Moreover, given that the unusual event is due to random and external forces, these studies minimize the likelihood that unknown spurious factors (e.g., personality traits) explain the link between early exposure to adversity and later physical health problems.

For instance, children who were born under adverse economic conditions in Denmark between 1873 and 1906 had higher mortality rates from cardiovascular disease than their peers who were born during more prosperous economic cycles (van den Berg et al., 2011). Further, van den Berg and colleagues (2011) reported that individuals who were born during a recession (and survived until at least age 40) lived, on average, *11 months* less than other individuals born during an economically prosperous time, providing evidence that economic circumstances early in life may have a lasting effect on health outcomes.

Not all studies of fluctuating economic conditions and long-term physical health have found support for this hypothesis, however. Cutler, Miller, and Norton (2007) did not find evidence of a link between economic fluctuations and physical health outcomes later in life in a sample of Americans who were born during the Great Depression. The detailed analysis of the Danish sample might shed light on why links between early-life economic circumstances and long-term health were not found in the U.S. study. In Denmark, the negative impact of economic adversity varied as a function of the community size: It was substantially less dramatic in major cities, such as Copenhagen, relative to smaller towns, where fewer resources were available. Similarly, individuals who lived in rural areas—with smaller communities of individuals who might take a more proactive approach to caring for each other—were similarly less affected than individuals who lived in midsize towns. It may be that a lack of early-life economic resources can be offset by community-level support systems, just as early-life socioeconomic adversity within the family appears to be mitigated by maternal support (e.g., Miller, Lachman, et al., 2011). Cutler et al. (2007) did not examine whether the link between early economic adversity and adult health varied based on the degree of urbanization in U.S.

communities, which may have obscured these possible community effects.

Other Forms of Adversity and Later Disease

To date, the epidemiological literature has provided some evidence that maltreatment and socioeconomic disadvantage may set the stage for a range of health problems in adulthood. Much less is known, however, about the extent to which other forms of adversity in childhood are risk factors for chronic diseases in adulthood. Of course, maltreatment and socioeconomic disadvantage are not the only forms of adversity that many children face that may shape the course of their long-term health trajectories. Next we briefly review evidence from several studies that have identified connections between other childhood adversities and later health outcomes. We note that these findings should be viewed as preliminary and will require further investigation in large, representative samples.

Parental Death and Later Disease

The death of a parent—resulting in the loss of an attachment figure—is widely regarded to be a profound stressor for children (e.g., Bowlby, 1980; Luecken & Roubinov, 2012). Studies have documented the risk for immediate and long-term mental health problems following parental death (e.g., Kivelä, Luukinen, Koski, Viramo, & Kimmo, 1998), but only recently have investigations studied the physical health consequences associated with parental loss in childhood. In an epidemiological study of women, Jacobs and Bovasso (2000) found that women who experienced the death of their mother in childhood were at increased risk for breast cancer. In another study, Krause (1998) examined early parental loss as well as recent life stressors in a national study of older adults. Although early parental loss alone was not associated with later disease, the interaction between parental loss and *current* stress levels predicted self-reported health and reports of acute conditions, including cancer, diabetes, and cardiovascular disease. In this case, the loss of a parent served as a vulnerability factor, and the addition of a current stressor increased the likelihood that individuals would have poor health outcomes. As we discuss in the next section, diathesis–stress models can add insight into links between early adversity and physical health, and they can shed light on specific contexts (e.g., stressful periods of life) and specific individuals (e.g., those who lost a parent in childhood) who might be especially prone to early onset of disease. Other studies, however, have not found links between early parental loss and later physical health (e.g., Maier & Lachman, 2000). When main effects do not emerge, it may be informative to examine whether there might be moderating factors that specify which individuals are most at risk, as Krause (1998) found.

Interparental Violence and Later Disease

To date, most studies examining the aftereffects of interparental violence on children's long-term outcomes have focused on emotional and behavioral problems (e.g., Hammen, Henry, & Daley, 2000), and little is known about how these early experiences might be associated with long-term physical health problems. The large-scale Adverse Childhood Experiences study (Felitti et al., 1998) included interparental violence in the cumulative risk assessment for adverse childhood experiences, but they did not examine the unique role that interparental violence played in contributing to long-term physical health problems. Several studies have reported links between individuals' exposure to interparental violence as children and self-rated health problems in adulthood. In a large-scale European sample of adults (Roustit et al., 2011), the odds of having poor self-reported physical health were 2.3 times greater if participants reported exposure to interparental violence in childhood. This preliminary evidence suggests that exposure to interparental violence in childhood may be a risk factor for the early onset of disease in adulthood, but additional research is needed to better understand the role of interparental violence in contributing to later disease. Further, studies that incorporate disease diagnosis rather than self-reports of health will be helpful for establishing support for a link between intimate partner violence and chronic disease.

Evidence from the study of children's short-term health outcomes associated with exposure to severe interparental conflict adds support to the idea that interparental violence may also be a risk factor for chronic health problems in adulthood (see Troxel & Matthews, 2004, for a review). Like much of the research on links between maltreatment and later physical health, this literature relies heavily on cross-sectional study designs and self-reports of physical health. Nevertheless, the evidence is compelling enough to warrant further examination of the role of interparental conflict in violence in contributing to long-term physical health problems later in life.

Extended Parental Absence and Later Disease

Some children encounter periods when their parents are absent for an extended period of time (e.g., military families where parents are deployed, families where a parent is imprisoned). Such long-term separations from

parents in childhood have been associated with long-term mental health problems, such as depression (Pesonen et al., 2007). Less is known about how these extended separations might be linked to later disease outcomes. Some naturalistic evidence from World War II suggests that long-term parental separation may be associated with physiological stress activity in late adulthood (Pesonen et al., 2010). During World War II, approximately 70,000 children were separated from their parents and sent to live in foster care to escape the dangers of war. Many of these children were separated from their parents for several years. Pesonen and colleagues (2010) found that adults who had been separated from both parents as children had higher average salivary cortisol and greater salivary cortisol reactivity during a laboratory stress task relative to adults who had not experienced long-term parental separation in childhood. Given the large numbers of children who experience lengthy parental separations due to ongoing military deployments and divorce, there is a need to examine what impact, if any, such disruptions in the parent-child relationship will have on long-term health outcomes.

Natural Disasters and Later Disease

Natural disasters, including hurricanes, tsunamis, tornadoes, earthquakes, and drought, result in dramatic disruptions to daily life. These disruptions range in severity from temporary setbacks to major transformations, including displacement and loss of one's home, inadequate access to food and other basic necessities, and uncertainty about the future. In some ways, natural disasters differ from exposure to some of the other adversities that have been a focus of this chapter, in that the cause of the distress is often not traceable back to poor parental care or disparities in resources. At the same time, however, the aftereffects that could result from living through a natural disaster may resemble the consequences of stressors that co-occur with poverty and maltreatment.

Several studies have documented the ways in which physical health can be affected in the short term by exposure to natural disasters. For example, in 1995, Japan experienced a 6.8-magnitude earthquake near Kobe, resulting in the loss of over 6,000 lives and leaving over 300,000 homeless. Following this disaster, there was a threefold increase in heart attacks and twofold increase in strokes, particularly for individuals who lived close to the epicenter (Kario, McEwen, & Pickering, 2003). These findings offer compelling evidence suggesting that natural disasters create enormous stress for individuals that might have serious health implications. To date, however, evidence for the long-term health impacts for individuals who endured natural disasters as children has been lacking. Further, although evidence suggests that children experience physical health problems in the months following a natural disaster (Datar, Liu, Linnemayr, & Stecher, 2013), the long-term effects of these stressful experiences still are largely unknown.

War and Later Disease

The immediate effects of war cause significant stress on children and their families. Children may face daily threats of violence, loss of loved ones, and fears about the future. In some cases, the effects of war have long-ranging influences on daily life, including reduced access to resources and basic necessities. For example, during World War II, a German blockade cut off the food supply to a large area of the Netherlands during the winter of 1944–1945. This tragic event provided the rare opportunity to examine the connection between starvation during pregnancy and long-term health outcomes of offspring affected by the war-induced famine (de Rooij, Wouters, Yonker, Painter, & Roseboom, 2010). Exposure to famine and malnutrition prenatally has been linked to Type 2 diabetes, cardiovascular disease risk, other metabolic abnormalities, and even breast cancer in adulthood (Barker & Clark, 1997; de Rooij et al., 2010; Painter et al., 2006; Painter, Roseboom, & Bleker, 2005; Rich-Edwards et al., 1999).

Findings from survivors of World War II suggest that exposure to wartime stressors may be associated with elevated rates of cancer. In one study, cancer rates were elevated in European-born immigrants who immigrated to Israel before or during the war (Keinan-Boker, Vin-Raviv, Liphshitz, Linn, & Barchana, 2009). The largest effects emerged for people born between 1940 and 1945, who would have been exposed to horrific conditions before age 5. Their cancer risk was elevated 3.5-fold relative to same-aged immigrants who arrived in Israel before the war.

Like the experience of socioeconomic disadvantage and maltreatment, these adversities described are likely to expose children to chronic, stressful circumstances, with lingering threats of repeated exposure to the stressor (e.g., lasting concerns of repeated interparental violence) and aftereffects resulting from the stressor (e.g., loss of all resources as a result of a natural disaster). To date, these adversities have not been examined extensively in relation to long-term health outcomes. As we develop a better understanding of the ways in which early adversity predicts later health outcomes, it will be important to understand the characteristics and contexts of early adversity that are most likely to contribute to poor health. Increased

specificity about the types of adversities that influence health will help researchers and policymakers focus efforts on mitigating the risks that are most likely to contribute to chronic disease.

Limitations and Alternative Explanations

Although the evidence linking early adversity to physical health is provocative, there are a number of weaknesses to this research that preclude a definitive interpretation. For example, many of the studies rely on one-time assessments, during which early stress and later health are measured via retrospective self-report. Understandably, this methodology raises concerns about the reliability of reporting, which would be particularly problematic if reporters are systematically biased in their assessments of early adversity and adult health. Some evidence suggests, however, that adults underreport negative experiences from childhood (Dill, Chu, Grob, & Eisen, 1991). Another concern is that these studies may reflect differences in the *reporting* of health problems as a function of early adversity, rather than real differences in the manifestation of disease. Notably, however, many studies—particularly studies linking socioeconomic disadvantage to later health outcomes—utilize medical records and physician diagnoses, thereby eliminating informant bias in symptom reports (e.g., Felitti et al., 1998; Rich-Edwards et al., 2012).

Yet another possibility is that genetic confounds might play a large role in creating the observed connections between early adversity and physical health. For example, there could be a familial genetic liability that contributes to abusive parenting and disease vulnerability. Or it could be the case that the direction of effects is wrong. For instance, a sick child can accumulate enormous medical bills, not to mention chronic stress on caregivers and other family members. The net effects of expensive medical care and lost earnings due to time spent caring for sick children might result in low SES in adulthood. A handful of studies have controlled for child sickness (e.g., Caspi et al., 2002), but this practice needs to be adopted more widely before we can definitively rule out this alternative explanation.

Using Animal Studies to Supplement Epidemiological Evidence

In light of the fact that it would be unethical and impractical to experimentally manipulate early human experiences or exposure to pathogens in adulthood, it is difficult and perhaps impossible to evaluate whether early adversity causally influences adult disease in humans. However, studies of this nature can be done with animals, and it is useful to consider how these studies have informed our understanding of connections between early adversity and adult physical health. In this section, we describe some of the findings that have emerged from experimental studies with animals that bolster support for the findings from epidemiological studies with humans.

Evidence from studies using experimental manipulations with animals suggests a causal link between early adversity and health outcomes. Animal models often provide good mechanistic evidence relating psychosocial risk factors to physical health. Unlike humans, animals can be randomly assigned to psychologically difficult circumstances and monitored over time to determine whether these stressful experiences influence disease outcomes. Further, questions about the effects of the relative timing of adverse experiences (e.g., early infancy versus later childhood) can be addressed by manipulating the onset of the stressor and examining differences in later health consequences associated with these timing differences. Often findings from animal studies converge with correlational evidence from human epidemiologic research.

Hofer's (2002) observations that rat pups responded with significant distress when separated from their mothers—similar to distress signals in humans—raised questions about the mechanisms of separation distress in nonhuman mammals. To explore this question, Hofer conducted a series of experiments to identify what physiological subsystems become disrupted when mothers were removed from their pups (for a review, see Hofer, 2002). These studies revealed a number of hidden regulators that no longer functioned properly if rat pups were separated from their mothers. Hofer found that when rat pups were removed from their mothers, they showed a dramatic decline in multiple physiological and behavioral systems, such as those controlling heart rate, body temperature, food intake, movement, and exploratory behavior. Hofer argued that maternal separation resulted in the removal of the important regulatory functions that the mother serves for her offspring, and the absence of these regulatory components resulted in rat pups' visible behavioral distress. These studies led Hofer to conclude that mother-infant interactions have embedded within them a number of vital physiological regulatory functions that are negatively affected by separation from maternal care.

In this regard, animal studies have some parallels to the experiences of children in poverty or unsupportive caregiving environments. On the whole, children exposed to these stressors receive less sensory, cognitive, and emotional stimulation and are more likely to be deprived of basic necessities, such as food and heat, than children growing up

without extreme adversity (e.g., Evans, 2004). That said, it is difficult to know how closely these deprivation studies in animals actually resemble human experience. Permanent maternal separation and extreme sensory deprivation are relatively uncommon in humans, even in families where maltreatment and disadvantage are present. At best, what these animal studies model is extreme and unusual human stress. Species differences in developmental growth are another major challenge in translating conclusions from animal studies to meaningful information for human development. At the time of birth, rodents are much less mature than humans. As a result, their physiology may need external regulation by caregivers in a manner that is not comparable to full-term human newborns.

These caveats aside, a number of studies indicate that premature separation can have long-term effects on animals' susceptibility to disease. In one study, mice pups were separated from their mothers for 6 hours a day over the first 2 weeks of life (Avitsur, Hunzeker, & Sheridan, 2006). As adults, the mice were challenged with intranasal exposure to an influenza virus. Compared to controls that remained with their mothers until weaning, the separated mice had greater viral replication and worse symptoms of infection, which was a result of an overly aggressive inflammatory response to the virus. Moreover, the proinflammatory response was present 9 days after the infection, a time when viral particles had declined to the point of being almost undetectable. These findings suggest that early stress calibrated the immune system to mount overly aggressive and extended inflammatory responses to the virus.

In another study, rats endured a stressful situation at 100 days of life (corresponding to early adulthood in humans). In order to obtain food and drink over a 4-day period, rats incurred electric shocks (Ader, Tatum, & Beels, 1960). Nearly all of the rats developed gastric ulcers following this stressful experience. However, the density of these ulcers was fivefold greater in rats that had been prematurely separated from their mothers at 15 days of life. In a follow-up study, a third group was added to evaluate whether nutritional disparities accounted for the health effects of the maternal separation manipulation. To test this hypothesis, rat mothers were removed from her offspring at 15 days, had their nipples cauterized to prevent nursing, and then were returned until 21 days. The median number of ulcers in this group was similar to the control condition. Because both groups in which the mother remained present had significantly fewer ulcers than the prematurely separated and weaned rats, these findings suggest that the effects were due to the absence of maternal nurturance rather than nutritional deficiencies per se (Ader, 1962).

There also has been mounting interest in early-life influences on asthma in animal models. In one study, mice were randomized into one of three conditions: In one condition, they received regular footshocks for 1hr on 3 days during the fourth week of life; in another condition, mice watched and heard other mice undergo this experience but were not shocked themselves; and in the third condition, the mice were undisturbed in their home cages (Chida, Sudo, Sonoda, Hiramoto, & Kubo, 2007). When the mice reached young adulthood (at 8–10 weeks of life), they were sensitized to ovalbumin, a protein in eggs that causes allergic reactions. At 11 weeks, all mice were given airway challenges with ovalbumin. Relative to controls, those mice that received or observed footshocks showed greater airway inflammation and more bronchial reactivity to the challenge. Similar patterns were observed in another study of rats that, over the first month of life, were either separated from their mothers daily for 2 hours and then reunited or remained undisturbed in their home cages (Kruschinski et al., 2008). When the rats were adults, asthma was induced by sensitizing subjects to ovalbumin, and airway tissue was collected. Analyses revealed striking differences. Adult rats that had been repeatedly separated from their mothers early in life showed more severe airway pathology than adult controls, with increased numbers of eosinophils, T-cells, and other proinflammatory mediators found in their lungs upon dissection.

Summary

Collectively, these studies provide evidence to support the notion that early adversity has long-term effects on physical health. To be sure, more work needs to be done to definitively rule out alternative explanations and clarify what the associations reflect in terms of underlying pathophysiology. But the weight of the evidence, from observational data and natural experiments in humans and randomized studies in animal models, leads us to conclude that there is evidence indicative of a causal effect. With that said, increased precision in the definition and assessment of early adversity and adult health will aid in our understanding of how and under what conditions early adversity leads to later health problems. This increased specificity in measurement will provide insight into what characteristics and contexts of early adversity prove to be most detrimental for physical health outcomes. Further, increased attention to whether there are protective factors that can mitigate the risk associated with early adversity and what mechanisms put people on a trajectory from

early adversity to poor health across development will be an important direction for future research.

CONCEPTUAL MODELS LINKING CHILDHOOD ADVERSITY TO ADULT PHYSICAL HEALTH

Researchers have long recognized that no single risk factor can account for all chronic diseases of aging, and research on the early origins of adult physical health outcomes has supported the notion that there are multiple pathways linking early experience to adult disease (e.g., Felitti et al., 1998; Miller et al., 2011; Taylor, Repetti, & Seeman, 1997). Yet to date, much research on the experience of early adversity and adult health has explored risk factors in isolation without consideration of the broader context in which the risk factors occur. Moreover, despite an interest in the impact of early adverse experiences on later health, existing studies have not thoroughly examined the relative timing of adverse experiences. Evidence from other areas of developmental research suggests that meaningful critical and sensitive periods constrain the impact of early experience on later outcomes (e.g., Knudsen, 2004), and it stands to reason that similar sensitive periods may constrain the impact of early adversity on long-term physical health outcomes as well.

Given that chronic disease is a multiply determined phenomenon, it is useful to clarify the complex pathways from childhood adversity to adult physical health by testing larger conceptual models that integrate multiple risks across multiple time points. In this section, we review several theoretical models that can be used to guide the investigations of connections between early-life adversity and adult physical health. Many of these models take into account the notion that multiple factors contribute to physical health outcomes; further, these models describe processes through which intervening factors (e.g., buffers, vulnerability factors) can alter individuals' health trajectories over time, leading to endpoints that may not have been expected, given individuals' starting points. These models provide a foundation for clear, testable hypotheses about the processes through which early adversity contributes to disease risk.

Cumulative Models

In contrast to models that examine a single risk factor in isolation, cumulative risk models provide a testable framework for studying how risk factors operate in the context of other risk factors to influence later health outcomes. Cumulative models of risk focus on the accumulation of risk factors and on how an increase in the number of risk factors an individual is exposed to might translate into an increase in risk for poor functioning (Sameroff, 2000). In other words, cumulative models predict that as the number of risk factors increases, there is an increase in the likelihood of poor outcomes. Two types of cumulative risk models, described next, offer variations in the hypotheses about how the presence of additional risk factors might be associated with poor physical health outcomes in adulthood.

Linear Risk Models

One type of cumulative risk model is a *linear* model, which emphasizes that each increase in early risk is associated with significantly greater risk for later disease. Two key assumptions go along with this model. First, one must assume that each adverse experience conveys more or less equal risk in shaping health. Linear models do not place any weight on the *relative severity* of risk factors. Instead of focusing on the characteristics of the risks, linear models focus on the *quantity* of risk factors. The second assumption of this model is that the various adverse experiences are nonredundant in their ability to predict later health. In other words, each risk factor creates additional strain or burden on individuals in a way that leads to worse health in adulthood. Although some early adverse experiences, such as neglect and poverty, may lead to the same specific deficit in access to resources (e.g., poor or neglected children may struggle to receive adequate food and health care), according to a linear risk model, an individual who is poor *and* neglected would have worse health outcomes than an individual who is poor but *not* neglected.

Support for a linear risk model comes from a recent study by Evans and Kim (2012), who examined the role of cumulative risk exposure as a predictor of markers of physiological wear and tear (i.e., allostatic load, a biological marker described in more detail in the next section). In this study, researchers created an index of cumulative risk exposure score by summing across items about physical risk (e.g., noise, housing problems) and psychosocial risk (e.g., violence in the home). Evans and Kim found that cumulative risk exposure at age 13 was a predictor of allostatic load at age 17. These findings are particularly notable because the markers of wear and tear (including measures of endocrine, cardiovascular, and metabolic functioning) were measured while participants were still young (i.e., during adolescence), so it will be important to examine whether cumulative risk exposure predicts individuals' accelerated aging and chronic disease later in life.

Threshold Risk Models

Threshold risk models, like linear risk models, focus on the number of risk factors present. Unlike linear risk models, however, threshold models predict that only after people experience a certain number of adverse experiences will their risk for poor health increase. Once people pass this threshold, they are likely to experience health problems. In this way, threshold models allow for the experience of some adversity without necessitating that each exposure to stress must lead to later health problems, as is the case in linear models. In other words, for every health outcome, there is some tipping point at which early adversity poses a serious risk for poor health. Moreover, at this tipping point, risk factors may have synergistic properties, such that the combined effect of the risk factors is much worse than the sum of each risk factor in isolation.

Some of the best evidence for threshold risk models comes from the Adverse Childhood Experiences study, which examined over 9,000 individuals who were enrolled in a large insurance health maintenance organization (Felitti et al., 1998). Participants completed self-report assessments about 17 adverse experiences that may have occurred in childhood, including abuse, violence, and parental mental illness. These experiences were categorized into seven domains of adversity, and participants received a total score indicating the total number of domains in which they were exposed to risk. This cumulative risk score was then used to predict physician-diagnosed diseases. As predicted, early adversity was associated with heart disease, cancer, and strokes. Interestingly, however, individuals were at increased risk for these diseases only when they reported four or more adverse experiences. When participants reported three or fewer adverse experiences, they were not at increased risk for these diseases.

Notably, in many studies, adverse experiences cluster together more than one would expect by chance (Crouch et al., 2000). This pattern of clustered risks may explain some of the observed threshold findings. For example, one risk in isolation might reflect circumstances that are beyond the control of caregivers (e.g., single parents in poverty may have limited abilities to raise their social status). Children who experience poverty but not maltreatment, parental psychopathology, or other serious risks may grow up in an environment that is lacking in material resources but otherwise stable and conducive to healthy development. These children may in fact be shielded from some of the most toxic aspects of poverty. Despite their economically stressed conditions, they would have access to a supportive caregiver who is reliable and responsive to their needs. In contrast, children who are exposed to many adverse experiences might endure chaotic, unsupportive family contexts that are ill-equipped to meet the needs of growing children. For these children, who face a multitude of risks, it is quite possible that their total exposure to stress is well beyond the sum of each stress alone; such multiplicative effects can be identified with threshold models.

In summary, both linear and threshold cumulative models offer a heuristic for explaining the role of early adversity in shaping later health. These models suggest that risk is best captured at the level of total exposure to risk, with the general framework that greater exposure to adversity will translate to more physical health problems in adulthood. These models do not differentiate between different *domains* of risk exposure (e.g., abuse from primary caregivers, neighborhood violence, access to resources); instead, these models posit that adverse experiences across domains will exert a negative influence on long-term health outcomes. In addition, these models typically do not take into account the timing of exposure to adversity, which limits researchers' ability to examine whether there are sensitive periods in which the experience of early adversity is most likely to translate into health problems in adulthood. Further, cumulative models explicitly ignore the relative severity of risk factors; as such, these models can be viewed as relatively crude approaches to defining risk. Yet despite this somewhat unsophisticated approach to quantifying adversity, many researchers have found strong evidence for cumulative risk models in the prediction of chronic disease outcomes in adulthood.

Diathesis–Stress Models

One question of great interest to developmental psychopathologists focuses on why some individuals seem to be at greater risk than others for poor functioning (Shonkoff & Phillips, 2000). One popular approach to answering this question is through testing of diathesis–stress models (e.g., Ingram & Luxton, 2005). In these models, a particular risk factor (e.g., poverty) is associated with poor outcomes only for individuals who have some sort of vulnerability, which might include a genetic risk factor, temperamental quality, or other personality characteristic. These vulnerability factors increase individuals' susceptibility to the negative effects of adversity. This model can be useful in examining connections between early exposure to adversity and adult health by focusing on whether there are specific individuals for whom stressors might be most likely to lead to poor health outcomes as a result of their early experiences.

To date, most diathesis–stress studies of vulnerability to early adversity have focused on adult mental health outcomes (e.g., Moffitt, Caspi, & Rutter, 2006). Recent evidence suggests that diathesis–stress models will be useful in future examinations of the links between early adversity and physical health. Brody and colleagues (2013) examined the family emotional climate in early adolescence and two gene polymorphisms (the short allele of the 5-HTTLPR gene and 7+ repeat of DRD4) as predictors of allostatic load in early adulthood. These two genetic polymorphisms were of particular interest because they have been suggested to confer sensitivity to family environments (e.g., Bakermans-Kranenberg & van IJzendoorn, 2011; Belsky, Bakermans-Kranenberg, & van IJzendoorn, 2007). Brody et al. found that individuals who had the short allele for 5-HTTLPR and 7R allele for DRD4 and who were exposed to less supportive family environments had greater allostatic load (a composite measure that included body mass index (BMI), blood pressure, and neuroendocrine functioning) relative to individuals without both "sensitivity" alleles. Individuals with these same alleles but living in supportive family environments did not have elevated allostatic load. Further, the quality of the family environment was not directly associated with allostatic load. These findings are provocative in suggesting more nuanced ways that family experiences might confer risk for allostatic load for certain individuals with particular genetic vulnerabilities. This line of research is still in its infancy; additional work is needed to better understand what vulnerability factors (e.g., genetic liabilities, temperament) best identify individuals for whom early adversity is most likely to be associated with poor health in adulthood.

Differential Susceptibility

In contrast to diathesis–stress models, models of differential susceptibility posit that vulnerability sources actually are better viewed as *plasticity* factors that magnify the risk for poor outcomes in adverse conditions and amplify the likelihood of positive outcomes in more supportive environments (Belsky, 1997; Belsky et al., 2007; Ellis, Boyce, Belsky, Bakermans-Kranenberg, & van IJzendoorn, 2011). Theories of differential susceptibility, including Belsky's (2005) differential susceptibility theory and Boyce and Ellis's (2005) biological sensitivity to context theory, are similar to diathesis–stress models in that they predict that certain individuals with particular characteristics (e.g., genetic predispositions, temperaments) will be more negatively affected by unsupportive environments relative to other individuals who have different genetic or temperamental characteristics. At the same time, however, differential susceptibility models assert that the traits that put some individuals at risk for exponentially worse outcomes also predispose the same individuals to better-than-expected outcomes given supportive contexts, leading researchers to argue that these individuals are both "for better and for worse," depending on their environment (Belsky et al., 2007, p. 300). Like diathesis–stress models, differential susceptibility models may be useful as a way of documenting why some individuals are more adversely affected than others by exposure to harsh conditions in early life. Differential susceptibility models take this idea a step further, however, by suggesting that the same individuals who flounder in adverse conditions may be ones who would thrive in more supportive contexts.

Evidence for differential susceptibility has been found for the prediction of a variety of outcomes, including mental health and behavior (for a review, see Belsky & Pluess, 2009), but to our knowledge, no evidence has been documented for differential susceptibility in studies of early adversity and adult physical health. Notably, however, it was Boyce et al.'s (1995) observations of children's illness rates that motivated the theory of biological sensitivity to context. In this study, highly reactive children had the *lowest* rates of illness in supportive environments and the *highest* rates of illness in unsupportive environments. Thus, it seems reasonable to predict that similar models of differential susceptibility will be evident in the study of early adversity and adult physical health.

Buffering Models

Similar to diathesis–stress models, buffering models help clarify the specific contexts in which risk factors are associated with poor outcomes. The main difference, however, is that buffering models uncover *protective* factors that can help mitigate the negative effects associated with early risk (e.g., Chen Miller, Kobor, & Cole, 2011; Miller, Lachman, et al., 2011). These models offer great starting points for the development of interventions; once a protective factor has been identified, interventions can target this domain with the goal of minimizing the negative outcomes associated with risk.

For example, as mentioned earlier in this chapter, Miller and colleagues (2011) examined the connection between early SES and metabolic syndrome at midlife and found that maternal care served as a buffer, such that individuals from poor backgrounds who experienced high levels of maternal nurturance were not at risk for metabolic syndrome. Given that many of the early

adversities that children face are difficult to resolve quickly (e.g., poverty is a chronic and pervasive form of adversity), efforts to uncover buffers that can lessen the negative impact of adverse experiences may prove to be particularly instrumental from a public health perspective.

Developmental Trajectory Models

One of the core themes of development is the notion that individual differences exist across development (Shonkoff & Phillips, 2000). Waddington (1957) argued that early in development, organisms have a range of possible developmental pathways (what Waddington called the epigenetic landscape). Over time, these pathways become more constrained and deterministic as a function of increasing constraints and limitations on the developing system. Further, the developing behaviors and systems become more canalized and resistant to change over time. According to Waddington, changes in the developmental trajectory are most likely to occur at decision points—transition periods with multiple options for the subsequent course of development. This theory proposes that major deviations from normative development early in life (e.g., child neglect) would lead to major changes in expected outcome (in this case, physical health) relative to minor deviations that take place at later points in development. Waddington's ideas about developmental pathways became the foundation for many theories that sought to explain variation in developmental trajectories.

Developmental trajectory models posit that there is a progressive pruning of possible pathways across development, an idea that is consistent with other developmental theories that emphasize the importance of early critical or sensitive periods in development (e.g., Bowlby, 1973; Shonkoff & Phillips, 2000). The issue of sensitive periods has been relatively unexplored in relation to early adversity and adult physical health. There is an assumption that early childhood represents a sensitive period in which adverse experiences have a disproportionately large influence on health trajectories, but empirical tests of this idea have been lacking. Is early childhood a unique time for the development of long-term health problems? Might there be other periods of development—such as adolescence—in which exposure to adversity is likely to confer greater risk for health problems?

Some evidence suggests that each exposure to adversity at different developmental periods confers risk for poor health outcomes (e.g., Singh-Manoux et al., 2004). Other evidence, however, suggests that experiences in infancy and early childhood are particularly potent for the long-term risk for infectious disease (e.g., Cohen, Doyle, Turner, Alper, & Skoner, 2004). For example, Cohen et al. (2004) examined adult participants' reactions to virus exposure as a function of early-life socioeconomic conditions. Following intranasal exposure to rhinovirus, participants were monitored for cold symptoms. As hypothesized, childhood SES was associated with cold systems. Notably, the strongest effects were found for SES at the earliest ages of measurement (12–24 months), with a progressive decline in the strength of the connection between SES and susceptibility to colds when examining later-childhood and adolescent family SES.

Evidence from some animal studies suggests that there may be windows of development in which stressful experiences lead to biological tendencies (e.g., Meaney & Aitken, 1985) and health outcomes (e.g., Ackerman, Hofer, & Weiner, 1975). These kinds of developmental timing studies are difficult to conduct in humans; intervention studies and the use of naturalistic experiments can help identify whether there are particular periods in development during which individuals are especially sensitive to exposure to adverse conditions.

Waddington's epigenetic landscape can be used to explain the processes involved in two developmental trajectory models (described in the next two subsections). These models document the processes through which development unfolds over time in a nonlinear pattern and can help explain how (a) individuals with different backgrounds and risk exposure experience the same physical health problems later in life and (b) how individuals with the same risk exposure ultimately experience dramatically different outcomes in adulthood. These models can serve as useful guides for understanding the complex ways in which early childhood adversity can contribute to adult physical health.

Equifinality

As we have already discussed, there is evidence linking early adversity to cardiovascular disease, diabetes, and a number of other chronic diseases of aging. One question that arises when looking at the links between adversity and health is: How do different adverse experiences—many of which are nonoverlapping experiences—lead to the same poor health outcomes? What happens across development that leads individuals with different backgrounds ultimately to share the same chronic diseases? Models of *equifinality* document the process through which different starting points in development may lead to the same outcome (Cicchetti & Rogosch, 1996). As Waddington (1957) theorized, individuals will vary in their developmental

trajectories, in part because of variations in choices and conditions at key decision points that shape subsequent experiences. As such, it is possible that a complex series of decisions made across the early years of life will set into motion a series of developmental trajectories that share a common endpoint (e.g., diabetes, cardiovascular disease). It may be that even though individuals from impoverished or abusive backgrounds experience different day-to-day stressors in childhood, the consequences of such stressful experiences may have the same effect on physiological regulatory systems, coping and regulation of emotional distress, and health behaviors that shape the course of disease.

For example, early adversity—whether such adversity includes maltreatment or poverty—may cause individuals to be vigilant toward threatening information in the environment and mistrusting of others. These characteristics shape the manner in which people engage their social worlds, making them more likely to elicit conflict and rejection and less likely to garner warmth and support. The experience of early adversity may shape success in forming and keeping long-term, high-quality relationships. Early adversity also is associated with poor self-regulation and coping skills, wherein the future is highly discounted in favor of immediate gratification, including engagement in risky or unhealthy lifestyle behaviors (e.g., high-fat diets, excessive alcohol consumption, drug use). Over time, these proclivities and experiences exert wear and tear on the body, with potential repercussions for disease outcomes. Thus, even though two individuals may have had unique starting points and sources of adversity (e.g., poverty versus abuse), they may come to share the same chronic health problems in adulthood because of a series of events across the life span that constrained their development and shaped their progression toward disease (Cicchetti & Rogosch, 1996; Miller et al., 2011).

Multifinality

Like models of equifinality, the focus of multifinality models is on the trajectories that explain developmental processes and how unique experiences can change the long-term path toward health or disease. Of course, not all individuals are affected in the same way by the experience of early adversity. Multifinality models help explain how individuals with similar starting points (e.g., growing up in poverty) develop varied outcomes over time (Cicchetti & Rogosch, 1996). These models can be particularly informative for understanding the different mechanisms that explain how individuals who share common adverse experiences in childhood face unique health problems decades later.

Individuals can take different trajectories for a number of reasons. For example, intervening factors can offset negative trajectories, as illustrated in tests of buffering models (e.g., Miller, Lachman, et al., 2011). In these cases, individuals who experience adversity do not go on to develop poor health outcomes because something in their development (e.g., a supportive parent, a new role model) changed the course of their trajectory. Similarly, as discussed in models of diathesis–stress and differential susceptibility, individuals might possess vulnerability or plasticity factors (e.g., genetic liabilities, temperamental traits) that explain why some individuals are more adversely affected by negative environments than others (e.g., Brody et al., 2013). Further, evidence for multifinality can emerge when individuals who are exposed to the same adversity go on to face different disease outcomes in adulthood (e.g., heart disease versus cancers versus autoimmune disease). In this case, the nature of the disease endpoint may differ across individuals for a variety of reasons (e.g., genetic predispositions), but disease morbidity can be traced back to the same initial stressor.

Developmental Cascades

Another model of development emphasizes the possibility that early experiences may influence the development of subsequent systems or domains (Masten & Cicchetti, 2010; Rutter & Sroufe, 2000). These developmental cascade models are particularly useful in depicting the connections between early experience and later adaptation (or maladaptation), particularly when the causal explanation for such a link is unclear. These models explain how problems in one domain of functioning (e.g., physical abuse in the parent-child relationship) can spill over into other areas of functioning (e.g., poor lifestyle behaviors) across development. Methodologically, researchers measure multiple domains of functioning across several time points (usually at least three of each; Masten, Burt, & Coatsworth, 2006). Analytically, cascade models control for the longitudinal stability of each domain while also including the cross-lagged paths across domains to test the extent to which one domain of functioning is influencing another. Developmental cascade models might provide insight into how it is possible that detrimental effects resulting from early experiences of childhood adversity might lie relatively dormant for decades, only to emerge as experiences of chronic disease in mid- and late adulthood. For example, the experience of adversity in childhood is unlikely to transform immediately into cardiovascular disease or other chronic diseases of aging. Nevertheless, as

described earlier in relation to individuals' developmental trajectories, exposure to early stressors might influence children's health behaviors, interactions with others, and outlook for the future. These subtle intervening steps along the path from early adversity to adult health would represent instances in which early exposure creates a cascade of aftereffects, which reverberate biologically across numerous systems and ultimately lead to chronic diseases in adulthood. In this way, cascade models can identify the steps along the progression from early adversity to later physical health problems.

Although these models have become quite popular in identifying spillover effects associated with mental health problems and social functioning (e.g., Bornstein, Hahn, & Haynes, 2010), cascade models have been underutilized in investigations of early adversity and adult physical health, in part because longitudinal studies are needed with multiple waves of assessments of adversity and health. Another difficulty with these study designs is that the same measure of health across ages might be impractical. For example, disease outcomes such as diabetes and cardiovascular disease are less likely to emerge before adulthood, so equivalent health measures across time points may not be available.

One study examined the cascading effects from family adversity and poverty in childhood to self-reports of health in adulthood (Herrenkohl et al., 2010). In this study, childhood family adversity was associated with adolescent internalizing symptoms, which in turn were associated with poor self-reported health in adulthood. These findings demonstrate that cascade models can be useful in identifying mechanisms that explain the progression from early adversity to later health. Research is needed using these types of models in samples with more objective measures of adult health.

BIOLOGICAL INTERMEDIARIES LINKING EARLY ADVERSITY TO ADULT PHYSICAL HEALTH

Now that links between early adversity and adult physical health have been clearly identified, the next step is to identify what biological processes translate the stressful experiences into the physical environment of disease pathogenesis (i.e., what biological mediators carry the effects of early adversity under the skin). In the last several decades, significant progress has been made in understanding the biological correlates of stress. This burgeoning area of research is due, in part, to Campbell and Fiske's (1959) long-standing calls to conduct multitrait-multimethod research, as well as directives to conduct research at multiple levels of analysis (e.g., cellular, molecular, individual, family, and societal levels; Cicchetti & Dawson, 2002). These data provide new insights and establish a conceptual approach for future studies mapping relations between early adversity and physical health. Yet at the same time, there are limits to what these biological mechanisms can tell us about why early adversity is an important determinant of physical health and disease.

In this section, we provide a nonexhaustive review of several of the most widely studied biological processes thought to translate early adverse experiences into chronic diseases of aging. These biological mediators have received considerable theoretical and empirical attention for their potential role in explaining how early adverse experiences contribute to disease and accelerated aging. We provide a critical review, highlighting the strengths and weaknesses of each mechanism and documenting the limits of conclusions that can be drawn when evidence is found for a link between biological processes and early adversity. We note that other biological mediators have been examined in relation to early adversity and later health outcomes (e.g., sympathetic and parasympathetic nervous system activity), but our focus is on mediators that have been, and continue to be, the major thrust of research in this area.

Hypothalamic-Pituitary-Adrenocortical Axis

One potential mechanism that has received widespread attention is the HPA axis. This hormonal response system is present in organisms ranging from birds to humans and can be activated by a broad range of mental and physical stressors (McEwen, 1998; McEwen & Stellar, 1993; Weiner, 1992). Next we provide a review of the HPA axis and common measures used to capture HPA axis activity. After that, we review evidence supporting the notion that HPA axis activity functions as a biological mechanism linking early adversity to adult health outcomes. We then discuss some important caveats that should be taken into consideration when evaluating the role of HPA axis functioning as a mechanism linking early adversity with health outcomes.

Cortisol: Background and Measurement

Activation of the HPA axis occurs when neurons in the paraventricular nucleus of the hypothalamus secrete corticotropin-releasing hormone (CRH). This molecule travels to the anterior pituitary gland, which responds by secreting a pulse of adrenocorticotropin hormone (ACTH). The ACTH signal is carried in the blood to the

adrenal glands, which synthesize and release cortisol into the bloodstream. Cortisol then travels throughout the body through the bloodstream and acts on a wide range of tissues. Of all the hormones released in this cascade, cortisol has gained the most notoriety, probably because of its widespread regulatory influences. Cortisol is a steroid hormone belonging to the glucocorticoid family, and it is thought to play a key role in the biological stress response system. In addition, cortisol plays an important role in the central nervous system, where it is involved in learning, memory, and emotion; in the metabolic system, where it regulates glucose storage and utilization; and in the immune system, where it regulates the magnitude and duration of inflammatory responses and the maturation of lymphocytes (Sapolsky, Romero, & Munck, 2000). Cortisol's role in regulating such a wide range of physiological systems has helped motivate research focused on its possible role in linking early adversity to adult physical health.

Cortisol levels in the body exhibit a diurnal rhythm, characterized by high levels upon waking, proceeded by a rapid increase in cortisol after approximately 30 minutes (a feature known as the cortisol awakening response [CAR]), followed by a progressive decline in cortisol levels across the day (Kirschbaum & Hellhammer, 1989). Thus, cortisol research tends to incorporate one or more of the following indices of cortisol: (a) the size of the CAR; (b) the slope of the cortisol diurnal rhythm; (c) reactivity to naturalistic or laboratory-based stressors; and (d) metrics reflecting total cortisol output over some unit of time, typically the day, as reflected by area under the diurnal curve or urinary cortisol output (Adam & Kumari, 2009; Miller, Chen, & Zhou, 2007). These measures of cortisol output are thought to provide distinct information about HPA axis functioning. For instance, the CAR, which is regulated in part by the suprachiasmatic nucleus (Clow, Thorn, Evans, & Hucklebridge, 2004), is thought to play a role in mobilizing energy stores for the demands of the day (Hucklebridge, Mellins, Evans, & Clow, 2002). Further, an increase in the CAR is thought to reflect an increase in life stress, whereas a reduced or blunted awakening response is indicative of a failure to recruit the resources needed to tackle the day's demands (Chida & Steptoe, 2009). Normatively, cortisol has a diurnal rhythm that is characterized by a pronounced decline from morning through evening, although there appears to be substantial intra- and interindividual variability in this pattern, even among healthy persons (e.g., Stone et al., 2001). Nonetheless, flat rhythms that lack the typical diurnal decline often are seen in persons exposed to chronic stress (Gunnar & Vazquez, 2001) or with chronic psychiatric disorders, such as posttraumatic stress disorder (e.g., Yehuda, Golier, & Kaufman, 2005). Indices of total cortisol output are thought to provide a cumulative estimate of how much of this hormone bodily tissues get exposed to over some defined period of time, such as a day. Levels that are either too high or too low are thought to be detrimental for health (though via different pathways; see Heim, Ehlert, & Hellhammer, 2000; Raison & Miller, 2003; Miller et al., 2007; Sternberg, Chrousos, Wilder, & Gold, 1992).

Evidence for the Role of Cortisol as a Biological Intermediary

Evidence from a number of studies on stress-related changes in the output of cortisol has helped shape the notion that the HPA axis may serve as a biological intermediary linking early adversity to adult physical health. Meta-analytic findings of studies linking chronic stress to cortisol activity suggest that there is considerable variability (Miller et al., 2007), however. For example, connections between chronic stressors and HPA activity varied dramatically as a function of the timing of the stressor, whether the stressor involved trauma, whether the stressor was controllable or physically threatening, as well as individual emotional responses to the chronic stress (e.g., feelings of shame, loss). For example, individuals who faced physical stressors, such as war, and traumatic, uncontrollable stressors had high volumes of cortisol output over the day. In contrast, individuals facing chronic or controllable stressors did not differ from controls in their total daily output of cortisol. These findings suggest that cortisol is perhaps not best viewed as a generic marker of stress; it may, however, be a marker of stress under certain contexts and conditions (e.g., when experiencing traumatic and uncontrollable stressors). This view reinforces the findings of an influential meta-analytic study of cortisol responses to acute stress, which showed that levels of the hormone rise only in experimental settings that evoke uncontrollable social-evaluative threats (Dickerson & Kemeny, 2004).

Notably, the best predictor of cortisol levels is the timing of a chronic stressor (Miller et al., 2007). Studies that focused on temporally distant stressors found lower-than-normal cortisol, whereas studies that focused on individuals' current experience of stress found elevations in cortisol levels. This finding suggests that stress might initially trigger a burst of cortisol, eventually leading to adaptations to the HPA axis that are meant to limit the damage that might result from sustained periods of heightened cortisol levels. In other words, it may be that the body mounts a counterregulatory response such

that cortisol output rebounds below normal levels. This rebound effect makes sense in light of the fact that the HPA axis is regulated by a potent negative feedback circuit, in which elevated levels of cortisol suppress the output of CRH and ACTH by acting on glucocorticoid receptors in the brain.

Consistent with these meta-analytic findings, a number of studies have found that exposure to a wide range of early adversities, including socioeconomic disadvantage, neglect, abuse, and the loss of caregivers, is associated with later hypo-activation of the HPA axis. For example, in a prospective sample of adopted children, those who experienced severe neglect and abuse prior to the adoption (as reported by the adoptive parents) had lower morning cortisol values and flatter diurnal slopes in adulthood compared to individuals who did not experience neglect or abuse prior to the adoption (van der Vegt, van der Ende, Kirschbaum, Verhulst, & Tiemeier, 2009). Similarly, in a sample of older adults, Gerritson et al. (2010) found that the experience of any early adversity (e.g., abuse, poverty, parental divorce, loss) was associated with reduced morning cortisol levels and flatter diurnal slopes.

Further, several studies have found evidence for a long-term effect of parental separation and loss on HPA axis functioning. In a small study of adult men, the loss of a parent in childhood was associated with greater cortisol levels throughout the day compared to men who did not lose a parent (Nicolson, 2004). Additional evidence suggests that prolonged separations from parents could be connected to adult HPA axis functioning (Kumari, Head, Bartley, Stansfeld, & Kivimaki, 2013). Using data from the British Whitehall II study, Kumari and colleagues (2013) found that the experience of prolonged maternal separation before the age of 16 was associated with flatter diurnal slopes compared to adults who did not experience prolonged maternal separation. Notably, these effects did not differ as a function of the reason for the separation (e.g., maternal death, wartime evacuation). Further, individuals who experienced parental separation exhibited larger cortisol awakening responses relative to individuals who did not experience parental separation.

Some evidence suggests that socioeconomic disadvantage is associated with adult HPA axis functioning (e.g., Li, Power, Kelly, Kirschbaum, & Hertzman, 2007). For example, using data from the 1958 British cohort study, Li et al. (2007) examined participants' SES at birth and ages 7, 11, and 16. For men (but not women), low SES in childhood was associated with greater cortisol output as indexed by area under the curve, even when controlling for adult SES.

Cortisol as a Biological Intermediary: Considerations and Caveats

Although cortisol has regulatory influences on many bodily systems, these dynamics are highly complex. The result is that it is often difficult to interpret the biological significance of adversity-related differences in cortisol. Here we discuss these complexities in some detail, with the goal of facilitating more probative research on cortisol's role as an intermediary linking early adversity and later disease.

We begin by noting that a number of steps must take place before the presence (or absence) of cortisol can begin to influence one of the body's tissues or organs. First, cortisol must bind to a specific receptor located inside a cell. Most cortisol that is released into the bloodstream, however, is attached to carrier proteins, such as cortisol binding globulin (CBG) or albumin. When cortisol is attached to these proteins—which is about 90% of cortisol that is produced—it is unable to traverse cell membranes. Consequently, it cannot get inside the cell to bind to receptors. The other 10% of cortisol making its way through the bloodstream—which is free, or unattached to carrier proteins—must go through several steps before it is capable of modifying tissue. First, the hormone must traverse cell membranes and avoid being excreted by a structure called the multidrug resistance (MDR) pump, which expels molecules that threaten homeostasis. Further, it must avoid being converted to its inactive form by an enzyme called 11-β-hydroxysteroid dehydrogenase. Then it must bind to either a glucocorticoid or mineralocorticoid receptor, once those receptors shed some accessory molecules known as heat-shock proteins (see Raison & Miller, 2003, for a review of the mechanisms behind glucocorticoid signaling). Once cortisol has progressed through these steps, the newly formed receptor-hormone complex must translocate to the nucleus, where it is then capable of modifying the cell's program of gene expression.

Clearly, several (often overlooked) steps must take place between the release of cortisol and the ultimate effect of cortisol on tissues of interest. An important implication of this multistep progression of cortisol activity is that even if a particular psychosocial factor of interest can be linked to the release of cortisol, the signal may not be heard downstream in the tissues of interest. One reason for this is that, as already discussed, most tissues are equipped with a host of counterregulatory mechanisms, such as carrier proteins (e.g., CBG) and the MDR pump that potentially can intervene in this process to ensure that acute changes in cortisol do not drastically disrupt homeostasis. This means that even if cortisol levels are increased markedly by a stressor, the tissues that are regulated by cortisol may

not be affected because counterregulatory mechanisms may alter how loudly cortisol's signals are heard. For example, cells may alter the characteristics of the receptors to which cortisol binds. In addition, cells can reduce the density and activity of their receptors. Receptors that are downregulated or desensitized will pass on fewer signals to the nucleus of the cell, where gene expression occurs (Cole et al., 2007). Even in the absence of connections between a given stressor and cortisol, however, it is quite possible that there is ongoing activity at the level of the receptor that has important implications for physical health. In other words, the sheer volume of unbound cortisol in the body (and the amount that cortisol levels change in response to stressors) does not provide enough information to explain how the HPA axis could be involved in shaping physical health outcomes.

One study nicely illustrates these complexities. In a sample of adult participants who varied in early-life SES (Miller et al., 2009), participants with low-status backgrounds had modestly elevated cortisol relative to high-status participants. Importantly, however, examination of gene expression profiles in leukocytes indicated that individuals from low-SES backgrounds had decreased glucocorticoid signaling relative to people with high early-life SES. In other words, the leukocytes of individuals from low-SES backgrounds were registering *less* cortisol signal. These findings are provocative because examination of cortisol levels alone would have suggested that low early-life SES confers risk for elevated circulating cortisol in adulthood, with the corresponding assumption that this extra cortisol could have a damaging effect on tissues and organs. Yet the gene expression findings suggested that individuals from low-SES backgrounds had cells that were hearing less signal from cortisol, not more—a finding that indicates that examination of circulating levels of cortisol alone is an insufficient assessment of HPA axis activity. Thus, the study of cortisol in isolation—without also considering glucocorticoid signaling—does not provide an accurate picture of the ways in which HPA axis activity might serve as a biological intermediary linking early adversity and later health outcomes.

An additional concern centers on the extent to which cortisol values exhibit within-person stability over time. Some recent studies highlighting cortisol's lack of temporal stability (Ross, Murphy, Adam, Chen, & Miller, 2014; Shirtcliff et al., 2012) call into question its plausibility as a mediator of the lengthy underlying pathologic processes that give rise to most chronic diseases of aging. For example, one recent study showed that only 13% of the variability in cortisol values over a 6-year period was attributable to a stable, traitlike component (e.g., Shirtcliff et al., 2012). Instead, over half of the variability in cortisol values could be explained by situational, or statelike, factors at the time of the assessment. Thus, even over relatively short periods of time, cortisol activity shows very little stability. In other words, if individuals' cortisol levels are not stable over relatively short intervals and appear instead to reflect dynamic changes in situational experiences of close temporal proximity, then it is unlikely that chronically dysregulated HPA axis activity is a mechanism that causally contributes to diseases such as cardiovascular disease, which evolves over decades.

In summary, the HPA axis has been a popular target for mechanistic research on early adversity and adult disease over the last several decades. This explosion of research has led to a greater understanding of how responsive the system is to stressful experiences. Important features of cortisol, however, often have been overlooked in this research (e.g., glucocorticoid receptor availability and sensitivity, counterregulatory mechanisms that influence cortisol's actions in tissue, temporal stability and dynamics of cortisol). These features are important details that cannot be ignored, particularly if researchers want to develop a biologically plausible understanding of cortisol's role in explaining how early experiences influence chronic disease outcomes.

Allostatic Load

Allostatic Load: Background and Measurement

Some of our physiological systems, such as body temperature and blood pH, are tightly regulated, such that they operate within a narrowly specified range of functioning, with *homeostatic* set points around which the body attempts to achieve stability. Other systems, however, operate under much more flexible states, and they can change adaptively in response to the demands of the environment. In these circumstances, the systems operate under conditions of *allostasis* ("stability through change"). The main difference between allostatic systems and homeostatic systems is that allostatic systems have dynamic and adjustable mechanisms in place that are responsive to the environment, whereas homeostatic systems operate to achieve a specific set point *despite* the environmental demands. For example, during exercise, our bodies achieve thermoregulation through perspiration (thus achieving a fairly static temperature despite changes in behavior), but our heart rate adjusts to the increased physical demands by beating faster.

Another way of viewing allostasis is as a measure of plasticity. This ability to adapt to environmental demands enables temporary adjustments in physiological systems that allow for the ultimate goal of overcoming stressful or challenging situations. This plasticity in physiological systems, however, is thought to come at a cost: When these systems repeatedly are required to adapt to meet the demands of the environment—as in cases when individuals are exposed to chronic, repeated stressors—the systems may become inefficient or less flexible in their ability to adapt. The systems may not shut off completely, or there may be delays in the return to baseline functioning as a result of repeated environmental stressors. McEwen and colleagues (McEwen, 1998; McEwen & Seeman, 1999; McEwen & Stellar, 1993; Singer, Ryff, & Seeman, 2004) developed the concept of allostatic load, which refers to the wear and tear that results from repeated stressors that activate the body's regulatory controls in an attempt to achieve a new level of stability (and recovery from stress). Over time, this wear and tear manifests itself in the dysregulation of multiple physiological systems. Measures of allostatic load, therefore, sometimes are viewed as reflecting the number of physiological systems that are experiencing disruption in optimal functioning.

A number of physiological systems are thought to be regulated under allostatic control, including the neuroendocrine, metabolic, cardiovascular, immune, and autonomic and sympathetic nervous systems (Singer et al., 2004). Accordingly, frequently a variety of biomarkers are included in measures of allostatic load. Neuroendocrine measures of allostatic load often include cortisol and catecholamines, such as epinephrine, norepinephrine, and dopamine. Immune measures often include markers of inflammation, including the cytokines interleukin-6 (IL-6) and tumor necrosis factor-α (TNF-α) as well as C-reactive protein (CRP), an acute phase protein that promotes inflammation by enhancing phagocytosis. Indicators of metabolic dysfunction include high-density lipoprotein cholesterol (this value is reverse-scored so that low values indicate risk), low-density lipoprotein cholesterol, triglycerides, glycosylated hemoglobin, and blood sugar. Cardiovascular components of allostatic load frequently include systolic and diastolic blood pressure and heart rate. Finally, waist-to-hip ratio or BMI usually are included in measures of allostatic load as indicators of adiposity. Researchers frequently create quartiles for each index, assigning individuals into dichotomous categories depending on whether their values are in the top high-risk quartile. These categories are then summed across indices to create a total composite score for allostatic load.

One question related to this method of creating a composite score is whether the indicators of physiological dysregulation reflect a single underlying construct or if they are better conceptualized as separate components of physiological dysregulation. To answer this question, McCaffery, Marsland, Strohacker, Muldoon, and Manuck (2012) tested the factor structure of allostatic load indices. In this study, researchers found support for a single factor underlying the allostatic load indices, including measures of metabolic, inflammatory, and cardiac vagal activity measures. These findings lend support to the practice of using one composite score for the wide range of physiological systems that are included in assessments of allostatic load.

With that said, McEwen and others (e.g., McEwen & Seeman, 1999) have sorted allostatic load markers into categories, including primary mediators, secondary outcomes, and tertiary outcomes, in a way that is conceptually and methodologically useful. Primary mediators include chemical messengers, such as cortisol, dehydroepiandrosterone (DHEA), and catecholamines, which are thought to relay messages from the brain to organs and tissues that mobilize resources for coping with stress. Secondary outcomes are hypothesized to reflect the impact that repeated signaling from primary mediators has on target organs and tissues. These outcomes include tissue- and organ-specific indicators of health, including waist-to-hip ratio, blood pressure, glycosylated hemoglobin, and cholesterol. Finally, tertiary outcomes (which currently are not included in most measures of allostatic load) include actual diseases hypothesized to result in part from allostatic load (e.g., cancer, dementia, heart disease). The basic premise of this model is that primary mediators influence the development of secondary and finally tertiary (disease) outcomes. This hierarchical organization of allostatic load indicators offers a conceptually grounded approach to understanding how a stressor could contribute to wear and tear on the body and ultimately lead to the accumulation of chronic diseases. As far as we are aware, however, longitudinal studies have not yet been done to confirm the theorized progression from primary mediators to secondary and finally tertiary outcomes. Prospective studies of this sort will be useful for improving our understanding of the role of allostatic load in translating early adversity into disease.

Evidence for the Role of Allostatic Load as a Biological Intermediary

Allostatic load has been proposed as a biological intermediary linking early adversity to adult health (e.g., Repetti,

Robles, & Reynolds, 2011; Taylor, Way, & Seeman, 2011). For example, in a prospective study of individuals in Sweden, Gustafsson, Janlert, Theorell, Westerlund, and Hammarstrom (2012) found that the experience of social stressors (e.g., loss of a parent, social isolation) and material adversity (e.g., parental unemployment, poor standard of living) in adolescence and early adulthood were uniquely predictive of allostatic load in midlife. Similarly, using data from the MIDUS study, Gruenewald et al. (2012) found that low SES in childhood and adulthood predicted allostatic load in adulthood. Notably, low SES at each developmental period was associated uniquely with later allostatic load. Further, Gruenewald and colleagues found evidence of a cumulative effect: Individuals who were persistently low in SES across childhood and adulthood had greater allostatic load relative to individuals who were consistently high in SES or who were upwardly mobile. Interestingly, these effects remained significant even after controlling for health behaviors and psychosocial variables in adulthood. Evidence from studies with children and adolescents suggests that these processes might start early in life (e.g., Evans & Kim, 2012).

Allostatic load, in turn, has been shown to be predictive of cardiovascular disease and mortality (Seeman, McEwen, Rowe, & Singer, 2001; Seeman, Singer, Rowe, Horwitz, & McEwen, 1997). These links are not particularly surprising, given that the index includes measures of blood pressure and central adiposity, two of the most established risk factors for cardiovascular disease and health. Reductions in allostatic load have been associated with lower 7-year mortality risk (Karlamangla, Singer, & Seeman, 2006). These findings have led researchers to suggest that allostatic load may be a pathway through which exposure to early adversities can lead to greater health problems in adulthood (e.g., Danese & McEwen, 2012; Gruenewald et al., 2012). Indeed, one strength of the allostatic load model is that the composite score reflects the extent to which multiple physiological systems are operating under strained conditions. If early adversity results in different biological cascades across individuals, leading to a wide variety of endpoints with possible dysregulation, then a single biological marker might not always be linked to adverse experiences. By creating a composite measure of allostatic load, researchers are better positioned to capture the connection to early adversity. Thus, in a way, the practice of creating a composite measure of allostatic load provides a simplified way of testing for multifinality in the links between early adversity and long-term health outcomes by creating a single outcome variable that reflects a diverse array of physiological systems.

Allostatic Load as a Biological Intermediary: Considerations and Caveats

One of the concerns about allostatic load, as it has typically been operationalized in this literature, is that its components vary in how proximal they are to actual disease. As McEwen and Seeman (1999) emphasize, primary mediators, such as cortisol, probably are quite distal causes of physical health problems, which act through more proximal secondary outcomes, such as insulin resistance, to cause disease. Yet most studies to date group all of these components into a single aggregate, making the implicit assumption that they are equally powerful and equally detrimental in terms of long-term health. We recognize that there is factor-analytic evidence to support a single composite score for allostatic load (McCaffery et al., 2012). However, it still seems likely that allostatic load components vary considerably in how proximal, necessary, and sufficient they are in the disease process. Indeed, allostatic load might foreshadow cardiovascular disease not because individuals are elevated on a diverse set of physiological measures but because they have high blood pressure and excess central adiposity, which are well-established risk factors for this condition. This lack of clarity in the utility of allostatic load indices makes it difficult to know whether this measure provides incremental value over already established stand-alone risk factors for poor health and whether some components may be more powerful contributors than others for poor health outcomes. Moreover, the practice of creating nonstandardized cut points for dichotomizing the indicators raises several methodological issues. For one, this practice often is done using sample-specific cutoffs, such as top quartiles, which makes it difficult to compare across studies and increases the odds of chance findings. Another problem with the cutoff approach is that it ignores the fact that functioning and risk within each domain may follow a more linear gradient. If domains have validated cutoffs with prognostic significance (e.g., blood pressure, cholesterol), then these established criteria may be more meaningful indices to use when sorting individuals into high- and low-risk categories.

One final concern relates to the choice of measures included in allostatic load composites. As described earlier, indices of allostatic load are categorized into primary mediators, secondary outcomes, and tertiary outcomes. Yet this level of categorization is not reflected in the single composite measure of allostatic load. Instead, these markers are aggregated across the different stages without consideration of the relative importance of each indicator or acknowledgment that primary mediators should prospectively predict secondary outcomes, which

should in turn shape the onset and progression of diseases. Given that the hierarchy is so fundamental to the theory behind allostatic load, it is unclear why these indicators are treated equally. In fact, some measures in and of themselves may pose no clear health risk, or do so in only a very distal manner, whereas other indices (e.g., blood pressure) are actually measures of damage already done to the system. For example, having higher-than-average levels of dopamine is not considered a risk factor on its own, but elevated blood pressure and cholesterol are risk factors for cardiovascular disease. Based on the theoretical model, early adversity should be related most closely to the primary mediators of allostatic load, and these changes should presage the onset of secondary outcomes. This kind of cascading model has not been tested to date, however.

In summary, allostatic load has been implicated as a potential biological mechanism linking early adversity to later disease and early mortality. We look forward to the next generation of research on this construct, which we hope will clarify some of the complex issues surrounding conceptualization and measurement of allostatic load. Future studies that can clarify the clinical significance of allostatic load and the processes through which allostatic load contributes to disease will be especially useful.

Telomeres

Telomeres: Background and Measurement

Recently there has been an active interest in the ways in which psychosocial stressors might accelerate cellular aging through changes in telomere structure (Aubert & Lansdorp, 2008; Aviv, 2008; Mather, Jorm, Parslow, & Christensen, 2011; Price, Kao, Burgers, Carpenter, & Tyrka, 2013). Telomeres are nucleoproteins located at the end of chromosomes. Telomeres act like caps that prevent DNA degradation when cells divide and in doing so ensure the stability of chromosomes and the cells themselves. Briefly, when cells divide, replication enzymes are unable to function at the very end of chromosomes (an issue known as the end replication problem; De Lange, 2009). Without telomeres, each cell division would result in segments of chromosomal DNA being lost to replication, meaning that as time went on, progressively more of genetic code (DNA) would disappear. The presence of telomeres slows the progressive erosion of genetic material. Telomeres serve as a kind of buffer for the chromosome, which can absorb successive losses of material with each replication. Because telomeres are comprised of noncoding DNA, or material that is not essential for building proteins, their degradation does not have significant consequences for cellular function in the short term. Moreover, as telomeres shorten with successive replication cycles, cells produce an enzyme, known as telomerase, which acts to restore their length. However, most cells do not contain enough telomerase to maintain telomere length indefinitely. So, with time, telomeres degrade. When this occurs, healthy cells enter a phase known as senescence, where they cease replication and can have limited functional capacity. Thus, cellular senescence is the endpoint of a lengthy process involving repeated cell replications and waning telomerase activity to counterbalance it.

Evidence for the Role of Telomere Degradation as a Biological Intermediary

Telomere length has been viewed by some as a biological marker of aging (Aubert & Lansdorp, 2008; Epel, 2009; Mather et al., 2011). Indeed, health-compromising behaviors, such as smoking, have been related to shorter leukocyte telomere lengths. And to the extent people have shorter leukocyte telomeres, their risks for morbidity and mortality from various conditions increase (e.g., Kimura et al., 2008; Valdes et al., 2005). Some researchers argue that shorter telomeres (relative to telomeres of other individuals of the same age) are an indication of accelerated aging, with the potential for long-term health consequences.

Emerging evidence suggests that early exposure to adversity may be associated with telomere degradation (Drury et al., 2012; Kananen et al., 2010; Tyrka et al., 2010). For example, Tyrka et al. (2010) found that recalled emotional and physical neglect in childhood were associated with shorter telomeres in white blood cells. Similarly, Kananen et al. (2010) reported a connection between early adversity (e.g., parental unemployment, parental mental health problems) and telomere length in white blood cells in a sample of anxious and nonanxious adults. Further, in a sample of Romanian children, Drury and colleagues (2012) found a link between buccal cell telomere length in middle childhood and time spent in early institutional care. Additional evidence for a link between early exposure to adversity and later telomere attrition comes from Kiecolt-Glaser and colleagues (2011), who found that older adults who had experienced multiple childhood adversities had shorter telomeres in white blood cells compared to adults who were not exposed to early adversities in childhood.

Some evidence suggests that supportive parenting experiences may play a role in buffering children from telomere degradation associated with early adversity. In a cross-sectional study, Asok, Bernard, Roth, Rosen, and

Dozier (2013) found that children from high-risk families who experienced responsive parenting had greater buccal cell telomere length than children from high-risk families whose parents were less responsive. These findings offer some insight into the ways in which telomere length may be influenced by both supportive and unsupportive environmental contexts, although longitudinal studies will be needed to lend support to the notion that these environmental inputs play a causal role in affecting telomere length.

Telomere Degradation as a Biological Intermediary: Considerations and Caveats

The studies just reviewed consistently find linkages between early adversity and telomere length, which suggests the provocative hypothesis that accelerated cell aging might be a mechanistic pathway to later disease. However, as is the case with the broader literature on telomeres, several features of these studies complicate interpretation. First, all of the studies were based on a single measurement of telomere length. There are significant individual differences in telomere length across the population (Aviv, Valdes, & Spector, 2006; Geronimus et al., 2010; Takubo et al., 2002). Thus, with a single time point measure, we cannot be certain whether the disparities in telomere length are a consequence of the earlier adversity or are simply a correlate. For example, it could be that the same children who are exposed to adversity are born with relatively short telomeres, for partly or fully unrelated reasons. To sort this complexity out, multiwave studies or natural experiments are needed.

Along these lines, some of the most convincing evidence that exposure to adverse conditions in childhood accelerates telomere degradation comes from the Environmental-Risk Longitudinal Twin Study, a nationally representative sample of children in Great Britain (Shalev et al., 2013). Researchers assessed children's exposure to violence in childhood, including domestic violence, bullying and victimization, and maltreatment from an adult. Telomere length in buccal cells was assessed at baseline (age 5) and 5 years later (age 10). Shalev and colleagues (2013) found that children who were exposed to two or more types of violence had accelerated telomere erosion across the 5 years compared to children who were exposed to one type of violence or who were not exposed to violence.

These are provocative findings from a methodologically rigorous study. They represent an important starting point for mechanistic research on early adversity. Nevertheless, there is some uncertainty about the clinical relevance of telomeres in buccal cells for the kinds of chronic diseases of aging we are concerned with in this chapter. For those conditions, telomere length at the site of disease pathogenesis—for example, in the heart for cardiovascular disease, the pancreas for diabetes, the immune system for virally mediated cancers and infectious diseases—would be more germane. It is possible that buccal cells, or other easily accessed specimens, such as white blood cells, can serve as a proxy for telomeres in these tissues of interest. But given the degree of tissue specificity seen in most cellular processes, this seems like a dubious assumption to proceed on, at least until the field has accumulated sufficient evidence to justify it. Indeed, recent studies indicate that the correlations between telomere length in buccal and immune cells are modest at best (Gadalla, Cawthon, Giri, Alter, & Savage, 2010).

This problem is not limited to buccal cells. As an alternative, researchers often measure telomere length in leukocytes, based on the quite reasonable presumption that immune cell aging could have deleterious consequences for host resistance to infections and cancers. But even when leukocytes are collected, most studies assess telomere length in bulk populations with heterogeneous cellular content. Peripheral blood contains a number of different types of leukocytes, including granulocytes, lymphocytes, and monocytes. These cell types differ significantly in their telomere profiles (Aubert & Lansdorp, 2008). What makes this methodological decision even more problematic is that people vary in the relative proportion of these cell types in peripheral blood, and adversity is known to shift that balance (Segerstrom & Miller, 2004). Thus, any linkage between adversity and telomeres could reflect individual differences in the balance of cell types present in the assay rather than cellular aging per se. To rule out this possibility, researchers need to account for cellular heterogeneity through statistical controls, or, even better, physically sort cells into different phenotypic clusters prior to telomere analysis (e.g., see research on stress and telomeres by Cohen et al., 2013; Damjanovic et al., 2007).

Aside from the heterogeneity in cell types used for telomere assessment, it is important to consider the fact that not all cells in the body replicate. Of the major immune cells, only lymphocytes do so routinely. This fact raises the question of what telomere length means in samples that are mainly composed of nonreplicating cells. (This is the case with most whole blood analyses of telomeres, where roughly 50% to 80% of the cells are nondividing granulocytes or monocytes.) Some researchers have argued that in nondividing cells, such as granulocytes, telomere length might index senescence of the parent cell—the cell

that divided to form the granulocyte. If so, these measures would take on significant new meaning. But until this issue and others are settled, we remain cautious about the interpretation of the telomere data.

Epigenetics

Epigenetics: Background and Measurement

All cells within an individual carry an identical DNA sequence, which is established at conception and fixed for life. (Lymphocytes and cells that have acquired mutations are exceptions to this rule.) The DNA sequence serves as a blueprint for transcription, the process whereby cells synthesize ribonucleic acid (RNA) molecules—a process known as gene expression. RNA molecules are later translated into proteins, which cells use for structural and functional purposes. Epigenetics describes stable changes in gene expression activity that arise without changes to the gene's DNA sequence (Jaenisch & Bird, 2003; Jirtle & Skinner, 2007). A primary function of epigenetic alterations is to allow cells to develop and maintain specialized functions. For example, epigenetic alterations can modify a cell's ability to transcribe a particular gene into RNA. Because RNA serves as a template for translation of proteins, these epigenetic alterations have downstream influences on how much of the gene's protein ultimately is synthesized. When this process takes place across many different genes, it can give rise to significant phenotypic diversity in cells. This variability is thought to play a role in the long-term development of physical disease (e.g., Rakyan, Down, Balding, & Beck, 2011), although the nature of these pathways is still largely unknown.

Epigenetic modifications to DNA typically occur in one of two ways (Whitelaw & Garrick, 2006). The first modification is DNA methylation, which involves the attachment or removal of a methyl group to cytosine residues in a gene's promoter. The methyl groups prevent transcription factors from interacting with DNA to modulate gene expression, which makes the gene inactive. The second form of epigenetic modification involves changes to the chromatin structure that packages the DNA. This process occurs by attaching or removing chemicals from the histone proteins that hold DNA within the cell's nucleus. These proteins cause the DNA near the gene to become more or less tightly coiled, which makes it more or less difficult for RNA polymerase and transcription factors to access its promoter (Whitelaw & Garrick, 2006). These epigenetic modifications can be quite stable over the life span, and sometimes they are passed along to daughter cells during mitosis. As such, it is possible for early experiences—such as early exposure to adversity—to create lasting epigenetic modifications that persist over the life span, which may help explain how early experiences become embedded in the epigenome and contribute to chronic diseases many decades later. Measurement of epigenetic modifications typically relies on DNA microarray analysis. This process assesses the presence of methylation at multiple promoter sites in each of many thousands of different genes (e.g., these analyses can quantify the proportion of sites that are methylated).

Evidence for the Role of Epigenetic Modifications as a Biological Intermediary

Recent evidence suggests that epigenetic processes might serve as pathways through which early experiences can bring about long-term changes in the activity of genes, thereby contributing to the pathogenesis of disease (e.g., Roth, Lubin, Funk, & Sweatt, 2009). Much of the early work in this area centered on animal models, including the work by Meaney and colleagues (see Meaney, 2001, for a review). Meaney found that, in rats, certain caregiving experiences early in infancy were associated with long-term changes in rat pups' stress response physiology (Liu et al., 1997). Specifically, rat pups that received high levels of maternal licking and grooming and arched-back nursing showed attenuated cortisol responses to threat and increased exploratory behavior—effects that lasted into adulthood (Caldji et al., 1998; Liu et al., 1997). In a series of elegant mechanistic studies, Meaney and his colleagues discovered that these lasting differences in stress responsivity arose through epigenetic changes to glucocorticoid receptor genes in the hippocampus of the offspring (Weaver et al., 2004)—in other words, in the rat pups that received more licking and grooming. In essence, maternal nurturance in the early days of life led to epigenetic changes in the offspring's hippocampus including demethylation of DNA and acetylation of histone proteins, which facilitated expression of the glucocorticoid receptor gene across the life span (Weaver et al., 2004). Greater expression of this receptor, in turn, enabled tighter regulation of the HPA axis, the hormonal system that controls the release of cortisol in response to stress. Notably, Weaver et al.'s (2004) findings revealed that the epigenetic modifications that took place during the first week of the rat pups' lives persisted into adulthood, suggesting considerable stability in these early programming effects.

Recent work with humans suggests that early experiences—including adversity—also bring about epigenetic changes that affect gene expression (e.g., Bick et al.,

2012; McGowan et al., 2009; Oberlander et al., 2008). In one study, hippocampal tissue from suicide victims was assessed postmortem (McGowan et al., 2009). Epigenetic modifications varied as a function of whether participants had been abused as children: Individuals who had been abused had greater methylation at sites in the glucocorticoid receptor gene promoter. In a prospective study of maternal depression and infant cortisol reactivity, Oberlander and colleagues (2008) found that exposure to prenatal maternal depression led to epigenetic changes in infants' gene expression that were associated with elevated stress reactivity in the HPA axis. Specifically, prenatal exposure to depression during the third trimester was associated with increased methylation at sites in the glucocorticoid receptor gene promoter. Further, methylation at this location was related to heightened cortisol reactivity when the infants were 3 months old, suggesting that this epigenetic alteration may have functional implications for HPA axis regulation. Additional evidence for lasting epigenetic modifications as a result of early adversity comes from a sample of adults who were exposed to famine prenatally as a result of wartime food scarcity and their unexposed same-sex siblings (Heijmans et al., 2008). Compared to their unaffected siblings, prenatal exposure to famine was associated with reduced DNA methylation in the promoter of the insulin-like growth factor II gene, which plays a role in insulin- and growth-related activities.

Additional evidence from studies of early adversity and epigenetic modifications also supports the notion that adverse experiences are biologically embedded in the epigenome (Borghol et al., 2012; Essex et al., 2013; Tyrka, Price, Marsit, Walters, & Carpenter, 2012). For example, Essex and colleagues studied DNA methylation in the buccal cells of 109 adolescents from a larger longitudinal study. In this sample, the extent to which adolescents' buccal cells were methylated varied as a function of their parents' stressors years earlier. The timing of stress influences differed for mothers and fathers. Specifically, methylation during adolescence was related to maternal stress during infancy but paternal stress during preschool. These findings are consistent with those of Tyrka and colleagues (2012), who found connections between early-life familial adversity (e.g., parental death, maltreatment) and methylation of the glucocorticoid gene promoter in white blood cells. Adults who, as children, experienced early familial adversity had increased methylation of the promoter region relative to adults who experienced more stable and nurturing care in childhood. Borghol and colleagues (2012) similarly identified connections between early SES and methylation of white blood cells in 40 participants from the 1958 British cohort study. In this detailed microarray analysis of approximately 20,000 genes, over 1,200 gene promoters were differentially methylated as a function of early-life SES—over twice as many regions that were differentially methylated as a function of adult SES. Lam et al. (2012) posed similar questions about early SES in a sample of healthy adults aged 25 to 45 but found a more modest association with methylation patterns.

These findings suggest that early adversity may leave an epigenetic residue in the genome of some cells. Based on basic research in model systems, there is reason to suspect these residues may be durable and persist over lengthy periods of time. This stability could help explain how early experiences can develop into diseases decades after the exposure to adversity has subsided. With that said, we do not yet have the prospective, longitudinal evidence in humans to know whether the findings reflect this kind of lasting biological imprint versus some other process or methodological artifact.

Epigenetic Modifications as a Biological Intermediary: Considerations and Caveats

Like the other biological mechanisms we have discussed, the study of epigenetic modifications to DNA poses some important methodological challenges that will need to be addressed in future studies. For example, in trying to extend Meaney and colleagues' findings (Weaver et al., 2004) to humans, research has made use of cord blood cells, white blood cells, and buccal cells. These approaches make sense logistically. Hippocampal tissue cannot be noninvasively acquired in living humans, whereas cells from the blood, mouth, and umbilical cord can be extracted noninvasively. With that said, it is important to keep in mind that very little is known about how well these tissues can serve as a proxy for the extent of methylation in the hippocampus. Many researchers believe the epigenetic processes exist mainly to allow tissues to functionally specialize. If that is true, we need to be cautious about assuming cross-tissue consistency in epigenetic marks, at least until there is evidence to support doing so. Further, the use of heterogeneous pools of cells for measuring DNA methylation raises some concerns. As was the case with telomeres, people vary in the relative proportion of cell types that make up their immune systems and their cord blood, and stress can shift the balance of cell types. And as was the case with telomeres, the degree of methylation varies across cell types (Lam et al., 2012; Ohgane, Yagi, & Shiota, 2008). Together, these issues complicate interpretation of the existing epigenetic data in humans—any disparities linked to adversity

could reflect differences in the cellular composition of samples or the degree of methylation. Some studies have addressed the issue of cellular composition in their analyses. Lam and colleagues (2012), for example, found that white blood cell methylation was correlated with the relative amount of lymphocytes and monocytes present in individuals. Thus, assessments of DNA methylation may need to take into account the relative proportion of cell types in the sample.

Finally, it will be important for future studies to explore the functional implications of adversity-related changes in methylation. Much work in this area proceeds on the assumption that epigenetic changes will have consequences for gene expression, as they do in the animal studies. But this assumption is not always borne out in studies of humans, which rely on large heterogeneous pools of cells from the buccal cavity or the immune system. For example, in the study by Lam et al. (2012), associations between methylation and transcriptional profiles were very modest, and this has been the case in other studies too. These findings suggest that methylation is likely to be one process among many that are important in regulating gene expression patterns. Thus, future epigenetic research in this area would be most helpful if it supplemented methylation data with studies of the functional consequences of methylation for gene expression or other relevant outcomes (e.g., see Oberlander et al., 2008, study). Also important in future research will be consideration of other epigenetic mechanisms—such as histone modifications and microRNA expression—that can work in concert with methylation to influence patterns of gene expression.

Inflammation

Inflammation: Background and Measurement

Inflammation occurs when cells of the innate immune system, including neutrophils, dendritic cells, monocytes, and macrophages, gather at the site of an infection or injury. These cells attempt to eliminate the pathogen, rid the body of infected tissue, repair any damage the pathogen caused, and begin the process of healing. The inflammatory response is essential for survival. Without it, minor injuries or infections would be lethal. However, the inflammatory response must be regulated carefully; otherwise, inflammation can become persistent and contribute to the emergence of multiple diseases of aging.

Inflammation is orchestrated by signaling molecules known as cytokines, which are released by immune cells and the damaged tissue. The major cytokines involved with inflammation are interleukin (IL)-1, IL-6, and TNF-α. Researchers sometimes use concentrations of these molecules in circulation as a rough estimate of ongoing inflammatory activity. However, these cytokines are fairly unstable in blood, so a more common approach is to measure CRP, a molecule produced by the liver during inflammation. CRP provides a reliable index of low-grade chronic inflammation over the preceding month or so and is prognostic of morbidity and mortality from a number of chronic diseases of aging, such as diabetes, obesity-related problems, cardiovascular disease, autoimmune disease, and cancer (Danesh, Collins, Appleby, & Peto, 2000; Libby, Ridker, & Hansson, 2009; Ridker, 2007; Yeh & Willerson, 2003). CRP's role is particularly well established in the progression of cardiovascular disease, where in apparently healthy individuals, it presages disease risk in a roughly dose-response manner. The role of inflammation in such a broad array of diseases, along with the relative ease of assessment, has prompted researchers to consider it as a mechanism linking early adversity to later disease.

Evidence for the Role of Inflammation as a Biological Intermediary

Mounting evidence supports the idea that exposure to early adversities is linked to measures of chronic inflammation. For example, in a prospective study of 12,000 adults from diverse backgrounds, early-life SES measured in childhood was inversely associated with CRP, independent of current SES (Pollitt et al., 2007). Similarly, in the British Women's Heart Health Study, evidence for a cumulative effect of SES was found: Lower status across development was associated with increases in CRP (Lawlor, Smith, Rumley, Lowe, & Ebrahim, 2005). Further, links between childhood SES and inflammation were examined in a sample of adults who took part in the Coronary Artery Risk Development in Young Adults study (CARDIA; Taylor, Lehman, Kiefe, & Seeman, 2006). In this study, Taylor, Lehman, Kiefe, and Seeman (2006) found that childhood SES was associated prospectively with measures of psychosocial functioning (e.g., depression, social contacts), which in turn predicted CRP.

Additional evidence suggests that early-life socioeconomic disadvantage confers risk for immune system profiles characterized by proinflammatory responses (Miller et al., 2009). In this study, researchers examined healthy adults who were either low or high in childhood SES (as defined by the prestige of their parents' occupations). Participants' white blood cells were cultured in vitro with a series of microbial products, and the magnitude of the cell responses to these stimuli was indexed by subsequent production of IL-6. Participants who were exposed

to socioeconomic disadvantage as children showed more pronounced IL-6 production in response to bacterial challenges relative to participants from families of high SES. Notably, participant groups in this study were balanced on the prestige of their adult occupations, which removed the possibility that these findings were attributable to adult SES.

Similar evidence has been found for the role of the early family emotional climate on adult inflammation. In the Dunedin longitudinal study, for instance, multiple assessments of early maltreatment and harsh parenting were predictive of CRP at age 32 (Danese et al., 2009; Danese, Pariante, Caspi, Taylor, & Poulton, 2007). For example, Danese and colleagues (2007) reported that adults who had been maltreated as children had a threefold higher level of CRP at age 32 relative to individuals who had not been maltreated. Similarly, those who came from poor backgrounds and were socially isolated as children were also more likely to show high CRP; notably, these risk factors were independent of each other.

Several other studies have assessed inflammation in samples of adults who were asked to report retrospectively on experiences of childhood abuse. In one study, adults who had been abused as children had higher circulating IL-6 and TNF-α levels relative to adults who did not report being abused as children (Kiecolt-Glaser et al., 2011). In the Nurses' Health Study II, Bertone-Johnson and colleagues found a link between retrospectively reported sexual abuse in adolescence and CRP and IL-6 in adulthood (Bertone-Johnson, Whitcomb, Missmer, Karlson, & Rich-Edwards, 2012). Interestingly, however, this pattern did not emerge when examining the link between inflammation and reports of physical abuse.

In the MIDUS sample, Slopen and colleagues (2010) examined a range of adverse early-life experiences as predictors of inflammation. In particular, adversity in childhood and adolescence was measured across three domains, including stressful life events (e.g., parental alcohol or drug problems, school failure), parent-child relationship quality (including relationships with mothers and fathers), and the frequency of verbal and physical abuse. Scores across each of these domains were standardized and then summed to create a composite of early-life adversity. This composite measure was associated with five different biomarkers of inflammation for African-American participants but not for participants of European descent (Slopen et al., 2010).

In summary, emerging evidence suggests that to the extent that individuals are exposed to early adversity, as adults they display evidence of mild, chronic inflammation. Further, many of the chronic diseases of aging (e.g., cardiovascular disease, strokes, autoimmune diseases, some forms of cancer) are widely recognized to involve chronic inflammation. Thus, inflammation could play a mediating role in the links between early adversity and adult physical health.

Inflammation as a Biological Intermediary: Considerations and Caveats

Converging evidence suggests that early adversity may contribute to later disease through inflammatory processes. Despite these encouraging findings, we note that there are several limitations that will need to be addressed in future studies. Like the studies of other biological mechanisms, many of the studies linking early adversity to inflammation rely on a single assessment of inflammation, which limits our ability to conclude that exposure to adversity causally shapes inflammatory activity. Longitudinal studies, with multiple assessments of inflammation, will help clarify the extent to which early stressors lead to changes in inflammation over time. These types of studies also will help to clarify the chronicity of the inflammation. To be plausibly involved in accelerating disease, the inflammation would need to be long standing. Only via multiwave studies can we ascertain whether inflammation is transitory or chronic. Another issue to be addressed in future studies is the fact that most existing studies of inflammation capture ongoing inflammatory activity in peripheral blood rather than inflammation in tissues or organs. Thus, it is unclear whether these measures of inflammation reflect activity happening in the tissues that are directly relevant for chronic diseases (e.g., coronary arteries, pancreas). Finally, nearly all studies focus on proinflammatory processes, but anti-inflammatory signals play an important role in regulating the balance of inflammatory activity. Going forward, researchers should examine both pro- and anti-inflammatory signals to capture a more comprehensive picture of how the immune system responds to adversity.

CONCLUDING COMMENTS AND DIRECTIONS FOR FUTURE RESEARCH

Over the last 30 years, researchers have made considerable progress in identifying links between early adversity and adult physical health outcomes. Findings from epidemiological studies, animal studies, and naturalistic experiments converge on the idea that exposure to early adversity is a risk factor for cardiovascular disease, metabolic disruptions, some cancers, and even early mortality. Great strides

have been made in formulating hypothesis-driven, conceptually based models that set out to test the processes by which early stressful experiences become embedded in the body only to emerge as physical health problems, early aging, and chronic disease several decades later.

Yet despite this wave of exciting research progress, we are only beginning to understand the pathways linking early adversity and health. Many of the studies to date, including retrospective reports and cross-sectional study designs, have significant methodological limitations, which limit our ability to draw strong conclusions about causality. Similarly, our knowledge about the biological mechanisms that might explain the progression from early adversity to accelerated aging and disease in adulthood is considerably lacking. Next we identify several key research areas that will be important to explore in the next generation of studies linking early adversity to adult physical health. The list of research priorities is far from exhaustive; nevertheless, advancements in each of these areas will increase our understanding of how and under what contexts early adversity shapes long-term physical health outcomes.

Expanding Research to Other Periods of Development

The large majority of the research reviewed in this chapter focuses on the impact of adversity that occurs during the early childhood years. There is good reason for this emphasis: During these early years, many biological systems are especially sensitive to environmental effects, and many organ systems and tissues are undergoing a rapid period of development, expansion, and specialization. At the same time, however, these early years capture only a brief glimpse of development, and we believe that other developmental periods as well as transitions across developmental periods may be particularly sensitive to the effects of adversity in ways that can make individuals susceptible to physiological disruptions and progression toward disease. We describe several of these opportunities for future research next.

Prenatal Period

The *fetal-programming model* (Lucas, Fewtrell, & Cole, 1999) posits that in utero experiences shape infants' development by exposing them to maternal signals about environmental conditions to be expected at the time of birth. From an evolutionary perspective, the ability to send signals to the developing fetus has a number of advantages for survival: The fetus, in response, can alter its development in preparation for the demands of the environment. Cottrell and Seckl (2009) have suggested that prenatal overexposure to glucocorticoids might be one mechanism through which prenatal stress results in greater risk for health problems, such as cardiovascular disease and metabolic abnormalities. Evidence from animal studies lends support to this hypothesis, but whether such an effect is present in humans remains to be seen.

Findings from a number of studies suggest an important link between prenatal experiences and subsequent outcomes in infants (e.g., Field et al., 2004; Oberlander et al., 2008; Sandman, Davis, & Glynn, 2012; Sharp et al., 2012) and adults (Heijmans et al., 2008). Using a sample of mothers who varied in their levels of depression during and after pregnancy, Sandman and colleagues (2012) examined the hypothesis that infants are calibrated in utero for postnatal environmental conditions. As predicted, infants with the best performance on measures of mental development (e.g., sensory-perceptual acuity) and psychomotor development (e.g., body control) were ones who had similar pre- and postnatal environmental experiences—even when those experiences included maternal depression. In other words, infants who experienced maternal depression pre- *and* postnatally fared better than infants whose mothers were depressed at only one time point. These somewhat counterintuitive findings suggest that infants receive important programming signals in utero, and when these signals do not correspond with the external environment, infants show early delays in motor skills and mental development. Evidence about the long-term deficits related to the incongruence between prenatal and postnatal environments is lacking, however. It is possible that these effects disappear by childhood or have little long-term health relevance. Nevertheless, continued research in this area will be useful for determining the extent to which prenatal exposure to adversity confers risk for long-term physical health problems.

Adolescence

Adolescence is a developmental period of multiple transitions, characterized by fundamental changes in biological, cognitive, social, and psychological processes (Holmbeck, 1994; Lerner & Castellino, 2002). Researchers now widely consider adolescence to be the second critical period of development, and experiences during this period are thought to have an unusually strong influence on long-term health outcomes. This plasticity confers unique sensitivity to environmental and contextual experiences that can have a lasting impact on health. Indeed, from a health perspective, adolescence represents a critical time in which long-term health trajectories are set in motion, and the precursors of chronic disease often emerge during this period (Lule, Rosen, Singh, Knowles, & Behrman, 2006).

Further, recent estimates suggest that a growing number of adolescents show symptoms that are indicative of metabolic disruption (Cornier et al., 2008).

Compared to the extensive body of research on pediatric and adult health, adolescent health has received far less attention, which is surprising given that adolescents represent 25% of the world's population (Sawyer et al., 2012). The World Health Organization, UNICEF, and the *Lancet* (Sawyer et al., 2012; United Nations Children's Fund, 2012; World Health Organization, 2014) recently highlighted the importance of investing in adolescent health research in order to address significant gaps in knowledge about determinants of health across the life span. The growing prevalence of health problems in childhood and early adulthood, including obesity and diabetes, has both immediate and long-term social, economic, and medical consequences. Although adolescent mortality rates are quite low, the precursors of chronic disease often emerge during this period (Balagopal et al., 2011; Berenson & Srinivasan, 2005). For example, risk for heart disease, including the early formation of atherosclerotic plaques, becomes apparent in adolescence. Thus, attempts to identify the processes that set adolescents on trajectories that culminate in health problems across the life span are of significant public health and economic importance. Moreover, identification of early-onset predisease processes has the potential to identify individuals for whom targeted interventions may be most beneficial.

An additional question about the connection between stressors and health outcomes in adolescence relates to the fact that the onset of puberty corresponds with many of the transitions that take place during this developmental period. We know little about how puberty and the corresponding shifts in stress hormones interact with stressful experiences to shape physical health outcomes—both in adolescence and into adulthood. These questions will be important to address in future research.

The Study of Transitional Periods Across Development

Transitional periods in development, such as the transition from elementary school to middle school and the transition to adolescence, have the potential to be stressful periods for children (Graber & Brooks-Gunn, 1996). These periods often are marked by dramatic shifts in behavior, responsibility, rules, and opportunities. Given the sweeping changes across social, cognitive, affective, and biological domains and the onset of new stressors that take place around developmental transitions, researchers should examine how transitions may create stressors that put children at risk for health problems. Transitional periods that affect social and emotional functioning also may engender changes in physiology and risk for poor health. To study biological changes that co-occur with transitional periods, longitudinal studies will be necessary, an issue we discuss in more detail later.

Strengthening Study Designs

Throughout this chapter, we have noted some of the important methodological limitations that limit our ability to make definitive conclusions about the extent to which early exposure to adversity leads to chronic diseases of aging in adulthood. Next we review a few of the main study design limitations and offer some solutions for stronger research designs that can be used to test research questions about how early adversity becomes biologically embedded in the body and translates into physical disease in adulthood.

To date, cross-sectional and retrospective studies make up the bulk of studies on early adversity, biological intermediaries, and later health outcomes. Although there certainly is merit in identifying connections at the cross-sectional level, our ability to draw conclusions about the causal nature of these links is substantially limited with these study designs. For one thing, retrospective reports have significant weaknesses (as discussed earlier in the chapter), which call into question the validity of the reports. Further, cross-sectional study designs cannot shed light on whether exposure to adversity contributes to dysregulation and disease or is simply a correlate of these outcomes. Future research needs to incorporate longitudinal study designs with multiple assessments of biology to allow for stronger statements about the direction of effects. These study designs can be costly and time-intensive, but they are important for researchers who wish to take a developmental approach to understanding the processes through which early adversity influences health. Of course, it is not necessary for researchers to conduct decades-long research investigations focused on experiences from infancy through adulthood in order to add to our understanding of adversity and health. For researchers who wish to test mediational models and developmental cascades models, at least three time points are preferable, with sufficient time between assessments for measures of interest to change during that period. Longitudinal designs that are conducted over relatively short time frames still can add insight into the intermediary processes that take place on the road from early adversity to chronic disease.

Another concern focuses on the nature of various proposed biological mediators of the link between early adversity and adult health. Many of the biological

mechanisms that we have described in this chapter are thought to serve as intermediate phenotypes, and they should be assessed at multiple time points to examine change over time. Research that can map the trajectories of these biological markers across time would greatly add to our understanding of how these mechanisms eventually lead to disease. Moreover, researchers studying these biological mediators should be aware of the strengths and weaknesses of the mechanistic concepts and methods used to measure them. They also should be aware of the untested assumptions about the clinical relevance of a number of proposed biological mechanisms (e.g., telomeres in nonreplicating cells, circulating cortisol).

Another way to strengthen future study designs is to conduct experimental and quasi-experimental studies. Given that some environmental experiences cannot be assigned randomly for ethical reasons, intervention studies may be a useful way to evaluate changes that result when reducing environmental exposure to adversity. Some evidence suggests that interventions designed to address socioeconomic disadvantage may lead to improvements in physical health. In the 1990s, the United States Department of Housing and Urban Development undertook a large-scale randomized intervention study in five large U.S. cities to examine the health outcomes associated with moving out of poverty (Ludwig et al., 2011). Families were randomly assigned to one of three groups: One group received housing vouchers to move to a low-poverty area, another group received the vouchers without the low-poverty location restriction, and a third control group did not receive vouchers or counseling. Approximately 10 years later, Ludwig and colleagues measured a variety of metabolic outcomes, including glycosylated hemoglobin and BMI. Women who moved to low-poverty neighborhoods had decreased rates of extreme obesity and glycosylated hemoglobin relative to women in the control families. These findings suggest that reducing exposure to adverse neighborhood experiences may have long-term health implications. This study was focused on health outcomes of adult women, but it is possible that similar intervention programs will have beneficial effects for children living in poverty. In fact, these types of intervention programs may have a stronger influence on children compared to adults if such an experience can create a lasting change in children's developmental trajectories.

Buffers and Protective Factors

As described earlier in this chapter, epidemiological findings suggest that exposure to stressful adverse experiences is a significant risk factor for poor health outcomes. Nevertheless, not all individuals who experience adversity get sick (e.g., Chen et al., 2011; Miller, Lachman, et al., 2011). Research focused on buffers against the negative mental health outcomes associated with adversity has uncovered key variables that might help explain why some individuals thrive despite early experience with adversity. Researchers have identified intrapersonal characteristics (e.g., temperament, emotion regulation capacities), family characteristics (e.g., sensitive caregiving), and neighborhood factors (e.g., connections to adults in the community, access to support services) that serve as buffers and help protect children from some of the negative consequences associated with exposure to socioeconomic disadvantage and maltreatment.

To date, most of this research has focused on protective factors for mental health outcomes, and only recently have researchers studied whether there might be buffers that mitigate the negative physical health outcomes associated with exposure to early adversity (Chen, Lee, Cavey, & Ho, 2013; Miller et al., 2011). For example, in a sample of healthy adolescents, low SES was associated with higher circulating markers of inflammation, but only for adolescents who did not have a supportive role model (Chen et al., 2013). Similarly, in a sample of adults who experienced low SES in childhood, high levels of maternal warmth buffered adults against a phenotype characterized by proinflammatory signaling (Chen et al., 2011). These findings are notable because they offer insight into the reasons why not all individuals exposed to early adversity go on to experience poor health in adulthood.

Another related question concerns the timing of these buffers. Recent empirical evidence for the positive outcomes associated with protective factors has focused on buffers that are temporally connected to the experience of adversity (e.g., receiving supportive caregiving or having a role model while living in poverty). Research on the effects of these buffering factors also should examine the extent to which buffers at other important periods of development might play a role in mitigating risk. For example, adolescents who experience adversity in early childhood may benefit from supportive caregivers or role models in adolescence. It may be, however, that support systems need to be in place at the time of exposure to adversity to offset the negative experience. These questions will be particularly important to explore in order to shed light on what factors are most effective at ameliorating the negative health outcomes associated with exposure to adverse experiences.

Translational Implications

After identifying the protective factors that shield children from the negative health effects associated with early adversity, clinicians and researchers should use this information to develop testable interventions to examine whether the programs that foster behavioral changes also shape biological intermediaries in ways that have long-term implications for physical health. For example, programs designed to provide mentors and supportive role models to at-risk children may alter biological pathways that ultimately could improve long-term physical health outcomes. Similarly, parenting interventions that reduce children's exposure to harsh parental caregiving could shape biological processes in ways that minimize risk for accelerated aging and early mortality. For example, evidence from an intervention study suggests that children whose foster parents received a positive parenting intervention showed declines in basal cortisol levels relative to control children whose foster parents did not receive the intervention (Fisher, Gunnar, Chamberlain, & Reid, 2000). Although this study had a small sample size (just 10 children in each condition), the findings offer some indication that parenting interventions might affect predisease pathways in ways that are beneficial to health. Community programs that are designed to improve family socioeconomic conditions may provide opportunities for researchers to examine whether a modest change in the experience of early adversity shapes epigenetic modifications, HPA axis activity, and inflammation. These kinds of translational studies will require researchers and community advocates to work together to advance our understanding of how early adversity shapes physical health.

Linking Research on Developmental Psychopathology and Health Psychology

Throughout this chapter, we have noted a number of instances in which exposure to early adversity has been associated with long-term mental health but not physical health outcomes (e.g., effects of exposure to interparental violence, natural disasters). This trend is not entirely surprising, given that programs of research often are focused on a narrow set of outcomes (e.g., mental health *or* physical health). Yet this tradition of focusing on a restricted range of outcomes ignores the fact that researchers interested in developmental psychopathology and health psychology often are motivated by a similar set of research goals. Going forward, we believe that a more integrated and interdisciplinary approach to research on mental and physical health is warranted. To the extent that researchers in these fields can share theories, methods, and work together collaboratively, scientific progress on all fronts will be much more rapid. Indeed, there are some exciting questions at the intersection of these fields, which we hope researchers will soon answer. For example, researchers across these disciplines frequently seek to understand the long-term developmental effects of early exposure to adversity and whether there are intrinsic or extrinsic buffers that can offset the negative outcomes associated with stress. These questions—and many others—will be of central interest in the years to come.

Conclusions

We look forward to the next generation of studies on early adversity and adult physical health. In the coming years, more research on the biological intermediaries linking early adversity and adult physical health will help uncover the processes by which stressful life events translate into chronic disease and accelerated aging. This research should take a developmental approach, using prospective studies and incorporating multiple levels of analysis, from molecular studies to large-scale epidemiological studies. The use of comprehensive models (e.g., models of equifinality and multifinality, developmental cascades, differential susceptibility) will help shed light on questions about (a) the relative timing of events in development (e.g., sensitive periods, transitional periods), (b) the complex interconnections among risk and protective factors, and (c) the biological consequences associated with early adversity. Findings from these studies will offer new ideas that can help inform public policy and clinical practice.

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CHAPTER 2

Community Violence Exposure and Developmental Psychopathology

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INTRODUCTION: VIOLENCE IS COMMON BUT PROBLEMATIC

Violence is a ubiquitous human behavior, occurring across human societies, economic and social positions, and the life span. Yet, for the vast majority of people, direct exposure is rare and is a high impact experience. Similarly, every community has violence, but exposure to violence in the community is exceptional in all but a few locations. Most people are violent at some point in their life and

accordingly have some victimization or witnessing experience. Yet even among individuals exhibiting violence at a relatively high rate and for those residing in our most dangerous neighborhoods, violence is still rare during conflict, when facing frustration, or when intending to aggress. Similarly, experiencing violence as a witness or direct victim, while it occurs at alarming rates for some portions of the population, remains in almost each instance an experience that stands out as remarkable. Thus, the experience and impact of violence exposure, even while having limited direct involvement, has substantial impact on development and warrants careful attention of developmental psychopathologists. This chapter focuses on the impact of exposure to one form of violence, community violence. However, in order to understand the subcategory of community violence, it is important to consider violence more generally and violence in other forms as a human behavior and environmental experience/condition more generally.

Evolutionary biology and archeological research explain violent behavior as an adaptive or protective response to compete for resources and power in the social hierarchy and to fend off similar threats from outside the group (Eisner, 2011). Folk and formal literature reveal a long-standing reporting of violence as an undesirable but complex part of human nature dating back to some of the earliest writings (James, 2011). For example, James (2011) notes a record from AD 24 of a trial of Plautius Silvanus for killing his wife by pushing her out a window. His defense was that he was asleep at the time and that she must have leapt. He committed suicide while awaiting trial. Also, his prior wife subsequently was tried for having driven him insane with potions and incantations leading to the murder of his second wife. In this example and in multiple historical accounts from the earliest times, two seminal controversies can be found that persist about the meaning of violence particularly in regard to psychopathology. Is violence a willful criminal act to be treated as a justice issue, or is it an outcome of emotional loss of control or other forms of psychopathology? Is it an inevitable part of human behavior? Are those who commit violent acts psychopathological or simply evil, and if sometimes one and sometimes the other, how do we distinguish these? Is use of violence and harm from it the result of pathological upbringing, or is the developmental course one of less proneness and impact as we mature, such that adults are expected to have full control over that behavior? Is use of violence the result of goading and provocation or a reflection of character and personality makeup? Are there times when violence is appropriate, perhaps even desirable? Is violence exposure inevitably harmful, or does that depend on the type and extent of exposure? What can be done about violence and to help those most vulnerable to its influence?

While these considerations fill volumes of legal, philosophical, and social analyses, and violence and related aggressive behavior have received as much attention as any subject in psychology, most of the controversies that are the subject of this scholarly attention remain unresolved. Understanding violence remains of critical interest in understanding psychopathology and is in need of more study. Violence is of continuing interest to those attempting to understand its pernicious role in the developmental course of psychopathology (Cicchetti & Toth, 1995). Violence is implicated regularly in theories about developmental psychopathology, whether as a symptom of some psychopathologies, a putative cause, or the conduit through which psychopathology can be imposed or promoted (e.g., violence causing traumatic anxiety in a witness or victim; Tolan & Gorman-Smith, 2002). In addition, violence occurs in many forms, from a variety of sources, and with differing levels of injury (including death; Tolan, 2007). Capturing the many roles, features, and meanings of violence for developmental psychopathology and organizing them into a coherent explanation can be challenging, because different aspects can seem pertinent depending on the specific interest (Elliott & Tolan, 1999). However, coherently relating the many aspects of violence is essential in order to understand community violence and violence as a whole and to advance knowledge about its role in psychopathology.

This chapter focuses on one form of violence, which is often cited as particularly pernicious: community violence. Still, there is limited understanding of this particular form of violence exposure and its effect on developmental psychopathology. Adequate understanding of the state of knowledge rests on integrating important work from a developmental psychopathology perspective on community violence, on other forms of violence, and on related descriptive and intervention studies. Therefore, this chapter begins with an overview of the multiple definitional challenges in determining what violence is, in general, and how it relates to the common view and framework of community violence. This general-to-specific relation is pertinent in the ensuing sections on patterns of violence exposure, causes of exposure, effect of exposure, interventions and policy related actions, and suggested further research and actions.

VIOLENCE PERPETRATION AND EXPOSURE ARE IMPORTANT BUT POORLY DEFINED DEVELOPMENTAL PSYCHOPATHOLOGY CONSTRUCTS

Because almost all people are violent at some point in their life and almost all are exposed to some form of direct violence, it is noteworthy that violence nevertheless is seen as dramatic and/or problematic in all but a few instances (e.g., minor physical aggression among young children, righteous war, self-defense, fighting injustice). Also, the harm is not seen as limited only to direct exposure or to whether that exposure is experienced as victim or perpetrator. Indeed, there is little disagreement that violence is almost always problematic and that abating it is positive. However, beyond that matter, consensus drops quickly about how it is understood and what to do about it. Much of the disagreement is tied to how violence and violence exposure are defined. In addition to carrying differential assumptions and connotations, the definitional variations make scientific comparison and certainty difficult. Moving to a useful scientific understanding of violence requires a balance between precision and consistency in definition and a consideration of the differential interests in research, practice, and policy related to violence exposure. That tension needs identification and articulation to facilitate sustained shared meaning and related action.

What Constitutes Violence for Understanding Developmental Psychopathology?

Among the controversies related to violence are these questions: What is considered violence? How is violence differentiated from nonviolent aggression and other forms of interpersonal disregard or insult (Elliott & Tolan, 1999; Tolan, 2007)? Variations in these boundaries carry important implications for the role of violence in psychopathology, how patterns are identified, what and how risk factors are related, and which interventions and policies seem appropriate. Moreover, different definitions can create variations in data, testimony, and other information that are the bases for scientific and public understanding, variations that in turn can lead to divergence in implications (Loseke, Gelles, & Cavanaugh, 2005). The lack of consensus hinders scientific progress by obstructing coordination and comparison between epidemiological and risk/causal studies, obscuring the meaning of trials of program and service procedures effects, and undermining standards of judging effectiveness. A lack of a consistent shared definition of violence impedes scientific interests such as generalization, replication, and robustness of knowledge. This vagueness of definition also degrades the respect given to such evidence in comparison to opinions and how policies designed to address violence define expertise.

Common and Differentiating Features of Violence

The common feature of most violence definitions is intent to injure from a perpetrator's point of view and physical harm or fear from threat of such harm from a victim's point of view (Krug, Dahlberg, Mercy, Zwi, & Lozano, 2002). Forms of violence are distinguished along dimensions that also form legal distinctions about violence: intentionality of action and a level of notable harm. This definition differentiates violence from injury that may result from an accident (no intention), negligence (failure to show due caution that results in harm), and recklessness (acting in such a manner as to greatly increase the potential for injury), not by the harm that may result by criminial intention (mens rea). Mens rea is legally an essential component of crime perpetration.

This definitional base also emphasizes physical harm or the threat of such harm (e.g., the threat to hit if someone does not do as the perpetrator insists) as an essential determinant that violence has occurred. Violence can be narrowly defined as an act of intentional physical aggression inflicted in order to cause and resulting in physical injury of self or another. Constraining the definition in this way has the advantage of making determination of what is violence easy and tracking violence patterns and effects more straightforward. Such clarity may enable criminal and civil codes to guide legal procedures more easily. It also may be more important for tracing epidemiological patterns than including less certain acts and intentions (Tolan, 2007). However, these benefits may come at the cost of excluding many important nuances of violence experience. Such a narrow definition simplifies three components that vary across violence definitions: (1) role of intent, (2) what constitutes an aggressive act, and (3) how harm to the victim(s) should be considered. For example, violent intentions may not result in injury. Recklessness, while a less intentional condition leading to harm, can be as injurious as other forms of violence and can appear intentional to the victim. Similarly, violence may not always be expressed directly or experienced directly. It can come in the form of intimidating gestures or verbal threats of violence. Participants in a conflict may have quite different perspectives on whether violence

was present, using different thresholds of what is termed physical threat and what needs to be explicit or can be implied to constitute violence. For example, a group of young men on a city corner may see as a threat another group of young men from a different neighborhood moving physically closer to them. They may be correct if the groups are organized gangs competing for drug sales turf. They also may not see such a move as violence, as no one was actually attacked or hurt, or no direct threats were made. Similarly, a couple bickering loudly within earshot of neighbors may induce fear and worry about the female's safety for some, but others may see the encounter as dramatic but insubstantial. The arguing couple may each experience the conflict as imminently at risk for violence or not.

Are Physical Harm Threat andlor Intent Necessary for an Act to Be Violent?

There is less certainty, and substantial disagreement, about how fully intentional the expression to cause physical harm must be for the act to be considered violent. The extent to which intent is seen as required for violence to occur is important for understanding how violence arises in relation to psychopathology. Similarly, the likelihood or imminence of intentional harm can affect how violence exposure is tied to trauma. It may be that traumatic impact is significantly dependent on actual harm (compared to threat or witnessing violence) or it may not be. Similarly, it is an unsettled debate whether, for violence to be present, the intention must be to cause physical harm or merely to coerce another (Tolan, 2007). For example, most would agree that threatening to hit someone unless he or she does as you demand is violent. However, in a given study, there may be important variations in impact and basis for effects depending on whether threat is treated the same as physical injury and how matters such as perceived intent and imminence are considered. At present, most of the difference in inclusion and exclusion across studies and reviews is not based on careful definitional comparison or empirical tests of the role of intention, actual harm versus fear of harm, and/or imminence of harm. Instead, variation in measurement makeup often is overlooked. Also, frequently a measure shows that a particular perspective was applied without the basis of the theory being clearly acknowledged (Chalk & King, 1998). Stakeholders vary widely on where such boundaries should be drawn (Jackman, 2002; Jouriles, McDonald, Norwood, & Ezell, 2001; World Health Organization [WHO] Summit on Violence, 2002). For example, while some definitions restrict violence to imminent threat of harm, others expand it to include direct attempt to oppress or coerce, and others go further, including where it might be implicit or would be considered so by an outside observer. These boundaries have been debated most when violence is occurring in a relationship and there is differing power and ability to cause harm (e.g., domestic violence, child abuse).

In regard to a recipient or victim's perception of potential harm or threat of injury as part of the definition of violence, some argue that acts, orientations, or statements that are experienced as intimidation, coercion, oppression, or creating undue insecurity are violent, even if they do not involve actual physical aggression or specific verbal threats. From this viewpoint, if the "victim" feels threatened or afraid or identifies some act as violent, it is considered violent. Although this definition incorporates the experiencing of violence and informs about behavior during conflict, it also introduces unspecified variation in responses within samples and across studies. Moreover, we cannot see any differences among the contribution of violence, the perspective about violence, and personal reaction when they are all collapsed into defining any interaction as violent.

Others suggest that violence should be differentiated from the victim's perception of threat even if only to permit more careful empirical testing of the relation between acts and perceptions (Johnson, 1995; Malley-Morrison & Hines, 2004). For example, in such an approach, the act would be defined as violent by intention to injure or to directly intimidate through threat of violence. Typically, some determination is made about what is a reasonable or common basis for concluding that threat has occurred (akin to the legal criterion of "reasonable person standard" for perception and expectation). This is done so that variations in labeling and reaction can be studied and understood as important but distinct components. When defined with objective criteria rather than personal determination, it can be argued that more sensitive consideration of variations in what is threatening also can be better considered because the perception and the conventional/objective definitions can both be considered. In addition, proponents of such a distinction would note that it also helps in offering perspective in explaining violence and the effects of the relationship between the involved persons, such as ongoing high levels of interpersonal conflict, contemptuous attitudes, or neglect of expected care. It is argued that limiting the definition of violence to the act itself and by using a "reasonable person" standard of threat/harm, research can disentangle violence and its affects from co-occurring problems. Research also can differentiate

between related but distinct contributors to functioning, susceptibility to trauma or other pathology effects, and best interventions.

Cultural and Societal Variations in What Is Considered Violence

Another important challenge in defining violence is that cultural differences may affect the meaning of the terms *violence* and *injury* (Hudley & Taylor, 2006; Walters & Parke, 1964). For example, injury in some cultures is broadly defined as an attempt to harm or manipulate the well-being of others. Alternatively, in other cultures, injury is reserved for serious physical harm, and minor assaults may not be considered violence. Similarly, behavior that is considered very offensive in one culture may be considered acceptable, even expected, in another. Even if physical force is clearly evident, such acts may not be seen as violent, or they may not be treated as similar to other acts of violence. For example, if two friends are teasing each other in a display of relative dominance during a group gathering of adolescents, one might smack the other upside the head. This action would not be seen as violence by anyone familiar with the exchange; it would be seen as part of group hierarchy competition in certain contexts. If asked about violence exposure, neither the perpetrator nor the victim would report this event.

Outside observers might say that this exchange was clearly violent, even if the adolescents involved did not view it that way. Whether cultural acceptability and commonality of occurrence should be considered criteria for violence remains controversial (Tolan, Dodge, & Rutter, 2013). For example, in a state of armed struggle, exposing children to violence may be seen as unavoidable. Therefore, those responsible for their safety and well-being may focus on how that exposure is managed and how the child might learn to avoid such exposure. Similarly, outsiders may view increasing empathy for an enemy and trying to train youth not to act violently toward members of the enemy's group as virtuous. However, within the culture, such actions may be seen as confusing and harmful to the children. Turning the other cheek may diminish children's vigilance, which risks their safety and/or distracts from allegiance to a religious cause or patriotic interest (Garbarino, 1996). A more common example of violence as part of developmental psychopathology is the question of how violence by parents affects youth when it is a part of routine discipline (Lansford et al., 2005). Although studies provide mixed results, a trend shows that cultural variation in harm of corporal punishment is related to how typical such practice is and how acceptable or normative it is perceived to be. It may be that acceptance of minor forms of punishment vary by culture whereas severe physical punishment may not be. The lesser forms of punishment also may be part of what is viewed as parental responsibility (or hierarchically, by teachers to students or older children to younger children).

Cultural considerations in the definition of violence also apply to understanding community violence, particularly how fear and perceived safety are related to actual levels of harm. For example, in the United States, there is a belief that violence in schools is increasing in the form of sudden violent rampages resulting in multiple victims. Each such horrific incident receives wide attention in the media, but it is important to recognize that such incidents still are extremely rare. At the same time, other types of school violence, which in fact causes more victims per year, do not receive such attention. These acts include student-to-student, student-on-teacher, and teacher-to-student violence. This violence often is concentrated in schools that serve lower-socioeconomic-status (SES) and ethnic minority populations. And, while some schools account for a higher percentage of overall violence, most schools are safe and in fact remain among the safest environments for children across neighborhoods. These variations in what affects the perception of school safety means that actual and believed threat may diverge, to the point that concern could be diverted to circumstances where violence victimization is actually unlikely (Tolan, 2001a).

Similarly, fear of strangers abducting children led to an infusion of funding and programming to teach children about "stranger danger," even though such occurrences are much less common than abduction by a person known to the child and is much less likely than harm from family members. Such emotionally charged responses seem to misdirect from acknowledging violent threats by family and acquaintances in favor of a much less likely threat of violence from strangers. For example, it may be presumed that violence exposure is not an issue in middle- and upper-middle-income communities because such communities have lower nonfamily assault and homicide rates than poorer and urban counterparts. Yet victimization, witnessing, and awareness of violence occurs within such communities. Conversely, it does not accurately characterize the daily experience of most urban, lower-SES residents (Horney, Tolan, & Weisbourd, 2012). These examples indicate that the perception of a setting as violence prone or violence ridden can induce fear, hypervigilance and

mistrust, attitudes that affect the definition of violence and how it may affect development.

Gender and Defining Violence

Related to the cultural and societal variation in violence perceptions is the understanding of the role that gender plays. Evidence clearly shows that males perpetrate violence at greater rates and are exposed to greater levels of violence than females (Farrington, Langan, & Tonry, 2004). Gender differences, particularly in physical aggression, are present early in life and remain throughout development (Tremblay et al., 2005). Further, it is widely recognized that male aggression includes more violence, ability to harm, intimidation, and other threatening aspects than female aggression. Also, community violence disproportionately occurs by and to males, although the extent of difference is hard to determine from existing research.

Yet among community samples of male-female couples, overall rates of violence do not differ by gender, and most violence is rare and minor (Tolan, Gorman-Smith, & Henry, 2006). A key consideration is that male relationship violence is more likely to be part of a pattern of coercion, intimidation, or contempt. This difference in relationship power is considered important in defining violence and in locating concerns about battering, political and economic inequities, and social resources when characterizing gender-based violence (American Psychological Association [APA] Presidential Task Force on Violence and the Family, 1996; Jouriles et al., 2001). Whether attempting to incorporate status differences in defining violence overtly or noting this contextual determinant of how violence and threat of violence might be related to gender, it is evident that the relation of exposure to psychopathology is dependent at least in part on this variation. These considerations have been central in research and policy debate about partner violence but have received much less attention in the study of community violence. In part, this is because much of the interest in violence emanates from study and policy related to domestic violence. Also, domestic violence is differentiated from what is considered community violence, treated as different in regard to likely effects on witnessing and with different treatment legally (likelihood of legal intervention and seriousness of potential charges). Whether status difference is literally less pertinent for community violence or not, partner violence is overheard regularly by neighbors. Thus, partner violence can also be community violence. It spills into the community experience, bringing to light gender and related power and threat differences for measuring and evaluating community violence exposure.

Moreover, there is controversy about how cultural variations and how gender should be incorporated into violence definitions. For example, even if actions that are violent, if violence is defined as physical harm or threat of such harm, are legal or sanctioned, should they be treated as violence in studies identifying patterns and rates and relating outcomes to risk factors? Should acts that seem to diminish the rights or status of others be treated as violence, even if they are labeled "not violent" in a given culture (Fagan & Browne, 1994)? When an act seriously harms the viability and safety level of a community, even if the act is legal or sanctioned, should it still be considered violent? Is the failure to care for those in pain or the imposition of prolonged neglect an act of violence? Not surprisingly, some argue for culturally based definitions of violence, whereas others argue for absolute definitions that focus on physical harm or imminent threat of harm. Some believe variations should be measured consistently and then interpreted within cultural contexts and other potential influences (Farrington et al., 2004; Krug et al., 2002). One argument for such an approach is that the relation of gender to violence and other cultural and societal variations that affect how a given act is perceived, experienced, and viewed by others needs to be considered. The best way to do that is to differentiate these variations from what is called violence. A second argument is that these effects are marked through legal codification, traditions, social structures and other engrained beliefs, so translation of scientific findings using this differentiation is more in line with social policies and existing norms. A third argument is that these considerations are always present, albeit in varied importance and prominence, and as such they should be measured separately for full consideration even if they are not implicated in a specific experience of a given individual (Chalk & King, 1998; Tolan et al., 2006). These arguments seem to permit due accounting of the role of gender in violence without conflating gender with violence.

Defining Violence Exposure for Developmental Psychopathology

These variations in what is considered violence and how it is measured affect studies of violence exposure and its impact, yet specifics of measurement formulation are rarely described in empirical studies. While giving due consideration to these variations in perspective, concerns, and empirical basis, there is consistency across studies that

points to the experience or imminent threat of physical harm as the hallmark of violence. This does not mean other forms of aggression and threat are not harmful or can be neglected, or that corollaries and corresponding problems are not worthy of consideration in understanding violence as a developmental psychopathology issue. However, focus on this central distinguishing feature seems important to permit differentiation and organization of the relation of violence exposure to closely related experiences and to conditions, covariates, and group differences in effects. Thus, there is increasing agreement that violence should be limited to referring to intentional physical harm or immediate threat of such harm to coerce another.

Even these basic considerations could lead to definitions that may vary in what is considered violence exposure. Because violence is a politically, socially, and culturally determined construct, there is an unavoidable compromise required between interests such as definitional precision and replication comparability and encompassing varying applications for policy and other actions (APA Presidential Task Force on Violence, 1996; Chalk & King, 1998; Office of the Surgeon General, 2001; WHO, 2002). For purposes of this chapter, the definition rendered by the *World Report on Violence and Health* (*WRVH*; WHO Summit on Violence, 2002, p. 5) seems to capture the variations in violence forms and sources while distinguishing it from other related behaviors. It is also suggested here as a definition for future work in the field:

> the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation.

The WRVH Typology of Violence

The *WRVH* also provided a typology of violence and categorized it into four modes of injury: physical, sexual, psychological, and deprivation. As is evident from this differentiation, there is interest in discerning when the injury is through sexual violence. The categorization also shows that in addition to physical injury, there can be injury that is psychological or that occurs by depriving the victim of basic needs or safety. These details help to define more specifically the forms of harm or likelihood of harm that are important in understanding violence and differentiating it from other potential risk influences.

WRVH also differentiated violence into three subtypes based on the victim-perpetrator relationship. *Collective violence* refers to violence committed by large groups of individuals, connoting the role of the group in precipitating the violence of the individual members. Collective violence includes acts that can be *social group*, *political*, or *economically* based. *Self-directed violence* refers to violence in which the perpetrator and the victim are the same individual, with distinction between *self-abuse* and *suicide*. *Interpersonal violence* refers to violence between individuals, and can be further differentiated into *family/intimate partner violence* and *community violence*. The former category includes child maltreatment, intimate partner violence, and elder abuse, while the latter is differentiated into *acquaintance* and *stranger* violence. With these categorizations and differentiation of forms of harm, this WHO definition brings into relief the complex variations that violence exposure can take and some systematization of how to measure and compare variation impact by type and relationship of victim and perpetrator. By these categorizations and in most writing, community violence includes: youth violence; assault by strangers; violence related to property crimes; and violence in schools, workplaces, and other institutions.

Considering Neglect or Deprivation as Violence

The word *power*, sometimes used in defining violence perpetration, refers to use of power in relationships and in relative social standing as a basis for imposing physical harm, threat of loss of safety or essential care, or deprival of resources (neglect). This view of coercive use of power as violence has focused most on relating gender to understanding violence impact. The inclusion of the use of power also incorporates treating acts of omission or deprivation/neglect as being violent. In order to understand violence as part of developmental psychopathology, this inclusion is important; it allows consideration of how coercion and harm can arise from lack of expected care or concern. However, this inclusion seems to suppose that effects of deprivation of care or regard are similar in extent and process as physical threat or harm rather than being based in empirical support. This relation is far from clear. In part, this is because many samples in studies to identify effects on maltreatment included children exposed to neglect as well as those physically or sexually abused. In most such cases, the large majority of such children have been neglected as well. These two limitations prevent understanding of how effects of neglect relate to other forms of victimization (Trickett & McBride-Chang, 1995). However, when differentiation permits comparison, results are mixed about whether neglect and violence have the same pathology-inducing and function-impairing effects (Trickett & McBride-Chang, 1995; Twardosz & Lutzker, 2010).

The way in which neglect relates to actual physical harm is relevant to community violence because community violence often includes exposure that is indirect or that induces fear. From that view, the absence of a safe environment is implicated as one form of violence exposure. For example, does failure to provide children with a safe route to school constitute the same harm as witnessing violence during that route?

This WRVH definition also includes a broad range of violence effects that stretch beyond variations in physical harm to include an increase in frequency of psychological disorders, elevated susceptibility to such disorders, and failures in development. While not stated explicitly, the definition also permits considerations in alteration of developmental pathways and sensitivities that can evince diminished functioning at key transitions or specific situations and at other points in the life span. Thus, consequences can be immediate as well as latent and can last for years after the initial violence. Also, it is important to consider not only the effects of violence on victims but also to examine the effects on perpetrators, those emotionally connected to the victim or perpetrator, and those witnessing the violence either directly or indirectly (e.g., child experience of partner violence between parents).

Defining Community Violence and Exposure

If violence is defined as imposing intentional physical harm or as the imminent threat of such harm, then community violence is the form of these actions that occur in one's community. Community violence is often differentiated from other violence in that it is something other than family or partner violence or violence between friends or acquaintances. It is also differentiated by where it occurs (or actually by where it does *not* occur). Community violence usually is defined as exclusive of violence in the home or at work. Violence at school is sometimes differentiated from community violence but most often is treated as a subset of community violence or separate therefrom. A third differentiating characteristic of community violence is that it includes a broader set of experiences than most other forms of violence. It is thought to include not only direct injury and threat of such injury but also knowledge or witnessing it. Often simply residing in a neighborhood with elevated rates of crime and violence is considered to be exposure to violence—growing up in an unsafe neighborhood with elevated opportunities to witness violence or know persons affected by violence can potentially affect development. Community violence is differentiated from family violence by the relationship between the perpetrator and the victim or witness. Also, as family violence means violence between persons who are also often responsible for care and affection toward each other or the child, the emotional and relationship complexities are differentiating. Similarly, serious injury or death of a family member caused by someone other than the family is usually distinguished from community violence. It should be noted that while these definitional differentiations are increasingly considered in measuring impact of different forms of violence, measurement of community violence varies considerably from study to study in what is included, how well it is differentiated from other forms of violence, and to what extent community violence is considered along with other forms (often only one form is considered in any given study).

Therefore, community violence exposure refers to a broad range of experiences related to violence and should be considered on a study-to-study basis. For example, violence exposure may refer to living in a high-crime community in one study, or it may be limited to serious violence that community members have heard about. Or it may be measured as personal experience of being the victim of physical aggression or witnessing it. Because community violence is often of interest as much for its direct effects as for its impact on creating an unsafe environment, many studies collapse varied contact with violence, such as victimizations of friends and families, witnessing or learning/knowing of violence in the surrounding community, with firsthand victimization. Thus, to some extent, community violence can refer to some subset or a variety of forms of violence that do not occur between family and friends and are not the result of war or political actions. Also, a given study may not distinguish, in measurement or in calculation of variable relations, the differences among direct victimization from exposure due to being a perpetrator of violence from witnessing violence as a bystander, from merely knowing about recent violent events, or a perception of low safety personally or of the school overall (Tolan, 2001a).

Differentiating Types of Community Violence Exposure

There is increasing agreement regarding the need to measure each of these types of exposure and to test for differentiation of effects (Tolan, 2001a). For example, Shields, Nadasen, and Pierce (2009) reported that direct victimization had more substantial and sustained effects on children's social and psychological distress than witnessing or hearing about violence, but the latter two forms were not significantly differentiated in regard to effects. However, the pattern of findings suggests it is not merely a matter

of extent of exposure or proximity to victimization that accounts for impact. Along that line, Schwartz and Proctor (2000) found that violent victimization was associated with negative social outcomes whereas witnessing violence was related only to subsequent aggressive behavior. Moreover, victimization effects on outcomes were mediated through emotion dysregulation. In a study with a related but different focus, Gorman-Smith, Tolan, Sheidow, and Henry (2002) tracked the link between family violence involvement and community violence and found that it was rare that community violence perpetration occurred without concurrent or preceding violence at home. Yet family violence did not simply account for effects of violent behavior in the community.

Empirically tracing the role of violence exposure to youth development and psychopathology patterns, causes, and course can entail extensive complexity. In fact, measurement detailed enough to make all the differentiations noted here as potentially relevant is impractical even for large studies with considerable resources. Also, as initially noted, it is unlikely for a given person to engage in violence even if subjected to it over substantial amount of time. Serious incidents of violence are rare enough to strain statistical reliability and validity assumptions for accurate interpretation of patterns even in high-crime communities. For these and other reasons most of the literature has focused on violence exposure overall, with a few instances in which differentiation of community violence from family violence is incorporated. What is known about demographic patterns, relation of forms of exposure, correlates, risks and protective factors, and effective interventions is often about exposure as generally defined or if there is more differentiation of type, role in the violence, or extent of exposure it is specific to the interest of the particular research project. There is little consistency across studies in such differentiation.

RATES AND PATTERNS OF EXPOSURE TO COMMUNITY VIOLENCE

Exposure to community violence came to the fore as a public health issue because surveys evidenced high rates of violence victimization and witnessing among youth residing in low-economic inner-city communities (Gorman-Smith & Tolan, 1998). These reports coincided with empirical verification of traumatic stress in veterans due to exposure to violence of war conditions and independent reports of posttraumatic stress symptoms, similar to what was seen in war veterans, among children exposed to terrible events. These events, such as kidnapping, produced interest in the conditions of a community, particularly violence levels, might potentially harm children (Tolan & Guerra, 1998). A third coincident influence was the emerging literature documenting effects of child abuse and neglect on developmental psychopathology (Cicchetti & Toth, 1995, 2005). As with traumatic impact of war and disaster, the finding of links between abuse and psychopathology susceptibility and developmental course helped to persuade many scientists and policy makers that violence in the community could have direct effects on child development.

Many of the initial reports about community violence rates, while useful in marking such violence a risk factor of importance, were dependent on questions that often were general, did not make clear the time frame for response, and did not provide ways for children to differentiate types of exposure. Moreover, there was considerable reliance on convenience samples via one-time surveys and limited attention to population representation and variations (Margolin & Gordis, 2004). Only a few of these studies differentiated questions about community violence exposure from familial or acquaintance violence and that which was a by-product of perpetration of violence from exposure due to victimization (Gorman-Smith & Tolan, 1998). Nevertheless, what was shown was that some children, particularly those residing in impoverished inner-city communities, experienced community violence at alarming levels, with reports as high as 70% reporting violence exposure (Thompson & Massat, 2005). For example, several studies published in the early to mid-1990s estimated that about 25% of inner-city youth have witnessed someone shot and/or killed during their lifetime (Groves, Zuckerman, Marans, & Cohen, 1993). The shock of one in four children witnessing such serious violence as well as documentation of related psychopathology led to much interest in rates of violence exposure of youth in the United States. As with child deaths due to violence, the United States stood out from other countries in the rates of children exposed to serious violence (Tolan, 2001b).

National Surveys

More careful assessment and sampling, although they documented for lower rates overall, seemed to verify the exceptional level of community violence exposure of U.S. youth. It also verified elevated rate of exposure in economic poor urban (inner-city) communities. For example, a recent national sample of U.S. adolescents found that 55% reported some type of violence exposure (McCart

et al., 2007). Similarly, another national sample study estimated that 17.6% of children and adolescents are direct victims of an assault in the community (Finkelhor, Turner, Ormrod, Hamby, & Kracke, 2009). One of the most extensive surveys has been by Finkelhor and colleagues (Finkelhor et al., 2009; Finkelhor, Turner, Shattuck, & Hamby, 2013), who reported on exposure to multiple sources of violence. Utilizing an extensive questionnaire, the Juvenile Victimization Survey, on a national sample of children ages 2 to 17 (adult reported for those under 10), found that 33% reported witnessing violence in the past 12 months, with 69% reporting some exposure to violence during their lifetime. In another report from the same data, Finkelhor et al. (2013) found that 22% of children had witnessed violence in their homes and schools in the past year and 39% had witnessed violence against another person during their lifetime. Specifically, 16.9% reported witnessing an assault of another in the community in the past year, with a lifetime prevalence of 27.5%, and 3.4% reported indirect exposure to community violence in the past year, with a lifetime prevalence of 10.1%. Notably, these rates are higher than for witnessing violence toward a family member or in the home. Other studies that have differentiated community violence from other exposure led to national estimates of witnessing community violence that range from 19.2% to 37.8%, with rates in inner-city communities of 30% to 50% directly experiencing violence and over 70% witnessing some form of serious violence (Finkelhor et al., 2009; Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003; Tolan, Gorman-Smith, & Henry, 2004;).

Among the major finding from this survey was the pattern of polyvictimization—that is, children exposed to violence were often exposed to more than one form. As the number of forms of violence they were exposed to increased, so did reported distress and problems in functioning. The results may suggest that the harm that results from multiple exposures does not increase linearly as exposure increases but may have qualitative increases in harm. However, this study leaves undifferentiated the extent to which effects from exposure overall differs from overall and component types of exposure. Repeated exposure and exposure to multiple types of violence are rare but are strongly related. In addition, multiple exposures may be attributable to additional risk factors also related to psychopathology. Thus, while documenting that multiple exposures occur and may have a nonlinear impact on functioning, this correlational survey study cannot authoritatively provide understanding about how exposure across types might impact psychopathology.

The Centers for Disease Control (CDC) has used the Youth-Risk Surveillance Survey to track exposure to and engagement in violence in school and the community. Although it does not differentiate fully community versus school or in-home/familial violence, the questions utilized permit reasonable estimates of community violence exposure. The most recent report, for 2013, indicated that nationwide, 24.7.8% of students had been in a physical fight one or more times during the 12 months before the survey, with the rate higher among males (30.2%) than females (19.2%) and higher rates by ethnicity (CDC, 2014). Blacks had a higher rate (34.7%) than Whites (20.9%) and Hispanic youth (28.4%). Also, Whites and Hispanics differed significantly. Within gender, the ethnic differences were maintained, but within ethnicity, the rate difference for males to females was similar. As with many violence exposure indicators, the rate has decreased since 1991 from 42.5% to 24.7%, with a significant drop between 2011 and 2013 (32.8%). The number of youth who reported having been threatened or injured with a weapon on school property one or more times during the preceding 12 months was 6.9%; 8.1% of youth reported being in a physical fight at school. Each indicator followed the same pattern of higher rates among Black than White or Hispanic youth as well as higher among males than females. In most cases, the differences between Hispanic and White youth were significant as well. The same ethnic group pattern was found for forced sexual intercourse (7.3% overall), but women reported rates of about twice to three times what males reported (10.5% to 4.2% overall respectively). Also, unlike most other physical attacks, significant differences in rates between 2001 and 2103 were found.

Being bullied at school (the only setting asked about) showed a different ethnic and gender pattern. Overall, this was reported by 19.6% of students with females reporting higher rates than males (23.7% versus 15.6%) and a higher rate among non-Hispanic White students than Black or Latino students. Similarly, with an overall rate of 7.1% indicating they had not attended school at least 1 day during the 30 days before the survey due to feeling unsafe at school, females had a higher rate than males. This rate was higher among Blacks than Hispanics. Both rates were higher than for non-Hispanic white students. Notably, the rates of such behavior increased from 1993 to 2013 rather than decreased, as has experience of violence at school and overall.

Across indicators, irrespective of gender or ethnicity trends, there was considerable variation in exposure by state and among similar communities. For example, across 37 states, the prevalence of having been in a physical fight ranged from 16.7% to 31.0% with a median of 22.8%.

Across 19 large urban school districts in the survey, the median prevalence rate was 26.3% with rates ranging from 17.2% to 37.6%. Although not summarized here, comparisons do tend to find urban-suburban differences in violence exposure rates.

Estimates from Youth Self-Report of Violence Involvement

Another way to estimate exposure to community violence, particularly of youth, is to consider how youth report weapon carrying, which suggests either likelihood of violence or concern for victimization. Notably, the vast majority of weapon-carrying youth say they do so for protection against attack rather than as intention to harm others (Tolan, 2001b). The CDC Youth-Risk Behavior Study (2014) reported 17% of youth had carried a weapon at least 1 day in the past 30 days, (more than 1 in 4 males; only 1 in 12 females). The highest rate was for White males (33.4%) followed by Black Hispanic males (23.8%) and Black males (18.2%). Female rates did not differ significantly by ethnicity. Gun-carrying patterns mimicked the overall weapon-carrying rate (5.5% overall; the highest rate, 10.7%, was for White males). There was no significant difference between Black and White males (Black males 9.8%, White males 10.7%)]).

Variations in Exposure by Gender and Ethnicity

These patterns reveal consistency in greater exposure for males than females for most types of violence, particularly community violence. Similarly, minority ethnic groups tend to have higher rates of community violence exposure, a fact that seems to be closely related to differences in likelihood of residing in a community marked by concentrated poverty and other associated problems, including higher violence rates. Therefore, it seems that differences in exposure rates are mostly accounted for by community economic levels and related resources. However, these covarying neighborhood conditions also represent a complex pattern of elevated risk, lesser opportunities, and scarce resources for avoiding exposure and for managing exposure (Tolan, Guerra, & Montaini-Klovdahl, 1997). These conditions constitute a differential risk ecology that may well relate to differential bases for exposure, impact of exposure, and ability to mitigate exposure and impact.

The gender differentiation seems to cut across ethnic groups and economic levels (to the extent studied). In this case, the greater exposure does not correlate with the group that has greater social status or access to more resources for coping. In addition, as with other forms of violence, serious community violence is more likely to emanate from males than from females. Thus, the differential exposure seems to reflect differences in proclivity for involvement in settings and antisocial behavior that is related to violence. Notably, the few studies that have made gender comparisons show consistency in relation to symptoms and impact on functioning, although exposure rates tend to be higher for males (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009; Pinchevsky, Wright, & Fagan, 2013). Yet in one of the most thorough comparisons of forms of exposure, Pinchevsky et al. (2013) reported that direct (victimization) and indirect (witnessing or hearing about) community violence proved to have limited relation to substance use for males (alcohol or marijuana use) but significant relation to use for females. The effect was more robust for indirect exposure than direct exposure. Notably, all of the relations were small, and many relations were not significant.

Age and Exposure

Exposure to violence in general and to community violence in particular is usually related to age, with adolescence marking a time of substantial increase in both time spent in the community and unsupervised time there. This means that youth not only have greater opportunity for exposure to violence, but violence also may occur in part because adult supervision that could quell it is not present (Tolan & Guerra, 1998). The exception to this general trend is for physical assault when violence (abuse) from family members is not differentiated. However, Finkelhor et al. (2013) state that across maltreatment sources, rates of maltreatment reported for children ages 2 to 5 was 10% ; ages 10 to 13, 17%; and ages 14 to 17, 21%. Physical assault rates did not increase over time. Witnessing violence increased from a rate of 8% of those ages 9 and under, to 26% for those ages 10 to 13 and 43% for those ages 14 to 17 (Finkelhor et al., 2009). Indirect exposure increased from a rate of 2% for ages 9 or younger to 4% for ages 10 to 13 and 6% for ages 14 to 17.

Another trend evident across studies is that severity of violence exposure increases with age. For example, in the Finkelhor et al. survey (2013), those under 9 years of age were most commonly exposed to assault without a weapon or without injury and assaults by a sibling, with 10- to 13-year-olds reporting more assault with a weapon, sexual harassment, and kidnapping and reporting more witnessing of domestic violence in the home involving their parents and assaults by other family members. Fourteen- to 17-year-olds had the highest rates of any age

group for the most serious forms of violence victimization. Among this age group, the most common types of exposure were injurious assaults, gang violence, sexual assaults, physical and emotional abuse, and witnessing violence in the community. They also reported more sexual violence victimization than younger children.

Community Violence and Residing in Low-Socioeconomic-Status Urban Neighborhoods

Implicit in results of the CDC surveys and others is that exposure to community violence is related to residing in urban neighborhoods with concentrated poverty, or what has been termed the inner city (J. Wilson, 1987). These neighborhoods are marked not just by elevated rates of violence, but low home ownership, the absence of middle-income residents, and many other social and political problems. There is now considerable evidence that living in such neighborhoods is associated with exposure to a host of risk factors, reduced protective factors, and many other poor outcomes for children, including aggression, violence, substance use, depression, and academic failure (Gorman-Smith et al., 2002; Leventhal & Brooks-Gunn, 2000; Sampson, 1997). Surveys of children and adults reporting about children sampled from lower-SES urban neighborhoods routinely report high levels of exposure (40%–70%) to the most serious forms of community violence, setting these neighborhoods apart from most other U.S., communities regarding child risk for exposure to community violence (Tolan & Gorman-Smith, 2002).

The juxtaposition of patterns evident in the CDC survey and others—which show greater rates among those residing in low-SES, urban neighborhoods—seems to explain much of the difference in exposure for minorities, who reside disproportionately in these neighborhoods. It is not clear how much of the difference is due to the compilation of risk factors, such as urban residence and lower economic status and the concomitant dearth of resources, or how much is the confluence or coincidence of these factors for given neighborhoods. However, most studies to date have not systematically compared what might differentiate exposure across such communities or compared them with communities that differ on one but not other risk characteristics. Most of the literature focused on community violence has used samples from communities that are urban and have low socioeconomic levels. As such, this population has comprised a large proportion of minority ethnicity samples, but without due recognition that these characteristics might differentially relate to violence exposure and impact. Nor is adequate consideration given to how the conflating of these two demographic characteristics may lead to unjustified conclusion that it is both ethnicity and low income prevalence that promotes community violence. Because the majority of studies also focus on the variation of exposure for individuals within high-risk communities, the focus tends to be on how individual and family variables explain exposure and impact rather than on how community differences and demographic differences might explain them. Thus, the understanding based on current findings is constrained to documenting that rates drawn from such neighborhoods are high and that relations to psychopathology can be found in many studies, some of which are focused on youth from urban, poor communities. For example, in a study of youth receiving mental health services, community violence, domestic violence exposure, and maltreatment effects were differentiated. Community violence and maltreatment contributed uniquely to conduct disorders, whereas domestic violence did not. Community violence, but not maltreatment and domestic violence, predicted externalizing behavior (McCabe, Lucchini, Hough, Yeh, & Hazen, 2005). However, the sample was not systematically differentiated or stratified by community of residence, limiting implications to how individual variation in exposure affects these relations and differ by forms of violence.

WHAT ARE THE MENTAL HEALTH AND BEHAVIORAL EFFECTS OF COMMUNITY VIOLENCE?

The majority of research on community violence has focused on documenting a relation to psychopathology symptoms. Primary interest has been about the effects on externalizing symptoms (aggression, antisocial behavior) and disorders (conduct disorder), internalizing symptoms and disorders (primarily depression but more recently an increased focus on anxiety) and posttraumatic stress disorder (PTSD). Studies have increased in sophistication over the past two decades from convenience samples with cross-sectional correlations to consideration of longitudinal tracking and modeling of how variations in exposure, psychopathology measurement, and covariates and moderators interact in affecting the patterns. Although there are studies that have controlled for exposure to other forms of violence, looked at other risks for psychopathology, and applied careful measurement of type and extent of exposure, these tend to be the exception. For example, a school-based study examining school, home, and neighborhood violence exposure reported that school

and home exposure predicted internalizing symptoms, whereas only home exposure predicted delinquency and overt aggression (Mrug, Loosier, & Windle, 2008).

As in the other areas of interest, the considerable study of violence exposure due to maltreatment also seems informative about likely effects of community violence (Paolucci, Genuis, & Violato, 2001). In addition, there has been considerable attention to effects of witnessing and being involved in parental domestic violence (Evans, Davies, & DiLillo, 2008; Kitzmann, Gaylord, Holt, & Kenny, 2003). For example, in a sample of youth identified by child protective services as neglected/abused, harsh physical discipline was associated with externalizing whereas witnessing home violence was associated with internalizing behaviors (Maikovich, Jaffee, Odgers, & Gallop, 2008), suggesting that different types of violence exposure may have different effects. These studies could be informative about different levels of exposure.

Studies also vary considerably in how recent the exposure was, how carefully chronology of exposure is considered (lifetime versus recent exposure), and correspondingly how time is considered in measuring psychopathology effects (e.g., current status, recent functioning, lifetime occurrence). Also, most studies focus on relative differences in level of psychopathology symptoms, not on presence or absence of disorder. In many cases, the relative differences, although statistically significant, are modest in size between two nonclinical range scores. Yet results from studies that have relied on diagnostic criteria or cut scores thought to correspond to clinical problems are generally consistent with those utilizing symptom scale score comparisons. Similarly, few studies have considered the impact of community violence exposure on practical functioning indicators, such as school functioning, relationship quality, or economic well-being. The few that are available suggest some substantial effects.

Most of the existing studies have at least one of the limitations mentioned. These methodological considerations mean that interpretations are best focused on relative risk increase and probability of disorder than on suggesting direct causal role in mental illness. Similarly, the overall trends across studies provide a more reliable guide than any given study. Methodic reviews have been provided over the past 10 years, including a recent thorough meta-analysis of studies of community violence exposure relation to psychopathology (e.g., Fowler et al., 2009; Lynch, 2003). In addition, a substantial literature has been produced about potential protective factors (Gorman-Smith, Henry, & Tolan, 2004) and about related topics, such as children witnessing domestic and other violence (Evans et al., 2008; Kitzmann, Gaylord, Holt, & Kenny, 2003). These related studies can also inform about the psychopathology effects that seem attributable to community violence exposure.

Meta-Analysis of Effects of Exposure to Community Violence

In 2009, Fowler and colleagues reported a thorough meta-analysis of studies of the relation of community violence exposure to psychopathology symptoms. Of the 110 studies and 116 samples (n = 39,667) published before 2005 that had adequate documentation to permit effect size calculation, Fowler and colleagues found that total level of exposure (however measured) predicted mental health symptoms significantly and substantially. The reported effect size averaged $d = .63$ for externalizing symptoms and $d = .45$ for internalizing symptoms. In addition, because PTSD symptoms were commonly considered as a distinct outcome in many studies, Fowler et al. examined effects on PTSD symptoms and reported an average effect of $d = .79$.

Effects for Different Levels of Exposure

Fowler et al. (2009) were able to examine effects for different levels of exposure. It had often been speculated, and some studies suggested, that those who were direct victims of violence were more at risk for psychopathology effects than those who merely witnessed and/or had heard about violence near where they resided (Martinez & Richters, 1993; Nader, Pynoos, Fairbanks, & Frederick, 1990). For example, Nader et al. (1990) reported that children who were on a school playground during a shooting at that school had more severe symptoms than children inside the building, and both showed more symptoms than children who were not at school that day. Fitzpatrick and Boldizar (1993) found victimization but not witnessing related to depressive symptoms. For externalizing symptoms, direct victimization ($d = .78$) and witnessing ($d = .72$) effects did not differ from each other, but both were greater than hearing about community violence ($d = .42$). For internalizing symptoms, the effects differed by direct victimization ($d = .45$) compared to witnessing ($d = .32$) or hearing about community violence ($d = .27$) but the latter two exposure types did not significantly differ. PTSD symptom effect sizes did not differ by level of exposure ($d = .65$ for direct victimization, .60 for witnessing, and .63 or hearing about).

Effects for At-Risk versus Other Samples

Fowler et al. (2009) reported that effects of exposure were not significantly different for externalizing or internalizing

problems for samples identified as at-risk by virtue of residence in high crime communities in comparison to effect for those not having this risk status. However, the relation was significant for both groups on each outcome. When PTSD was the outcome, stronger effects were found for the samples not residing in high risk neighborhoods. Notably, only samples in which the neighborhood risk could be identified were so rated, meaning that some of those samples not so rated simply lacked enough information about where the sample was from to determine if crime was elevated in those communities.

Age Patterns in Effects

Fowler et al. (2009) reported that some age patterns were significant, comparing adolescent-only to child-only to mixed child and adolescent samples. For externalizing symptoms, correlations were greater for adolescent samples ($d = .99$) than for mixed child and adolescent samples ($d = .53$), which were greater than for child-only samples ($d = .35$). For internalizing, mixed-age samples had the largest effect ($d = .51$), which was greater than for adolescent samples ($d = .45$), and which was greater than found for child-only samples ($d = .33$). For PTSD comparisons, a similar pattern to internalizing symptoms was found, with mixed samples having stronger effects ($d = 1.02$) than for adolescent-only ($d = .66$) or child-only ($d = .63$), but with the latter two not significantly different.

Gender and Ethnicity Variations in Effects

Gender comparisons in the meta-analysis of Fowler et al. (2009) did not show significant differences in effect sizes for externalizing or PTSD but did find stronger effects for females than males for internalizing symptoms. Ethnicity comparisons showed significant effects for all ethnic groups, with some suggestion of lower effects for internalizing and PTSD for African American and larger effects for PTSD for Latinos when compared with each other and non-Hispanic White samples. However, Fowler et al. noted that relatively few studies had female-only samples or effects reported in a way that could be separated; likewise, there were not enough studies of Latinos or non-Hispanic Whites to permit sensitive comparisons. Thus, any conclusions need to be drawn with caution.

Example Studies Linking Exposure to Psychopathology

Studies Relating Externalizing Problems to Community Violence Exposure

Within the overall significant relation between community violence exposure and externalizing symptoms reported by Fowler et al. (2009), there was significant variation in quality of studies and in strength of findings. The interest in violence exposure promoting aggression, conflict with authority, involvement in delinquency, and exhibition of violence has been long-standing (Gorman-Smith & Tolan, 1998; Lambert, Ialongo, Boyd, & Cooley, 2005; Lynch & Cicchetti, 1998). Many of these studies focused on variations in symptomology among those residing in high-risk communities. For example, Gorman-Smith and Tolan (1998) demonstrated that among young men residing in high-poverty, high-crime Chicago neighborhoods, the length of community violence exposure related to level of aggression, even if exposure to family violence and exposure to other life stress were controlled for. As with many other studies, family functioning (parenting practices, quality of family relationships) explained likelihood of exposure and effects of exposure. Other studies focused on how neighborhood violence level might help explain externalizing symptoms, with residing in such communities considered as representing more exposure. For example, Plybon and Kliewer (2001) differentiated urban neighborhoods using cluster analyses of indicators or relative poverty and crime levels. Children (ages 8–12) living in high-crime, high-poverty neighborhoods exhibited more externalizing behaviors than those living in low-crime, low-poverty neighborhoods. Neighborhood type was mediated by family stress level; and family cohesion moderated the relation of neighborhood type to externalizing. Other studies have examined the relation of community violence exposure to personal behavior. For example, Lynch and Cicchetti (1998) reported that externalizing behavior among urban 7- to 12-year-olds predicted increased exposure to community violence one year later, even when prior exposure was controlled. Gorman-Smith and Tolan (1998) found similar effects but also showed that when controlling for prior behavior, community violence exposure predicted increased aggression. Lynch and Cicchetti also demonstrated that family violence increased likelihood of community violence exposure. Gorman-Smith, et al. (2002) reported similar results for their inner-city male sample. However, in both studies and as examined in some detail by Gorman-Smith et al., the overlap of patterns suggested much variation in likelihood of exposure to violence in the home and also in the community.

Not only do these examples show consistent linkage of violence exposure to occurrence of and growth in externalizing symptom levels; they also suggest several aspects of understanding that relation. First, both child behavior and family circumstances contribute to differentiating the

likelihood of exposure and effects of exposure. Second neighborhood social relation are important for understanding effects (Sampson, Raudenbush, & Earls, 1997). However, there is still a gap in studies that examine how neighborhood conditions might predict exposure and how such exposure translates to increased aggression and antisocial behavior.

Studies Relating Internalizing Problems to Community Violence Exposure

Multiple studies have shown that violence effects are not specific to externalizing but usually also affect internalizing problems (e.g., Gorman-Smith & Tolan, 1998; Schwab-Stone et al., 1999). In many cases, the internalizing symptoms were measured broadly, not differentiating anxiety and depression or other internalizing effects. Others focused on one specific type of internalizing disorder. For example, Fitzpatrick & Boldizar (1993) linked depressive symptomology to violence in the community. Lynch and Cicchetti (1998) found that direct victimization (but not witnessing) of violence related to depression symptoms. That study controlled for victimization from child abuse. These findings are in line with the overall finding in the Fowler et al. (2009) meta-analysis showing that effects on internalizing may be more specific to community violence victimization than to overall exposure or merely witnessing violence.

Studies Relating Posttraumatic Stress Symptoms to Community Violence Exposure

As noted by Fowler et al. (2009), the largest average effect size of the three psychopathologies considered in the meta-analysis was the relation between exposure and PTSD. As with externalizing, the investigations have gone beyond documenting increased symptomology as a correlate of violence exposure. For example, Garrido, Culhane, Raviv, and Taussig (2010) examined foster care youth to explore the relation between community violence exposure and family violence exposure in predicting trauma symptoms. Community violence was associated with trauma symptoms controlling for family violence exposure, but family violence was not related once community violence was considered. Similarly, in a sample of youth from Cape Town, South Africa, Fincham and colleagues reported that both community violence and child abuse and neglect significantly predicted PTSD symptoms in children. Notably, personal resilience via coping skills moderated the relation of abuse and neglect but not community violence exposure. Gapen et al. (2011) examined how neighborhood processes that are linked to community violence might relate to PTSD symptoms. In their sample of low-income, urban African Americans, perceived neighborhood disorder (a measure of self-reported perceptions of the physical environment) and community cohesion (a measure of perceived social ties) related to self-reported PTSD symptoms even after controlling for previous trauma exposure. Although both neighborhood disorder and community cohesion related to PTSD symptoms, cohesion also partially mediated the relation between disorder and PTSD symptoms.

Studies Relating Other Outcomes to Community Violence Exposure

Studies Relating Substance Use to Community Violence Exposure

Effects on substance use have also gained some attention, although they are usually secondary to another primary interest, such as effects on PTSD. Significant positive associations have been reported in some but not all studies that tested the relation between exposure to community violence and alcohol and/or other substance use by teenagers (Fagan, Wright & Pinchevsky, 2014; Farrell & Sullivan, 2004; ; Kliewer, 2006; Schwab-Stone et al., 1995; Zinzow, Ruggiero, Hanson, Smith, D., Saunders, & Kilpatrick, 2009). Kaufman (2009) reported a difference in habitual drinking for victimization but not indirect exposure and also no difference for drug use. Similarly, Pinchevsky et al. (2013) assessed direct and indirect exposure to community violence (approximating victimization and witnessing as well as proximity as one combined category) in relation to alcohol and marijuana use. They found each type significantly predicted the use of alcohol and marijuana and binge drinking. However, the effects were weaker and less robust for consideration of covariates for males. In a nationally representative sample, Zinzow et al. (2009) reported that witnessing community violence was associated with substance use, although witnessing parental violence was not. Among those who had witnessed community violence, the chronicity of violence exposure also related to substance use. What may be important, but is often not considered, is that violence exposure is more prevalent in communities in which substance use is less prevalent for adolescents. For adolescents, there is a lower rate of substance use among inner-city adolescents than is found in less-violent suburban communities (Tolan & Morris, 2005). Thus, it may be that among those residing in a given community, there is a positive correlation of substance use and violence exposure, but this effect may occur within a community-level relation of relatively lower rates of use.

Studies Relating Community Violence Exposure to Practical Functioning Effects

In addition to the psychopathology symptom effects reviewed by Fowler et al. (2009), it is thought that community violence can affect practical functioning as represented by outcomes such as academic functioning, relationship quality including marital stability, and economic and work functioning (Schwartz & Gorman, 2003).

In regard to academic functioning, several studies report lower academic skills and performance related to community violence. For example, Schwarz and Gorman (2003) correlated academic functioning and community violence, noting the relation was partially mediated by depression score. Bowen and Bowen (1999) reported that school danger predicted declines in grades among middle school and high school students and also predicted lower attendance. A specific study of community violence exposure in a large urban sample found that the degree of exposure affected school achievement and engagement (Perkins & Graham-Bermann, 2012; Ratner et al., 2006). Exposure to community violence negatively correlated with IQ and reading ability in a sample of first graders (Ratner, Chiodo, Covington, Sokol, Ager, & Delaney-Black, 2006).). However, in at least one study of inner-city children, controlling for other stress exposure, community violence did not independently explain school performance (Attar, Guerra, & Tolan, 1994). One longitudinal study noted that poor academic skills predicted earlier exposure to community violence, which related to later level of aggression (Lambert, Bettencourt, Bradshaw, & Ialongo, 2013). Sharkey, Tirado-Strayer, Papachristos, and Raver (2012) reported that children assessed within a week of a homicide that occurred near their home showed lower levels of attention and impulse control and lower preacademic skills than was found otherwise in the community. Parental distress was also elevated, suggesting one mechanism by which this community violence "exposure" could affect child functioning.

This smattering of findings suggests there are several ways that such exposure might affect school performance, engagement, and attainment. It might be that violence exposure compromises self-control, attention management, and the executive functioning critical for achievement. It might be that if travel to and from school is perilous, the ability to attend school is decreased. Similarly, it may be that motivation to achieve is lowered when life expectancy is shorter and life is threatened and uncertain. Further basis for expecting such effects can be found from studies of learning processes related to violence (not specifically community violence). De Bellis, Hooper, Spratt, and Woolley (2009) reported lower vocabulary, language processing, and attention control scores related to such violence exposure. Macmillan and Hagan (2004) reported lower academic attainment among adolescent violence victims. Others have shown the same relation for abused children (e.g., Currie & Widom, 2010; Herrenkohl, Sousa, Tajima, Herrenkohl, & Moylan, 2008; Lansford et al., 2005).

Not surprisingly, given the consistent relation between community violence exposure and increased aggression, there is a positive association between community violence exposure and involvement in the criminal justice system. For example, McGee and Baker (2003) reported that victimization by community violence correlated to juvenile offenses in a sample of 12- to 18-year-old African Americans, with a stronger relation for males than females. Among youth already in the juvenile justice system, those previously exposed to community violence were four times more likely to have committed serious criminal behaviors (Preski & Shelton, 2001). In a longitudinal study, Eitle and Tuner (2002) controlled for prior antisocial behavior, other stress, and demographic characteristics and found that exposure to violence as an adolescent predicted young adult crime. Notably, witnessing and direct victimization each independently added to the explanatory capability of this relation.

Violence exposure on stability and quality of later relationships has not been studied much. Most of the attention has been on documenting greater violence in personal relationships (Gorman-Smith et al., 2002). Covey, Menard, and Franzese (2013) reported that witnessing community violence correlated to marital status quite modestly ($r = .12$ to not having married). The relation was at a level comparable to experiencing abuse ($r = .14$). There has been documentation that adults with histories of child abuse have greater rates of divorce and less stable premarital relationships (Currie & Widom, 2010).

One area that has not received much attention is the long-term effect of community violence exposure on employment and income. Prior studies found such relations for exposure to childhood abuse and neglect (Currie & Widom, 2010; Zielinski, 2009) and adolescent victimization (Macmillan & Hagan, 2004;). For example, adolescent violence victimization was associated with adulthood wages averaging over $1 per hour less than those not victimized. Covey, Menard, and Franzese (2013) tracked the relation between adolescents' exposure to physical abuse, witnessing parental violence, and neighborhood violence in a nationally representative sample of adolescents. Controlling for parental education and

SES level, Covey et al. reported that of the three forms of exposure, only community violence exposure related to employment ($r = -.08$) and income level.

Differentiating or Specifying Effects of Community Violence Exposure

As noted throughout this chapter, much of what has been studied about violence exposure has not been focused on community violence or has not differentiated exposure to community violence from other forms. Lynch and Cicchetti (1998) and Tolan et al. (2006) reported that community violence and other forms of violence are associated, meaning those exposed to one form are more likely to be exposed to another. However, both reports emphasize it is a transactional relation, not merely coincidence that is of interest. This means that among those residing where community violence is more prevalent, those with family violence are more likely to be exposed and susceptible to the effects of community violence. It is also likely that there is some increased acceptance and use of family violence when violence is more frequent or normative in the community (Tolan et al., 2006).

For example, Cichetti and Toth (1995) compared maltreated and nonmaltreated children in a longitudinal study in which exposure to community violence was also considered. They found that maltreated children were more affected by community violence, with specific impact depending on type of maltreatment. Others have compared violence effects from home and school to community exposure. For example, Morales and Guerra (2006) examined the relation of internalizing and externalizing symptoms to exposure in community, school, and at home. After controlling for several risk factors for exposure, community exposure was differentiated from home and school exposure in not relating to internalizing or externalizing symptoms. Community violence attenuated the relation between home violence and internalizing and between school violence and externalizing problems. Similarly, there is evidence that exposure across different contexts is not independent, with those more likely to be exposed in one context likely to be affected in another (Laub & Lauritsen, 1998). These studies point out the value of differentiation of violence exposure from other potential sources in identifying potential risk and protective factors. They also highlight the importance of understanding how risk and protective factors may differentially relate to risk for exposure than to exposure impact as well as by extent or type of exposure. Most fundamentally, these findings point to the need to consider interactive dependencies of influence and to trace the transactional patterns that are the basis for community violence exposure effects.

RISK AND PROTECTIVE FACTORS ASSOCIATED WITH COMMUNITY VIOLENCE EXPOSURE AND EFFECTS

Multiple risk and protective factors have been related to the likelihood of exposure to violence and to the variation in effects of such exposure (Gorman-Smith & Tolan, 1998). These factors range from within-individual characteristics, such as impulsivity and prior aggression level (Lynch & Cicchetti, 2002); to parenting and family relationship characteristics, such as parental monitoring of child behavior and family support and cohesion in managing life challenges (Sheidow, Gorman-Smith, Tolan, & Henry, 2001); to peer influences, such as gang involvement (Thornberry, 1998); to elevated life stress (Attar et al., 1994); to community characteristics related to social functioning of neighborhoods and resources for child development (Tolan et al. 2003). As in other areas of research on this topic, much of what is understood is drawn from inferences from studies of other forms of violence exposure or of community violence considered without controlling for or distinguishing from other forms of violence exposure (Tolan, 2001a). However, there have been empirical investigations of community violence exposure related to indicators within each level of systems of influence in the developmental ecology and also study of the relation of impact if exposed to indicators across several levels. The latter studies often seek to identify protective factors that might mitigate effects or to understand how these additional risk factors might differentially affect those exposed to community violence.

Most studies of community violence exposure draw samples from communities that have elevated crime levels. Often these communities are also impoverished because exposure likelihood is also elevated there. In addition, most of the studies available consider how individuals within such neighborhoods differ in likelihood of exposure or in effects from exposure rather than in how variations in neighborhood conditions systematically relate to group risk. Thus, results inform about individual differences among those residing in communities or attending schools where violence exposure is elevated rather than in the vast majority of communities. Also, as is the case for other topics within community violence effects, often exposure to other forms of violence is controlled for or collapsed into

a single indicator. Thus, there is limited information about how community characteristics affect populations residing in communities where violence is elevated, about how community violence specifically might affect those youth, and about how community violence may affect youth residing in communities without elevated violence rates.

Individual Characteristics Linked to Community Violence Exposure

Studies of individual differences have concentrated on documenting effects of violence and identifying what differentiates impact among exposed individuals. The most documented individual risk factor is prior exposure (often measured as direct victimization) due to other forms of violence and/or community violence. For example, in a national survey, Finkelhor et al. (2009) reported that children who experienced one type of victimization in the past year had double or even triple the risk of other types of victimization. These risks held true for lifetime exposure as well.

Empirical reports of individual differences suggest greater risk for exposure as well as greater impact from exposure for youth with lower self-regulatory capabilities (Lambert et al., 2010; Salzinger, et al., 2002), social-cognitive processes biased toward aggression acceptance and use (Bradshaw, Rodgers, Ghandour, & Garbarino, 2009; Guerra et al., 2003), and higher prior aggression level (Gorman-Smith & Tolan, 1998; Lambert et al., 2005). Hill and Madhere (1996) tested for violence exposure related to social-cognitive features; they determined that perceived level of violence, not outwardly identifiable exposure, that related to social-cognitive features and that this perception mediated the impact of exposure.

Overstreet and Braun (2000) demonstrated that perceived exposure may mediate impact of actual level of exposure, suggesting that social-cognitive features may affect not only exposure but also the impact such exposure has on adjustment. Schwartz and Proctor (2000) and Guerra et al. (2003) each reported effects of violence exposure on social cognition (beliefs about aggression use, norms for violence, problem solving when facing conflicts) and that the effects mediated impact on peer relations and subsequent aggression in the respective studies. Notably, in both cases, the correlations were small but significant, despite the studies taking place over some significant length of time. However, neither study tested how these characteristics might affect risk for exposure.

Accumulating evidence suggests that exposure to community violence compromises central organizing behaviors (i.e., self-regulatory capacities), such as emotion regulation, and impulse control (Attar et al. 1994; Overstreet & Braun, 2000; Schwartz & Proctor, 2000). Impairments in self-control or behavioral control may limit access to social support or increase likelihood of victimization (Pope & Bierman, 1999; Schwartz & Proctor, 2000). Low and Espelage (2014) found that impulsivity related to more exposure and exacerbated exposure effects by increasing involvement with antisocial peers.

In addition, there are indications that prior psychopathology symptom levels relate to greater likelihood of exposure. Gorman-Smith and Tolan (1998) reported that prior depression and prior aggression related to subsequent violence exposure among a sample of inner-city high-risk males. Kliewer (2006) and Overstreet and Braun (2000) reported a similar relation to trauma symptomology. All of these studies noted that psychopathology did elevate risk for exposure but also that greater exposure related to a relative increase in symptoms as well. Thus, similar to the transactional model suggested by Lynch and Cicchetti (1998) for the relation between child maltreatment and community violence exposure, it appears that aggression and depression relate both to greater exposure and also to greater effect if exposed.

Similar but more complex findings were reported by Boyd, Cooley, Lambert, and Ialongo (2003). In that study of urban students from economically disadvantaged schools, teacher and parent reports of aggression at baseline each predicted subsequent exposure to violence, but only for boys. In addition, impact on later behavior was dependent on the boys' anxiety level, with an effect only for low-anxiety boys. In longitudinal follow-up with this urban student sample, Lambert, Ialongo, Boyd, and Cooley (2005) reported that among males, aggression, anxiety level, and depression each related to subsequent victimization but not exposure due to witnessing. However, for females, the relations held across type of exposure. Overall, the reports suggest that effects of exposure, including variation in exposure type effects, immediacy of effects, and psychopathology symptoms affected, may be different by gender.

Studies of the impact of moderators of violence exposure have identified coping skills as a potential mitigating factor (Tolan et al., 1997). Dempsey (2002) showed that violence exposure relates to reliance on aggression and other negative forms of coping. Edlynn, Gaylord-Harden, Richards, and Miller (2008), found methods used for effectively coping with violence exposure may be considered maladaptive in other contexts (e.g., the use of avoidance). In a study of anxiety impact of violence exposure, Edlynn

et al. found that direct problem solving had no moderating effect for young men residing in high-violence, high-poverty urban communities. Other studies suggest that the benefits of coping may be dependent on adequate social support, particularly from adults (Hammack, Richards, Luo, Edlynn, & Roy, 2004)). Tolan and Grant (2009) summarized the research on coping for youth residing in inner-city communities—the communities where violence exposure is most elevated—as often requiring strategic use of methods such as avoidance and reliance on others for protection and guidance largely because personal control over one's own circumstance may be limited. Direct action and individual problem solving may lead to decreased safety and/or engulfment in social challenges that are developmentally beyond what is manageable by children and adolescents. For example, if faced with an unfolding violent situation, trying to stop it may increase the likelihood of victimization. At the same time, reputation and subsequent safety might rest on not opposing the violence.

Others have suggested that coping skills for violence exposure need to be understood from a critical consciousness framework in which the political and social forces thought to be the reason for elevated violence exposure in a given community are discussed and utilized to help support productive coping (Bentley, Thomas, & Stevenson, 2013; Watts, Abdul-Adil, & Pratt, 2002). From this framework, coping is based in cultural identity, awareness of inequities, and positive alternatives to frustration and aggression or depression.

Parenting and Family Characteristics

Exposure to community violence has been related to family structure (Martinez & Richters, 1993), although inconsistently (Fitzpatrick & Boldizar, 1993). Miller et al. (1999) noted that younger siblings of delinquents were more likely to be exposed to community violence. When differentiated from family violence exposure, there is no relation of family structure (e.g., one-parent family) and violence exposure (Hanson et al., 2006).

Some studies have shown a relation between parenting skills and violence exposure as well as impact of exposure (Low & Espelage, 2013). However, the majority of studies that have differentiated particular parenting practices or qualities of family relationships find no significant relation to exposure and show inconsistent relation to impact of exposure (Gorman-Smith & Tolan, 1998; Miller et al., 1999), except as related to maltreatment (Lynch & Cicchetti, 1998).

Risk for exposure to community violence has been related to family alcohol or drug problems (Hanson et al., 2006; Stevens et al., 2005). Similarly, children from families where there was intimate partner violence showed increased risk for community violence exposure (Lynch & Cicchetti, 1998; Rumm et al., 2000). These findings suggest that a breakdown in parenting may result in greater exposure risk for children, and they may incur additional accompanying risk for effects due to similar lack of access to family as a resource (Tolan et al., 2013; Tolan, Sherrod, Gorman-Smith, & Henry, 2004;).

Some have suggested that apart from the effects attributable to parental and family violence exposure, family influence on risk for exposure may be better understood as violent events causing a disruption in parenting support and resources (Tolan & Gorman-Smith, 2002; Trentacosta et al., 2009). From this perspective, violence in the community creates challenges that strain family capabilities, imposes threats that overwhelm or exacerbate other stress faced by families in these communities, and/or occurs along with many other risk factors such as violence-involved peers that also challenge parental efficacy (Overstreet & Mazza, 2003; Salzinger, Feldman, Stockhammer, & Hood, 2002; Tolan & Gorman-Smith, 1997). A study by Gorman-et al., (2004) showed an exception to limited indication of parenting and family relationship correlates to exposure. That study examined person-based patterns of combined parenting practices (monitoring, discipline consistency, use of positive parenting) and family relationship characteristics (cohesion, support, organization) to classify families into four groups: exceptionally well-functioning (high on all scales); typical families (midrange on all scales); struggling families (low on all scales); parenting-focused families (mid to high on parenting scales but not on family relationship scales). Struggling families were more likely than the other types to have sons with greater exposure to violence, but both struggling and parenting-focused families showed greater impact of such exposure than the other two types. The results suggest that children from typical and exceptional families were protected from the effects of exposure on subsequent aggression and depression. This difference in findings for the person-oriented configuration of characteristics from that obtained from variable-based correlations seems to reflect how patterns of characteristics might represent family risk that are not captured in variable-based studies. Specifically, these results suggest that overall functioning of the family and the cumulative impact of different configurations of family relations are important, not just specific, characteristics. In addition, this study suggests subtle differences in what might relate

to exposure and what might relate to effects. Spano, Rivera, and Bolland (2010) recently reported a similar approach and found that particularly vigilant monitoring was related to less exposure of urban impoverished youth but that it had a less clear protective effect for impact. These results are consistent with the studies of Gorman-Smith et al. (2004) and others of family relationship qualities as protective of violence exposure effects (Hammack et al., 2004; Hardaway et al., 2012). In particular, the prevailing findings seem to be that family functioning that includes strong monitoring and warm relationships between parent and child can moderate effects of violence exposure even if it is unable to prevent such exposure (Kliewer, Murrelle, Mejia, Torres, & Angold, 2001).

Peer Influences

Multiple studies have documented a positive relation between involvement with delinquent or violent peers and victimization from community violence (Fagan, Piper, & Cheng, 1987; Felson, 1997; Lauritsen & Davis-Quinet, 1995; Tolan et al., 2003). Affiliation with delinquent peers is related to likelihood of witnessing community violence (Halliday-Boykins & Graham, 2001). Children who associated with more deviant or delinquent peers in one year have greater exposure to community violence in the next year (Lambert et al., 2005; Salzinger et al., 2002). Such association seems to promote risk particularly for high-risk youth. For example, Lambert et al. (2005) reported that deviant peer affiliation moderated the association between aggressive behavior and exposure to community violence. It would be important to disentangle how community violence exposure is related to engagement with delinquent or violent peers (Thornberry, 1998). One important distinction is to differentiate how antisocial tendencies may lead to affiliation with peers who are more violent, thus increasing community violence exposure, from how such exposure may spur peer affiliations with deviant youth. For example, it is evident that violence perpetration increases as youth get involved in gangs and decreases if they leave gangs (Thornberry, 1998). The theoretical explanation is that by being affiliated with violent youth gangs, use of violence is promoted and the youth tend to exhibit violence they might otherwise not perpetrate to. It seems likely that community violence exposure could have similar processes of effects, but it is also plausible that such violence has less direct and immediate influence than that related to peer relationships.

More recently, studies of protective factors for violence exposure effects have identified social support and in particular engagement with peers for social support. For example, Hammack et al. (2004) found that social support (mostly from peers) emerged as a protective-stabilizing force for witnesses of violence both cross-sectionally and longitudinally. Similarly, Hardaway, McLoyd, and Wood (2012) reported that engagement in prosocial activities moderated violence exposure, an effect they thought might be related to support from prosocial peers. Notably, these findings indicate that support, not only from peers but also from family and the family-peer network, serves to mitigate exposure impact (Kaynak, Lepore, & Kliewer, 2011).

Neighborhood Social Relations and Structural Characteristics

Community violence exposure is defined in part by proximity to where the violence occurs. Also, it is well documented that violence exposure is greatest in the lower-SES communities in large cities. Therefore, it seems likely that much of the risk for exposure, and potential solutions to reduce exposure, rest in understanding neighborhood or community characteristics like these (Tolan, Sherrod, Gorman-Smith, & Henry, 2004).). What is now emerging is a theoretical framework for understanding neighborhood characteristics and processes affecting development that can be applied to understanding violence effects (Henry, Gorman-Smith, Schoeny, & Tolan, 2014; Sampson et al., 1997; Tolan et al., 2004). This framework focuses on how community structural characteristics, such as economic resources, income level of residents, and single-parent family prevalence, can affect social problems, such as high crime rates and limited opportunities for conventional achievement. These issues are in turn related to social processes of neighborhoods, such as collective efficacy, informal social control, shared norms, and felt responsibility for the neighborhood safety level.

The interest in how neighborhood differences in economic and social resources and problems relates to crime and particularly to crime inducement has been longstanding (J. Wilson, 1987). For example, community-level variations in population makeup, home ownership, mobility, and housing density positively relate to variations in community-level crime (Bursik, 1988; Byrne & Sampson, 1986). In these and subsequent studies, structural characteristics were differentiated from social characteristics or processes (Sampson et al., 1997; Tolan et al., 2004; J. Wilson, 1987). The term *structural characteristic* refers to demographic, economic, and political differences that mark communities economically and politically and are related to resource limitations and problematic outcomes

(Tolan et al., 2004). Structural characteristics tend to be examined in terms of the average economic status of residents and the range of income levels within the community, the crime rate, and the opportunity for employment and adequate housing and education. Other structural characteristics, such as quality of schools and social and health resources, can also be related to violence (Henry et al., 2014). Theoretically, structural limitations affect the opportunity for neighborhood social processes that are thought to be important for healthy development. The term *neighborhood social processes* refers to relations among residents (Sampson et al., 1997; Tolan et al., 2004). These include processes such as informal social control or how much neighbors regulate each other's behavior through expectations, behavioral norms, and interaction. The classic example of informal social control is the extent to which youth in a community might be subject to control of deviant behavior by the adults in the community (Sampson et al., 1997; Tolan et al., 2004). These processes have been incorporated into an overall construct referred to as collective efficacy (Sampson et al. 1997), which refers to a felt, shared ability among residents to manage issues and problems facing the community. Multiple studies have tracked the combined and interdependent effect of these different aspects of community ecology to violence perpetration, including increased exposure to violent peers in the community (Chung & Steinberg, 2006; Tolan et al., 2003). Recently, Henry et al. (2014) validated a set of scales that measured three neighborhood processes commonly referred to in the literature and that relate to child development outcomes: norms (type of behavioral expectations and extent shared), informal social control (regulation of neighbors by group expectations and felt responsibility for community safety and order), and social connection (extent to which residents organize to manage the neighborhood, spend time together, feel connected). Notably, these sets of scales were validated using neighborhood-level scale construction and also focusing on child development as well as crime outcomes. Many prior measures actually were constructed and validated as individual level measures, even though they were used and interpreted as representing community-level constructs.

Although violence exposure seems to be concentrated in high-poverty urban neighborhoods, the extent of violence and exposure of youth can vary substantially among those with similar structural characteristics (Tolan et al., 2004). Browning, Gardner, Maimon, and Brooks-Gunn (2014) reported that exposure to community violence that was life-threatening had effects on psychopathology for those youth in neighborhoods with low collective efficacy but not when efficacy was elevated. Tolan et al. (2004) showed that while neighborhood processes could be predicted by structural characteristics, structural characteristics also mediated the relation of neighborhood processes to exposure of violent peers and subsequent risk for violence perpetration. Sheidow et al. (2001) found that neighborhood social process level had a small effect on violence exposure among young men residing in poor urban communities, but youth from families with a combination of lower parenting skills and less supportive family relationships had particular risk. The most direct test of neighborhood processes related to youth community violence exposure was a study by Fagan, Wright, and Pinchevsky (2014) that showed that collective efficacy moderated the relation between community violence exposure and substance use by adolescents. This finding suggests that neighborhood processes can serve a protective role against the structural characteristic of high levels of violent crime. However, the limited number of studies points to how little we know about what neighborhood characteristics, beyond poverty, relate to risk and how social processes might help mitigate exposure and effects from exposure. These initial studies suggest that a critical area for empirical investigation is how crime rates that may drive exposure to community violence are related to neighborhood social characteristics within those communities with structural characteristics that also relate to crime rates.

THEORIES ABOUT HOW COMMUNITY VIOLENCE EXPOSURE CAUSES OR INCREASES INDIVIDUAL RISK FOR PSYCHOPATHOLOGY

Varied explanations have been offered regarding how community violence exposure is harmful. Most explanations have not differentiated community violence exposure from violence exposure in general, or they are drawn directly from formulations of how family violence might affect a child (Margolin & Gordis, 2000). However, an additional thread of reasoning compares residing in communities with high violence rates to exposure to war conditions, natural disasters, or horrific accidents and maltreatment (e.g., kidnappings) (Fitzpatrick & Boldizar, 1993). These explanations tend to emphasize a trauma process of impact that either precipitates pathology or exacerbates prior risk into expression of syndromes. Other theories have focused on attachment disruption, similar to what is thought to be an effect of neglect and abuse (Cichetti & Toth, 2005). Social-cognitive theories have been offered that suggest the impact is to shift normative expectations about behavior and of rewards or functionality of violence. Still others

have suggested that violence exposure is often part of an overall ecology of exceptional stress and unpredictability and so is best understood as one of many challenges faced by children and families residing in impoverished urban communities. In this approach, violence exposure is considered as distinct from, but one of many, stress-inducing experiences affecting risk (Tolan & Gorman-Smith, 1996). Explanations framed using this perspective tend to see the effects as cumulative and linear, with more exposure and less stress-coping resources equating to more symptomology.

Explanations Emphasizing Trauma Process

Trauma-focused explanations rest on the concept that severe fright and disgust caused by witnessing violence, being directly victimized, or residing in an unsafe community overwhelms and perverts neurophysiological functioning—particularly attention regulation and inhibition of impulses. Further, this traumatic exposure also impedes or misdirects further development of these key systems that increases susceptibility to other psychopathology risk factors or sets overactive or underactive attention and arousal management and the relation between emotion and behavior. Overdeveloped fear conditioning is seen as a key process, with additional effects on hypothalamic-pituitary-adrenocortical (HPA) axis regulatory systems. Both processes are thought to either lead to hypervigilance about threat (and related anxiety, depression, or aggression) or problematic habituating and underreactivity to violence (and related aggression and depression) (Horowitz, McKay, & Marshall, 2005; Perry, 2008). Children who are still developing are particularly susceptible to these effects and also suffer from the ongoing unpredictability of the environment, including a lack of ability to rest secure and safe (Garbarino, Dubrow, Kostelny, & Pardo, 1992). At too early an age and in an ongoing, clearly unhealthy way, these children must be always on alert. As a result, psychological functioning and underlying neurobehavioral regulatory systems are compromised, analogous to the impact of war exposure found in veterans and survivors of disasters. This may lead to anxiety, depression, as well as use of aggression as a means of intended self-protection (Tolan et al., 1997).

A related theory is that violence exposure in the community disrupts attachment because it brings into acute awareness the inability of caregivers to provide safety and belonging, which are so critical to healthy development. Most essentially, the precariousness of a safe environment and dependable care is thought to disrupt secure attachment capability, which acts as a trauma to undercut relationship engagement, trust, and communication with parents and other caregivers and the ability to properly depend on others. All of this exacerbates risk for psychopathology and/or is thought to cause it (Lieberman, Chu, Van Horn, & Harris, 2011; Perry, 2008). This approach is different from the framework that says experience overwhelms neurobehavioral regulatory systems. Instead, it posits that the mechanism of psychopathology is disruption of social relationships through effects on personal attachment and relationship skills. Although these trauma frameworks provide important ideas and potentially critical insights about how community violence affects children, they are primarily based on evidence accumulated about child abuse and neglect or domestic violence. An exception is a study by Farrell and Bruce (1997) that tracked community violence exposure to emotional distress features related to trauma. That study focused on individual differences in exposure and found a modest positive link. However, the authors did not focus on documenting a traumatic process as the cause of behavior change, but rather to correlate how extent of symptoms thought to represent post traumatic stress disorder corresponded to violence exposure extent.

Thus, it seems likely that the same processes implicated for other forms of violence exposure might be at work when people are exposed to community violence. However, as with many other theories, there has been almost no tracking of these effects specific to community violence exposure. In part this is because the needed studies would entail comparing samples defined as community violence exposed to counterparts who have only had traumatic events or family violence experiences or to nonexposed children who are otherwise similar (e.g., also reside in low-SES urban communities). Creating such a study and garnering the resources to enable measuring the neurobiological effects and related symptomology presents numerous challenges. This lack of empirical studies has limited how much can be inferred from findings of violence effects from abuse, witnessing domestic violence, or disaster experiences (Cicchetti & Toth, 2005).

Social-Cognitive Impact Theories of Community Violence Exposure Effects

Social-cognitive theory has also been offered as an explanation of community violence exposure but almost exclusively in relation to subsequent aggression levels. Within this framework, violence exposure promotes aggressive reactions but also supports the use of aggression as a method

of managing fear, frustration, and conflict (Dodge & Somberg, 1987). Growing up in a community where violence exposure is more likely means that it is more likely to be seen as normative, acceptable, and useful (Guerra, Huesmann, & Spindler, 2003). For example, Guerra et al. (2003) reported that community violence exposure had a significant effect in increasing aggression, normative beliefs about aggression, and aggressive fantasy. In older children it showed effects on social-cognitive processes. Additionally, this study showed that these changes in social cognition mediated the effects of exposure on aggression exhibition. While emphasizing the role of exposure in increasing an expectation of violence from others and to form a bias toward viewing motivations of others as hostile (which increase use of violence), these social-cognitive processes have also been tied to depression symptoms (Dodge, 1993).

Social cognitions related to conflict, frustration, and self-control are shaped by imitating others (who are also likely to use and approve of violence) by the utility of violence in enabling development (e.g., creating status, reducing threat, accessing rewards) and shifting what is considered normative or acceptable behavior. In turn, this misdirected form of self-control, self-image, and consideration of others in forming behavioral responses leads to a more limited arsenal of alternatives to aggression, more use of aggression, lack of impulse control over life span, and less reward or reward orientation related to nonaggressive behavior (Morales & Guerra, 2006). Notably, this approach has been based on empirical studies that suggest correlation among the components and some moderating and mediating relations (Attar et al., 1994; Guerra et al., 2003)). For example, Chaux, Arboleda, and Rincon (2012) corelated residence in more or less violent communities in Bogota, Columbia to aggression. The 1,235 fifth- to ninth-grade students studied reported a relation between exposure to community violence and levels of proactive and reactive aggression (aggression used to solve a problem versus used in reaction to immediate threat). Moreover, normative beliefs supporting use of aggression, hostile attributions of intent, positive expectations from use of aggression, and low guilt about using aggression each partially mediated that relation.

Notably, much of the theorizing about violence effects has been formulated through studies of youth residing in high-risk communities and through measurement of variation in individual behavior based on extent of exposure (Guerra et al., 1995; Guerra, et al., 2003). These theories also correspond to stress models in that exposure to violence is seen as one of many forms of environmental challenge that might affect normative beliefs about behavior, particularly the role of aggression in conflict management (Cooley-Quille et al., 2001; Guerra et al., 2003). Thus, some models link social-cognitive processes to a developmental-ecological model that characterizes exposure as inducing stress in parallel, linked, or contributing to a confluence of pathology-promoting process (Morales & Guerra, 2006).

Stress Models of Community Violence Exposure Effects

The primary supposition of this approach is that violence is one form of life stress, a particularly powerful and potentially virulent form (Gorman-Smith & Tolan, 1998). Based on the observation that community violence exposure is often based on residence within communities that are marked by many other stressful conditions and families facing these also have limited social and economic resources for managing stress, it is suggested that violence exposure may result in anxiety, depression, PTSD symptoms, and aggression (Tolan et al., 1997). This theorizing has focused at the level of individual coping skills and resources, such as social support, parental guidance, and protection from places and situations that might increase community violence exposure. Linkage to neurodevelopmental processes in stress-regulatory systems has been limited, and most of these studies have not considered other forms of stress. An exception is a study by Sharkey et al. (2012), who assessed children within a week of when a homicide occurred near their homes to test for its effects on child behavior, utilizing a stress framework. They found lower levels of attention and impulse control and lower preacademic skills than found otherwise in the community. Parental distress was also elevated, suggesting that one mechanism by which this community violence exposure could affect child functioning is that it renders violence-exposed parents less able to help to provide needed regulation and care.

Only a few studies have examined the impact of community violence exposure on physiologic markers of stress response in children (Kliewer, 2006; Wilson, Kliewer, Teasley, Plybon, & Sica, 2002;). For example, Kliewer (2006) examined the association between salivary cortisol levels and exposure to violence in 101 African American youth. Witnessing community violence was associated to lower baseline cortisol and increased cortisol in response to a mild stressor (e.g., watching a video showing scenes of community violence).

Much of the theorizing about violence exposure treats it as a life stress that can overwhelm coping mechanisms

and support resources and strain the physiological systems involved in managing stress; in doing so, it induces distortions in psychological functioning that characterize posttraumatic stress (anxiety), depression, and aggressive tendencies. For example, Attar et al. (1994) showed that exposure to violence and threats exacerbated the effects of more minor stress. In a related study, Gorman-Smith and Tolan (1998) documented that for inner-city youth, violence exposure has a distinct effect on level of externalizing and internalizing symptoms, over and above that attributable to general life-stress level. Although it helped explain symptoms from other forms of stress, it was distinct from being just another form of stress. In that study, the effect was found even after accounting for individual variations in behavior that might have prompted different levels of exposure to violence. White, Bruce, Farrell, and Kliewer (1998) reported a similar set of effects, with community violence promoting additional effects over and above those found from other forms of stress.

Common to these diverse theoretical explanations is a recognition that exposure to violence is related to larger developmental context characteristics, such as residing in inner-city communities, or transactional confluence processes, such as low parental monitoring. Similarly, residing in such communities may increase opportunity for proximity to violence or affiliating with those likely to perpetrate violence (Lynch & Cicchetti, 1998; Tolan, Guerra, & Kendall, 1995). These developmental-ecological models emphasize that multiple risk processes, with interdependencies among the processes, are implicated in both the risk for exposure and the impact a given level of exposure may have. For example, violence exposure is more likely to occur to families with fewer economic and social resources and in neighborhoods with fewer social connections among neighbors but also to those youth with more impulse problems and more antisocial friends. The limited evidence does not suggest that risk is explained simply by the accumulated adverse experiences in life; rather, it may be due to some particular interactions and may vary substantially by the type of community in which one resides. At the same time, there is growing interest and basis for understanding how violence exposure gets under the skin to affect psychopathology through neurodevelopmental processes.

NEURODEVELOPMENTAL PROCESSES THAT MIGHT BE IMPLICATED IN COMMUNITY VIOLENCE EXPOSURE

Neurodevelopmental explanations of community violence exposure are essential to translate the social and behavioral nature of these experiences to individual developmental psychopathology effects. As with all areas of developmental psychopathology, the relation includes a dual consideration: neurodevelopmental functioning and processes that differentiate susceptibility to environmental conditions and experiences and determination of how the environmental experience (in this case community violence) affects brain and neural physiology, systems, and functioning. Much work has been conducted to identify the impact of violence on neurodevelopment, but little has focused on community violence specifically (Cicchetti & Toth, 2005; Mead, Beauchaine, & Shannon, 2010). Most understanding of neurodevelopmental effects from violence exposure has come study of abused and neglected children. These samples often included a mix of children who were exposed to violence and those neglected but not exposed to violence. In addition, as exposure to abuse and neglect are also related to probability of community violence exposure and other failures in care and safety, it is difficult to parse what might be effects of abuse/neglect, community violence exposure and attendant failures in care, attachment, other stress, and co-occurring insults to the neurodevelopmental systems and course (Lynch & Cicchetti, 1998; Malik, 2008). Yet it may also be that violence exposure source or type does not significantly affect the neurodevelopmental processes or susceptibility to pathological effects on development. Thus, while providing many potential clues to the likely processes of and effects from community violence, the applicability of neurodevelopmental understanding gained from studies of violence impact is not yet determinable.

Genetic Contributions to Violence Exposure Susceptibility

Gene–Variant Contributions from Other Forms of Violence Exposure

Genetic contributions might relate to violence exposure in many ways, but these can be grouped into two main ways (Tolan et al., 2013). First, genetic differences related to tendency to be aggressive or to be antisocial may lead to greater likelihood of being involved with community violence (Raine et al., 2005). Second, there may be genetic differences in disposition that are affected differently by violence exposure. Several studies have suggested that genetic polymorphisms (e.g., monoamine oxidase A [MAOA]) moderate the relation between violent abuse as a child and violence and aggressive outcomes (Caspi et al., 2002; Kim-Cohen et al., 2006). Others have traced genetic variations (serotonin transporter; 5-HTT) in response

to stress (Cicchetti, Rogosch, & Sturge-Apple, 2007). Therefore, it is likely that there are some genetic variations in response to community violence and in the outcome of such exposure.

However, since specific genetic studies of community violence exposure effects have not been conducted, it could also be that the process and the genes involved are not analogous to that of direct victimization through abuse (Huizinga et al., 2006). Other gene variants and genes might be involved. It is likely that not only will there be multiple genetic variations implicated but also that those identified as most likely candidates may not prevail. It seems likely that gene variants will help explain the differential effect of violence exposure and may help explain the differential likelihood of exposure. It is also likely that networks rather than specific gene variants will be implicated in this effect and that a confluence of genetic contributors and other developmental influences will also contribute.

One possibility is that exposure to community violence is not interactive in the sense of only having influence in the presence of certain genetic variants but that there are two main effects or a gene–environment (G×E) correlation. For example, a very severe level of abuse exposure is the environmental moderator implicated in several G×E interaction demonstrations of violence effects on aggression (Kim-Cohen et al., 2006). Below that level, the effects seem to be additive, not interdependent. For example, Foley et al. (2004) utilized a lower threshold of violence exposure in a G×E interaction study of violence effects, including exposure to witnessing domestic violence, which may be more analogous to community violence exposure. They report a main effect for this exposure on conduct disorder in addition to moderation by genetic vulnerability. The relation also could be a passive or evocative correlation. Those with the tendency to be violent or to engage in social relations with other aggressive individuals may be more likely to be exposed to violence. Those with a genetic disposition toward antisocial personality characteristics may be more likely to evoke parental hostility or other risk, thereby exacerbating related environmental responses related to exposure. Since these studies are related to family-based violence (maltreatment), the coalescence of multiple methods of genetic influence are also present, which may not transfer to how community violence exposure and effects occur (Tolan et al., 2013).

Similarly, maltreatment and abuse have been related to depression likelihood through polymorphism studies, primarily in the promoter region of 5-HTT, the serotonin transporter gene (Cicchetti et al., 2007). This study also reported that different allele variations had a G×E effect depending on the type and extent of maltreatment exposure (e.g., neglect, sexual, physical). The effect also related to stress level. More generally, studies of depression have focused on life-stress experience, including violence exposure, showing stress exposure moderates a genetic tendency for depression, increasing risk more for those with heritable risk than those without (Kendler, Kuhn, Vittum, Prescott, & Riley, 2005). For example, Kaufman et al. (2004) found that among a sample of maltreated children, the short/short allele variant related to greater probability of current depression than either the short/long or long/long variant. However, they also noted that this relation was moderated by social support, which is often viewed as protective against stress. The trend across these G×E interaction studies of maltreatment and stress and depression suggests a more complex set of interactions than implicated in studies of antisocial behavior outcomes. These findings seem consistent with a stress interpretation of violence impact on developmental psychopathology (Gorman-Smith & Tolan, 1998).

The G×E interaction studies suggest two processes for community violence exposure effects. Exposure leads to greater likelihood of aggression for those with the at-risk allele MAOA pattern and to depression and other internalizing problems for those with the risk allele for 5-HTT. Susceptibility to type of effect also could have some variability by gender. Some have speculated that MAOA and aggression relation and 5-HTTT and depression relation moderated by violence exposure differs by gender, with males primarily affected by the MAOA and females by the 5-HTTT (Mead et al., 2010). Whether this is borne out in additional studies of violence exposure or is tested and found applicable to community violence exposure remains to be seen. A dual neurodevelopmental process of violence impact is suggested: increasing aggressive tendencies by breaking down self-regulation systems and increasing depression by overwhelming stress management systems (Crockett, Clark, Hauser, & Robbins, 2010). It may well be that rather than two distinct G×E interactions that affect impact of community violence exposure, the interactions could act together. It may be that, if moderated by genetic susceptibility, the effects of violence exposure act through stress systems and also through threat-impulse control systems. Thus, effects may vary from internalizing and externalizing to the extent that both self-control and self-regulation of emotion are susceptible.

What is not determinable is how applicable the results of these studies are for community violence when the evidence for G×E effects are only from exposure to family

violence, usually as direct victim, and with substantial levels necessary for interaction. In addition, the evidence of the MAOA polymorphism and family violence exposure has been replicated only for White samples, although many studies have been limited in ethnic diversity. For example, Widom and Brzustowicz (2006) failed to find this moderation for the non-White portion of their sample. Also, 5-HTT polymorphism relating abuse to depression has been inconsistent in findings across genders and age groups. Given that community violence exposure disproportionately occurs for minority persons, this finding suggests that further caution be exercised on generalizing from these findings. Although samples used in these gene expression studies have been more diverse ethnically than those demonstrating MAOA interaction, there has not been the type of comparison that might permit consideration of how ethnic group differences in gene variants might affect impact. Moreover, although there have been demonstrations of poverty relating to cortisol differences, it is not clear how this relates to G×E interaction (Lupien, King, Meany, & McEwen, 2001). Since violence exposure is related to poverty and residence location and since it is also a correlate of ethnic group in our current society, these contextual differences may substantially shift the relation of environment and genetic susceptibility. Given that community violence exposure disproportionately occurs to non-White persons, this finding suggests further caution in any generalizations from these findings.

Genetic Variation in Environmental Sensitivity

An alternative to a polymorphism variation risk susceptibility model is the formulation that emphasizes sensitivity to environment as a key genetic difference: that some persons have a tendency to be more affected by environmental conditions, good or bad, than others (Belsky & Pluess, 2009). One relevant example noted by Belsky and Pluess (2009) in support of this formulation of G×E effects is that toddlers who scored high in proclivity to get angry at 15 and 28 months were more likely than other children to manifest behavior problems at age 5 if provided ineffective parental guidance and were less likely to display such problems than others if parental guidance was effective. It may be that those most affected by community violence are those most sensitive to environmental disorder, fear-inducing threats, or the shock of experiencing, seeing, or living with violence. Although each of these models might be quite important in understanding how individual differences in reaction to violence exposure occurs, at present, a G×E study of community violence exposure has not been conducted. Thus, little is known about how G×E relations should be considered in psychopathology formulations of community violence exposure.

Epigenetic Explanations of Violence Impact

Another genetically informed area of study of violence effects might show the importance for studies of community violence impact. This is the rapidly developing area of telomere science. This field focuses on cellular and molecular processes affecting telomere length, particularly related to stress and stress-related aging processes over the life span. Shorter telomere length is associated with advancing chronological age and also increased disease morbidity and mortality. Thus, interest has been stimulated in how stress might accelerate erosion of telomeres, even early enough in life to affect newborn setting of telomere length. Shalev et al. (2013) tested for relation stress to telomere erosion or aging in a prospective-longitudinal study in children and found that children who experienced multiple forms of violence exposure (either exposure to maternal domestic violence, frequent bullying victimization, or physical maltreatment by an adult) showed significantly more telomere erosion in buccal cells in measurements between ages 5 and 10. This effect remained even with controlling for multiple potential confounds. This finding suggests that perhaps violence exposure acts to age or to deteriorate telomere length, which is thought to explain susceptibility to psychopathology.

From the findings of G×E relations and apparent interactions, it can reasonably be concluded that there may be genetic variations in susceptibility to community violence and genetic impact that is analogous to what has been demonstrated for other forms of violence exposure. Moreover, it appears that exposure can have effects through stress regulation and self-control or aggressive tendencies in the face of threat influence. In addition, G×E models (or gene network and multiple environmental contributors) that emphasize specific risk susceptibility may provide understanding. Or these models may affect relative sensitivity to environmental conditions. These studies may provide important models, suggested processes, candidate gene and environmental precipitants, and insight about brain plasticity related to psychopathology effects and therefore guide helpful preventive and treatment interventions (Cicchetti & Curtis, 2006). However, most fundamentally, studies are needed that explicitly and distinctly consider community violence.

Alteration of Neural Networks, Brain Areas, and Regulatory Systems

Violence exposure effects on psychopathology and functioning are presumed to occur through some alteration of neural physiology, processes, and regulatory systems that affect symptom occurrence and functioning. Most essentially, it is believed that shocking, threatening, unpredictable, and sensory-overloading experience through violence disrupts healthy developmental processes for adaptation by altering brain systems that manage threat-reaction and stress responses. Exposure to violence, particularly early in development, is seen as potentially altering formation, efficiency, and proper functioning of important areas of the brain. These inferences are drawn from studies of direct victimization, usually from caregivers. However, some studies of exposure to domestic conflict and violence have been influential on this conceptualization.

Unlike neglect, which is viewed as failure to consistently stimulate in order to promote organization and relative stability in emotional functioning, violence exposure is unregulated, unpredictable overstimulation, with harm resulting from repeated and extreme overstimulation. As suggested by G×E interaction studies, this overstimulation can occur through multiple systems and can affect orienting and regulatory functions of the cortex (cognition), limbic system (affect regulation), diencephalon (e.g., fine motor regulation, startle response), and brainstem (heart rate, blood pressure regulation). Since each system is affected by experience-dependent neurochemical signals and each has different periods of sensitivity, the impact can vary as to which system is compromised and how that affects development. Also, since many of these systems can be affected by in utero experience, children may be born with substantial variation in sensitivity to disruptions such as violence exposure (Perry, 2008). For example, in animals, experimental inducement of prenatal and perinatal stress can alter hippocampal organization and the HPA axis and have lifelong effects (Plotsky & Meaney, 1993).

Lower Areas of Brain (Brain Stem, Diencephalon, Hypothalamus)

Lower areas of the brain are the portals for neural/sensory input and relay sensory information to the primary sensory receptive areas of the cortex into a feedback process of sorting and actions related to threat experience. The reticular activating system (RAS), the hypothalamus, and the thalamus are brain regions most likely to be affected through violence exposure. The RAS is a network of arousal related neural systems through which neurotransmitters, including epinephrine (EPI), norepinephrine (INN), dopamine (DA), and serotonin (5-HT), orient and set regulation of arousal, fear, stress response, and threat reaction. The hypothalamus and thalamus receive input from various afferent sensory systems and transmit arousal information from the RAS to the limbic, other subcortical, and cortical systems (Castro-Alamancos & Connors, 1996).

Violence exposure could affect the lower brain areas through affecting orientation sensitivity, with primary focus and evidence to date on startle response. For example, several studies have identified exaggerated startle responses among people with PTSD related to war (Morgan, Grillon, Southwick, Davis, & Charney, 1996) and among female sexual assault survivors (Morgan, Grillon, Lubin, & Southwick, 1997). Not all studies have shown this link, however. In some cases, the startle response is blunted. The implication is that exposure to violence affects orientation to threat. There is some suggestion that earlier and more chronic exposure might blunt response, after an initial effect of heightening the startle response. For example, Klorman, Cicchetti, Thatcher, and Ison (2003) found such a pattern when they examined electromyograms in response to acoustic startle in maltreated children 3 to 11 years old.

The Limbic System

The limbic system is a subcortical network regulating emotion, stimulation, and memory. Along with the amygdala, this system processes, interprets, and integrates emotional experience and information (Clugnet & LeDoux, 1990). The system interprets positive versus negative emotional experience, initial organization of an experience affectively and cognitively, and response tendency for socially relevant stimuli. As the seat of emotional memory, it also is implicated in activation of motor behavior and neuroendocrine (stress) response. Within this system, the hippocampus is potentially affected by violence exposure because it is involved in storage of sensory information and in stress activation (Phillips & LeDoux, 1992). Threat may affect the nature of emotional storage as well as the efficiency. Studies of abused children suggest no difference or only marginal effect in hippocampal volume among maltreated children with PTSD (De Bellis, 2005). Hippocampal volume has not been shown to relate to violence (De Bellis, 2005). However, as hippocampal atrophy relates to impairment in memory functions and is implicated in HPA axis dysregulation, some suggest it may be an important effect through which violence exposure contributes to psychopathology (Mead et al., 2010). This view emphasizes

perceptual and response bias over impulsive responding in understanding how community violence might affect psychopathology and behavior.

Cortical and Subcortical Areas

In concert with the limbic system, cortical areas of the brain serve to modulate, organize, and moderate emotional and behavioral impulses for adaptation and goal-directed activity (Perry, 2008). Since the cortex takes the longest to develop and is the site of complex decision making, it is thought that violence impacts cortical physiology in part through harm to lower areas that affect the "input." Also, severe challenges, such as environmentally harsh or under- or overstimulating experiences, might impair development of cortical areas that are the neural substrates of important executive functions (Cicchetti & Toth, 2005; Perry, 2008). Perry (2008) reported that rats raised in an environmentally enriched setting have 30% higher synaptic density in the cortex than rats that were raised in an environmentally deprived setting and suggested that this effect process is analogous to the effects of exposure to violence and neglect. Magnetic resonance imaging and other brain scans in children exposed to abuse and violence have shown differences in white and gray matter volumes and gray matter thickness in cortical areas (e.g., Choi, Bumseok, Rohan, Polcari, & Teicher, 2010; De Bellis, 2005). Mead et al. (2010) provided an extensive review of diverse studies that might together provide a basis for formulating the neurodevelopmental impact of violence exposure, particularly family violence victimization, on cortical development. Although the majority of studies focus on abused and/or neglected children, some focus on media violence exposure. This latter focus may be informative as it is a form of violence exposure that has similarities to community violence. Media violence is not direct victimization but instead is tantamount to being in a violent and violence-accepting environment or as a witness. Also, the violence exposure is not due to perpetration by a caregiver. That the findings seem consistent across media- and abuse-based exposure lends some credibility to looking for similar effects due to community violence exposure.

Neurotransmitter Systems

Studies of violence in relation to psychopathology have focused mostly on three neurotransmitter systems: dopamine (DA), norepinephrine (INN), and serotonin (5-HT). The DA system has been implicated through its linkage to differences in novelty seeking, reward responding, approach motivation, and emotion; and through the cortical effects on cognition, working memory, self-regulation, and planning. Thus, much of the work on understanding the role of the DA system in psychopathology has been related to externalizing problems, such as attention-deficit/hyperactivity and conduct disorder. The theoretical linkage from violence exposure to these empirical findings is that substantial and sustained exposure could induce long-term downregulation of central DA activity (Mead et al., 2010). Behaviorally, this would translate to more impulsive and aggressive behavior with related changes in motivation, cognitive processes of aggression, and self-control.

Elevated INN has been related to trauma symptoms and violence exposure in numerous studies (De Bellis, 2005). It has been shown to differentiate children with such symptoms and history from those without such history. It also has been shown to relate to duration or trauma and predicted symptom levels posttrauma (De Bellis, 2005; Delahanty, Nugent, Christopher, & Walsh, 2005). INN is one of the few neurotransmitters studied in relation to exposure to community violence (Wilson et al., 2002). In that study, victimization that was related to community violence predicted INN level for both males and females. There was a significant relation between witnessing or hearing about violence and INN level across the day for males but not females. Although the study used a small sample ($n = 56$) of a single ethnic group (African American), it is one of the few studies to document neurotransmitter effects related to violence exposure. Since selection screening was for healthy youth, members of this sample probably had little or no abuse histories, so these results may represent a linkage of findings about community violence empirically to those observed in studies of maltreated children. Across studies, including Wilson et al. (2002), the primary hypothesis has been that INN functioning is changed by stress exposure and that the effect is to lower the behavioral inhibition system, which may not lead to more impulsive and aggressive behavior. Additionally, it is thought that this exposure will reduce aversion to violence through blunting the stress response.

There has been substantial documentation of the relation of 5-HT depletion and impulsive and aggressive behavior (Duke, Bègue, Bell, & Eisenlohr-Moul, 2013; Pine et al., 1997). Depletion of 5-HT has been linked to lessening of harm avoidance and to greater likelihood of anxiety and depression. Animal studies indicate that regulation of the 5-HT system is affected by the animal's early rearing environment, particularly abusive rearing environments. These patterns are taken to imply that 5-HT functioning can be affected by violence exposure and may

be one way of affecting brain development and functioning. As with INN and DA systems, there is no compelling evidence of what effects, if any, community violence has on the 5-HT system. However, there is substantial indication of the relation of functioning of these systems and violence exposure or psychopathology. Thus, there is good reason to investigate how these might be affected by community violence.

Cortisol and Cortisol Regulation

The area of brain functioning that has received the most attention in relation to violence exposure, particularly related to maltreatment, has been cortisol regulation and the HPA axis (Cicchetti & Rogosch, 2001; Gunnar & Vazquez, 2006). The primary hypothesis is that stress, particularly traumatic or overwhelming stress, leads to increased cortisol levels and/or impaired regulation of cortisol levels such that reactivity patterns (more reactive, longer to return to baseline) and diurnal patterns are affected. During acute stress, the HPA axis is activated and cortisol serves to downregulate hormonal secretions and to stop many metabolic and neuronal defensive and immune reactions in order to mobilize coping with stress. Thus, cortisol as a catabolic hormone activates energy mobilization, focused attention, vigilance, and memory formation. The effect is to distort emotions related to threat and cortical processes essential in processing, evaluating, and managing threat (Gunnar & Vazquez, 2006). Ongoing and particularly shocking stress (such as violence exposure) is seen as potentially permanently affecting this system, perverting brain functioning, and perhaps affecting physiology. The behavioral effect is threat-focused anxiety, depression, and/or aggression (Twardosz & Lutzker, 2010).

Although a large number of studies have marked a relation among cortisol level, reactivity, and/or diurnal patterns and violence exposure, the results have varied across studies. Sometimes variations show complex patterns that vary by type of maltreatment or violence exposure, gender, and which cortisol regulation characteristic was implicated (Cicchetti & Rogosch, 2001). Also, in many studies, it is difficult to disentangle what might be psychopathology basis for cortisol regulation differences and what is attributable to violence exposure that might also explain psychopathology occurrence. As with other areas of neurodevelopmental violence effects, the vast majority of studies focus on maltreatment as the source of violence exposure, often sampling children with severe and chronic abuse histories. The next largest set of studies in this area did not differentiate source of violence exposure. These latter studies often summed up types of violence experiences to relate overall exposure. One exception was a study that showed negative relations for both peer victimization and witnessing violence and basal cortisol levels among children living within urban neighborhoods with high rates of violence (Kliewer, 2006). These effects were found after controlling for stressful life events, gender, and age. Recently Aiyer, Heinze, Miller, Stoddard, and Zimmerman (2014) examined the longitudinal relation of cumulative violence exposure of an African American sample residing in a low-income, high-crime community. A cumulative exposure to violence effect on cortisol was found for males, with those exposed having a more attenuated response pattern. Notably, the effect of cumulative exposure to violence on cortisol was moderated by the presence of fathers' support during adolescence. This study did not limit focus to community violence, but it was part of the cumulative violence exposure index.

The relation of cortisol patterns and psychopathology among violence-exposed children has been stronger for depression or internalizing disorders, with the relation primarily to higher levels of cortisol (Cichetti & Rogosch, 2001; Mead et al., 2010). Lower levels have shown relation to aggressive tendencies among maltreated and nonmaltreated children, albeit inconsistently and with gender variations in any effect and type of effect (Cicchetti & Rogosch, 2001; Gunnar & Vazquez, 2006). Also, there is evidence that cortisol regulation effects related to abuse may be influenced by entry into nonabusive care and may be responsive to targeted intervention (Cicchetti, Rogosch, Toth, & Sturge-Apple, 2011; Fisher, Gunnar, Chamberlain, & Reid, 2000). Other studies have shown long-term effects of violence exposure on cortisol regulation (e.g., Peckins, Dockray, Eckenrode, Heaton, & Susman, 2012). However, the promising findings in some studies show a pattern of inconsistencies across studies that have raised questions about how much cortisol patterns may reflect the current situation more than developmental effects of prior experience (see Gunnar & Vazquez, 2006, for an excellent review of the issues). Moreover, how community violence exposure may compromise cortisol regulation in a manner that could reasonably be interpreted as contributing to psychopathology remains relatively unexplored.

In a study not of violence exposure but of "neighborhood disorder related to residence in impoverished urban communities," Dulin-Keita, Casazza, Fernandez, Goran, and Gower (2010) reported that neighborhood disorder was predictive of lower serum cortisol levels. The number of years spent living in poverty related positively to overnight

cortisol level and extent of dysregulation of cardiovascular response (i.e., muted reactivity). A similar finding was reported by Evans and Kim (2007), which tracked poverty status, cumulative life stress, and health and reactivity to an acute stressor. The cumulative stress measure appears quite similar to the neighborhood disorder indicators used by Dulin-Keita et al. (2010). Evans and Kim reported that the more years one lived in poverty, the more elevated overnight cortisol was and the more poorly regulated was the cardiovascular response (i.e., muted reactivity). These studies suggest that studying the effects of community violence on cortisol regulation would be very useful.

Arousal/Resting Heart Rate

As violence and other stressful experiences typically increases arousal, one presumed effect of exposure to community violence in neurophysiology is the effect on resting heart rate (Perry, 2008). Indeed, studies have documented both increased arousal and hypoarousal of youth exposed to violence, although most of these studies have been of specific clinical populations and with a focus on trauma (Margolin & Gordis, 2000). A few studies have examined the link between exposure to community violence and arousal, and conclusions have been inconsistent. For example, high exposure to community violence has been associated with a lower resting heart rate in a sample of urban school-age children (Krenichyn, Saegert, & Evans, 2001). Similarly, Cooley-Quille, Boyd, Frantz, and Walsh (2001) reported adolescents with higher levels of community violence exposure had lower baseline heart rates than less exposed subjects in response to media violence. In contrast, Wilson et al. (2002) reported higher heart rates in exposed youth. Cardiovascular recovery was not affected by duration of poverty exposure. Notably current poverty status did not relate to these outcomes. These studies suggest the value of consideration of arousal level muting as one effect of community violence exposure. However, these studies also raise the question of confounding of effects with residence in impoverished communities, particularly those marked by more "disorder" or more limited structural resources for social organization (M. Wilson, 1988).

Implications for Understanding and Affecting Community Violence Exposure

This broad set of neurodevelopmentally focused studies has identified many promising areas of research on how community violence exposure affects youth, including some indicators of what processes might be implicated in psychopathology. The applicability of each and every area of study remains highly uncertain at this point simply due to the lack of more than a few studies of community violence effects as a specific risk factor. The complexities of differentiating such exposure, isolating effects of community violence exposure from frequently co-occurring developmental risk factors, and the size and scope of studies needed to explore neurodevelopmental effects of such exposure competently are all impediments to such efforts. However, this important prior work has suggested many promising topics for research and avenues for likely effects. Among these is how genetic variation in susceptibility to violence exposure and disordered and neglectful/non-nurturant developmental environments affect brain physiology, neurotransmitters, and important neurophysiological systems. Others are to track how variation in family management practices and/or neighborhood social processes affects violence exposure and the extent of the effects on psychopathology of those exposed. Similarly, following patterns of stress reactivity and impulsivity subsequent to incidents of violence exposure or over time due to chronic community violence exposure would help illuminate how this form of violence exposure compares to other forms.

INTERVENTIONS FOR COMMUNITY VIOLENCE EXPOSURE

As with understanding other aspects of the relation of community violence exposure, there are few direct tests of interventions meant either to lessen community violence exposure or to mitigate impact. Most efforts have focused on reducing violence exhibition by youth or by those directly involved in their supervision (e.g., reduce use of violence by parents). Although victimization was also considered in some cases, most efforts to affect community violence levels only measure impact on perpetration of crimes. Moreover, most reports are descriptive only or use empirical comparisons of limited methodological quality, which limits confidence in the validity and/or robustness of the findings. Thus, efforts to reduce youth crime and neighborhood-level violence can be considered potentially valuable in reducing community violence exposure.

Similarly, few studies have focused on mitigating exposure to community violence specifically. Often violence exposure measurement does not differentiate source of violence exposure (e.g., community versus familial) or type of exposure (e.g., direct victimization from witnessing). A set

of studies has approached mitigation of violence effects, including community violence as a traumatic experience (Lieberman & DeMartino, 2006). These studies treat the exposed youth as traumatized and typically apply individual or family interventions to help reduce the trauma symptoms and the resulting behavioral effects. Also, some studies focus on aggression or conduct problems as the targeted effect of community violence exposure, although in most cases it is not clear how exposure and involvement in violence as a perpetrator comingle in the effects (Tolan, 2001b).

Efforts to Reduce Community Violence

Community Organization for Violence Deterrence

One strategy for reducing community violence that has gained much attention is helping communities to organize, be vigilant, and act to make safe areas for children. The intent is to engage residents to help monitor their own communities, notifying police if violence seems imminent and thereby decreasing opportunities for violence. Often these efforts enlist joint efforts by police, child welfare, churches, other civic organizations, and youth services. One variant on this approach is to organize for communication and intercession to block youth violence, particularly gang-related violence that may be brewing over time (Braga & Weisburd, 2012). Often in this variant, an agency has staff that engages with gang-related youth who are informed about when disputes might be leading to violence and can stave off conflict escalation. In addition, there is a concentration of legal prosecution efforts on violence, particularly shooting, such that resorting to such violence is more likely to lead to prosecution and incarceration. A third element is to positively affect police—neighborhood relations, educating youth and minimizing any broad harassment or intimidation efforts (Graczyk & Tolan, 2005). Not infrequently, these efforts incorporate block meetings by police with residents and other aspects of community policing that can affect crime rates (Braga & Weisburd, 2012). Although there are no reports of effects on reducing exposure to community violence, there is evidence of effects on community violence overall from a meta-analysis (Braga & Weisburd, 2012) and specific tests of programs within this general approach (Braga, Kennedy, Waring, & Piehl, 2001). These effects are small. Within multisite studies, it is common to find effects in some but not all of the included sites. Overall, it appears that neighborhood organization could be useful in reducing youth exposure to community violence.

Neighborhood Watch Programs

Neighborhood watch programs fall within the category of neighborhood organization, but they limit citizen organization to monitoring neighborhood settings. Public notification of such monitoring in an effort to discourage violence and crime has been tested most frequently. In addition, these programs often emphasize norms of pride about the community upkeep and safety and are thought to improve neighborhood engagement of citizens. Often these efforts include "target hardening," meaning making citizens aware of how to be less easily victimized. Bennett, Holloway, and Farrington (2008) conducted a meta-analysis of 15 samples across 10 studies of neighborhood watch programs, reporting an average effect of a 16% drop in crime rates. However, the primary contributor to crime rates studied was burglary, not violence. This review noted an average decrease in victimization of 9% from such programs but noted that this was not statistically significant and that only three such tests with adequate evaluation design could be found. Of those, two out of three favored the control condition. These findings suggest that neighborhood watch may deter certain types of crime but may have little impact on exposure to violence. However, any conclusion is quite preliminary without an adequately conducted test of impact on community violence exposure.

Community Policing

A related effort to the previous two community organization approaches is to alter policing practices from specialists investigating and solving specific crimes to a community presence in order to discourage crime and identify methods for prevention. Police are assigned to the overall responsibility for a neighborhood's crime and the residents' safety and security. This method has been characterized as a shift of policing from crime solving to crime prevention. The best efforts focus on working with community members to learn about the community, create communication channels with the police that build trust and increase security, and work to promote safety and crime-reducing norms and activities at the neighborhood level. Often a local office is set up for police contact. It is thought that a greater connection between community members and police increases understanding and communication, which can lead to diffusing emerging violence and should lead to more effective police strategies for addressing crime causes and effects, which in turn should prevent crimes, including violence (Graczyk & Tolan, 2005). Careful studies of community policing have shown effects on perceived order and safety in the community,

and one has documented reduced victimization (Wycoff & Skogan, 1993). However, a recent meta-analysis of 65 programs across multiple countries reported a positive but not statistically significant effect on crime (5%–10%) (Gill, Weisburd, Telep, Vitter, & Bennet, 2014). Similarly, there was a small but not statistically significant effect for felt safety. It should be noted that there was considerable variation in effect sizes across the included studies and there was considerable variation in what comprised the different programs. The implication may be that the way community policing is done and, in particular, its level of implementation can relate to effects. When the primary principles are followed and multiple components are included, effects can be found for violence levels in communities and probably also for victimization. However, the way in which community policing affects children's exposure to community violence is still unsubstantiated.

Gun Control and Management Efforts

There has been considerable interest in the role of access and use of firearms as a contributor to youth exposure to community violence. In part this is because of the prominence of firearms, often illegally obtained, in community violence among youth (National Research Council of the National Academies, 2004, 2013). It is also due to the corresponding high rates of youth violence, particularly gang-related violence, in these communities. Although the value of gun control remains one of the most contentious issues in our society and within academic communities, research has suggested some findings relevant to reducing community violence that may be important in efforts to reduce exposure to such violence. These efforts can be categorized into four groups. The first is community-focused efforts to educate about the relation between gun access and lethality of violence, safe storage and proper use of weapons, and efforts to lessen youth access to guns legally or illegally. These efforts also can include community organization to affect norms about gun use, gun violence, and community responsibility for monitoring crime in the community à la community policing strategies. A second community approach is to try to obtain guns owned by youth and others through amnesty for turning in illegal firearms or buy-back programs. A third strategy is for legislation to increase penalties for use of guns in crimes, for illegal sale or buying of guns, to limit the number and type of guns that can be purchased during a given time period, and to require background checks. Fourth, law enforcement campaigns can aim to reduce gun violence. These campaigns can include concentrating on the policing of hot spots (areas of particular interest to law enforcement because of a concentration of criminal activity) to reduce opportunity for gun violence to occur, community-police engagement, gun courts that speed up the court processing and trial of crimes committed with firearms, stricter supervision of probation and paroled offenders who utilize guns in committing a crime, and required educational programs for first offenders. A recent meta-analysis was published by Makarios and Pratt (2012) of 29 studies categorized into these four types of interventions to determine the effects of policy and community interventions to reduce gun violence. Overall, they found a small but statistically significant decrease in violent gun crime ($r = –0.14$). When examining more specific interventions, small reductions on average were reported for gun laws ($r = –0.09$) and a significant moderate effect for law enforcement campaigns ($r = –0.23$). More specific analysis of gun laws found that weapons bans had significant, moderate effects on reducing gun crime ($r = –0.19$). Policing strategies in general had an effect size equivalent to law enforcement campaigns ($r = –0.23$). A similar effect was found for community education and engagement programs ($r = –0.27$). The latter finding may be particularly relevant in reducing violence exposure of youth. This finding suggests that consideration of efforts to reduce gun violence should include such community engagement strategies and that they are most useful also in affecting exposure because they include elements with some evidence of reducing exposure.

Efforts to Reduce Effects of Exposure

The scholarly literature contains many descriptions of efforts designed to reduce exposure or mitigate its impact on youth but few reports of outcomes (e.g., Bowen, Gwiasda, & Brown, 2004; Horowitz et al., 2005). Recently, two large initiatives were launched as federally funded and coordinated demonstration efforts, intended to permit testing of effects. The Office of Juvenile Justice and Delinquency Prevention launched Safe Start Promising Approaches, which funded efforts in 15 sites to develop and/or implement programs meant to mitigate effects on trauma and other problems, although decreasing exposure was also part of the charge (Jaycox et al., 2011). The consistent goal was to ameliorate the negative impacts of violence on children ages zero to 12. Programs provided differed by sites. Also, some community efforts focused on the development of specific services while others attempted to organize or support existing services. Some provided services to children only while others served both children and their families or primary caregivers. The programs also varied within site and in how recipients of services

were identified. Most targeted various exposure levels of domestic violence, with some targeting families with child abuse, but others included exposure to community violence. Launched in 1999, an evaluation report was recently released (Jaycox et al., 2011). Most notably, the report noted that outcome effects were often difficult to ascertain with any certainty, which precluded conclusions of effects across the initiative. Nor were specific effects for any given site presented. Underenrollment and attrition issues, evaluation design limitations, inadequate evaluation resources, and a premature end of the evaluation marked the projects. The retained sample in programs at most sites was too small to permit adequate power to detect expectable effects. For example, some sites had enrollment rates as low as 2% of targeted participants.

Similarly, the Attorney General's National Task Force on Children Exposed to Violence report led to a national initiative called Defending Childhood. In this case, eight cities were provided funding and technical support for community organizing to provide services to reduce children's exposure to violence (not just community violence) and to make services available that were thought to lessen the impact of such exposure. Most of the funded cities and Native American groups (included in the funding) focused on getting family-focused services to children exposed to domestic violence or abuse. However, the intent was to also address those exposed to community violence. This initiative, like Safe Start, included a variety of efforts. Therefore, surmising what might be effective was difficult since each individual effort had substantial methodological limitations (Swaner & Kohn, 2011). The Defending Childhood initiative is still in progress. However, interim reports suggest major impediments to implementation of programs as intended and engagement of families that are consistent with those in the evaluation report about Safe Start Promising Approaches (Jaycox et al., 2011). Thus, this experience in implementing needed programs provides an unfortunate but instructive example of how difficult it can be to carry out community-based violence-mitigating efforts.

Conceptual organization (what is thought to be needed), implementation challenges (getting needed efforts in place and utilized), and adequate methodological quality to permit inference are all necessary to complete adequate evaluation to determine what efforts might mitigate exposure or its impact. Each of these factors can be a major challenge. Together, they can overwhelm good intentions. It should be noted that these elements often involve large-scale community engagement efforts, shifting of some long-held approaches to services violence prevention. At the same time, identifying viable comparison conditions or communities can be difficult; and implementation in a sufficient number of neighborhoods for valid statistical inference can overwhelm budgets and the operational capabilities of evaluators. The lesson may be to consider some smaller-scale, more controlled demonstrations to establish efficacy. Furthermore, basing work on collaboration models that have shown benefits for other youth problems could then be implemented, marrying promising programming with promising organization (Hawkins, Oesterle, Brown, Abbott, & Catalano, 2014). Also, it is important to focus on community violence exposure apart from family violence as integral to the evaluation. This could be via a focus on community violence exposure specifically or as an attempt to parse the relative level of each among participants and how those levels relate to effects.

Police and Social Worker Collaboration

Marans and Berkman (2006) developed a variant on the community policing approach as a way to get services to youth exposed to violence that differs from community organization. They formed a collaboration between community police and mental health professionals to address effects of witnessing violence on children. The approach combined extensive training of the police in child development theory and violence effects on children and direct intervention by mental health caseworkers as soon as children had witnessed a violent crime. Marans and Berkman noted several promising effects on police approach and on the handling of domestic violence, but empirical evidence of specific impact on youth exposed to community violence has not been reported to date. As with most other approaches discussed here, there is some suggestion of utility in regard to violence exposure impact. However, that utility awaits empirical testing.

Trauma-Focused Efforts to Mitigate Violence Exposure Effects

As with several other approaches to community violence exposure, the literature describes multiple efforts but few target youth exposed to community violence. Or the efforts do not provide results of evaluation to judge effects. There have been multiple trials of psychological interventions for children thought to be traumatized due to maltreatment (Leenarts, Diehle, Doreleijers, Jansma, & Lindauer, 2013). This systematic review and other conceptual reviews suggest that cognitive-behavioral approaches that systematically include a mix of emotional support, opportunity to talk about the trauma in a safe place, anxiety-reducing

and thought-redirecting practices can reduce PTSD symptomology. One example, which included violence exposure not specific to maltreatment, was reported by Stein et al. (2003). They reported on a program entitled Cognitive Behavioral Intervention for Trauma in Schools. The program was designed to reduce PTSD, depression, and anxiety among children with symptoms of PTSD and who were exposed to violence. The 10-session school-based intervention taught cognitive-behavioral skills in a group format, led by mental health professionals, with six to eight students per group, using a mixture of didactic presentation, examples, and games to solidify concepts. Techniques used include relaxation training, combating negative thoughts, reducing avoidance, developing a trauma narrative, and building social problem-solving skills. In addition to the group program, students were provided one to three individual sessions and optional sessions that included parents. Teachers in the school were provided an in-service on trauma, violence, and the intervention. Youth in the program showed significant decreases in trauma symptomology compared to randomized waitlist controls. No effects on problem behavior were found, however. This trial produced results consistent with other tests of this intervention as a clinical treatment for maltreated youth and other similar approaches (Leenart et al., 2013). This single example is a weak basis to infer how community violence exposure might be mitigated through cognitive-behavioral intervention. However, this is among the few efforts meant to mitigate violence exposure in general, not just community violence exposure specifically. This type of approach deserves priority for testing.

Lessons from School-Based Programs

School-based prevention has been a popular approach to reduce aggression perpetration. Further, because these efforts are focused on youth violence in a setting where youth spend a large portion of their time, these findings can have two types of implications to affect exposure to community violence. First, these settings provide some attention to the ecology and social basis of violence exposure, with a few considering victimization and other exposure to violence in addition to the main focus on perpetration. Second, while not out in the community, school-based violence is sometimes considered a part of community violence exposure for youth. Therefore, these interventions may provide direction for direct impact on community violence exposure that occurs at school.

There is some evidence that some school-based violence prevention programs reduce victimization (Hahn et al., 2007). Similarly, there is some evidence that bullying prevention efforts also can reduce victimization. In both cases the effects can be from reducing perpetration so fewer students are victims or by making aggression/bullying less acceptable and providing potential victims coping and assertion skills, The best evidence for bullying programs is those that include family-focused components are helpful (Ttofti & Farrington, 2010). For example, Ttofti and Farrington (2010) examined 89 reports and noted an average reduction of victimization of 17% to 20%. The effect sizes varied substantially (from about 1.00 standard deviation to negative effects), with some characteristics relating to effect sizes. They noted that programs that were delivered by or focused on peer groups seem to have lower and sometimes negative effects. Among the effective programs were elements such as clear and explicit display and enforcement of norms in school against violence, engagement of families as part of this norming effort, problem-solving opportunities when conflicts arose, and opportunities for students and staff to increase social and emotional skills. Also, some programs utilized engaging games to help students learn methods to avoid bullying or to help stop victimization. Thus, a variety of approaches had some effects on victimization, at least as measured as bullying, within schools. Notably, the effect sizes tended to be larger for demonstrations in countries other than the United States. Thus, it is not clear how these efforts might translate to reducing community violence or affecting exposure impact and how these might be useful in the United States.

Two recent large-scale tests of school-based violence prevention suggested that what might affect victimization differs from what might affect perpetration. The Multisite Violence Prevention Project (2009) tested two programs for middle schools meant to affect violence rates (perpetration and victimization). One program utilized cognitive skills training and norms promotion, similar to what characterizes many programs designed to reduce violence use and acceptance and was applied as a universal classroom-delivered program. The other focused on youth whom teachers identified as among the more aggressive.

It utilized small family groups to help with parenting skills, parent-child communication, and group support for nonaggressive problem solving. Testing of effects showed no overall differences for either intervention or a combination of the two for victimization, although some effects of the selective family intervention were found (Multisite Violence Prevention Project, 2009, 2014). There was some suggestion of lower victimization of the combined program for those students with very elevated aggression.

Similarly, Espelage, Low, Polanin, and Brown (2013) reported that test of a curriculum, Second Step, that focused on many of the same cognitive features as the Multisite Violence Prevention Project (and many other such programs) showed no effects on victimization even though there were positive effects for perpetration of bullying. As with other tests of in-school programs, both of these efforts focused on within-school victimization, so results may not transfer to tests that measure effects of community violence.

ADVANCING KNOWLEDGE, PRACTICE, AND POLICIES RELATED TO COMMUNITY VIOLENCE EXPOSURE

Violence exposure has harmful effects on development. Numerous studies have implicated exposure to violence as contributing to risk for psychopathology symptoms and disorders and in exacerbating psychopathology. Community violence, one form of violence exposure, has been studied less than other forms, but research suggests its impact is similarly deleterious. In addition, it probably affects psychopathology through comparable psychological and biological processes.

Community violence differs from other forms of violence in that it occurs outside the home and is not due to violence between family and friends. It also differs from these latter forms of violence in that it may affect youth by virtue of residing within a geographic region. Thus, its forms can vary from isolated horrible events to an atmosphere where violence is endemic and frequent. Most specifically, it can range from direct victimization to witnessing victimization of others to being aware of violence nearby or occurring to neighbors. Also, unlike family violence (including partner violence, child abuse, and sibling violence), community violence tends to be concentrated in particular neighborhoods, particularly urban impoverished communities. Thus, it is substantially related to economic class and location, which is not the case for other forms of violence. This makes community violence a political and social policy issue as much as psychological and psychopathological issues.

Over the past 20 years, considerable theory, policy analyses and suggestions, and empirical study have been applied to community violence. In addition, considerable effort and advances have occurred in understanding the importance of the definition of violence applied, how distinct measurement of exposure types and sources are, and how these are interwoven into developmental tracking and intervention studies. This collective work has revealed important understanding of the issues, including alarming prevalence among some children in particular communities. The starkness of these findings and the concentration of violence within poorer communities in larger urban centers suggest the importance of contextualized understanding of impact. This can include better understanding of what community-level actions can reduce violence and exposure but also what might be needed to mitigate harm from exposure in communities marked by limited social and economic resources and limited political importance. There is sufficient evidence that community organization, community policing, and community awareness can reduce crime rates and probably reduce community violence rates. Therefore, such actions deserve to be central in efforts to reduce community violence exposure and to the study of what makes a difference.

It has also shown that while effects of violence exposure can be traumatic to some individuals, this is not universally so. In fact, there is mixed evidence for any form of violence exposure affecting symptoms of PTSD, with thin evidence of effects extending to disorder incidence. Evidence is similarly strong for violence exacerbating rather than affecting conduct disorder symptoms and other externalizing disorders and depression. Evidence is less robust for violence affecting anxiety symptoms apart from PTSD, but is the available evidence shows effects consistent with those shown for other symptoms and other disorders, suggesting potential effects for some exposed. As expected, the few studies that have examined the relation between psychopathology and impact of subsequent exposure to violence have demonstrated the transactional quality of the interdependence. Those with mental health problems seem most susceptible to exposure harm. In some cases, particularly for those with aggressive tendencies, the exposure may be due to those tendencies with additional increased impact in the presence of such psychopathology. Similarly, when related to different forms of violence, those with prior abuse or exposure to domestic violence are most affected by community violence. Impact is also dependent on multiple personal and familial characteristics, suggesting that those growing up with fewer resources or poorer functioning are also most susceptible to violence risk in comparison to others residing in similar communities. The accumulated research on community violence effects on psychopathology underscores the transactional nature of its development with attention to group level as well as individual differences in exposure risk and impact processes. Although the components of models that can explain and provide guidance for additional studies can be found significant gaps still exits in the empirical basis for

the link between community violence and psychopathology occurrence, course, and mitigation.

When theories of processes are applied, whether framed within a neurodevelopmental approach or as psychological processes of emotion and cognition, a common element is strong dependence on theories and studies from maltreatment exposure and explanations of violence or aggression perpetration. This is due to limited research on community violence, limited differentiation of community violence from other forms of violence when it is studied, the larger and more extensive set of studies on maltreatment and violent behavior, and the likelihood that there are similar if not shared processes of impact. A more carefully drawn definition of violence is critical to permit confident understanding of the meaning of various studies. But violence also must be differentiated into levels of seriousness, sources, and forms. Doing this will allow us to determine whether effects and processes are similar across community and family violence and are related to differences in level of exposure to and directness of involvement in the violence. In addition, more studies are needed that test for community violence exposure in particular as a source of stress and as impeding self-control. Also, it is necessary to trace neurobiological processes, test for differences in physiology, and document the stability/transience of effects on those processes thought to underlie/characterize psychopathology. In reviewing areas related to community violence, much of what we know is based on inference from studies of exposure to violence in general or due to other forms. There are still basic questions of how community violence exposure specifically relates to likely symptoms and behavior change. While there is great value in testing the application of lessons from these findings about violence in general to exposure to community violence in particular, this application needs to take into account differences in how this type of exposure occurs and in likely co-occurring risk factors.

Interventions for community violence exposure that are designed to test theories of psychopathology as well as those intended to demonstrate the potential for public health benefits if taken to scale are both needed, and should be priorities for future research. There have been a notable number of failures to implement adequately or to complete study of community violence interventions. Therefore, there is very limited scientific information about impact of any approach and even scarcer basis for judging one approach as advantageous over others. In part, this state of knowledge can be attributed to the scope and complexity of implementing interventions that attempt to address structural issues such as gang and criminal activity in a community, or operate with limited police availability and engagement with the community, and/or attempt to address only violence when it is part of a collective concentration of social problems (Tolan & Guerra, 1998; M. Wilson, 1988). It may be important to focus on how communities can become more engaged to form and express collective efficacy (Sampson et al., 1997). Similarly, it may be advantageous to explore how families and youth can be reached through greater school-community engagement or encouraging neighborhood supports (Tolan et al., 2003). If affecting the social forces that seem to undergird rates of violence and therefore likely violence exposure in communities is beyond the reach of most policy or service efforts, perhaps some of the promising family support, safe space, youth engagement, and youth monitoring efforts that show promise from prior trials could be utilized to explicitly limit exposure and mitigate harm from exposure.

CONCLUSION

Community violence exposure remains a compelling social and psychological problem that deserves more of the careful and informative scientific work extending what has been done in the past 25 years. In particular, what is needed are: (a) more carefully defined samples; (b) measures of community violence exposure that delve into extent of exposure (e.g., direct victimization versus witness versus being aware of) and of exposure with considerations of other bases for violence (exposure, chronicity of exposure); and (c) specific theoretically driven formulations of the relation of community violence exposure to context, family, individual behavioral, affective, and cognitive features, and neurodevelopmental underpinnings; and (d) analytic approaches that can trace causal influence of community violence exposure to changes in psychopathology symptoms and conditions. With such design features, it is plausible that knowledge could be accumulated to move us from the basic understanding available at this point toward delineation of the basis, effects, processes of impact, and needed interventions and policies for community violence exposure. The field seems poised to build on prior work to incorporate more careful definitions of key constructs and to apply methods and findings from adjacent studies of violence, aggression, crime prevention, and neighborhood organization, and on processes of developmental psychopathology. With such careful and substantial attention, understanding of community violence could be greatly improved in a relatively brief time and could be used to help lessen this harmful part of the lives of too many children.

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CHAPTER 3

Social Support and Developmental Psychopathology

ROSS A. THOMPSON and REBECCA GOODVIN

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We live in an environment of relationships. Those relationships are important for many reasons, and one of the most important is the psychological support they provide. Family members can be counted on for understanding and advice, help with child care, and financial assistance. Friends are sources of encouragement and counseling, for sharing information and experience, and as referral sources. Coworkers can provide professional advice and guidance about workplace concerns. Neighbors are valuable sources of information and tangible aid, sometimes in the exchange of favors or resources. Marital and romantic partners support self-esteem and emotional well-being. Although not all relationships function optimally, and thus these forms of assistance may be provisional, the value of these relationships rests on their offering support in the context of the emotional ties that define them. This is especially true when individuals need help because they are under stress.

Formal helping relationships are often intended to emulate these forms of informal support. Counselors, religious advisors, social workers, and other helping professionals attend to the psychological needs of their advisees as well as their material or spiritual condition. Teachers, professional coaches, and personal advisors likewise provide encouragement and support in the context of promoting skill development and knowledge acquisition. Social support is a critical function of many forms of psychological therapy, whether support is received from an individual mental health professional, a therapy or support group, or a special preschool, classroom, or adult education program designed for troubled individuals. Although individuals benefit from the support received in formal as well as informal helping relationships on any occasion, when they face significant stress or psychological turmoil, the psychological support that formal helping relationships afford can be critical to their coping and recovery.

Children depend even more significantly than adults on the support provided by their environment of relationships. This is because central developmental achievements—emerging sense of self, social and emotional competence, cognitive and language skills, even physical health and development—are constructed in the context of social interactions in which the supportive assistance of relational

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partners is critical. In addition, because children (especially when they are young) are less capable of creating alternative sources of support for themselves, they rely more significantly on support from people in the family, school, and neighborhood social networks that are created for them by their parents. This is one reason why social support to children differs from social support for adults: It is mediated to a significant extent by parents and the opportunities they provide. Parents are also significant to children's support because they are key providers of the varieties of emotional, informational, material, and other resources that children need. They are, as we subsequently describe, support generalists. Where children are concerned, therefore, it is essential to think *multigenerationally* about relationships and social support.

Understanding the value and functions of social support in everyday life provides a basis for understanding its role in developmental psychopathology. As described in this chapter, social support is relevant to developmental psychopathology in at least three ways. First, social support or its absence is important to the *origins* of clinical problems for children and their families. Children who encounter adversity without the buffering assistance of supportive relationships are at higher risk of developing psychopathology. Risk is especially heightened when family relationships become sources of adversity rather than of security because of children's reliance on the support of family members. For this reason, many preventive programs, such as home visitation, enlist social support to improve family conditions for children, using the assistance of formal helpers to strengthen informal support to children. Second, social support or its absence is important to *maintaining* clinical symptomatology for children in troubled families. In this sense, family ecologies can become enabling conditions for affective psychopathology because of the absence of the kinds of support from family members that might help remediate children's anxiety, conduct problems, or other difficulties, and these family conditions instead exacerbate these problems. Third, social support is important to the *treatment* of clinical problems of children. Indeed, it is arguable that most forms of therapeutic assistance entail some form of social support, so the important questions concern the sources of support, the avenues by which it is provided, and most important the clinical symptomatology it is expected to address. Several models of therapeutic intervention entailing different kinds of supportive assistance are profiled later in this chapter.

Taken together, the value of social support seems obvious and obviously beneficial in everyday experience, and thus of clear relevance to the prevention and treatment of clinical problems in children. Such a view led to what Shumaker and Brownell (1984) described as an "era of unrestrained enthusiasm that has dominated social support research and interventions for more than 10 years." What led, then, to the close of this enthusiastic period? Some considerations are listed next.

- Social support may address some of the emotional needs of its recipients without addressing the root problems that contribute to dysfunctional behavior. This problem is evocatively illustrated by Jill Korbin's (1989, 1991, 1995) interviews with mothers convicted of fatal child abuse. These mothers were surrounded by family, friends, and neighbors who were often painfully aware of the bruises, neglect, and other harms the mothers inflicted on their offspring. But in their efforts to be emotionally supportive, they failed to challenge abusive practices and instead overlooked other signs of parental dysfunction, minimized the seriousness of abuse, and offered reassurance about the mothers' good intentions while providing noncritical emotional affirmation. In doing so, of course, they contributed little to curbing abusive practices or protecting the children. As Korbin (1991, p. 23) noted, "A high level of perceived support sustained, probably unintentionally, these women in their pattern of abusive behavior." It is not difficult to see similar patterns of emotional support enabling other forms of family pathology that victimize children, such as family practices that excuse rather than challenge parental substance abuse or domestic violence by offering reassurance without addressing the causes of clinical symptomatology.
- Social support may have attendant negative consequences that ultimately undermine sustaining support to needy recipients. Home visitors who seek to provide emotional support, material assistance, and information to at-risk parents are often surprised, for example, to discover that parents are absent during scheduled visits and resistant to the assistance they receive, and that they respond to the home visitor not with gratitude but instead with resentment and ill will. The home visitors do not understand that receiving one-way assistance, even (perhaps especially) from someone motivated by beneficent motives, often generates feelings of humiliation, failure, stigmatization, and vulnerability in recipients (J. D. Fisher, Nadler, & Witcher-Alagna, 1982; Schumaker & Brownell, 1984). One implication is that *how* social support is provided and the nature of the relationship in which it is offered are crucial to recipient

reactions to assistance and the maintenance of a helping association. Without considering recipient reactions to assistance, helping relationships often break down.

- Social support may exhaust the resources of informal and formal helpers, and the characteristics of those most in need of social support are especially likely to drain helping relationships. Friendships become stretched by the emotional neediness of someone who is in chronic distress, and individuals may begin to distance themselves from those who are depressed because of the negative affect, demandingness, and even hostility that can become part of their relationship. Troubled families with neglected children may evoke compassion in neighbors but also aversion because of parents' disorganization, social incompetence, and withdrawal (Gaudin & Polansky, 1986; Polansky & Gaudin, 1983). Professional clinicians also experience the drain of providing emotional assistance to their clients. The maintenance of supportive relationships, whether informal or formal in nature, requires attention to the needs of helpers as well as recipients.

The current era of social support research and interventions has learned these lessons, and as a consequence, there is greater attention to tailoring supportive interventions to the needs of specific recipient populations, devoting attention to the contexts in which assistance is offered, considering the characteristics of helpers and those they aid, and creating networks in which social support is most likely to be maintained (Thompson, 2015a). In addition, social support in the context of developmental psychopathology increasingly relies on understanding children's social networks and the role of parents as organizers, gatekeepers, and mediators of children's access to helpers. Research in developmental relational science provides insight into the influence of relationships to promote or undermine children's well-being. Recognizing that social support is easy to conceptualize but difficult to implement in the lives of troubled children and their families, the field of social support research and intervention is less enthusiastic, more cautious, but potentially more helpful in addressing the clinical needs of children and families than it was several decades earlier (Thompson, 2015a).

The purpose of this chapter is to consider the complex and multifaceted association between social support and developmental psychopathology. Our goal is to draw on diverse research literatures to illustrate how social support is relevant to the etiology, maintenance, and treatment of clinical disorders in children and families in the context of a developmental appraisal of children's social support networks. Our goal is also to use the lessons of treatment interventions and basic research to outline suggestions for how social support interventions can have the most positive effects for children and families as well as to outline directions for future research.

The chapter opens with a discussion of how to define and conceptualize social support, considering both what it is and what it is not. In doing so, the multiple functions of social support for adults and children are discussed, with attention to similarities and differences in the experience of social support for children and adults. Regardless of age, however, social support is believed to contribute to psychological well-being in two ways: by preventing stresses from occurring, and by buffering the effects of stress when it occurs. The next section of the chapter discusses multiple ways by which support has these consequences, including studies of the social buffering of stress neurobiology (Thompson, 2014a). Not surprisingly, the association between social support and stress is complex and bidirectional, and these bidirectional associations also are considered.

Recognizing that social support is provided most often in the context of relationships and that relationships are multifaceted, the next section considers the characteristics of relationships that afford support, as well as how relationships sometimes can undermine support between relational partners. Also discussed is how obtaining support in a relational context compares for children and adults and how children's access to support is mediated by parents and family conditions. Developmental changes in children as relational partners are also discussed, especially how these changes increasingly enable children to construct and maintain their own social networks. The nature of social support in the context of online relationships through social media and other technological avenues is considered as well. Then this relational perspective is extended to consider cultural processes related to giving and receiving social support. A series of interim conclusions about social support then follow.

In the next section, we discuss most directly the relevance of social support to risk for affective psychopathology in children in relation to the origins, maintenance, and treatment of clinical disorders. We use examples from well-studied areas of clinical psychopathology or at-risk family conditions, rather than focusing directly on a few diagnostic categories, in the hope that this will yield more general lessons for those who seek to enlist social support interventions to aid at-risk children and families. We also offer examples of promising intervention efforts as exemplary models. These lessons learned provide the

transition to the final section, which offers directions for future research and intervention.

DEFINING SOCIAL SUPPORT

To most adults, "social support" consists of the emotional affirmation received from close relational partners, particularly during periods of distress or turmoil. Most researchers believe that although emotional affirmation is important, social support is actually a more multifaceted phenomenon (Gottlieb & Bergen, 2010). The next definition reflects this fact:

> Social support consists of social relationships that provide (or can potentially provide) material and interpersonal resources that are of value to the recipient, such as counseling, access to information and services, sharing of tasks and responsibilities, and skill acquisition. (Thompson, 1995, p. 43)

Unpacking this definition provides a more complex portrayal of the functions of social support and better understanding of how social support to children compares with support to adults.

Functions of Social Support for Adults and Children

First, social support offers *emotional encouragement,* including affirmation, understanding, and empathy, the sense that others share one's troubles and are reliably "on your side" (what Gottlieb, 1985, calls "milieu reliability"). For adults, this emotional function contributes to a sense of perceived support from social network members, especially those in close relationships, that is an important component of how support buffers stress (Barrera, 1986; Cohen & Wills, 1985). The emotional understanding and companionship entailed in this support function is important also to children. From infancy, children rely on the solicitude and emotional support of their caregivers and develop secure attachments to those adults based on the sensitivity and reliability of the adult's assistance (Cassidy, 2008; Thompson, 2006). The security in a caregiver's support and responsiveness is important whether children's relationships are with adults within or outside the family, and it contributes to children's social and emotional competence and self-confidence (Thompson, 2008). Likewise, children's friendships incorporate emotional understanding and acceptance, especially as children mature and as intimate self-disclosure and emotional support become increasingly important to friendship quality (Gottman & Parker, 1987).

Second, social support provides *counseling, advice, and guidance.* For adults, counseling may be sought concerning marital or child care concerns, workplace issues, personal problems, or other issues. Children require advice and guidance for a much broader range of individual and developmental issues because caregivers have much greater knowledge and experience about major life issues, and peers are sources of relevant social understanding and perspective. This function of social support is thus, like emotional support, essential to healthy child development (Thompson, 2014b).

The counseling and guidance function of social support may be combined with emotional encouragement, but whether this occurs or not depends on the nature of the relationship between the recipient and the support agent. Adults may seek guidance from a workplace colleague or neighbor about a problem without expecting emotional support, for example, but they may obtain advice with the expectation of encouragement from a spouse. Likewise, children may obtain helpful advice from a teacher, peer, or parent in the context of different expectations for emotional support. Indeed, social discriminations concerning expectations for the kind of support that might be solicited from different members of one's social network become part of social-cognitive growth in middle childhood and adolescence. During this period, for example, peers become significant sources of advice on matters of style (hair, dress, music) and activities, whereas parents remain important for guidance on questions of moral values and future goals (Coleman, 2011). In this respect, different network associates are preferred for different kinds of advice, which may or may not be accompanied by emotional affirmation.

Third, social support enables *access to information, services, and material resources and assistance.* In this way, support agents provide tangible aid or act as brokers with others who can do so. For adults, this may occur when neighbors and friends are consulted for information about schools, community agencies, or child care settings or when extended family lend money or provide needed transportation. These activities often overlap with another function of social support, *sharing of tasks and responsibilities*, in which people assist the recipient in these ways or provide access to others who can do so. For children, these functions of social support are more extensive because children depend on adults within and outside the home for information, services, and the necessities of life. This assistance can occur in the informal settings of family or peer group, or through the formal services of school or community agencies. Importantly, however, access to these

formal services depends, at least until children are older, on the permission and assistance of parents.

Fourth, social support can contribute to *skill acquisition.* Skill acquisition occurs for adults when coworkers assist with job-related skills, neighbors assist in learning about gardening or car repair, and friends or extended family aid in personal skills related to household management, parenting, or financial planning. Skill acquisition is a central feature of social support for children, whether considering parents, peers, or people outside the family (such as teachers or members of a faith community) as support agents. As in other support functions, the contributions of others to children's skill acquisition is more extensive than for adults because many of the abilities to which parents and peers contribute are developmentally foundational. Social skills, literacy, navigating familiar routes, and consumer practices are among the multitude of skills that are acquired in the company of social partners. As with sources of advice and guidance, children acquire different skills from different people in their support networks. Peer relationships are, for example, rich contexts for the acquisition of unique social skills that are relevant to interactions between equals (Rubin, Coplan, Chen, Bowker, & McDonald, 2011).

Social Monitoring as Social Support

These four generic forms of social support are intuitively recognized and appreciated in everyday social relationships and constitute the foundation of most research portrayals of social support (e.g., House & Kahn, 1985; Thoits, 2011). But when research on social support is considered in relation to developmental psychopathology, at least one other function becomes important: *social monitoring.* Social monitoring emphasizes the protective influence of social network members, such as when friends notice signs of depression in an adult and seek assistance for this reason or extended family members detect and respond to disturbing bruises on a child. In contrast with the provisioning forms of social support earlier described, this is a protective function (House, Umberson, & Landis, 1988). It is an important, and sometimes overlooked, influence of social support and recognizes that support is important for preventing harm as well as for promoting good, and that both aspects are important to supporting individual well-being. Indeed, social monitoring may be most important, especially for some of the preventive and remedial influences that social support is believed to have in the lives of at-risk children and families, such as a home visitor's monitoring of an infant's development and of parental functioning. Furthermore, individuals and families in social isolation are commonly perceived as being at greater risk of psychosocial problems (such as child maltreatment) compared to those who are embedded in extensive social networks because the social monitoring of isolated families does not occur (Thompson, 1995). Although extensive networks do not necessarily safeguard against child maltreatment, as Korbin's (1991) research described earlier indicates, it improves the chances that child harm will be detected and that interventions on the child's behalf will be mobilized.

Distinguishing the provisioning functions of social support—emotional encouragement, counseling and guidance, access to information and resources, and skill acquisition—from the protective function of social monitoring is important for understanding why these do not necessarily operate well together. Stated simply, people are much more comfortable offering encouragement and help than with monitoring and drawing concerned attention to another's behavior, especially in informal social networks, and recipients are much more likely to respond positively to the former than to the latter (Thompson, 1995). In the families that Korbin (1991) studied, mothers were surrounded by affirmative and supportive kin who failed to intervene despite indications that a child was at risk. A similar conclusion derives from a recent study by Freisthler, Holmes, and Wolf (2014), who indicated that parents who experienced a high sense of belonging with others, especially when companionship involved drinking outside of the home, were more likely have physical abused their children. They described this phenomenon as "the dark side of social support" because the contexts of companionship may have fostered abusive conduct and friends did not help to curb this conduct. In a culture in which privacy boundaries, even within families, can cause adults to resent perceived intrusions into personal issues, these privacy norms can make neighbors, friends, coworkers, and even extended family members hesitate before bringing up uncomfortable concerns about personal conduct or parental behavior. Raising these issues can cause these individuals to be perceived as meddlesome, intrusive—and unsupportive. For most adults, formal helping professionals may be more successful than informal helpers in social monitoring and correction because of the nature of their role responsibilities. But even in formal contexts, these behaviors may be resented and resisted.

This is, however, another manner in which social support to adults and children differs. There is much less perceived dissonance between the provisioning and protective functions of social support to children, in part because

children's need for guidance is self-evident and privacy concerns do not apply as strongly to children's conduct (Smetana, 2006). In addition, both children and parents recognize that parental monitoring and correction are compatible with parental support and affirmation as long as parents are perceived as acting fairly and consistently with their parenting responsibilities (Grusec & Goodnow, 1994; Lansford et al., 2005). As Lansford and colleagues (2005) have noted, for example, even physical punishment by parents is accepted by children if this practice is perceived as normative. Thus although neither children nor adults like the attention drawn to their inappropriate or dysfunctional conduct, for children the correction of their conduct is a more normative feature of their relations with adults within and outside the family.

Distinguishing different functions of social support in this manner draws attention to the different supportive functions that can exist in relationships between a support agent and a recipient. In some relationships, individuals are support specialists who are valuable primarily because they have one or two specific forms of social support to offer, and this can also be true of formal helpers, such as physicians, counselors, and religious leaders (Bogat, Caldwell, Rogosch, & Kriegler, 1985). Other individuals are support generalists who provide many different social support functions, and these individuals can often be found in neighborhood and kinship social networks. As noted earlier, parents are support generalists to children, a fact that helps to account for their unique and significant influence on children's development (Cauce, Reid, Landesman, & Gonzales, 1990). But peers can also be support generalists of a different kind. Parker and Asher (1993) found, for example, that the friendships of children who were highly accepted among their peers provided greater validating and caring, more help and guidance, greater conflict resolution, and more intimate exchange than the friendships of children with lower peer acceptance. The extent to which children's developing social networks provide multifaceted support to them depends, in part, on the number of support generalists these networks include.

What Social Support Is and Is Not

This multidimensional portrayal of social support includes the various ways that individuals derive interpersonal and material resources from others. It recognizes that social support extends beyond the emotional affirmation and understanding that is prominent in everyday conceptions of support and includes other contributions that are ultimately valuable to the recipient (although they may not always be immediately recognized as such). Viewed in the context of developmental psychopathology, this conceptualization recognizes that support can include skills training, community referrals, economic assistance, and social monitoring for purposes of preventing or remediating clinical problems. Indeed, these functions of social support may be influential whether they are accompanied by emotional affirmation or not.

It is arguable, however, that this portrayal of social support is *too* inclusive. As earlier noted, for example, it is possible to view most forms of therapy as entailing one or more forms of social support. Any relationship that is worth maintaining likewise functions in a socially supportive manner in some form. In this light, it is perhaps less important to regard relationships as "supportive" than to delinate more specifically *how* they offer support and the particular support functions they provide. If the term *social support* is here conceived broadly, it nevertheless permits portrayals of helping relationships as functioning supportively in distinct ways.

Moreover, it is important to clarify what social support is *not.* Social support is not the same as having a large social network. Individuals who know many people may not derive support from them—indeed, large social networks may be "conflicted networks" that impose stress more than support, and this may be especially true for troubled individuals (Barrera, 1981). Moreover, some people enjoy close, supportive relationships with a very small handful of network associates. Although these conclusions may seem obvious, they challenge the view that it is important to try to integrate socially isolated children or families with larger numbers of people with the expectation that doing so will enhance their social support. Without efforts to ensure that new relationships function helpfully in the lives of socially isolated individuals, simply enhancing network size may not accomplish much.

For similar reasons, social support also is not social embeddedness (the frequency of contact with network members), dispersion (the ease with which individuals can get in contact with network members), or stability (the consistency of network members over time). Each of these structural features of social networks can be important in certain circumstances, and often these features are used as measures of social support. But research studies indicate that social network measures like these are only modestly associated with the extent to which individuals report expecting, or actually receiving, social support from others (e.g., Barrera, 1986). One reason is that relationships with social network members can be troubled, coercive, or critical in ways that undermine the benefits these relationships

potentially can provide. This is especially likely to be true for children at risk of psychological difficulty.

These considerations thus focus the conceptualization of social support on the qualities of social transactions that matter to the recipient and are influential in promoting health. Subjective perceptions of perceived or enacted support from network associates are more strongly associated with individual coping and resilience than are structural features of social networks, such as network size (Barrera, 1986; Cohen & Wills, 1985). The association between individual coping and a subjective perception of support may be based on the sense that people are benefiting from their transactions with social network members in emotional, informational, material, protective, and/or other ways that are important to them. When this occurs, those social network members function in a socially supportive manner and usually are perceived to be doing so by the recipients. It also means, however, that individuals who act protectively in the lives of troubled families or children must carefully consider how their actions are perceived by recipients or risk that their assistance will be regarded as unsupportive, even if they are striving to act in the recipient's best interests.

SOCIAL SUPPORT AND STRESS

This portrayal of the functions of social support embeds helping relationships within the everyday positive social transactions of children and adults. Social support benefits its recipients: It is part of what makes life manageable and cements close relationships. Supportive relationships are nice to have.

With respect to children, however, Thompson (2014b) goes further to argue that social support is developmentally constitutive. In other words, beyond being desirable, the ways that supportive relationships (especially with parents) provide emotional security, foster the growth of age-appropriate skills and understanding, offer essential information and guidance on matters that are important to children, and offer protection through social monitoring address essential needs of developing children, particularly when they are young. They are not optional for healthy development. The view that social support is developmentally constitutive grows out of children's dependence on those who care for them, their limited capacity (until much older) to create and maintain their own supportive social networks outside the family, the centrality of caregivers in children's environment of relationships, and the importance of supportive relationships to critical developmental achievements in self-confidence, social and emotional competence, cognitive functioning, and even physical health (Thompson, 2014b). One implication of this view is that children's experience of social support is closely tied to the quality of the relationships they experience with family members, peers, and other important network associates. This concept is explored further in the next section. Another implication is that when these relationships are troubled, particularly with parents, children are especially vulnerable because alternative sources of support are not readily available to them. This idea is explored further in the examination of social support in relation to developmental psychopathology.

Social support is important, and it is especially so when individuals are under stress. Extensive research highlights that social support mediates the impact of stress on individuals in at least two major ways (Barrera, 1986; Cohen & Wills, 1985; House et al., 1988; Taylor, 2011; Vaux, 1988).

First, social support can be *stress-preventive.* Social support provides its recipients with psychological and material resources that contribute to healthy functioning and positive development and in so doing prevents many stresses from occurring. This influence of social support has been studied most extensively in the field of health psychology, where social support is believed to encourage healthy practices through the encouragement and example of network members; the monitoring of healthy practices by others; the investment of the individual in roles and relationships that support healthy functioning; and encouragement of the individual's self-esteem, sense of belonging, and companionship (Thoits, 2011; Uchino, 2004; Umberson, Crosnoe, & Reczek, 2010). Viewed more broadly, social support can also promote mental and physical well-being by fostering needed competencies and skills, promoting effective coping strategies, and enabling access to assistance and material aid. These resources support the growth and maintenance of constructive practices and equip individuals with the capacities to manage ordinary challenges and prevent their escalation. In these ways, social support contributes to the prevention of stress.

This influence of social support is also true of children in their social networks. Parents who are warm and nurturant, support children's self-confidence and self-esteem, encourage constructive social competencies, and foster personal and academic accomplishments help to prevent sources of stress for their children that can arise from difficulties in school or with peers or from problems of adjustment. Moreover, parents often enable access to other sources of social support (e.g., health care providers, teachers, extended family, coaches, mentors, and peers) that can

have similarly constructive benefits. If social support is a protective factor, then it potentially can mitigate some of the risks that many children face in difficult or disadvantaged circumstances, but only if children experience support in their families and other relationships.

Second, when stress occurs, social support can be *stress-buffering*. The psychological and material resources available through supportive relationships can diminish the impact of stressful events by enhancing constructive coping. In health psychology, clinical studies have shown that social support is associated with a reduction of the effects of disease pathology and psychological distress, contributing to less severe symptomatology, quicker recovery, enhanced coping, and diminished long-term sequelae (Cohen, 2004; Cohen & Janicki-Deverts, 2009; Umberson & Montez, 2010). This buffering can occur by altering recipients' appraisals of stressful events, enhancing their knowledge or utilization of effective coping strategies, providing useful information or instrumental aid, and supporting self-esteem, optimism, and perceptions of self-efficacy. These benefits are even more significant for children in light of their more limited capacities for coping with stress and their reliance on the assistance of parents and other caregivers.

More than 30 years of research have provided a fairly reliable account of the association of social support with stress, although there has been much less research confirming the hypothesized behavioral and psychosocial mediators of this association (Taylor, 2011; Umberson & Montez, 2010). This lacuna constitutes an important research agenda, especially with children in at-risk circumstances, because the hypothesized mediators of the preventive and buffering effects of social support may not regularly characterize the relationships on which children rely. Relationships may for them be sources of support but also of adversity, a topic that is discussed further in a later section.

Social Buffering of Biological Stress Reactions

An important contribution to understanding the association of stress and social support comes from research on the neurobiology of stress reactivity and its social buffering. Taken together, this research contributes further evidence to the importance of social relationships in coping with stress, especially for children, for whom nurturant, supportive care shapes the functioning of biological systems relevant to stress responding.

When acute stressors occur, a network of biological systems are activated in response to cortical appraisals of threat or danger (Lupien, McEwen, Gunnar, & Heim, 2009). One of the most important (and best studied) of these is the hypothalamic-pituitary-adrenocortical (HPA) axis, which, in concert with the sympathetic nervous system, releases the catecholamines epinephrine and norepinephrine and corticosteroids, such as cortisol, into the bloodstream. This activity contributes to the mobilization of energy, enhanced cardiovascular tone, and other critical components of the stress response that have psychological as well as physiological consequences. These responses are designed to provide short-term resources for coping with threat. When stress is chronic or recurrent, however, repeated HPA activation is costly. Chronic activation of the HPA system can change its neurocircuitry over time, contributing either to hyperreactivity to threat or hyporesponsiveness of HPA function, in each case reflecting dysregulated biological functioning (see reviews by Thompson, 2014a, 2015b). In addition, chronic release of cortisol affects the functioning of limbic systems (such as the amygdala, hypothalamus, and hippocampus) and cortical systems (including prefrontal functioning) that can alter emotional reactivity, cognitive functioning, and self-regulation (Ulrich-Lai & Herman, 2009). Chronic stress also alters autonomic functioning, suppresses immune response to infectious challenges, and generally embeds proinflammatory tendencies into biological functioning (El-Sheikh & Erath, 2011; G. E. Miller, Chen, & Parker, 2011). The biological consequences of chronic stress are consistent with the concept of allostatic load: the progressive wear and tear on biological systems attributable to the long-term effects of chronic stress, which elevates risk for later health and mental health problems (Danese & McEwen, 2012). The behavioral consequences can include poorer emotion self-regulation, cognitive and attentional problems, and difficulties in social functioning (Blair & Raver, 2012; Evans & Kim, 2013).

These considerations are particularly serious when children are stressed because of the plasticity of developing neurobiological systems and their sensitivity to experiences of stress. Fetal exposure to maternal stress hormones is associated with altered stress reactivity after birth. In one prospective longitudinal study, for example, maternal depression during pregnancy was associated with heightened cortisol levels when infants were observed at 3 months in a moderately challenging procedure (Oberlander et al., 2008). In another longitudinal study of children in poverty, environmental characteristics such as poor housing quality, family economic strain, and poor parenting were associated with disrupted HPA activity from

age 7 months to age 4 (Blair et al., 2011). Yet in the same sample, observed maternal sensitivity from birth to age 2 buffered some of the effects of family stress on children's cortisol reactivity (Hibel, Granger, Blair, Cox, and the Family Life Project Key Investigators, 2011).

The latter finding is consistent with the view that social support can buffer biological stress reactivity in children and adults (Hostinar, Sullivan, & Gunnar, 2014). Studies with adults show, for example, that social contact with a supportive person can reduce cardiovascular and HPA reactivity and reduce threat-related neural activation to a stressful task (Taylor, 2011; see, e.g., Coan, Schaefer, & Davidson, 2006). In research with children, a growing literature finds that a secure attachment has comparable physiological stress-buffering consequences, especially for children who are prone to fear or inhibition (Gunnar & Donzella, 2002). Nachmias, Gunnar, Mangelsdorf, Parritz, and Buss (1996) found, for example, that behaviorally inhibited toddlers exhibited significant cortisol escalation when faced with a variety of novel and challenging events in the company of their mothers, but only when they were insecurely attached to her. For inhibited toddlers in secure mother-child relationships, cortisol response to the same events was more moderate, comparable to that of uninhibited children.

These studies underscore the importance of relationship quality to the social buffering of stress. Warm and supportive relationships are more likely to moderate stress reactivity than are those that are less affirmative or aversive, and this is true for adults as well as children (Taylor, 2011). However, owing to the plasticity of developing neurobiological stress systems, this relational buffering may have both immediate effects and long-term consequences for children's stress reactivity. This conclusion is suggested by the programmatic studies of Meaney and his colleagues on biological stress responding in rat pups (see Meaney, 2010, for a review). They have shown that differences in maternal licking and grooming (LG), an important component of maternal nurturance, are associated with differences in stress reactivity in pups, with the offspring of high-LG mothers showing lower behavioral and neuroendocrine responses to stress compared to the offspring of low-LG mothers. In the short term, maternal LG is a source of tactile stimulation that modulates endocrine and cardiovascular functioning in the pup and regulates immediate stress reactivity. Over the long term, however, the pups of high-LG mothers also show more modest behavioral and endocrine responses to stress as well as stronger performance in learning and memory tasks and greater synaptic density in the hippocampus. By contrast, the offspring of low-LG mothers show greater efficiency of fear conditioning in high-stress contexts. Cross-fostering studies indicate that these influences arise from early experience, and Meaney's research group has documented the biochemical processes by which maternal LG stimulates epigenetic changes in glucocorticoid receptor gene expression that relates to these behavioral outcomes associated with stress reactivity and early cognitive functioning (Meaney, 2010; see also Suomi, 2011, for comparable findings on the social buffering of stress in rhesus monkeys).

Social support also moderates the behavioral manifestation of genetic characteristics that, in the context of stress or danger, are likely to be risk factors for developing psychopathology. Bakermans-Kranenburg and van IJzendoorn (2006) studied this gene–environment (G×E) interaction in a sample of very young children and their mothers. They observed maternal sensitivity when infants were 10 months old, measured children's externalizing problems at 39 months, and genotyped children to identify those with the DRD4 7-repeat polymorphism, which has been associated with novelty seeking and conduct problems. Children with the DRD4 7-repeat whose mothers were insensitive were high in later externalizing, but children with same genetic profile with sensitive mothers showed much less externalizing behavior, comparable to children without the DRD4 7-repeat. In this case, the support afforded by a secure attachment buffered the behavioral risk associated with this gene polymorphism and, in fact, contributed to more optimal later behavior, consistent with the formulations of differential susceptibility theory (Belsky & Pluess, 2009).

An intervention study subsequently enlisted this G×E interaction in an effort to improve developmental outcomes (Bakermans-Kranenburg, van IJzendoorn, Pijlman, Mesman, & Juffer, 2008). A video-feedback parenting program was provided to a sample of mothers who had rated their toddlers high on externalizing behavior. A posttest after 1 year revealed that the program succeeded in improving mothers' positive disciplinary practices. In a follow-up assessment 1 year later, the children of the intervention group showed less externalizing behavior, but this finding was significant only for children with the DRD4 7-repeat polymorphism. There were no intervention program–related changes for children without the 7-repeat allele. The benefits of improved social support, through more sensitive parenting, were apparent for children who were at greatest risk of adverse developmental outcomes and who showed the greatest improvement as the result of the parenting program.

Illustrations of G×E interaction involving social support interventions for children under stress are evident in other research. Kaufman and her colleagues (2004) showed that for children with a history of maltreatment and a genetic vulnerability to depression, those without social support showed elevated depressive symptomatology, more than twice the rate of nonmaltreated comparison children with the same genotype. By contrast, those reporting access to social support exhibited only minimal increases in depressive symptomatology compared to nonmaltreated children. In other research, Luby and her colleagues (2012) studied school-age children with or without a history of preschool depression, and focused on hippocampal volume, which is smaller in adults with severe depression. Maternal support observed when children were preschoolers was positively associated with hippocampal volume at school age for nondepressed children.

What neurobiological influences can account for the immediate and long-term benefits of social support as a stress buffer? The biological mediators identified in this research complement, to some extent, the behavioral explanations discussed earlier, which focus on changing appraisals, strengthening coping, and supporting self-esteem. Hostinar et al. (2014) argue that social support (especially from caregivers) strengthens the regulatory influences on HPA activity arising from (a) the oxytocin system and (b) prefrontal activation, based on research concerning the neural regulators of HPA activity and oxytocin as a socially elicited stress buffer (Ulrich-Lai & Herman, 2009). This formulation argues that stress buffering consists not only of the downregulation of HPA activity and its associated sequelae but also the upregulation of oxytocinergic hormonal influences and cortical controls that become primed by supportive social contact. Social support also contributes to downregulation of many of the proinflammatory tendencies associated with chronic stress, although it is unclear whether support builds protective factors into the immune system (Kiecolt-Glaser, Gouin, & Hantsoo, 2010). These biological formulations certainly merit further exploration.

Unfortunately, it must be remembered that just as social support can biologically remodel stress reactivity over time, chronic stress can have comparable consequences. As earlier noted, these consequences include effects on the neurocircuitry of stress reactivity, downstream consequences for the neurobiology of learning and memory, and immune suppression. In addition, chronically stressful experiences are associated with epigenetic changes in gene expression that dysregulate stress reactivity, immune function, and neurological development (Naumova et al., 2012; see Thompson, 2015b, for a review). In these studies, parental care is the major determinant or mediator of early life stress. Children growing up in conditions of family adversity, which can range from harsh or insensitive care to maltreatment, are likely to suffer the biological dysregulation arising from these experiences in ways that are behaviorally manifested in heightened vigilance and threat detection, emotion dysregulation, chronic health problems, and risk for affective and conduct disorders (Repetti, Robles, & Reynolds, 2011). These biological programming effects can make behavioral remediation much more difficult, and they underscore the developmentally constitutive influences of supportive care.

The research on the social buffering of stress, especially newer work on its biological underpinnings, highlights the significance of the quality of parental care to children's biological and behavioral development by shaping capacities for stress regulation and coping (Thompson, 2015b). It indicates that the quality of care can have significant consequences—positive or negative—that can have a snowball effect in children's developing abilities to cope with stress and challenge, function in a self-regulated manner, and mobilize cognitive skills for learning and achievement.

Stress and Access to Social Support

In the paradigmatic portrayal of social support that guides thinking about support as a stress buffer, assistance begins when one or more individuals discern that a person or a family is in crisis. They offer to help and also mobilize others in the recipient's social network to contribute. In a short time, that person or family is surrounded by solicitous acquaintances offering emotional support, material resources, guidance and access to information sources, assistance with life tasks, or anything else they think might be of value and benefit to the recipient. Although it is often impossible to ameliorate the circumstances that led to crisis, this kind of assistance can give recipients a sense that they are not alone, provide tangible help where it is needed, and temporarily lift the burden of other responsibilities, and it is welcomed for these reasons. In some circumstances, furthermore, formal helping agents—such as religious advisors, social workers, counselors, physicians, or psychological therapists—also may be enlisted to provide professional and targeted kinds of support.

The association among social support, stress, and psychological well-being is complicated, however, because stress often is associated with the deterioration, rather than enhancement, of social support for recipients (Shinn,

Lehmann, & Wong, 1984; Vaux, 1988). Stress can undermine social support in at least two ways. First, stress can cause potential recipients to withdraw rather than engage with other people who might provide assistance. Withdrawal can occur because of the circumstances contributing to difficulty, such as how the loss of a job, divorce, residential relocation, and other events can separate individuals from familiar social networks. It can also occur because of the recipient's humiliation or feelings of vulnerability, which can accompany stressors such as mental health problems, unexpected financial difficulty, or other serious family problems. This perceived vulnerability can motivate individuals not only to avoid contact with social network members but also to avoid seeking the assistance of formal help providers who might offer tangible assistance. Withdrawal can also result from the recipient's deliberate efforts to conceal the reasons for current difficulties deriving from, for example, psychological distress, domestic violence, or child maltreatment. This withdrawal can be one of the reasons for the social isolation of families in which children are being abused or neglected (Polansky, Chalmers, Buttenwieser, & Williams, 1981; Powell, 1979; Young, 1964). Finally, individuals in crisis may simply experience too much emotional turmoil to seek or accept much assistance from others.

A second reason that stress can contribute to diminishing social support is because of the effects of stressful circumstances on potential providers of support. Individuals in natural social networks may withdraw from potential recipients because the behavior of the recipient is disturbing or repelling. Sometimes this is the response to neglectful or abusive parents, for example, or individuals with serious mental health problems. Withdrawal may also occur over time because the recipient's problems are emotionally challenging or overwhelming, such as when helpers try to support friends who are coping with the loss of a child or suffer from terminal illness. Sometimes potential support providers withdraw because they are undermined by circumstances that are similar to those of potential recipients, such as when neighbors live in poverty or face the challenges of single parenting (e.g., Belle, 1982; C. S. Fisher, 1982; Wortman & Lehman, 1985). More generally, potential support providers may withdraw from troubled individuals because of the emotional drain of providing one-way assistance to very needy individuals (J. D. Fisher et al., 1982; Shumaker & Brownell, 1984). The self-protective withdrawal of potential helpers derives from the difficulty of providing meaningful assistance to individuals who need so much. When formal helping agents are concerned, professional training and experience buffer these provider reactions to assistance for stressed individuals. Nevertheless, effective supervisory and supportive professional associations are necessary to prevent burnout of these providers also.

In everyday circumstances, these causes of diminishing access to social support can be overlapping and interactive. Young children who are physically maltreated may be prevented from gaining access to needed support because of the impact of their abuse on social skills, affect regulation, and expectations for how others will respond to them, which undermine how they function in the adult and peer relationships that might provide support (Cicchetti & Valentino, 2006). Abusive parents may, in turn, actively isolate the child from others in the community to prevent the detection of abuse, and other adults may distance themselves from a family that seems troubled or disturbed. Childhood and adult depression also shows these cumulative isolating processes (Cicchetti & Toth, 2006). In adults, the anhedonia of depressive symptomatology is typically accompanied by social withdrawal together with irritability and hostility, passivity, self-denigration, dependency, and a sense of helplessness and hopelessness. The emotional demands of this symptom profile on close relationships can cause others to withdraw and avoid contact, which, in turn, confirms the depressed person's perceptions of being rejected by others and of the unreliability of those relationships (Coyne, Burchill, & Stiles, 1991; Coyne & Downey, 1991). Adult depression is thus associated with smaller social networks, fewer close relationships, and diminished perceptions of others' support by the depressed adult, and the same associations have been found for children and youth. Dubois, Felner, Brand, Adan, and Evans (1992) found, for example, an expected negative association between social support and psychological distress 2 years later in young adolescents, with initial levels of distress and other sources of stress controlled. They also found, however, evidence that distressed youth acted in ways that inadvertently reduced their access to social support and increased the stressfulness of daily experiences.

In short, the association between social support and stress is complex. Although support can contribute to preventing stressful events and there are psychological and biological reasons to regard support as a stress buffer, there is also a reciprocal association between social support and stress. Because of the consequences of stressful circumstances for potential recipients and on potential helpers, increased stress can diminish access to social support and leave individuals more isolated than they were before. These considerations caution against simple, paradigmatic portrayals of how support affects stress and contribute

to the recognition that the effective mobilization of social support for individuals in need, from both informal and formal sources, must consider the nature of the stress, its impact on both recipients and support providers, and the context of their interaction.

SOCIAL SUPPORT IN RELATIONSHIPS AND SOCIAL NETWORKS

An important context of social support consists of the relationship between recipient and support provider and the social networks that encompass them both. To be sure, the growth of social media, online social networks, the Twitterverse, blog posts, even virtual gaming (some with avatars in simulated societies) and a growing range of technological advances enable children and adults to contact and develop associations with potentially hundreds of other people without direct face-to-face contact with them. Moreover, these associations can provide some forms of social support, especially sympathetic responses to an individual's posts, and we shall return to these considerations later in this section. But there are many reasons to argue that the most beneficial and comprehensive forms of social support, especially for stressed individuals, arise from relationships that involve mutual understanding, direct give-and-take, and emotional connectedness emerging from a history of reciprocated assistance. Most often these interactions occur in the context of social networks with distinct characteristics and affiliative connections. Individuals who are capable of providing diverse and complex forms of social support, mobilized by intimate understanding of the recipient and the recipient's problems, are most likely to be in real, not virtual, social relationships and social networks. Yet it is also true that the characteristics of those relationships and the networks in which they are embedded may pose obstacles as well as benefits to the provision of social support. This section explores these considerations with respect to both informal and formal sources of support. After considering the characteristics of relationships that contribute to perceptions of social support, the discussion turns to characteristics of the social networks that influence how relationships function and the similarities and differences between the social networks of parents and children. We then return to the question of online social support.

The "Active Ingredients" of Supportive Relationships

A relationship can be defined as an integrated network of enduring emotional ties, mental representations, and behaviors that connect one person to another over time and across space (Laible & Thompson, 2007). Why are relationships important to social support and promoting individual well-being? When relationships function well for adults and children, they uniquely offer psychological resources that are essential to perceptions of support that contribute to reducing stress and enhancing well-being. With respect to children, Thompson (2014b) has identified four characteristics of relationships in children's central social networks—family and peers—that are important to perceived support from people within them.

- *Mutual responsiveness/reciprocity* is based on the reciprocated affinity by which relationships are formed and consolidated and which contributes to a partner's perceived support. In infancy, the parent's sensitive responsiveness contributes to the development of a secure attachment as well as cognitive and linguistic achievements that are based on the reciprocated give-and-take of social interaction (Laible & Thompson, 2007). The parent's responsiveness also provides the basis for developing mutual responsiveness at somewhat older ages that supports early socialization (Maccoby, 1984; Waters, Kondo-Ikemura, Posada, & Richters, 1991). In peer relationships, reciprocity is what distinguishes friends from nonfriends: In friendship, there is mutuality of affection, intimacy, interests, initiative, and other aspects of relational interaction (Newcomb & Bagwell, 1995). When asked "What is a friend?" children of a variety of ages talk about the reciprocity or mutual give-and-take of interaction with friends (Hartup & Stevens, 1999).
- *Warmth/affection* define the affective quality of relationships. In parent-child relationships, warmth conveys love and respect for the child and, as it elicits a complementary response in children, mediates the efficacy of other parenting practices that promote cooperation and competence (Kochanska, 2002). In peer relationships, mutual affection is an important characteristic of friendship even though friends also exhibit greater conflict than nonfriends do (Simkins & Parke, 2002). Their greater mutual liking is part of what motivates friends to resolve conflict in order to remain in the relationship rather than walking away.
- *Approval/acceptance* constitutes the positive regard that supports the recipient's self-confidence and perceptions of a partner's liking and support. From parents, approval contributes to a sense of competence in children and adolescents and contributes to achievement motivation in this way (see, e.g., Pomerantz & Dong,

2006). Peer acceptance (versus rejection) is a major contributor to developing self-esteem, social skills, and social understanding as it strengthens children's constructive peer interactions (Bukowski, Brendgen, & Vitaro, 2007).

- *Security*, in relationships with family members and peers, is a contributor to and a derivative of perceived support. A large research literature in parent-child attachment documents the significance of early relational security for social and emotional well-being (Thompson, 2008), while security in friendship networks contributes to many positive outcomes, including school adjustment and academic achievement (e.g., Berndt, Hawkins, & Jiao, 1999).

These four characteristics of children's relationships with parents and peers contribute to children's perceptions of support from these social partners, and these characteristics are also important to adult relationships. Even though social support is multifaceted, as earlier argued, these relationship characteristics are significant because perceived support is the dimension of social support that is most strongly related to psychological well-being in adults and children (Barrera, 1986; Cohen & Wills, 1985; Jackson & Warren, 2000; Sarason, Shearin, Pierce, & Sarason, 1987). Perceived support is more predictive of coping and well-being than even enacted support. This finding is important because, surprisingly, there is not a strong association between perceived and enacted social support (Barrera, 1986; Haber, Cohen, Lucas, & Baltes, 2007). To be sure, the relation among enacted support, perceived support, and coping is empirically complicated, as the preceding discussion of the association between social support and stress illustrates (interpreting the correlations between these constructs is complicated by (a) the recognition that individuals under stress may be less capable of viewing others as sources of available support because of their emotional turmoil, (b) individuals in difficulty may be less capable of mobilizing supportive social networks when they are needed, (c) individuals can enact support without being perceived by recipients as doing so, and (d) individuals who experience psychosocial well-being are more likely to be high in perceived support even though there is no causal connection between them (see, e.g., Kaul & Lackey, 2003; Seagull, 1987)). Nevertheless, qualitative and quantitative reviews consistently find that perceived support has a stronger predictive association with psychological well-being than does enacted support.

The significance of perceived support underscores the importance of confidence in the availability and helpfulness of social partners, whether or not that support is actually realized, to an awareness that assistance is available if needed. This is, in a sense, what is meant by a secure (attachment) relationship at any stage of life. More broadly, Lakey and his colleagues (e.g., Lakey & Lutz, 1996; Rhodes & Lakey, 1999) have argued that perceptions of social support derive from (a) personality characteristics of the recipient (e.g., a secure or insecure attachment history; interpretive biases, extraversion), (b) characteristics of the helper (e.g., personality factors like empathy; enacted support), and, most important, (c) the interaction between helper and recipient (e.g., their similarity in background and outlook). This heuristically powerful analysis invites broader inquiry.

The significance of perceived support also underscores the importance of mental representations of relationships to developing and maintaining psychological well-being (Thompson, 2014b). Mental representations of network associates as being supportive, accessible, reliable, and helpful are based on direct experience with them, and these representations may be more important than specific acts of support to promoting coping and well-being. With respect to social support and developmental psychopathology, this conclusion has important implications. It suggests that attention to these relational representations, in children as well as adults, may be an important element of preventive and therapeutic intervention. It may not be enough, for example, to change the behavior of a parent who has been an inadequate caregiver without also altering the child's expectations for the behavior of that adult in the future (see, e.g., Toth, Maughan, Manly, Spagnola, & Cicchetti, 2002; Toth, Rogosch, Sturge-Apple, & Cicchetti, 2009). Similarly, altering parental expectations for child conduct may be essential, along with changing damaging behavior patterns, to effecting long-standing improvement in a dysfunctional family system (see, e.g., Snyder, Cramer, Afrank, & Patterson, 2005).

Relationships and the Social Networks of Parents and Children

Relationships do not always function well for children and adults. Indeed, the psychological complexity of relationships and their multifaceted influences often cause them to be simultaneous sources of support and stress (Badr, Acitelli, Duck, & Carl, 2001). Equally importantly, the nature of the relationship helps to determine what kinds of support are possible and the limitations that may exist in giving and receiving social support. This is true of relationships with informal social network members and with formal helpers.

The informal social networks that family members depend on are both local and geographically disparate (Cochran, Larner, Riley, Gunnarsson, & Henderson, 1990; C. S. Fischer, 1982; Litwak & Szelenyi, 1969). They can include extended family members, friends who live nearby or far away, current and former neighbors, associates in the religious community, and networks based on children's peer relationships and school activities. For parents, their social networks are also likely to include colleagues at their workplace or school and perhaps individuals in local businesses and community leaders. For children, their social networks include peers and teachers at school and the variety of other adults involved in after-school programs, recreational and sports programs, and other activities; when adolescents are concerned, they may also include workplace associations. For both parents and children, the breadth of their natural or informal social networks is influenced by access to transportation and technology—each of which can significantly extend their networks of relational ties—and the availability of time to cultivate relationships with others. Informal social networks have changed historically in their breadth and diversity, and also vary according to socioeconomic status and other circumstances (Cochran et al., 1990).

There is high turnover in natural social networks, but turnover is selective. In a 3-year follow-up study of the personal and familial social networks of a sample of 240 parents living in Syracuse, New York, nearly one-fourth (22%) of the network members on average were dropped from adults' social networks over 3 years between the first and follow-up interviews (Larner, 1990a). When researchers examined the nature of the social relationships that were dropped or retained, they found the highest turnover among neighbors (32% turnover); friends, acquaintances, and former workmates (31% turnover); and other nonkin ties (34% turnover). The lowest turnover rate was among kin: only 9% turnover. This finding is not surprising, given the extent to which high rates of mobility, job change, educational completion, and other factors can alter neighborhood and workplace social networks in contrast with the stability and commitment to kinship ties that motivate efforts to remain in contact, even across a distance. These findings suggest, however, that the relative reliability of network contacts over time can influence those from whom one seeks and receives social support.

Consistent with this view, researchers have found that individuals rely primarily on support from extended kin within their natural social networks (Cochran, Gunnarsson, Grave, & Lewis, 1990; Gunnarsson & Cochran, 1990; Litwak & Szelenyi, 1969). By contrast, neighbors do not figure prominently in perceptions of social support and were readily dropped or added to personal social networks with little influence on individual or familial social support (Larner, 1990b). The turnover in neighborhood and other local associates makes depending on them as reliable sources of assistance more difficult, while the enduring, obligatory relationships that develop with extended family members provide a more consistent basis for expectations of support. Indeed, when a person is reliant primarily on neighborhood contacts for support, it may be an indicator of social insularity in other spheres of life. In a study of socioeconomically stressed single mothers, for example, Belle (1982) found that the reason these women interacted more frequently with people in the neighborhood was that they felt they had nobody else to whom they could go. However, these contacts did not help them much. The mothers who were in frequent contact with neighborhood network associates did not experience greater emotional well-being, receive more tangible assistance, or report more support than did other women who saw their neighbors infrequently, perhaps because these neighborhood associates provided social contact but not social support (see also Belle & Benenson, 2013).

The turnover in informal social networks and the distinction between kin and nonkin ties is important to the preventive and therapeutic mobilization of social support. It suggests that a focus on strengthening neighborhood-based forms of social support—"neighbors helping neighbors"—must balance the potential benefits of such a strategy against families' limited reliance on neighbors owing to residential mobility. The recommendations to Congress of the U.S. Advisory Board on Child Abuse and Neglect (1991, 1993) to encourage the development of "caring communities" by strengthening supportive connections among neighbors builds on their proximity and the commonality of neighbors' interests with those of recipients, as well as the potential utility of such a strategy in communities across the socioeconomic spectrum. Neighbors can also provide referrals to local help givers, material aid, emergency assistance, and respite child care—in short, they can be multifaceted support generalists. But if residential mobility undermines the ability of family members to even become well acquainted with their neighbors, it is also likely to undermine perceptions that social support might be obtained from them. Furthermore, in communities at risk, neighbors may experience the same economic and personal problems as do the families who need their assistance, and neighbors may have little to offer because of their own needs. Neighbors may be more concerned about finding a quick exit from a dangerous or

impoverished community than with providing support to a troubled family who lives nearby.

Kinship ties, however, also have advantages and disadvantages in the provision of social support. An extended history of shared experiences contributes to common values and mutual understanding. Family relationships are densely interconnected, with family members often knowing many other family members well, which contributes to the mutuality and intercoordination of support. Cultural expectations and practices concerning kinship also better enable family members to maintain connections through formal practices (such as celebrating holidays together and recognizing birthdays and anniversaries) and informal occasions, even though extended kin may be geographically distant. But family relationships can also be characterized by animosity, criticism, privacy intrusions, or distrust that also endures. Moreover, the shared history and values that characterize family relationships can be an impediment to healthy behavior if those values condone or rationalize abusive conduct toward children or partners, substance abuse, poor health or relational practices, or other dysfunctional individual or family behaviors. Family members may be more motivated to deny or conceal these practices if exposing them risks bringing these and other family practices to the attention of others, including clinical or criminal justice professionals. Thus, families can become enabling environments for developmental psychopathology rather than settings of health and healing.

The different constellations of strengths and weaknesses of relationships with neighbors and extended family are important because each kind of network connection is important to informal social support. Just as parents are support generalists to their children—providing many different kinds of social support—so also are family members generalists in support to each other (see, e.g., Bogat et al., 1985). To a lesser extent, neighbors can also be support generalists in the various kinds of assistance they can potentially provide to those who live nearby. This is one of the reasons why kinship networks and neighbors have often been identified as primary sources of social support that can be mobilized for preventive or therapeutic intervention. But as this analysis suggests, there should be careful consideration of the advantages and disadvantages of mobilizing social support from each source.

The same balancing of supportive benefits and risks characterizes other relationships within informal social networks. Family friends and workplace associates can offer counseling and advice, but their help may be limited to the domain of common association (e.g., workplace concerns, shared recreational interests, connections through children's peers at school), and they may otherwise have less in common with the recipient. The same may be true of associates in religious institutions or community groups, and in these cases the organization's values or mission may additionally constrain disclosure or the kinds of assistance that can be offered. In general, people in these relationships can be characterized as support specialists who can be helpful with specific kinds of supportive assistance, but not more broadly.

The same situation specificity of relationships is also true of formal support agents (Unger & Powell, 1980). A social worker may offer valuable assistance by connecting individuals or families to community resources and providing informal counseling. But an overwhelming caseload may diminish the caseworker's reliability and limit the extent of the assistance that can be offered. Similar limitations may also be true of physicians, counselors, or religious leaders, who may also view problems through the prism of their specialized background, which might compel them to offer forms of assistance that may or may not really be needed. Their support may be limited by other considerations as well. It is well known, for example, that professionals who are legally mandated reporters of suspected child maltreatment are often aware of many more cases of suspected abuse than they formally report. This fact owes, in part, to the complications introduced into their professional relationships with families once a child abuse investigation has been initiated, and the preference of many helping professionals to address family problems on their own (Zellman, 1990; Zellman & Anter, 1990). In this case, and in others, their professional role may complicate their assistance. In general, professional helpers have expertise, the benefits of a clear role definition in relation to recipients, and professional training and accountability that can enhance the support they offer. But their influence can be limited by the specific forms of assistance they are capable of offering, the fact that their assistance is not well integrated into the everyday experience of the recipient, and sometimes because their values and perspectives are different from those of the recipients of their assistance.

Although the nature and functioning of informal and formal social networks share many commonalities across subcultural and cultural groups, there are also important variations that are relevant to social support (Cochran, Larner et al., 1990; Vaux, 1985). In general, for example, the individual and familial social networks of lower-income families tend to be smaller and more kinship-based than for middle- and upper-income families (Cochran, Gunnarsson

et al., 1990; Fischer, 1982; Vaux, 1988). In one large study, these differences by size were apparent for each category of social network membership: Higher-income families had a larger number of social ties with kin, neighbors, and "others" than did lower-income families (Cochran, Gunnarsson et al., 1990). Single mothers also have smaller social networks with higher rates of turnover compared to married mothers, and these networks afford less social support (Larner, 1990a; Weinraub & Wolf, 1983). Taken together, these findings point to the importance of differences in the resources, energy, and opportunities to construct and maintain the social networks that afford social support. Unfortunately, for parents and families who are most likely to need support, their networks often may be quantitatively and qualitatively less capable of providing it.

Development and Functioning of Children's Social Networks

Children's social networks are, not surprisingly, similar to those of their parents because they are built on them. But they are also very different in several important ways (Belle, 1989; Cochran & Brassard, 1979; Salzinger, Antrobus, & Hammer, 1988).

Children's social networks evolve developmentally as a result of children's growing social competencies and their expanding social ecology. Parents are uniquely central to children's initial social networks and mediate children's relationships with other social partners. This is, of course, true from birth. The security of an infant's attachment to each parent derives from representations of support from that adult based on the parent's history of sensitive responsiveness. One reason why the development of secure or insecure attachment early in life is developmentally formative is that it influences the growth of other central socioemotional capacities, including the development of social skills, self-regulation, self-concept, and representations of other people and how to get along with them (Thompson, 2008). One implication of this conclusion is that in this earliest experience of reliable parental support (or its absence), children's capacities to elicit social support from other partners are shaped. In a sample of lower-income African American 6.5-year-olds, for example, Anan and Barnett (1999) found that secure mother-child attachment (assessed 2 years earlier) was associated with children's perceptions of greater social support from various sources (including family, peers, and teachers), and social support mediated the association between secure attachment and lower scores on measures of externalizing and internalizing problems. Bost, Vaughn, Washington, Cielinski, and Bradbard (1998) likewise found that secure preschoolers had more extensive and supportive social networks and were also higher on sociometric assessments of peer competence. These and other findings can be understood as reflecting the more constructive social skills and more positive social expectations that are associated with an early secure parent-child relationship. But they also reflect the snowball effect that can derive from the supportiveness of early parental care, which fosters a range of social and emotional competencies, which then contributes to children's developing capacities to elicit support from others. In this respect, children's experiences in early relationships affect other relationships.

Throughout the world, it is rare that the social networks of very young children are exclusively parent-focused. In many cultures, for example, caregiving is shared with other adults, including but not limited to extended family members, to whom infants and toddlers also form attachments (Hrdy, 2009). In the United States and other Western industrialized countries, child care practices also include family-based and center-based out-of-home care settings and early childhood education programs. These and other normative child care practices provide early avenues for broader sources of social support to children as well as their parents. Extrafamilial caregivers can offer parents guidance and knowledge, respite care assistance, and referrals to others who can offer help and can monitor the child's well-being. These resources depend on the nature and the quality of the care, of course, and these caregivers can also offer intervention avenues for preventive or therapeutic assistance (Thompson, Laible, & Robbennolt, 1997). Many child care and preschool programs, for example, have created avenues of mental health consultation that provide teachers access to an early childhood mental health practitioner for advice concerning the behavior of children in the classroom or general guidance concerning the needs of children encountering stressful circumstances (Johnston & Brinamen, 2006). In the context of consultation, parents are often engaged to better understand children's needs and to collaborate in the design and implementation of an intervention strategy. Early childhood mental health consultation illustrates one way of enlisting extrafamilial care settings as avenues of support to children and their parents. It also exemplifies the coordination of formal and informal sources of social support to families, as well as the value of two-generation interventions on behalf of young children.

School entry in middle childhood further expands children's extrafamilial social networks by providing access to

a more extensive range of peers as well as with adults who, as teachers or school counselors, can potentially provide advice, counseling, emotional support, and other forms of needed assistance. Teachers can potentially become important sources of social support because they, like early childhood care providers, may be the first to identify the seriousness of a child's problems and create a bridge between the family and formal helpers (Meehan, Hughes, & Cavell, 2003). In adolescence, workplace and community associations further broaden access to potential sources of social support as youth become more independent of family networks.

Throughout childhood and adolescence, peers become more important sources of social support as peer relationships increasingly draw on and advance children's developing psychological and emotional sensitivity to other people. Viewed in this light, positive peer relationships can be stress buffers for children, while peer rejection and relationships with deviant peers may contribute risk for behavioral and emotional problems. One large, prospective longitudinal study that followed over 500 randomly selected children from preschool through early adulthood found that, as early as preschool, exposure to aggressive peers predicted later aggressive behavior (Sinclair, Pettit, Harris, Dodge, & Bates, 1994). In another longitudinal study, Gazelle and Ladd (2003) found that the combination of anxious solitude (an index of individual vulnerability) and peer exclusion predicted levels of depressive symptoms in a sample of 388 children studied from kindergarten to fourth grade. But there is evidence for the stress-buffering effects of positive peer relationships as well. In the prospective longitudinal study by Dodge and colleagues just described, peer acceptance moderated the effects of low socioeconomic status, high family stress, single-parent status, and violent marital conflict on the development of externalizing behavior in early grade school (Criss, Pettit, Bates, Dodge, & Lapp, 2002). In the same study, peer acceptance and friendship moderated the effects of harsh discipline on the same outcomes. These positive effects of peer relationships remained even when the researchers controlled for child temperament and social information processing skills.

Friendship is an especially important avenue of social support, although children and adolescents also derive significant benefits from more general peer acceptance. Friendship can contribute to enhancing self-esteem and positive self-evaluation, promote emotional security, offer a nonfamilial context for intimacy and affection, provide informational and instrumental assistance, and offer companionship (Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). In this respect, friends also constitute support generalists. These peer influences are potentially enduring. A longitudinal study found that peer group acceptance and friendships in the fifth and sixth grades significantly predicted adult life status, perceived competence, and psychopathology 12 years later (Bagwell, Newcomb, & Bukowski, 1998). In this study, early peer group acceptance and friendship made unique contributions to adult well-being: Having a reciprocal friendship in childhood was associated with adult self-worth, for example, even when preadolescent levels of self-competence were controlled. With increasing age, adolescent and early adult peer associations become more extensive (encompassing workplace and recreational connections as well as school relationships), more intimate (incorporating self-disclosure and loyalty concerns), and more multidimensional (including romantic as well as companionate relationships).

Although increasing autonomy from the family system is a developmentally appropriate transition of adolescence, parents' continuing importance as potential social support agents should not be underestimated. Even as peer relationships become more important forums for self-disclosure and mutual understanding, parents remain preferred advisors on core moral values, political and religious beliefs, and planning and achieving life goals (Coleman, 2011). With increasing age, however, there may be important changes in children's attitudes toward seeking parental support. While seeking emotional reassurance or instrumental aid is natural and encouraged in younger children, adolescents may resist help-seeking if doing so is regarded as a threat to self-efficacy or perceived competence (Robinson & Garber, 1995). The simultaneous reliance on parental help combined with the increasing need for perceived self-reliance contributes to the mixed signals of adolescents and the mixed perceptions of their parents concerning their support needs.

There are developmental changes in how children perceive support from different people in their social networks (Furman & Buhrmester, 1985, 1992; Reid, Landesman, Treder, & Jaccard, 1989). In self-report studies, adolescents report expecting less support from their parents, for example, than do younger children, and there are similar developmental decreases in perceived support from other family members, such as siblings and grandparents. Expectations of support from peers increase from childhood to early adolescence but then stabilize or decline in later years. Teachers, by contrast, are rarely regarded as sources of social support.

Children's social networks are therefore initially based on parents and their associations but progressively expand

to encompass partners and contexts that are unique to them. But parents also mediate children's access to sources of social support, both formal and informal, in other ways (Cochran & Brassard, 1979; Parke & Bhavnagri, 1989). Parents' decisions concerning housing, neighborhoods, and schools directly affect the range of children's options for developing social connections outside the family. Ladd, Hart, Wadsworth, and Golter (1988) found that the breadth of preschoolers' social networks was inversely associated with the number of moves the family had made to a new home. Neighborhoods vary significantly in their safety, traffic congestion, availability of safe play areas, quality of schools, and access to other families with children, each of which can affect opportunities for children to create new relationships (Medrich, Roizen, Rubin, & Buckley, 1982).

Parents are also gatekeepers who typically arrange, facilitate, and monitor their children's contact with others (O'Donnell & Steuve, 1983; Parke & Bhavnagri, 1989). Parents permit children to socialize with certain children and adults but not others. Parents schedule activities, provide transportation, and supervise offspring during social or recreational activities, especially when children are young (Ladd & Le Sieur, 1994). O'Donnell and Steuve (1983) found that lower-income and middle-income mothers differed significantly in the access they provided their school-age children to community activities, with middle-income mothers participating extensively with their offspring in these programs (sometimes as volunteers and aides) in contrast with lower-income mothers, who instead permitted their children greater unscheduled freedom for "just being with friends." Mothers in economic difficulty are less likely to have time off from work, access to transportation, or the resources necessary to invest themselves in their children's activities. Children's access to extended family members is similarly mediated by parental assistance, especially when kin are not local (Thompson, Scalora, Castrianno, & Limber, 1992). To be sure, children become increasingly competent at creating and maintaining their own social networks by choosing peers and activities, arranging their own transportation, and maintaining access through indirect means (such as technology) with increasing age. Parents remain important, however, as monitors and gatekeepers, and this role may be especially important for children and families at risk (Dishion & McMahon, 1998). With respect to developmental psychopathology, of course, the parental gatekeeping role means that access to extrafamilial sources of social or therapeutic support may be contingent on the parent's support for this access.

The social networks of children and their parents overlap in other important ways. Parental social networks have significant consequences for children because they influence parents' well-being, provide opportunities for new experiences and relationships, and sometimes directly socialize and support parenting competence through modeling and mentoring (Cochran, 1990; Cochran & Niegro, 1995). Thus, when mothers receive social support from people in their social networks, it is associated with many positive outcomes for children, potentially including more secure attachment, more positive parent-child relationships, and improved peer relationships (e.g., Jacobson & Frye, 1991; Jennings, Stagg, & Connors, 1991; Melson, Ladd, & Hsu, 1993; see Parke & Buriel, 2006, for a review). These child outcomes arise, in part, from the benefits of social support for the quality of parenting, including mentoring and practical assistance (e.g., respite care). At times, moreover, parents' network associates can also be role models and natural mentors for children. Of course, parents' social networks can undermine rather than improve parenting practices, especially when extended family members, coworkers, neighbors, or others create stress rather than enhance well-being or provide reinforcement for poor parenting practices (Ceballo & McLoyd, 2002). As another illustration, then, of how relationships affect the functioning of other relationships, the social support or conflict that parents experience in their own social networks has important implications for the quality of their parent-child relationships and, in turn, children's development.

Children's and parents' social networks overlap also because they are constructed in the same neighborhood and community context and are thus affected by comparable resources, risks, and stresses. As noted earlier, neighborhoods vary in the resources they provide for families with children (e.g., safe play spaces, recreational activities); equally importantly, they also vary in the human capital on which families can rely. When neighborhoods in economically disadvantaged communities are high in these human resources, children benefit significantly (Odgers et al., 2009). In most such neighborhoods, however, limited economic resources are combined with social impoverishment to undermine support resources for family members (Garbarino & Kostelny, 1992). In a classic study, Garbarino and Sherman (1980a, 1980b) compared neighborhoods with higher-than-expected child maltreatment rates (based on sociodemographic predictors) with neighborhoods that had lower-than-expected maltreatment rates. Sampling informants in each neighborhood, they found that mothers in higher-risk neighborhoods

reported receiving less assistance from neighbors, finding fewer options for child care, and generally perceiving the neighborhood as a poorer place for raising children. Risk to children was greater in neighborhoods perceived as providing fewer human resources for the families living in them. Children can also be affected in other ways by troubled neighborhoods. Lynch and Cicchetti (2002) reported, for example, that children who reported that they had been exposed to high levels of community violence also reported feeling less secure with their mothers.

Understanding the functioning and developmental influence of children's social networks requires, therefore, perceiving them within the broader social ecology and the social networks of other family members. A study of Australian families by Homel, Burns, and Goodnow (1987) illustrates this. These researchers reported that the socioemotional adjustment of school-age offspring was predicted by the breadth and reliability of parental support networks, as indexed by the number of "dependable friends" that parents could list, and the parents' affiliation with voluntary organizations. However, the family's "neighborhood risk level" (indexed by the neighborhood's socioeconomic status, delinquency and school truancy rates, and related variables) also predicted child adjustment in the opposite direction, indicating that community-level as well as proximate features of the family's social ecology were important. Child well-being was affected both by the availability of immediately supportive partners to parents and by the broader human resources of the neighborhood.

This conclusion is affirmed by the findings of another Australian study by Cotterell (1986), who found that the child-rearing attitudes and behavior of parents were strongly predicted by an interaction between (a) the father's absence from the home (owing to job demands), (b) the mother's "informational support" from neighbors about raising children, and (c) characteristics of the community (such as the stability of the population). Support to the mother was the most significant of these predictors, but all were important to parental conduct.

It is important to remember, however, that children have their own neighborhood networks that may be relatively independent of the family. This network independence is especially likely when they reach adolescence, and those networks can buffer other characteristics of the neighborhood ecology if they function supportively. In one illustration, the internalizing symptomatology of a sample of urban African American adolescents was studied in relation to characteristics of their neighborhoods. In general, higher neighborhood poverty and unemployment rates predicted greater internalizing symptoms, and these associations were mediated by lower perceptions of neighborhood cohesion and perceived social support. However, when neighborhoods were residentially stable and had higher concentrations of African Americans, adolescents reported greater social support and higher perceptions of neighborhood cohesion, and these network characteristics were associated with fewer internalizing symptoms (Hurd, Stoddard, & Zimmerman, 2013).

Online Social Support

We close this section with the question with which it opened: Can the availability of social media, online social networks, the Twitterverse, blog posts, even virtual gaming and a growing range of other technological advances offer avenues of social support to youth and adults? In light of the foregoing discussion, it is now possible to identify more clearly some of the unique characteristics of social support through social media. Social media offers people opportunities for social contact that are convenient, self-determined, and easy to initiate. Requiring only a computer with an Internet connection, people can interact with individuals throughout the world with diverse backgrounds, perspectives, and experiences who would be inaccessible through other means, and they can also interact online with individuals whom they see on a regular basis. People can be selective in choosing these online contacts based on the websites, media, or privacy settings they use. Moreover, people can also be selective in the information they divulge about themselves, providing representations of themselves and their experiences that may be genuine, partial, or even fabricated, depending on their purposes in doing so.

Perhaps for these reasons, social media appears to be a desirable avenue for obtaining emotional support from others, such as through text messaging, Facebook posts, or tweets. The individuals selected for contact can respond with concern and support to one's descriptions of their personal experiences. Although other forms of material or protective social support may be less possible, emotional support may be an important benefit derived from online media. Emotional affirmation is especially possible because some of the obstacles to social support posed by relationships discussed earlier, such as the stresses imposed by privacy intrusions or personal demands, are less likely when one can choose one's online contacts. Furthermore, it is possible that online communication could have other benefits for psychological well-being, such as obtaining information and guidance that socializes conduct in healthy ways.

The explosive recent growth of social media and its use by older children, youth, and adults has provoked research attention by social and developmental psychologists. Research in this field is still in its infancy, but there are several lessons relevant to social support and developmental psychopathology, with a considerable research agenda remaining.

There are at least two uses of online communication for social interaction. The first consists of online contact with individuals with whom one is in direct contact. In such cases, online media—such as instant messaging and texting, e-mail, Facebook, Twitter, and other kinds of social networking media (e.g., Spotify, Pinterest)—provide a means of ongoing digital communication or, in some cases, enables continuing communication with those who were previously in one's social network, such as friends who moved from the area. Despite early concerns that participation in online social networking would be problematic for youth, precipitating a decline in healthy personal relationships and increasing risk for loneliness and depression, the most recent research indicates that adolescents who are more engaged in online communication experience *higher* relationship satisfaction with people they are in direct contact with and enhanced psychological well-being (see Valkenburg & Peter, 2009b, for a review). The same may also be true of adults (Bessiére, Kiesler, Kraut, & Boneva, 2008). One explanation for these findings is that online communication fosters enhanced intimacy and reciprocity in self-disclosure, as people are more comfortable sharing sensitive personal information with their friends in an online context, and this enhanced intimacy improves relationship quality with these friends (e.g., Valkenburg & Peter, 2009a; see also Jiang, Bazarova, & Hancock, 2011). Thus, online contact with friends strengthens relationship support. This process appears to particularly benefit socially anxious adolescents who use online communication to enhance relationships with friends, in part because of reduced social cues triggering anxiety and the opportunity to carefully craft communications (Valkenburg & Peter, 2007a, b). For these youth especially, the ability to deepen existing friendships online may provide an important buffer against psychological difficulties exacerbated by challenges in direct peer relationships. Perhaps unfortunately, socially anxious youth are also somewhat less likely than their peers to engage in online communication with friends (Valkenburg & Peter, 2007b).

A second use of online communication for social interaction is to initiate and maintain interaction with individuals who are known only online – such as through chat rooms, virtual gaming, blog posts, and other social media—although most adolescents and adults primarily use online tools to maintain and enhance existing personal (offline) friendships. Research findings are more mixed regarding the consequences of the Internet for relationship initiation and communication with unfamiliar peers. Some studies suggest that young people and adults who use the Internet primarily to communicate with contacts who are known only online may have reduced psychological well-being (Bessière et al., 2008; Valkenburg & Peter, 2007b). But there is also evidence that communication with online-only contacts can alleviate psychological distress. In one study, for example, online communication with an unfamiliar peer had a positive effect on restoring adolescents' self-esteem and perceived relational value, and reducing negative affect, following an episode of social exclusion (Gross, 2009). Additionally, unique processes may operate for individuals who are members of marginalized or stigmatized groups. For these people who have limited access to social support in their communities—and who have higher rates of depression and suicidal ideation—access to a larger virtual community can serve important support functions, reduce isolation, and aid in identity development (e.g., Gray, 2009; McKenna & Bargh, 1998). More broadly, the correlates of Internet use to form new relationships and connect with unfamiliar people may depend on the level of existing social support: People who have smaller social networks and limited social support available to them may benefit especially from social connections online (Bessière et al., 2008).

There are also important developmental considerations in the function of online social networks as relevant to psychological well-being. Very little is known, for example, about the use of online resources for social support in preadolescence. In later adolescence and adulthood, however, social network sites become an aid in maintaining supportive connections to physically distant close friends, with positive implications for emotional adjustment (Ranney & Troop-Gordon, 2012). At the same time, social networking allows individuals to expand their network of new contacts easily. Greater use of social networking for this purpose appears to promote bridging social capital: the sense of being connected with and able to effectively elicit resources from a broad community (Ellison, Steinfield, & Lampe, 2007). Although this function of social networking diverges from the more intimate functions of enhancing and deepening relationships, a sense of connectedness and access to support within a new community (e.g., during the transition to college) may still serve an important protective function, particularly during transitional developmental periods.

Still, many questions remain regarding the nature of social support in online relationships and the connections between online support and developmental psychopathology. For example, although most people use online communication as an extension of offline friendships, it is important to better understand whether unique relationship processes relevant to social support occur in online communications between friends. It is known that disclosure is often more intimate in direct and online communication to support relationship closeness, but it is not known whether the negative effects of co-rumination could be exacerbated in an online context or whether friends are willing to address dysfunctional or inappropriate conduct online (e.g., Rose, Carlson, & Waller, 2007). Further, when youth exhibit signs of psychological distress in an online context, do those signals elicit support from others, and if so, what form does support take, and how effective is it? An intriguing recent study with young college students suggests that individuals signaling depressive symptoms online would still prefer that friends and acquaintances express their concerns in person, perhaps underscoring that when concerns are deeply personal and disclosure is risky, such communications should *not* take place online (Whitehill, Brockman, & Moreno, 2013). However, this study asked only how individuals might *prefer* someone to contact them rather than how friends and acquaintances actually respond.

Finally, research on online relationships has primarily addressed informal connections rather than formal social support programs that might be created for people facing mental health challenges. This avenue merits further exploration, as some formal online support programs for individuals dealing with specific adjustment issues demonstrate benefits for participants. For example, Dunham and colleagues (1998) reported that adolescent mothers of infants who were given access to a computer-mediated social support network provided each other with positive emotional, informational, and tangible support. Mothers developed close personal relationships with each other, and active participation was related to a decrease in parenting stress over the 6-month study period. Given adolescents' comfort with online forums, the relative ease of establishing an online environment in which adolescents feel comfortable discussing personal vulnerabilities, and the decreased personal and social risk in such an environment, online social support networks or programs may hold promise for adolescents (see Caplan & Turner, 2007). However, much work remains to determine the utility of online connections—either informally or as part of formal social support systems—to buffer or alleviate distress for people at risk or experiencing psychological difficulty (see Hazzard, Celanno, Collins, & Markov, 2002, for one example for seriously ill children).

Taken together, a considerable research agenda remains for better understanding the potential benefits and risks of social media and other online resources to youth and adults. But research evidence thus far suggests that initial concerns about its problematic consequences have not been confirmed, while some of the benefits of more intimate disclosure online may be meaningful and significant. Despite widely publicized accounts of the devastating consequences of online bullying by young adolescents, for example, the supportive and potentially therapeutic uses of online resources merit further examination.

GIVING AND RECEIVING SOCIAL SUPPORT IN A CULTURAL CONTEXT

Social support is deeply integrated into cultural values and practices concerning individuals and their social connections. It is associated with cultural beliefs about the nature of the person and his or her social obligations, equity and reciprocity in social relationships, and family and parental responsibilities. This discussion of social support in cultural context extends the relational focus of the preceding section by first considering the challenges of giving and receiving support as it is experienced in mainstream Western culture. The focus is then widened to consider these issues from an expanded cultural lens, and the implications of this analysis for social support and developmental psychopathology are then evaluated.

Recipient and Helper Reactions to Assistance

Receiving assistance from another evokes surprisingly mixed reactions from recipients in the United States, which is where most research on social support is conducted. In addition to the feelings of pleasure and gratitude that helping naturally inspires, recipients may also experience various negative feelings (J. D. Fisher et al., 1982; Shumaker & Brownell, 1984). Receiving assistance can be humiliating and stigmatizing, especially when the need for assistance derives from inadequacies in the recipient (such as poor parenting, substance abuse, or inadequate personal or financial management) rather than from broader, impersonal circumstances (such as an economic recession or a natural disaster) (Heller & Rook, 2001). Receiving help can also create feelings of failure, indebtedness, and inferiority, especially when assistance cannot be repaid, because of

cultural norms of equity and reciprocity (Greenberg & Westcott, 1983). If assistance cannot be reciprocated or compensated, the recipient may also experience feelings of vulnerability or dependency because obtaining assistance from another violates Western norms of self-reliance and autonomy. There can also be sensitivity to privacy violations if helpers become intimately acquainted with aspects of the recipient's life that are not normally disclosed to others.

As a consequence of these reactions, recipients may rather paradoxically begin to resent the assistance they receive and the person providing it. This resentment is especially likely when assistance is received from voluntary benefactors (whom one cannot give back to or otherwise compensate, enhancing the violation of equity and reciprocity norms) or strangers (with whom one does not share an ongoing relationship of mutual aid) and when the helper and the recipient are from similar backgrounds and circumstances (enhancing the inequity of the helping relationship). When recipients experience assistance as humiliating, demeaning, or intrusive for these reasons, they are less likely to seek help in the future and are more likely to abridge or terminate a helping relationship if they are capable of doing so. These reactions can explain why recipients of assistance, to the surprise of their benefactors, may be ungrateful, may fail to become engaged in the helping relationship, are often inexplicably absent from scheduled meetings, do not return phone calls, and progressively make the relationship unworkable or unsatisfactory.

This analysis has surprising implications for providing social support to at-risk individuals or families. It suggests that assistance is more easily accepted when recipients have opportunities to reciprocate or repay the aid they receive, perhaps in service to other individuals. It suggests that support is more readily received in circumstances that minimize the potential for humiliation or stigmatization, such as when support services are broadly available or universal (rather than specifically targeted to those in greatest need) and accessed in everyday settings (e.g., at home rather than at an agency office). This analysis suggests also that social support is more easily received when the recipient and the helper agree about the need for assistance and the reasons for the need. By contrast, assistance from another may be resented when the recipient perceives that it derives from unshared judgments of the recipient's inadequacy or incompetence. Provider efforts to preserve the dignity and the privacy of recipients are thus important.

Interestingly, although negative recipient reactions to assistance are a risk when adults are concerned, they are much more rarely observed in children because of the universal acceptance of children's dependent status and their need for care. Children expect and readily accept the social support they receive from adults most of this time, and this is one reason why feelings of gratitude, as well as resentment, are not as characteristic of children's responses to the solicitude of their parents, teachers, or other adults. Children recognize that they need assistance and that adults are expected to provide it. To be sure, as children become more competent with increasing age, adult help that they regard as unwarranted can be threatening to self-esteem and perceptions of personal competence. Mothers often help their children with homework, for example, but with increasing age, children may begin to perceive that their mothers' helping, monitoring, and praising reflect mothers' beliefs about their children's lack of competence to do the work on their own (see Pomerantz, Moorman, & Litwack, 2007). Because children depend on adults for assistance of many kinds, especially when they are young, however, these resistant responses to help are fairly rare.

The negative responses of adults to social support often interact with other recipient characteristics that can make it difficult for them to accept assistance, such as problems with substance abuse or affective psychopathology, personal disorganization, or the emotional effects of stressful circumstances (Heller & Swindle, 1983; Shinn et al., 1984). Taken together, these characteristics not only make it difficult for adults to maintain supportive helping relationships with other adults but also place considerable strain on help providers, especially in informal social networks. Offering assistance to troubled individuals can be draining and demoralizing (Collins & Pancoast, 1976; Shumaker & Brownell, 1984). Recipients have needs, but they may also be demanding and critical, and providing help in relationships of one-way assistance can be unrewarding and exhausting because support is not reciprocated. Moreover, the relationship between support providers and recipients can be difficult because each may have different goals, with recipients seeking noncritical emotional affirmation and providers striving for changes in recipient behavior and attitudes. They may differ in their views of the recipient's problems and the best solutions to them. Crises may force support providers to focus on immediate needs (urged to do so by recipients) and neglect attention to long-term strategies for building healthy practices. For these reasons, it is common for providers and recipients each to feel frustrated by their relationship and sometimes to experience conflict. Informal social support can break down, and social support interventions enlisting natural helpers must address the frequent turnover and burnout of their staff.

These vulnerabilities derive from the challenges presented by recipient responses to the help they are offered and the challenges of providing assistance to them in relationships of one-way aid.

Cultural Considerations in Giving and Receiving Social Support

Although these challenges are, to some extent, intrinsic to providing and accepting social support, especially in informal social networks, cultural processes moderate them considerably (Dilworth-Anderson & Marshal, 1996; Jacobson, 1987). Understanding these processes is important for better conceptualizing the associations of social support with psychological well-being and developmental psychopathology, as well as for the design of effective interventions to enlist social support for children and families at risk.

A well-known dimension by which concepts of the self in relation to others vary interculturally is that of individualism and collectivism (Triandis, 1989) or independence and interdependence (Markus & Kitayama, 1991). In cultures with an interdependent view of self, there is greater emphasis on connectedness with others and on deriving important features of identity and esteem from those associations. In cultures with a more independent view of self, there is a greater emphasis on the autonomy of personal thoughts and feelings, self-reliance, and privacy. Critics of this dual-cultures approach point out the heterogeneity of cultural views of the self within each orientation, as well as the fact that some societies making the transition to increased urbanization and industrialization integrate elements of each orientation (Kagitcibasi, 2005). In any case, cultural views of the self are developed quite early and influence how children perceive themselves and their relationships from early childhood (e.g., Greenfield, Keller, Fuligni, & Maynard, 2003; Keller, 2007; Rogoff, 2003). By later childhood and adolescence, youth with backgrounds from interdependent cultures (such as Hispanic and Asian societies) acknowledge the expectation that they will assist and support family members more than do adolescents from European backgrounds (Fuligni & Pedersen, 2002; Fuligni, Tseng, & Lam, 1999), and one study of Chinese American teenagers reported that such intergenerational expectations had neither positive nor negative consequences for psychological well-being (Fuligni, Yip, & Tseng, 2002).

But the association between cultural values and family support is complex. A cultural emphasis on interdependence may facilitate help-giving and help-receiving through normative practices, but cultural values may also make receiving help more difficult in many circumstances. One illustration is a study of older Japanese American adults living in New York City for whom norms of reciprocating support made receiving assistance difficult. Adults who held strong reciprocity norms and who received material support from their families were more depressed and were less satisfied with their lives than those who did not embrace strong reciprocity norms (Nemoto, 1998). Thus, in a cultural context that emphasizes interdependence, negative recipient reactions to receiving assistance nevertheless emerged owing to the reciprocity norms of that culture.

Cultural values and practices are related to a number of features of social networks and social support. Specifically, there is significant intercultural variability within the United States in (a) the nature and functioning of informal social networks, (b) the association between social support and psychological well-being, and (c) attitudes toward receiving assistance from formal helpers. Each of these sources of variability is relevant to designing culturally competent interventions involving social support and linking formal and informal sources of support to troubled children and their families, as described below.

Although the components of social networks are similar for families in different ethnic and cultural groups (such as including immediate and extended family, friends, neighbors), the relative importance of each of these network members for social support can vary. MacPhee, Fritz, and Miller-Heyl (1996) compared lower-income Native American, Hispanic, and European American parents living in the United States on their self-reported sources of support. They found that Native Americans reported more interconnected social systems, more frequent contact with extended kin (but not friends), more members who knew one another, and greater closeness with members of their support networks. Hispanic parents reported having the largest social networks and, although these networks were close-knit, Hispanics were in general most likely to rely primarily on kinship networks for emotional support. While they reported the lowest proportion of network members who could offer emotional support, they also reported the highest proportion of network members who could provide instrumental support (e.g., material assistance). European American parents had more diffuse social networks but also reported having a higher proportion of members available for instrumental support. Unlike parents in the other two groups, they reported that friends were the primary providers of emotional support, not family members.

Children also exhibit intercultural variability in the network members on whom they rely for support. For Latino

and African American children, for example, support may derive from extended family or in broader fictive kin networks (e.g., Rhodes, Ebert, & Fischer, 1992; Sanchez & Reyes, 1999;). In African American families, children and youth report receiving greater support from their extended families than do children from European families (Cauce, Felner, & Primavera, 1982; Taylor, Casten, & Flickinger, 1993). Likewise, Hispanic values of familialism, involving strong feelings of support and reciprocity with family members, expand the social support networks of children to include adults beyond the immediate family unit (Sagobal, Marin, Otero-Sabogal, Van Oss Marin, & Perez Stable, 1987). These intercultural differences are important for understanding the network members who are likely to provide the most helpful forms of informal social support to children and families in need, as well as the avenues by which such support can be offered.

Although social support comes from potentially diverse sources and is experienced within the context of cultural values, there is good evidence that despite this, social support contributes to psychological well-being for different cultural groups within the United States. Coatsworth and colleagues (2002) examined family, school, and friend support in relation to externalizing and internalizing behavior in Hispanic girls in middle school, for example, and found that controlling for age, socioeconomic status, and years in the United States, youth reports of greater perceived family support and teacher support (but not friend support) predicted fewer externalizing problems, while greater perceived family support and friend support (but not teacher support) predicted fewer internalizing problems. Support within the family was the strongest buffer of externalizing and internalizing symptomatology. Likewise, in a short-term longitudinal study of African American male adolescents, Zimmerman Ramirez-Valles, Zapert, and Maton (2000) found that although support from friends did not predict later outcomes, support from parents predicted diminished depression and anxiety. Rodriguez, Bingham Mira, Myers, Morris, and Cardoza (2003) examined perceptions of family and friend support in relation to stress and psychological adjustment in Latino college students. They found that higher support from family and friends predicted increased psychological well-being, although only friend support was a unique predictor of lower psychological distress.

However, cultural values may significantly mediate whether members of different ethnic and cultural minorities access formal—rather than informal—supports when facing psychological distress. This difference between informal and formal supports can occur for various reasons, including lack of awareness of formal services, distrust of providers (or providers who cannot speak their language), cultural beliefs that assistance from nonfamilial helpers is unnecessary or inappropriate, resistance to formal helpers from within the family or cultural group, service delivery practices that are culturally uninformed, or for other reasons. In the study of lower-income families earlier described, MacPhee and colleagues (1996) found that European American parents were significantly more likely to have sought professional therapy than were Native American or Hispanic parents, and they also tended more to seek professional help with parenting issues.

Findings such as these underscore the need for cultural awareness in designing interventions to enhance social support to children and families of culturally diverse groups. A culturally competent service delivery system will (a) identify groups that are underserved and seek to reduce cultural barriers that may interfere with service delivery by understanding their characteristics, resources, and needs; (b) orient program planning, staff training, and community involvement to ensure that the development, implementation, and evaluation of services are respectful of the values and practices of recipient families; (c) evaluate assessment and outcome procedures and instruments to ensure their appropriateness and validity for the children and families who are served; (d) build cross-cultural communication skills within program staff, including the appropriate use of interpreters and an ethnographic understanding of communication approaches within cultural groups; and (e) seek to develop an appreciation of cultural diversity as a facilitator rather than impediment to service delivery. These practices are especially important in services that seek to strengthen the benefits of social support interventions by linking formal support to informal support networks, especially in light of how "outside" helpers can be regarded with distrust or resentment by members of closely knit families or communities. In the end, cultural beliefs and practices are among the most significant personal characteristics mediating the needs of potential recipients and the providers of social support.

INTERIM CONCLUSIONS

Before turning to research focused on social support and developmental psychopathology, there is value in summarizing the implications of the foregoing analysis of social support in the lives of children, parents, and families. Doing so provides a set of conclusions that suggest the kinds of socially supportive interventions that are likely to

prove most effective in helping children and their families. Several conclusions and their implications seem warranted:

- *Relationships influence other relationships.* Parents mediate children's access to other people outside the family and the support they can provide. The quality of parent-child relationships is affected by the support or conflict that parents experience within their own social networks. The ability of a formal helper, such as a home visitor, to engage parents and children may be affected by attitudes of extended kin. These conclusions underscore the interconnected nature of the social networks of family members and how relational influences on one person have broader scope for how that person engages others. Insofar as social support is given and received in the context of relationships, these observations suggest that supportive relationships beget other supportive relationships—with the opposite result when relationships are stressful and taxing. With respect to intervention, this conclusion suggests that multigenerational interventions are important to strengthening social support to children, as well as efforts to improve parental social networks. Improving parental well-being, such as through the assistance of a grandparent, a friendship network, or a professional helper, can contribute to improving the quality of parenting and, through this, children's well-being. Because child psychopathology is typically associated with broader family processes, intervening to improve the quality of multigenerational relationships within the family, and the quality of the social networks that each family member draws on outside the family, improves the chances for healthy development for children within that family.
- *Coordinating informal and formal sources of social support is important.* Formal and informal helpers have, as we have seen, unique strengths and weaknesses in the provision of social support (Gottlieb, 1983, 2000). Members of informal social networks share the values of recipients, and their accessibility, mutuality of assistance, trust, and multifaceted avenues of potential assistance make them influential agents in everyday life. But because natural helpers may share the circumstances of their recipients and lack extensive training, they may be ineffective and are subject to exhaustion and withdrawal as helpers. Formal sources of support, by contrast, have professional training and a formal role definition that contributes to their impact and the reliability of their assistance. But because they are less well integrated into the lives of recipients and do not share their values, experiences, and background, support can be stigmatizing, and formal helpers may have difficulty engaging the cooperation of family members.

  Because of these distinct characteristics, integrating the efforts of formal helpers with those of informal helpers in recipients' natural social networks may offer the best opportunities for creating enduring preventive or therapeutic benefits (Froland, Pancoast, Chapman, & Kimboko, 1981; J. L. Miller & Whittaker, 1988). Formal helpers working with members of informal social networks can support natural helpers in their efforts while ensuring the skill and expertise that formal helpers can provide. The integrated efforts begin with the mutual recognition that formal and informal helpers have unique contributions to offer needy recipients, and this mutual recognition can occur in many ways. Formal and informal assistance is harmonized, for example, when an early childhood mental health consultant works with parents or teachers at a local school or child care program, a perinatal home visitor encourages the involvement of extended kin during home visits, or a group therapy program for adolescents has connections to the school or to the peer group. In child welfare, children and/or family members are often encouraged to enlist someone from their natural social networks to advocate for them at social service meetings and help them follow through on the goals identified at these meetings.

  The effective coordination of formal and informal support networks is not easy, however, because of the differences in background, values, goals, and definition of the problem that may provoke mutual distrust between formal and informal helpers. All too commonly, for example, extended family members or neighbors reinforce a parent's skepticism regarding the potential helpfulness of a counselor or paraprofessional home visitor. Sometimes social workers undermine informal helpers by criticizing them to the recipient. But the integration of formal and informal helping is important to promoting the engagement of recipients in social support interventions and to providing a foundation for continuing assistance. Many well-meaning social support interventions fail because they do not sufficiently incorporate the natural helping networks of family members, or rely on them exclusively, resulting in assistance that is limited in time, scope, and impact.
- *Parents are central to children's environment of relationships, but they are not solely influential.* The first part of this conclusion affirms the importance of parent-child relationships to children's developmental competence,

emotional well-being, and capacities for receiving social support. It also underscores the vulnerability of children, especially when they are young, to parental dysfunction. Research on children in homes characterized by marital conflict shows, for example, that children become emotionally enmeshed in their parents' conflict, contributing to risk for their own emotional psychopathology. They monitor parental moods to anticipate conflict before it occurs, and they intervene in parental arguments as they are trying to manage their own emotions (Davies, Harold, Goeke-Morey, & Cummings, 2002; Davies & Woitach, 2008). The emotional dysfunction in a child created by a parent who has become a source of threat or stress is illustrated in research on the effects of parental depression, domestic violence, and, of course, child maltreatment. In the attachment literature, it is often observed in young children developing insecure disorganized attachments, manifested behaviorally in the approach-avoidance conflict of a child who needs but cannot seek assistance from the parent (Lyons-Ruth & Jacobvitz, 2008). In these and other circumstances, the social support that children need from within the family is inaccessible. Moreover, social support from outside the family also may be inaccessible because of how parents function as gatekeepers to children's extrafamilial social contacts. Parents may limit children's access to alternative support agents because of their own emotional problems or to conceal their disapproved conduct from detection. The recognition that parents are central to children's emotional well-being, therefore, underscores not only the importance of the support that parents ordinarily provide but also the vulnerability of children to parental dysfunction.

The second part of this conclusion, however, underscores that others can have important influence in assisting children even when they cannot ameliorate negative family experiences. Indeed, some research suggests that support from only one or two people outside the family can be instrumental in helping children in stressful family circumstances cope more effectively (Beeman, 2001). As this review has shown, those extrafamilial agents may be found in early child care settings, primary grade classrooms, and community and recreational activities; for older children, they may be found in the peer, after-school program, and workplace environments. When children are young, extrafamilial support agents can provide them with a safe haven of security and predictability that can support coping even when the family environment remains difficult. At best, such agents can help bridge the provision of other resources to the family (Small, 2009). When children are older, programs designed explicitly to provide support, such as youth mentoring programs, have the potential of providing considerable assistance (Hirsch, 2005). Thus, parents are central but other agents of social support can also be influential in helping children at risk.

- *Representations of support from others are important to psychological well-being.* The importance of perceived support to psychological functioning suggests that expectations that support is available are at least as important as the actual experience of receiving assistance from network associates. Indeed, perceived support seems to be more important than enacted support in many circumstances. In light of the modest association between perceived and received support, this conclusion warrants further research into the influences that cause individuals to expect that others will provide assistance when needed, even if they have not regularly obtained such aid in the recent past. How affective psychopathology influences individuals' perceptions of support, which may be independent of the actual assistance they receive from formal and informal helpers, also warrants research attention. At the very least, this conclusion means that interventions to strengthen social support to increase psychological well-being must attend as much to changes in recipients' expectations for future support as to changes in the actual support they receive because the benefits of intervention may be limited unless support expectations are altered. In this respect, it is important to recognize that expectations of support from significant people have a stress-buffering consequence.

  One reason why attention to perceived support is so important is that it requires addressing why recipients may not perceive support in contexts when it is provided. It is likely that natural helpers and formal helpers who focus attention on the recipient's dysfunctional behavior and try to help change it may be perceived as unsupportive, even if their efforts are necessary and potentially effective. The research on negative recipient reactions to assistance suggests also that *how su*pport is provided may be significant for shaping recipients' reactions to the assistance they receive and their expectations for future support. When support provision is normalized for the recipient's neighborhood or community, when it is provided in contexts that avoid stigma (e.g., at home or church rather than a clinic), when it is broadly available rather than targeted, when recipients can repay the help they are given, and when helpers and

recipients jointly agree on the need for assistance and the goals it will accomplish, it is more likely that received support will be perceived as such. Furthermore, when formal helping professionals take the time to establish relationships of trust with recipients and respect their perspectives and values, their assistance is more likely to be regarded as supportive. Understanding how to enhance perceptions of supportiveness in the context of social support interventions is an important future research task.

Little is known, furthermore, about developmental changes in expectations of social support. Research reviewed above suggests that securely attached children perceive greater support from those around them, but it is unclear whether such perceptions derive from greater amounts of actual assistance (deriving perhaps from the capacity of secure children to elicit support from others) or whether a secure attachment itself contributes to more positive expectations. Very little is known about how other child characteristics, including temperamental individuality, contribute to perceptions of social support, or about developmental changes in these expectations. It is also crucial to understand how children's actual experiences in the family, such as marital conflict, affect children's generalized expectations of social support and how they are affected by potentially stress-buffering relational influences, such as through interactions with other adults. There is potentially a very rich research agenda here with important practical applications and clinical implications.

- *Social support efforts will be more effective when there is clarity concerning the goals they are intended to achieve.* Because social support is multifaceted and recipients have different constellations of challenges, a one-size-fits-all strategy is inappropriate to social support interventions. Rather, interventions should be preceded by a careful analysis of the needs of target individuals or families, the capabilities of informal or formal helpers enlisted for them, the specific purposes or goals of supportive interventions, and the outcomes that can reasonably be expected to result (Gottlieb, 2000; Heller & Rook, 2001). Such an analysis is important is because there are inevitable trade-offs between different strategies and goals that might be envisioned. Enlisting formal helpers is typically more costly than using volunteers and/or informal network members, but it may be necessary and cost-effective when the recipient's problems are so serious that they are beyond the capabilities of nonprofessionals to address effectively. Universal or broad-scale support programs can be useful in the context of expectations that recipients need information and advice but do not have serious problems, but determining what outcomes might reasonably be anticipated from such programs can be difficult. At times, other resources may have to be enlisted in addition to supportive interventions, such as social skills training (Gaudin, Wodarski, Arkinson, & Avery, 1990–1991) or public assistance (Pelton, 1989, 1994) in order to address problems that contribute to the recipient's difficulties. Taken together, therefore, a generalized initiative to broadly provide support with the hope that it will improve the well-being of children or their parents is less likely to be successful than one that is based on a careful analysis of the child's and family's needs, who can provide assistance, and the reasons for intervening.
- *Stress and social support are complexly interwoven.* The prevailing approaches to understanding the association between social support and psychological well-being are to regard social support as either stress preventive—through the incorporation of healthy practices into the recipient's experience—or as a stress buffer, supporting more effective coping by the recipient. But this analysis has shown that the association between social support and stress is much more complex. Stress may undermine the capacity of recipients to solicit or receive support and may increase their negative reactions to receiving help. As it is shared among neighborhood or community members, stress may also impair natural helping networks from providing mutual aid as individuals must cope with the demands of poverty, dangerous neighborhoods, or other difficulties in their own lives. The experience of receiving social support may itself be stressful, especially if it is stigmatizing or humiliating or contributes to feelings of failure or vulnerability. Recipients may also perceive helpers' interventions as unsupportive if it casts light on harmful practices that must change. Moreover, the process of providing social support may be stressful to helpers, especially if it becomes draining and demoralizing.

In light of these considerations, there is value in distinguishing different sources of stress that social support interventions might address in potentially different ways. One source of stress is associated with the helper-recipient relationship, whether this is a formal professional association or an informal relationship between neighbors or friends. In each case, efforts to reduce the negative consequences of accepting aid may be necessary. Such efforts can include promoting a relational atmosphere of mutual respect and creating ways

of normalizing support within the community in which the recipient lives. Another source of stress consists of neighborhood or community stressors, such as economic impoverishment and the drain of human capital resources, which contribute to more difficult lives. These stressors can have widespread influence within natural social networks and may be difficult to ameliorate, but they must be recognized and accommodated as the context in which support is provided. Finally, there are critical events, such as immediate crises, that a social support intervention can hope to change through effective intervention. By distinguishing different sources of stress, impediments to the efficacy of social support efforts can be recognized and, where possible, reduced to increase the effectiveness of interventions.

- *Cultural awareness.* Finally, cultural beliefs, values, and practices significantly moderate how social support is received, how potential sources of support are perceived (including attitudes toward formal as well as informal support agents), and the association between social support and psychological well-being. Developing culturally informed social support interventions requires recognizing the importance of these beliefs and practices, incorporating them into program goals and design, reducing cultural barriers, developing staff training that enhances cross-cultural communication, and valuing and respecting the beliefs and values of recipient families.

Social support alone is unlikely to be an effective answer to the complex problems faced by children with serious affective psychopathology or dysfunctional families. But social support is an important component of any multifaceted effort to prevent psychological difficulties in at-risk families and children or to provide therapeutic assistance when family problems have resulted in a child with clinical disorders. The challenge is to craft well-designed interventions that improve the support afforded by natural helpers and to enlist the assistance of formal helping professionals, based on a careful assessment of the needs of the child or family at risk (Thompson & Ontai, 2000). Accomplishing this requires a thoughtful appreciation of the nature of social support, as well as the specific role of social support in developmental psychopathology, to which we now turn.

SOCIAL SUPPORT AND DEVELOPMENTAL PSYCHOPATHOLOGY

With these interim conclusions from research on social support in mind, we now turn to the research literature on developmental psychopathology. Recognizing the breadth of intervention efforts that incorporate social support, our purpose in this selective review is to focus on concepts and interventions that test and extend the conclusions described in the preceding section. To what extent, in other words, do existing preventive programs and clinical interventions draw on these conclusions, and in what ways could existing interventions be improved with greater attention to them?

In this section, we discuss the relevance of social support to three phases in the course of psychological disorders. First, we consider how the absence of social support contributes to the development of psychological disorders. This is especially important to portrayals of social support as a preventive and buffering agent in stressful circumstances, and therefore we also consider the nature of preventive interventions to at-risk families lacking social support. Second, we examine the role of social support (and its absence) in the maintenance of psychopathology over time, underscoring the importance of social factors in the persistence of affective symptomatology. Finally, we consider social support and the treatment of psychopathology and the alternative avenues that exist for enhancing support as a therapeutic aid.

Social Support, Social Isolation, and the Origins of Developmental Psychopathology

In light of the stress-preventive and stress-buffering functions of social support, it is reasonable to expect that children in families experiencing social isolation would be at greater risk of psychological difficulty than children in families experiencing considerable social support. Research on social isolation and developmental psychopathology, particularly studies of risk for child maltreatment, indicate the complexity of the concept of social isolation, however. Studies of efforts to address social isolation, particularly through home visitation, illustrate the challenges of engaging families in supportive social interventions to prevent the emergence of child and family problems.

Social Isolation and Risk for Child Maltreatment

The social isolation of families who have abused or neglected their offspring, or who are at significant risk of doing so, is the most extensively studied condition in which the absence of social support is believed to contribute to risk for the development of child psychopathology. In this case, children's risk of clinical problems is believed to be mediated by their parents' lack of social support. Many researchers have concluded that parents who abuse or neglect their offspring lack significant social connections

to others in the extended family, neighborhood, and broader community and to social agencies that can provide assistance (e.g., Daro, 1988; Garbarino & Sherman, 1980a; Polansky et al., 1981; Seagull, 1987, Gelles, & Steinmetz, 1980; see Thompson, 1995, for a review). As a consequence, their maltreatment of their offspring is likely to remain undetected, these parents have few interpersonal resources to which they can turn when they are stressed, and the ways that social connections with potential helpers can buffer the effects of stress, promote healthy behavior, and socialize positive parenting are strained.

An extensive review of this research by Thompson (1995) yields, however, a fairly complex picture of the association between social isolation and child maltreatment. Two conclusions from his review are important to this discussion of social support and developmental psychopathology. First, in most studies, the social isolation distinguishing abusive or high-risk parents consists of their smaller social networks or their more limited social contacts with network members (i.e., limited social embeddedness). Parents at risk of child abuse know fewer people, and see them less often, compared to other parents in similar circumstances. But research findings are inconsistent about whether at-risk or abusive parents experience significant deficits in enacted support or have lower perceptions of expected support from their network associates. A study by Lovell and Hawkins (1988) is typical; in it, abusive mothers reported that very few of their network associates provided practical help with child care or parenting responsibilities, but mothers reported enjoying seeing nearly 80% of these companions very much and reported that they could "share their thoughts and feelings frequently" with nearly 50% of them. Like the fatally abusive mothers studied by Korbin (1989, 1991), in other words, parents often perceived support from network associates as satisfactory even though the social support mothers received did not significantly reduce abuse potential (cf. Freisthler et al.'s, 2014, "dark side of social support"). Thus, on the most important dimension of social support for psychological well-being—perceived support—there are often negligible differences between maltreating parents and those who are nonabusive, even though the social networks of maltreating parents are smaller and less supportive in other ways.

Second, there are subgroups of maltreating parents who experience significant social isolation for specific reasons. Polansky and his colleagues (Polansky, Ammons, & Gaudin, 1985; Polansky et al., 1981; Polansky, Gaudin, Ammons, & David, 1985) have studied neglectful mothers, who report feeling greater loneliness and lack of neighborhood support compared with socioeconomically comparable nonneglectful mothers. They describe an "apathy-futility syndrome" consisting of a passive, withdrawn demeanor coupled with emotional "numbness," limited competence, distrust of others, retreat from social contact, and verbal "inaccessibility" to others that makes them hard to reach socially (Gaudin & Polansky, 1986; Polansky & Gaudin, 1983). In Polansky's view, the social isolation of these mothers derives from their general inability to develop and maintain supportive social ties owing to character disorders, deficient social skills, and difficulties in coping adaptively with life stress. In a sense, their neglect of offspring is part of a broader syndrome associated with their disorganization and lack of social and emotional competence.

Garbarino has described, by contrast, a different kind of social impoverishment of families within neighborhoods that experience heightened rates of child maltreatment (Garbarino & Kostelny, 1992). As earlier noted, by comparing neighborhoods with higher-than-expected child maltreatment rates (based on sociodemographic predictors) with neighborhoods with lower-than-expected maltreatment rates, and using informants within each community, Garbarino sought to characterize the neighborhood conditions associated with child abuse and neglect (Garbarino & Sherman, 1980a, 1980b). He found that mothers of higher-risk neighborhoods reported receiving less assistance from neighbors and regarded the neighborhood as a poorer place for raising children, but on other assessments related to social support, such as perceptions of sources of potential assistance, mothers of higher-risk and lower-risk neighborhoods did not differ. By contrast with the characterological problems of the neglectful mothers studied by Polansky and colleagues, therefore, the mothers in the high-risk neighborhoods studied by Garbarino suffered from the diminished social resources of their neighborhoods and the diminished human capital of their communities.

Studies like these indicate that social isolation is not a homogeneous phenomenon. Consequently the reasons for social isolation are diverse in families at risk for child maltreatment (Thompson, 1995). For some people, such as Polansky's neglectful mothers, isolation may derive from social marginality; for others, such as Garbarino's higher-risk neighborhood residents, it arises from the impoverishment of social capital in difficult neighborhoods. Some people may actively seek social isolation as a means of concealing abusive practices. For others, isolation may result from difficult circumstances that create feelings of humiliation and vulnerability and rob adults in the

neighborhood of the time or energy required to maintain social networks. A significant proportion of high-risk families do not feel socially isolated at all; instead, they are satisfied with their social interactions with a small network of close associates who provide emotional support that does not seem to constrain abusive or neglectful practices. Social isolation, when it is apparent, can have diverse origins.

The multifaceted causes of social isolation in families at risk for child maltreatment are important for at least two reasons. First, these studies indicate that social insularity may be a significant factor in the origins of child maltreatment for some families, especially when the causes of social isolation derive from psychological problems in parents, or difficult or dangerous neighborhood conditions, or active efforts to conceal abusive practices. In these circumstances, the absence of significant social connections increases risk for child maltreatment because there are few from outside the family who can provide assistance or monitor or socialize parental conduct, especially in the context of life stress. However, it is unwarranted to generalize this portrayal of abusive families. For many other families, social isolation does not appear to be etiologically relevant because abusive practices occur in the context of active social networks from which parents derive emotional support, but which are benign influences on abusive practices. Social isolation is not necessarily implicated in child maltreatment—and perceived support is not necessarily a buffer against abusive parenting. Second, the diverse causes of social isolation are also relevant to intervention. Strategies for enhancing social support for at-risk families who are socially isolated must also be multifaceted. They may require, for example, social skills training (Gaudin et al., 1990–1991), improving recipient reactions to receiving assistance (Tracy, Whittaker, Boylan, Neitman, & Overstreet, 1995), incorporating new support agents into natural social networks, or other approaches depending on the causes of social insularity. When enlisting social support into clinical treatment, one size does *not* fit all.

Risk for child maltreatment is not the only vulnerability for children living in socially isolated families because in these contexts, parenting quality is more likely to be poor, the family's use of community resources is more likely to be limited, and children's developmental outcomes are more likely to be problematic as the result of limited access to the mentoring and advice, information and material aid, developmental guidance and social monitoring that social networks can provide. This diversity of risks associated with family social isolation suggests that efforts to address it need to be clear about how social support is to be provided and the goals it is intended to achieve in order to be effective. This is well illustrated in the research on home visitation.

Home Visitation as a Preventive Intervention

During the past several decades, home visitation has become the most enthusiastically supported and widely recognized approach to providing social support for at-risk families. The fundamental strategy uniting diverse home visitation programs is the delivery of information, guidance, and emotional support to family members in their homes by a paraprofessional or volunteer home visitor. The purpose is to prevent the emergence of problems that may arise from parental stress, lack of knowledge or resources, or social isolation and thus to promote more healthy developmental outcomes beginning early in life. Home visits can begin prenatally, shortly after the child's birth, or later in childhood, and visits can extend in duration based on family need and engagement and program funding. Home visits are believed to provide an avenue for offering diverse forms of social support to parents and children, overcoming some of the barriers these families otherwise face to obtaining needed assistance (such as lack of transportation or health insurance), enabling monitoring of children's development, and establishing a relationship of trust with a home visitor who can provide individualized assistance and bridge connections to broader resources (Wasik & Bryant, 2000). Home visitation is the umbrella orientation of a number of programs established in communities throughout the country, most notably the Healthy Families America initiative, developed by the National Committee to Prevent Child Abuse, which has established a nationwide consortium of hundreds of home visitation programs serving families at risk (Daro, 2000; Daro & Harding, 1999). Home visitation programs are funded by direct legislative appropriation in many states, or by project grants from federal agencies, as central features of statewide efforts to strengthen child health and development, prevent child maltreatment, improve parent-child relationships, or address other issues. Most notably, as part of the Patient Protection and Affordable Care Act (ACA), Congress in 2010 established a new Maternal, Infant, and Early Childhood Home Visiting Program and appropriated $1.5 billion over 5 years to develop and improve state-administered home visitation programs.

Home visiting has considerable potential to support families with young children, especially those with limited social networks of support, but problems exist in the effective implementation of home visitation initiatives. This is one of the reasons for the mandate of the

Obama administration, through ACA, that states focus on programs offering evidence-based documentation of effectiveness. A recent review of 35 different home visiting programs commissioned from Mathematica by the U.S. Department of Health and Human Services (DHHS), however, identified only 14 programs meeting the criteria for an evidence-based early childhood home visiting service delivery model (Avellar, Paulsell, Sama-Miller, & Del Grosso, 2013). Programs were classified in this manner because they had a high- or moderately high-quality research evaluation (e.g., randomized controlled trials, quasi-experimental designs, implementation studies) and demonstrated statistically significant positive effects in at least 2 of 8 targeted areas of impact, as well as sustained positive effects for at least 1 year following program enrollment. The impact areas identified in this report reflect the diversity of developmental outcomes that home visitation programs are intended to address: child health; child development and school readiness; family economic self-sufficiency; linkages and referrals to community programs; maternal health; positive parenting practices; reductions in child maltreatment; and reductions in juvenile delinquency, family violence, and crime. Across the evidence-based programs, the most frequent positive outcomes occurred in child development and school readiness, positive parenting practices, and child and maternal health. Positive outcomes were not limited to particular subgroups of families, and many were sustained for at least 1 year following program completion. In some cases, much longer-term impacts were identified. For example, the Nurse Family Partnership, which provides support to first-time expectant mothers beginning prenatally through the child's second birthday, had initial positive impacts on parental care and maternal behavior (e.g., subsequent pregnancies, education, and work). At a follow-up at age 15, children of program participants who had been low income and unmarried during program participation had fewer arrests and convictions, less substance use, and lower levels of "promiscuous" sexual activity compared with children of control group families from similar backgrounds (Olds, 2006). The Healthy Families America initiative described earlier also had positive outcomes in all assessment areas.

Nonetheless, even the programs identified as most successful had relatively few effects relative to the range of targeted outcomes, and less frequently demonstrated positive impacts in areas such as family economic self-sufficiency, maternal and child health, linkages and referrals to community programs, and reductions in juvenile delinquency and family violence. (For many programs, these outcomes were not measured, however, because they were not part of the program's intended outcomes.) Several of these studies identified at least one unfavorable impact, although the nature of these impacts was not specified. Additionally, other programs reviewed did not meet criteria because they showed few positive effects or did not sustain positive effects over time.

The DHHS review did not identify the reasons for limited program success, but this has been the focus of other reviews of the home visitation research literature, including a 2004 meta-analysis of 60 home visitation programs by Sweet and Appelbaum (2004) and an influential assessment by Gomby, Culross, and Behrman (1999; see also Halpern, 2000). The reasons for limited program success identified in these reports include the inconsistent participation of recipients, the importance of supporting help providers, the need to develop community connections, and the problem of lack of clarity in program goals and expectations.

The failure to fully engage families in the program and the high attrition rates of participants have been identified as significant challenges for virtually all home visitation programs. According to Gomby and colleagues (1999), between 10% and 25% of families invited to participate in home visitation programs decline and between 20% and 67% of the families who enroll fail to complete the program. Moreover, even when families enroll and remain in home visitation programs, they tend to receive only about half or fewer of the planned number of contacts with the home visitor (Gomby et al., 1999). Program engagement is particularly problematic for the highest-risk families, which may explain the more limited effects seen at higher levels of family risk. For example, Early Head Start evaluators reported that families with three or more identified sociodemographic risk factors were harder to engage and remained enrolled for shorter durations compared with families facing fewer risks (Administration for Children and Families, 2002). The reasons for problems in participant engagement are diverse, often related to residential relocation, busy or disorganized family schedules, and other characteristics of recipients. But lack of engagement may also be related to the mixed recipient reactions to obtaining assistance discussed earlier, especially if family members do not perceive that home visitation addresses their needs and concerns or if they feel embarrassed, indebted, or vulnerable because of the services they receive.

A second problem in successfully implementing home visitation programs is the lack of training, supervision, and support for home visitors, which contributes to the high turnover rates that are observed in most home visitation programs and diminished program efficacy

(General Accounting Office, 1990; Gomby et al., 1999). It is common for home visitors to report shorter visits than planned, broken appointments that are not rescheduled, and preoccupation with immediate family crises rather than the delivery of intended education or guidance during home visits. Home visitors are further challenged when working with culturally or linguistically diverse families, at-risk populations, or parents who suffer from depression, domestic violence, or substance abuse (Administration for Children and Families, 2002; Margie & Phillips, 1999). Moreover, several studies have found that how the intended curriculum of a home visitation intervention is implemented varies significantly depending on the values and orientation of the home visitor (Baker, Piotrkowski, & Brooks-Gunn, 1999; Wagner & Clayton, 1999). At times, in other words, what actually occurs during home visitations may be much different than what program designers had intended. The high turnover of home visitors further undermines the relationship between participants and the program, and this factor may contribute to the lack of family engagement. Turnover can be especially difficult for adults in the highest-risk families, who may have fewer alternative sources of support on which to rely and who often have histories of abandonment and relational dysfunction (Goodvin, 2004).

These challenges to program implementation are directly related to the training, supervision, and support provided to home visitors, especially those who are volunteers or paraprofessionals. However, personnel, training, and supervision expenses account for most of the costs of a home visitation program, and thus poorly or inconsistently funded programs are likely to scrimp on these essential features of service delivery. This fact is especially unfortunate in light of findings that the professional identity of home visitors may substantively impact program results. For example, one evaluation of the Nurse Family Partnership—identified as a highly successful program for the breadth of positive impacts across target areas (Avellar et al., 2013)—included a comparison of nurses to paraprofessionals. The goal was to identify whether trained paraprofessionals could replicate the positive effects seen in earlier studies with nurse practitioners. However, results indicated that effects were not comparable: When paraprofessional home visitation produced any positive effects, they were approximately half the magnitude of those found with nurse home visitors (Olds, 2006). It is likely that in addition to their greater clinical training to support families dealing with challenges, nurses are also perceived by support recipients as having a greater degree of authority and useful information. But because of their professional training as formal helpers, nurse practitioners may not share the backgrounds, experiences, and often values of recipient families. Balancing the benefits of expertise with the value of shared orientation—which distinguishes formal from informal helpers—remains one of the challenges of designing effective home visitation programs.

Another challenge to effective program implementation is the failure of many home visitation programs to explicitly establish the development of community supports as a central goal for recipient families. Illustrating this, only 4 of the 35 programs reviewed by Avellar and colleagues (2013) assessed whether program participation increased family linkages and referrals to other resources. This finding is unfortunate because the social support approach incorporated into home visitation recognizes that a home visitor cannot provide all that recipients need. Consequently one of the significant goals of intervention must be to help families forge associations within their communities to individuals and agencies that can offer longer-term support. Moreover, community connections and visibility can enhance the positive regard for a home visitation program within the neighborhood, which can also contribute to improving family engagement and strengthening the connections between family members and community services.

Finally, the reviews by Gomby and colleagues (1999) and Sweet and Appelbaum (2004) each identified program goals as problematic because they were unclear, unduly ambitious, and/or not carefully translated into intervention strategies. Gomby and colleagues emphasized, in particular, the need for a renewed appreciation that home visitation programs must have modest expectations for what social support alone can accomplish for needy families. Thus, home visitation efforts should be combined with other services that can address other family needs. This conclusion is an additional reason for consolidating stronger connections between family members and community resources so that home visitors do not seek to do it all. Home visitation programs that focus on limited, clear, well-defined, and realistic objectives have the greatest chance of success by enabling program staff to sustain program focus and to use limited resources to achieve realistic expectations (General Accounting Office, 1990).

These concerns with the effective implementation of home visitation programs are familiar in light of the foregoing analysis of the challenges of social support interventions to address risks associated with social isolation. Together, they do not indicate that efforts to improve social support in the lives of troubled children and their families are not worthwhile. In fact, rigorous evaluation

of promising programs suggests their potential, even for long-term benefits (e.g., Olds, 2006). The concerns do, however, indicate that it is crucial to move beyond a general expectation that providing social support in itself will yield many benefits to recipients. Instead, in recognition that (a) social support is multifaceted; (b) potential recipients have diverse needs, expectations, and personal and cultural backgrounds; (c) their natural social networks have unique resources and difficulties; (d) their communities likewise have unique constellations of material and human capital; (e) support providers have needs for training and support that are central to an effective intervention; and (f) social support cannot alone address the complex needs of recipients, the importance of clear thinking concerning the purposes of social support interventions, how these objectives should be translated into program strategies, and how the outcomes of these efforts should be evaluated is warranted.

Social Support and the Maintenance of Developmental Psychopathology

Psychological problems have multifaceted origins, of course, arising from the interaction of biological, ecological, cognitive, and other influences. The absence of social support, especially in the context of conflict in close relationships, adds further risk to the development of internalizing and externalizing disorders. The availability of social support can, in turn, help to buffer the onset of clinical symptomatology. Social support and its absence are relevant also to the persistence of symptomatology over time. In other words, once clinical problems have developed, their maintenance may be associated with continuing social adversity and social isolation. Several research literatures suggest how this may be true.

Children with anxiety disorders are highly vigilant for and hyperresponsve to situations associated with fearful stimuli. They interpret everyday situations in ways that exaggerate potential threat, are acutely sensitive to their own visceral signs of fear arousal, and become preoccupied with their negative emotion (Vasey & Ollendick, 2000). They are, not surprisingly, challenging for caregivers to help, but research evidence indicates that the efforts of parents to be emotionally supportive may exacerbate rather than alleviate anxious symptomatology (Thompson, 2001; Vasey & Dadds, 2001). Many parents of anxious children respond sympathetically and protectively to the fear expressed by their offspring, assisting the child in avoiding the fear-provoking event but, as a consequence, offering few opportunities to master the anxiety (Dadds, Barrett, Rapee, & Ryan, 1996; Gerlsma, Emmelkamp, & Arrindell, 1990). In light of studies showing an intergenerational family history for anxiety disorders and their high heritability, these characteristics of parent-child interaction suggest that anxiety is learned in families as part of the shared environment and that parents may become anxious in situations in which their offspring are also fearful (Eley, 2001; Hettema, Neale, & Kendler, 2001). Thus, a child who responds to an anticipated encounter with a fear-evoking event with screaming, tantrums, hiding, and aggressive resistance offers powerful incentives for adults to accede to the child's fears. If the adults do so and the child subsequently calms down, each partner is negatively reinforced for behavior that helps to perpetuate anxious symptomatology (Vasey & Ollendick, 2000). At the same time, parents may be worried about the effects of anxious pathology on the child's capacities to act in a socially and developmentally appropriate manner, and thus parental criticism and possible rejection may accompany parental overprotectiveness (Gerlsma et al., 1990).

Thus, childhood anxiety disorders are likely to be accompanied by troubled family relationships. They are troubled by aversive encounters focused on the child's efforts to avoid fear-provoking events that are inadvertently reinforced by parents' efforts to be emotionally supportive and helpful. They are troubled also by the parents' mixed response to the child's behavior—overprotective but also critical—that contributes to parent-child relationships of insecurity and uncertainty. Parental behavior in these instances is well intentioned: Adults are striving to provide social support, even though their efforts inadvertently reinforce anxious symptomatology in children (Thompson, 2001). One reason for family difficulty is that the emotional support offered by parents does not contribute to alleviating anxious fear. The problem in these circumstances is that parental social support is conceived narrowly as emotionally supportive behaviors that, paradoxically, maintain rather than reduce child anxiety. A broader conceptualization of social support is needed that incorporates parental practices that help children to progressively cope with their fearful emotion, with parental assistance, that children may initially experience as distressing but which ultimately contribute to a reduction in child anxiety.

Another illustration of the influence of social support in the maintenance of clinical problems is the well-developed research literature linking peer relationship problems and childhood loneliness (see Asher, Parkhurst, Hymel, & Williams, 1990, for a review). Several studies have explored the associations among peer rejection, loneliness, and depressive symptoms in children (e.g., Boivin, Hymel, &

Bukowski, 1995; Boivin, Poulin, & Vitaro, 1994; Burks, Dodge, & Price, 1995; Nangle, Erdley, Newman, Mason, & Carpenter, 2003; Oldenburg & Kerns, 1997). Nangle and his colleagues (2003), for example, found that a fully mediational model of the influence of peer relationships on children's loneliness and depression was warranted in their study of 193 third- through sixth-grade boys and girls. In this study, loneliness was the gateway through which problems in peer relationships influenced the development of depression. However, friendships buffered children from depressive symptomatology. The influence of popularity, or peer acceptance, was completely accounted for by the fact that peer acceptance temporally preceded friendship, suggesting that more popular children were likely to have both larger friendship networks and better relative quality of peer relationships. The researchers concluded that before adolescence, "the mutuality that is unique to friendships appears to be critical" (p. 552). Peer rejection is important not only to the development of depressive symptomatology but also to its maintenance over time, as children without friendships are likely to continue to feel lonely, self-deprecating, and isolated in their peer networks.

Social Support and the Prevention and Treatment of Developmental Psychopathology

Social support is important to developmental psychopathology not only because of its contribution to understanding the etiology or maintenance of pathological symptomatology but also because of its promise for pioneering avenues for prevention and therapeutic assistance. The core features of social support—counseling and guidance, emotional nurturance, information, skill acquisition, and sometimes material aid—are components of successful therapeutic efforts in all theoretical approaches. Whether in the context of individual therapy sessions, peer counseling, group therapy, parent education or parent support groups, therapeutic preschool programs, crisis counseling, or other therapeutic avenues, social support is an almost inescapable element of successful clinical intervention. Understanding the nature of social support as well as obstacles to its efficacy in promoting psychological well-being and recognizing conditions that foster perceptions of support in troubled individuals are each important to successfully enlisting social support in therapeutic efforts. Moreover, just as social support is incorporated into most forms of psychological treatment, it is also a central feature of prevention efforts to avert psychological problems or to avoid their recurrence, especially for individuals at risk. Social support is a contributor to long-term adaptive functioning as well as immediate assistance to individuals and families in need.

Despite its ubiquitous contribution to therapeutic endeavors, incorporating social support in prevention and intervention strategies presents significant challenges. The forms of social support that are most helpful to individuals experiencing psychological distress are not self-evident, and, as we have seen, not all social support efforts are effective in achieving therapeutic or preventive goals. These dual observations are crucial considerations because of the many ways that well-intentioned supportive efforts can be rendered ineffective in changing maladaptive behaviors, fostering psychological well-being, or accomplishing therapeutic goals. Earlier in this chapter, we considered examples of how the emotional support of family and friends did not prevent troubled mothers from committing fatal child abuse and how parental efforts to respond sympathetically and protectively does not promote effective coping in offspring with anxiety disorders. For social support to be effective, its purposes and functions must be strategically considered within a broader array of therapeutic efforts, keeping in mind that social support should include not only emotional sustenance and counseling but also reeducation, behavioral change, and monitoring the well-being of those it is intended to assist.

In the next section, we consider five interventions that incorporate aspects of social support for purposes of prevention or therapeutic remediation. These programs were chosen to sample a broad variety of intervention strategies and goals, ranging from efforts focused on strengthening informal support through peers or mentoring relationships to more formal therapeutic strategies to alter family functioning or mental representations of relational support to changes in child welfare practices to improve the well-being of foster children. The outcomes assessed in the evaluations of these interventions are equally diverse, ranging from behavioral competence to attachment security to cortisol regulation. Together, they illustrate the opportunities and the challenges of enlisting social support for preventive or therapeutic purposes. They also illustrate how far we have to go in the evaluation of promising intervention strategies, the science underlying program design, and the extension of that science in conceptualizing the provision of social support and its anticipated benefits.

Peer Support Programs

As noted earlier, one strategy for enlisting social support to remediate clinical problems is to engage natural helpers. For children and adolescents, doing this usually means providing training and supervision to peers who are then

expected to help their classmates or friends. The goals of such strategies may be to increase the total number of peers who interact with the target child or to teach target children social skills that will help them to attract more friends. Enlisting healthy, socially skilled peers to help children or adolescents who have behavioral or emotional disorders or who are at risk for the development of such disorders has intuitive appeal because of the potential to address both of those goals. However, as we have noted, what appears simple and straightforward is often deceptively so. Lewis and Lewis (1996) identified several concerns with involving peers in helping each other. Most notably, in programs without careful role definitions and professional supervision, young people who are motivated by a desire to help others may find themselves in situations that require significantly more training, expertise, and maturity than they have. Lewis and Lewis focused their analysis on risks to peer helpers in programs enlisting peer support for children at suicidal risk, and they reported findings from a descriptive study of Washington schools indicating that suicide rates were higher at schools where peer helpers were not supervised by professional counselors. As we have noted earlier, the potential advantages of enlisting natural supporters to aid troubled children or families must be balanced by their limitations in expertise and capability.

One of the lessons of the social support literature is that designing interventions with carefully defined target behaviors and narrowly focused strategies is likely to avoid some of the ambiguity of more general supportive or mentoring approaches. Such interventions also provide more precise guidance about what works and what does not work. Consistent with this view, one group of researchers (Christopher, Hansen, & MacMillan, 1991; Guevremont, MacMillan, Shawchuck, & Hansen, 1989) trained 7- to 9-year-old children in specific social skills and rewarded them for playing with identified classmates. Same-sex peers were trained in initiating, responding to refusals, maintaining interactions, and responding constructively to negative behavior. Each was then paired with a socially isolated, dysphoric child and rewarded for playing with that child during one daily recess. The intervention resulted in a meaningful increase in positive social interactions for the target children. The improvement in peer interactions for the target children occurred with both the designated helpers and with other classmates, and the levels of positive interactions were comparable to those of social comparison children in the same setting. The treatment gains increased at a 4-month follow-up (Guevremont et al., 1989). In a similar study that also targeted socially isolated, dysphoric children, the researchers increased the training for peer helpers and achieved similarly promising results. Gains in positive interactions were maintained at the 4-month follow-up, and the positive effects generalized to situations when the intervention was not used. In addition, there was no evidence of negative impact of social support on the helpers (Christopher et al., 1991).

A similar approach has proven successful with high-risk preschool children. Fantuzzo and colleagues have demonstrated that their Resilient Peer Treatment (RPT) program improves the social competence of maltreated and nonmaltreated socially withdrawn children in Head Start programs. In RPT, highly socially competent peers help to create regular positive peer play experiences, with interactions supported by a trained family volunteer play supporter. Supporters created a space for the two children to play together and provided guidance and encouragement for interactive play. The intervention involved 15 play sessions over a 2- month period. Multiple experimental evaluations of this program indicated improvements in withdrawn children's teacher-rated social competence and decreases in withdrawn behavior within sessions (Fantuzzo et al., 1996) and with all peers during classroom free play sessions 2 weeks later (Fantuzzo, Manz, Atkins, & Meyers, 2005). Teachers also rated children as higher in self-control and lower in disconnected and disruptive play compared with control group children. Longer-term follow-up is necessary, of course, but successful intervention enlisting peers to help young high-risk children is promising, given its potential for improving later trajectories of social interactions and behavior problems.

Taken together, these programs illustrate the potential benefits that may be derived from enlisting peers as informal social support agents for children who are at risk of developmental problems or face significant adversity. They also illustrate, however, the need for clarity of goals that are suitable to the enlistment of peer helpers and the importance of guidance and support of children who are recruited to help their peers.

Youth Mentoring

Mentors outside the family may play a significant role in providing social support to youth, and this fact has given rise to a proliferation of formal mentoring programs as preventive and therapeutic interventions for at-risk youth. Over 5,000 mentoring programs were operating in the United States in 2005 (MENTOR/National Mentoring Partnership, 2006), spanning multiple program models, such as community-based programs and school- or faith-based approaches. Some programs serve children with existing emotional or behavioral problems, while

others target children with one or more risk factors for developmental difficulties (e.g., children with incarcerated parents). Mentoring programs link youth in difficulty who may not have strong natural mentors with an adult or older peer to provide support and guidance and serve as a positive role model. Rhodes and colleagues (Rhodes, 2002, 2005; Rhodes & DuBois, 2008) have proposed that when mentoring relationships develop mutuality and trust, they can potentially have a positive influence on socioemotional functioning (including developing emotion regulation), cognitive capacities (such as perspective-taking skill), and identity development.

Although formal youth mentoring programs garnered enthusiasm and funding from public and private sources with little evidence of their effectiveness for many years, recent well-designed evaluations and meta-analyses provide some indication of their potential benefits for children and the mediators of these benefits. One example is the Big Brothers/Big Sisters (BBBS) impact study (Grossman & Tierney, 1998; Rhodes, 2002). The BBBS community-based program individually matches adult mentors to children from single-parent homes. Mentors commit to at least one contact per week for a minimum of 1 year, with the expressed goal of developing a friendship with the child. The program provides high levels of supervision and ongoing support of matches. In the experimental evaluation study, diverse youth ages 10 to 16 were randomly assigned either to a treatment group and matched as quickly as possible with a mentor (n = 571) or to a waitlist control group (n = 567). Many of the children in the study had experienced relationship disturbances associated with single parenting, including parental divorce or death, domestic violence, and abuse. At the 18-month follow-up, 378 treatment group youth had been matched with a mentor for 11 months on average. At follow-up, youth who had a mentor were significantly less likely to have initiated drug or alcohol use and reported fewer instances of physically aggressive behavior. Mentored youth also reported greater trust and communication with parents and more emotional support from peers than did control group youth. The latter findings appear to support program claims that the presence of one supportive, healthy relationship may carry over into other relationships by increasing social skills, constructive forms of emotion regulation and the ability to trust others. If this is the case, an effective mentoring relationship may enhance social support both directly and indirectly, with positive implications for overall perceptions of social support and mental health (see also Rhodes, Reddy, & Grossman, 2005).

Recent meta-analyses conclude that effects of youth mentoring programs are relatively consistent but quite modest. In a 2011 meta-analysis covering 73 evaluation studies published after 1998, DuBois and colleagues reported effect sizes of .17 for positive social/relational outcomes, .15 for positive psychological/emotional outcomes, and .21 for lower conduct problems (DuBois, Portillo, Rhodes, Silverthorn, & Valentine, 2011). These results were consistent with those of an earlier analysis (DuBois, Holloway, Valentine, & Cooper, 2002). Although very few studies reported on longer-term effects, when follow-up data were available (7 studies), the effects of program participation showed little to no deterioration over periods lasting up to 4 years.

DuBois and colleagues also reported a number of moderators of mentoring program effectiveness. Prominent among these were characteristics of the mentor-child relationship. Several characteristics were important to program efficacy. First, the positive effects of mentoring relationships were more likely to exist in longer, more established relationships that provided extended opportunities for the development of trust. For example, in a reanalysis of the BBBS evaluation data, Rhodes and colleagues (2005) found that the positive effects of mentors on parent-child relationships and on lowering levels of substance use were present only in relationships established for at least 1 year. Second, the style of mentoring also plays a role in the efficacy of this helping relationship. Reanalyzing the BBBS data, Langhout, Rhodes, and Osborne (2004) found that there were different mentoring relationship styles characterized by varying levels of support, structure, and activity, and these were differentially related to youth outcomes at follow-up. An "unconditionally supportive" mentoring style, for example, was high in levels of positive support but lower in structure of conversations concerning goals and the number of shared activities. By contrast, a "moderate" mentoring style was comparable in shared activities and structured conversations but lower in positive support, while an "active" style was characterized by the highest number of shared activities. Interestingly, youth experiencing "moderate" mentoring showed the best outcomes on follow-up, with decreased feelings of alienation from parents, lower levels of peer conflict, and improved academic competence compared to controls. By contrast, an "unconditionally supportive" mentoring style was associated with an increase in both alienation and peer conflict over the study period. The authors suggested that children in this program may have benefited most from mentors who provided a sense of structure and goal orientation within the context of an emotionally positive

adult-child relationship rather than unconditional positive regard with little structure.

Are there groups of children who are more likely to benefit from the social support provided by a mentor? Although effects held across a range of ages, from early childhood through late adolescence (DuBois et al., 2011), other child characteristics moderated effects. For example, children with prior behavior problems and children who brought *either* high individual or environmental risk appeared to benefit more from mentoring. It is important to note that mentoring programs appear most effective for those children who face an intermediate but not an overwhelming degree of challenges; as earlier noted, the potential impact of nonprofessional mentors may be blunted by the complex problems of children facing both high individual and environmental challenges. The nature of individual mentoring programs may also bear on their effects. DuBois et al. (2002, 2011) reported that mentoring effects were considerably stronger when programs were structured using research-based best practices, such as matching mentors and children based on individual interests, family involvement, and high levels of program supervision and mentor support.

Taken together, studies of the efficacy of formal and informal mentoring relationships for enhancing the well-being of at-risk children and youth suggest that these programs can be helpful for improving social functioning, reducing behavioral problems, and even strengthening academic success. They suggest that in many circumstances, the positive relationship established with an older mentor may provide a foundation for improved relationships with family members, peers, and others in the child's social ecology and may contribute to enhancing perceptions of social support that are important to psychological well-being. The findings also indicate, however, that understanding the characteristics of effective mentoring relationships is important, especially as they concern the match between youth and mentors in background, interests, and other characteristics; the nature and longevity of their relationship; and the severity of youth difficulties that a mentoring relationship is expected to address.

Family Support Intervention

Interventions designed particularly for family members, especially parents, are often part of the therapeutic effort for children and adolescents. Families are the primary source of support for children, and family dysfunction—whether it is manifested in child maltreatment, domestic violence, serious marital conflict, parental depression, or other conditions—poses significant risk to children's emotional health. Consequently, the quality and effectiveness of the support that family members provide to children with clinical problems is crucial to children's healthy adjustment.

As we have seen, however, not all efforts to enhance social support are helpful, and, indeed, emotional support alone may not be effective in remediating children's problems in many situations. In fact, a parent's emotional engagement may have negative effects in certain circumstances. For example, children's emotional or behavioral difficulties may lead to heightened criticism and hostility toward the child (Hooley & Richters, 1995). Expressed emotion (EE) (Hirshfield, Biederman, Brody, Faraone, & Rosenbaum, 1997a) is an index of parental attitudes of criticism or emotional overinvolvement in a child's problems that has been studied as a contributor to the onset, maintenance, or relapse of a number of clinical problems, including schizophrenia (Brown, Birley, & Wing, 1972), depression (Hooley, Orley, & Teasdale, 1986), bipolar disorder (Pavuluri, 2008), behavioral inhibition (Hirshfield et al., 1997a, 1997b), and conduct disorder (Caspi et al., 2004; Rogosch, Cicchetti, & Toth, 2004). EE is associated with these clinical outcomes because it constitutes a major relational stressor in family experience that undermines psychological functioning in an environment that should ordinarily provide social support.

Family support or treatment components have been designed to include a specific focus on EE as a way of improving the quality of social support for young people with clinical problems. The RAINBOW treatment protocol, for example, is a child- and family-focused cognitive behavioral therapy for children with bipolar disorder that addresses the intense personal demands of raising a child with bipolar disorder in an effort to decrease the potentially harmful effects of EE (Pavuluri, 2008; Pavuluri et al., 2004). Elements of this program include encouraging family members to distinguish helpful from unhelpful reactions in their efforts to cope with a child who can be difficult to live with, helping parents model appropriate strategies for affect regulation, fostering shared effective problem-solving strategies in which parents and target children jointly participate, assisting children in their efforts to develop successful peer relationships, and identifying other sources of social support. The program, designed for families with children in the middle childhood or adolescent years, consists of twelve 60-minute sessions that occur weekly over a 3-month period. Conclusions from a study of 34 families participating in this program indicated that symptom severity for children decreased significantly following therapy and parents reported strong satisfaction

with the treatment, although there were no family-based measures of the emotional environment (Pavuluri et al., 2004; see also West et al., 2009). A maintenance model of this intervention showed that these benefits persisted 3 years after initial participation in the program (West, Henry, & Pavuluri, 2007).

Family support interventions like this illustrate how informal social support in the family can be strengthened with the therapeutic assistance of formal helpers from the psychological and psychiatric community. This collaboration can occur even in circumstances when the child's symptom severity has contributed to elevated family stress and hostility toward the child. The duration of the program, however, and the need for a maintenance regimen together illustrate that these benefits are not easily achieved in troubled families.

Child-Parent Psychotherapy

Because social support is based on the quality of helping relationships, efforts like family support interventions are designed to strengthen these relationships by altering the behavior of each partner. But often behavioral change is insufficient because relational interactions are affected not only by the behavior of the immediate partner but also by the individual's prior history of the relationship and its psychological impact. This idea is captured in attachment theory in the concept of internal working models, or mental representations that emerge from early caregiving experience and subsequently color the child's expectations and interactions for subsequent relational partners (Thompson, 2006, 2008). For adults, the quality of their earlier close relationships can color their capacity to respond to a child's needs and emotions. The importance of these mental representations of relationships is reflected also in the social support literature reviewed earlier, particularly in the realization that *perceived* support is more important to psychological well-being than are the actual experiences of receiving support from social network associates. The expectation that others are available to provide assistance, which is important to a sense of social support, may be undermined by earlier experiences of trauma, neglect or abuse, relational violence, and other experiences that impair how individuals are capable of functioning in other relationships.

One approach to therapeutic assistance is thus to address the relational representations that may be obstacles to functioning effectively in potentially supportive relationships. One example is Child-Parent Psychotherapy, an attachment-based approach designed for young children who have experienced a traumatic event, such as maltreatment or exposure to domestic violence, that can be manifested in posttraumatic symptomatology and attachment disorganization (Lieberman, Ghosh Ippen, & Van Horn, 2006; Lieberman & Van Horn, 2008; Lieberman, Van Horn, & Ghosh Ippen, 2005). This is a two-generation intervention because of the recognition that parents of children in these circumstances often have their own history of traumatic experiences that significantly affect their interactions with the child. Thus, trauma-focused therapy for the parent is also a focus of intervention, which may include recollections of difficult childhood experiences as well as explicit attention to the impact of these experiences on the mother's representations of herself and her child. In addition, therapy focuses on parent-child interaction, including guidance for the mother concerning the child's developmental needs and fostering healthier patterns of maternal behavior to alter the young child's expectations for maternal responsiveness and encourage the development of a more secure attachment to her. Age-appropriate therapeutic assistance to the child is also a component of the intervention. Evaluation studies of Child-Parent Psychotherapy have found a reduction in behavior problems and posttraumatic stress symptomatology in preschoolers in a therapeutic group compared to a control group (Lieberman et al., 2006).

In an adaptation of this approach, Toth and her colleagues (2002) used Preschooler-Parent Psychotherapy with a sample of young children who had been maltreated by their mothers and focused on changes in children's representations of the mother and their relationship (assessed through semiprojective narrative story stem completions with dolls) in the assessment of therapeutic outcome. Children and their mothers were seen in weekly 60-minute sessions with a clinician over the course of 12 months. Toth and colleagues found that children in the intervention group exhibited a greater decline in negative maternal representations, a greater decrease in negative self-representations, and more positive expectations of the mother-child relationship by postintervention compared to children treated in alternative approaches. In another study, Toddler-Parent Psychotherapy was used with a sample of mothers with major depressive disorder and their children. After a year of weekly therapeutic sessions, the rate of secure attachment for children in the intervention group had increased significantly and was higher than for a nontreated control group and a nondepressed community group (Toth, Rogosch, Manly, & Cicchetti, 2006; see also Cicchetti, Toth, & Rogosch, 1999). Similar findings have been reported in other applications of this psychotherapeutic approach. Cicchetti, Rogosch, and Toth

(2006), for example, reported significant increases in secure attachment in 2-year-olds after participating with their mothers in a year of Infant-Parent Psychotherapy. In a follow-up study, Stronach, Toth, Rogosc, and Cicchetti (2013) reported that these benefits were sustained for a year following the intervention.

Taken together, these studies underscore the importance of attention to the representational dimensions of receiving support in the design of social support interventions. Indeed, they suggest that without consideration of how prior experience has affected a potential recipient's expectations for assistance from others, efforts to enhance social connections or aid may be blunted because greater received support may not yield increased perceptions of support or expectations that others will be helpful in the future. Conversely, support interventions that focus explicitly on improving expectations of support from others, especially in the context of efforts to strengthen supportive social network ties, may provide greater benefits. But much more remains to be understood about how mental representations of relationships change and grow over time and, in particular, how enduring are therapeutic interventions that address these representations related to social support.

Supportive Interventions in Foster Care: Behavioral and Biological Outcomes

A theme of the research surveyed in this chapter is that stress has psychological and physiological consequences, and the social buffering of stress is likewise psychological and biological in nature. Social support is believed to foster more effective coping and promote psychological well-being through its effects on an individual's psychological stress and its physiological substrates. Although research confirms this multilevel orientation, supportive programs rarely examine the effects of interventions on biological processes, such as stress neurobiology, that are believed to be associated with stress and coping. Even more rarely do they consider concurrent behavioral and biological outcomes of social support. A final illustration of a social support intervention that does so shows how these biological and behavioral outome can be studied together and provides a model for similar kinds of evaluation research in the future.

Children in foster care commonly experience chronic adversity owing to the conditions associated with their initial removal from the family, their experience in foster care, and transitions between care settings. Considerable research has shown that these experiences create stress that is manifested in behavioral problems, distrustful relationships, and dysregulated patterns of biological stress reactivity. Concerning the latter, children in foster care have been shown to exhibit either elevated diurnal cortisol levels or flattened diurnal cortisol, depending, it appears, on the quality of care they have received (e.g., abusive or neglectful treatment) (Bruce, Gunnar, Pears, & Fisher, 2013). In either case, their biological stress systems, most notably HPA activity, have become dysregulated as the result of their experiences of care. This dysregulation of biological stress reactivity is consistent with findings for other groups of children experiencing chronic stress, such as those who are maltreated or are in institutional care (see Thompson, 2014a, 2015, for reviews).

Can social support provide benefits to children in foster care that improve their behavioral functioning and normalize biological stress reactivity? The results of two intervention studies that share many common features suggest that this may be possible. In one program, Fisher and colleagues (Fisher, Stoolmiller, Gunnar, & Burraston, 2007; Fisher, Van Ryzin, & Gunnar, 2011) designed an intervention to ease young children's transition to new foster care placements and enhance continuity of care to reduce the stresses of such placement. Before the intervention began, these children showed a profile of flattened cortisol activity as a result of their earlier placements. The intervention program was designed to promote warm, responsive, and consistent relationships between children and new foster parents in which positive behavior was encouraged, problem behavior was reduced, and caregiver stress was lowered. The program included individualized sessions with child therapists, weekly playgroup sessions, and other child-focused services. Foster parents completed intensive training prior to the children's placement, and they continued to receive support and supervision in daily phone contacts, weekly group meetings, and on-call assistance. The program was thus a 2-generation intervention involving multiple adults who functioned as caregivers for the child. Compared to children assigned to regular foster care placements, who showed the pattern of cortisol hyporesponsiveness described earlier, children in the intervention group showed patterns of HPA reactivity that progressively resembled the normal patterns of a nonabused community comparison group over the course of 6 to 12 months of treatment. Reductions in foster parent stress were directly implicated in these changes in young children's HPA function recovery (Fisher & Stoolmiller, 2008).

In another intervention with very young children, Dozier and her colleagues (Dozier, Peloso, Lewis, Laurenceau, & Levine, 2008; Dozier et al., 2006) reported

that following a home-based 10-week program, infants and toddlers in foster care showed more typical daily patterns of HPA activity and moderated cortisol reactivity to a stressor compared to a group of foster care infants in a different treatment program. This attachment-based intervention was designed to improve young children's relationships and self-regulation by assisting foster parents in better interpreting and responding to infants' signals, enhancing affectionate behavior, and providing more reliable support for infants' self-regulation.

In both intervention studies, moreover, the researchers also obtained concurrent measures of behavioral change that may be viewed as additional indicators of treatment efficacy. In the Dozier study, infants and toddlers showed greater evidence of attachment to their foster parents (Dozier et al., 2009); in the Fisher intervention, a similar gain in secure attachment behavior was noted, together with greater placement success (Fisher, Burraston, & Pears, 2005; Fisher & Kim, 2007). In light of the goal of each intervention to improve the quality of children's relational experience, and in view of research indicating disturbance of biological stress systems in young children with insecure attachments (Spangler & Grossmann, 1993), these behavioral changes should be regarded as indicators of intervention efficacy, parallel to the changes in HPA reactivity occurring over the same period.

Both of these intervention programs for foster children can be regarded as focused on improving social support. Each emphasized strengthening young children's relational security by improving caregiver responsiveness and reducing caregiver stress. The success of each program in improving the quality of children's attachments while also regularizing their HPA functioning is consistent with the research reviewed earlier concerning the social buffering of physiological stress reactivity and provides some of the earliest evidence for how social support interventions can have both psychological and biological consequences.

Even so, much more remains to be understood. Longer-term follow-up research on children in intervention and comparison groups is needed, for example, to examine how enduring are the changes in stress reactivity resulting from these interventions or, more specifically, the conditions in which these changes endure or not. Recognizing that the plasticity of HPA functioning can be limited in conditions of highly aversive care (e.g., Gunnar, Morison, Chisholm, & Schuder, 2001), it will also be important to understand how early adversity is related to the intensity and duration of intervention efforts required to normalize children's stress reactivity and its behavioral correlates. In the end, what makes this research field so exciting is the opportunity to extend research on socially supportive interventions to the biological domain and, in so doing, to better comprehend the behavior-biology associations that underlie psychological functioning and its changes over time.

Taken together, the preventive and therapeutic programs surveyed in this section certainly do not exhaust the range of interventions that have been designed to strengthen social support in the lives of troubled individuals and families. But they illustrate the significant opportunities that exist to improve informal and formal sources of support for beneficial purposes as well as the challenges of enlisting social support for these purposes that have been discussed throughout this chapter. More specifically, these programs illustrate and confirm the interim conclusions about social support identified earlier from the research literatures discussed in the opening sections of this chapter. They show, for example, the importance of recognizing how relationships influence other relationships and the value of multigenerational interventions that provide support both to children and their caregivers. They illustrate the significance of coordinating informal and formal sources of social support for providing multifaceted avenues of assistance to those who need it. These programs show both that parents are central to children's environment of relationships but that they are not alone influential, and sometimes support can be provided by enlisting other people in children's natural social networks (e.g., peers) or by enlisting others outside the family (e.g., mentors). These programs indicate how representations of support from others are important to psychological well-being and that sometimes interventions with a representational focus can be most valuable. Most important, these programs together show that social support efforts will be more effective when there is clarity concerning the goals they are intended to achieve. Taken together, these interventions illustrate both the lessons learned and to be applied in future social support interventions.

CONCLUSIONS AND FUTURE DIRECTIONS

Two of the central conclusions from the research on social support and developmental psychopathology are how complicated is the provision of social support in intervention and how beneficial everyday social support is for psychological functioning. When people are surrounded by natural networks of family, friends, neighbors, coworkers, and others who offer emotional guidance, instrumental aid, and monitor well-being, the odds in favor of psychological

health and healing are meaningfully improved. But it is difficult to create the benefits of natural forms of social support in preventive or therapeutic interventions. This conclusion owes to the challenges of instituting formal helping relationships that can offer social support and also because when natural social networks are not functioning supportively (e.g., because they are drained or stressed), it is difficult to reconstitute them in healthy and helpful ways. Added to these challenges are the characteristics of support recipients and how their personal and ecological conditions can pose obstacles to the success of social support interventions. Moreover, in order to be effective in addressing clinical psychopathology, social support must accomplish more than simply providing the emotional reassurance that recipients might want most; it must also change behavior and thinking.

In short, the benefits of social support are easy to envision but difficult to implement. This finding poses a challenge to researchers, theorists, clinicians, and practitioners who, after the initial wave of enthusiasm for the preventive and therapeutic benefits of social support interventions two decades ago, must now confront the host of practical challenges to effectively implement social support in the lives of at-risk children and their families. As the summary of preventive and therapeutic program models illustrates, however, there is cause for hope. From the varieties of programs that have documented measurable and predictable benefits for recipients—and from those that have failed to do so—there is now a wealth of good ideas for crafting more carefully conceived, thoughtfully designed social support interventions that have greater promise of success. There are also some excellent program models to draw on.

The research literatures we have discussed related to social support are broad, detailed, and expanding and will continue to provide new ideas about support and its effects in the years to come. Although basic conclusions concerning the benefits of social support seem to be settled (some perhaps prematurely) and the era of unbridled enthusiasm concerning the promise of social support interventions is over, we believe that there are three questions meriting further research that have the greatest promise of significantly expanding understanding of social support and its relevance to developmental psychopathology.

First, *why is social support a stress buffer?* A vast research literature documents the association between perceived (and sometimes received) social support and measures of coping and psychological well-being. But reviewers of this research, including us, find process explanation lacking (see also Cohen & Janicki-Deverts, 2009; Thoits, 2011). Psychological researchers typically focus on intervening processes, such as enhanced self-esteem, perceptions of self-efficacy, modeling, sense of belonging and companionship, while sociological and community researchers more commonly focus on processes like resource acquisition, networking and mentoring, and skill development. But there is no widely accepted model for why social support should enhance health and coping. As we have emphasized, the multifaceted nature of social support probably means that different constellations of intervening processes are influential with different subsets of recipients.

Research on stress neurobiology and the social buffering of stress reactivity may, however, offer new perspectives to this question. In the context of behavior-biology transactions—or, as emphasized by Thompson (2015b), behavior-*representation*-biology interactions—researchers in developmental neuroscience are beginning to identify some of the constituent mechanisms by which social support modulates neurobiological stress reactivity. The intervening processes currently hypothesized include, for example, the effects of social support on the biological regulators of HPA activity (including prefrontal influences but possibly also limbic regulators), the downregulation of the proinflammatory tendencies induced by chronic stress, and the influence of other neurohormonal processes, including oxytocin (see Hostinar et al., 2014; Kiecolt-Glaser et al., 2010; Ulrich-Lai & Herman, 2009). This research is still at an early stage, and establishing connections between neuroscience and behavioral functioning in this area poses an additional challenge. But there is the potential for the development of theoretical models of social support that describe the ongoing transactions between different levels of the neuroaxis and behavior that can help clarify the physiological mediators between social support and mental health as well as other neurobiological processes associated with clinical psychopathology that may alter these processes. This is an exciting prospect for theoretical portrayals of biology-behavioral interactions and has potentially important intervention applications.

Second, *what developmental processes guide children's changing representations of social support in their environment of relationships?* One of the conclusions of this chapter is that the experience of receiving social support is similar for children and adults in some ways but very different in others. As we have noted, for example, children's access to social support is significantly mediated by parents and their social networks. But this review has underscored how little is known about developmental changes in children's experience or representation of social support. This is an important question for future understanding

of the association of social support and developmental psychopathology.

In this discussion, for example, we have underscored that social support is developmentally constitutive for children in a way that it is not for adults: Children depend significantly on the various kinds of support they receive from others for their survival, health, and well-being. This dependency has an effect on their reactions to receiving assistance: Children do not seem vulnerable, for example, to the feelings of indebtedness, humiliation, or vulnerability that adults often experience when receiving unreciprocated assistance from another (for that matter, they are also much less likely to experience gratitude) because it is widely acknowledged that children depend on the solicitude of adults. But we know little about how these perceptions change with increasing age and children's growing autonomy. We know little about developmental changes in how children represent more broadly the support that is available to them from parents and extended family members, neighbors, peers, teachers, and others in their social ecology. How are individual differences in characteristics such as temperament influential in the growth of these mental representations? And although the attachment literature suggests that the internal working models of secure attachment cause children to perceive greater supportiveness from others and perhaps also to elicit that support, little is known of how this occurs or whether it creates a snowball effect that might contribute to some of the broader socioemotional outcomes associated with attachment security. Finally, the emergence of online forms of social support raises important new questions concerning the extent to which children and youth experience support in these transactions and the conditions in which this support can occur. In short, better understanding of developmental processes associated with children's experience and representation of social support is a crucial future research task.

Third, *what are the essential ingredients for effective preventive and therapeutic social support interventions?* As researchers have increasingly recognized the complexity of designing social support interventions for at-risk children and their families, a number of promising interventions have been developed, some of which we have discussed in this chapter. Furthermore, these efforts have provided clinicians with a short list of things to do (e.g., engage recipients; clarify goals; support help providers; respect culture) and to avoid (e.g., expect more than informal helpers can do; view social support alone as the answer to recipients' needs) in their thinking about intervention strategy. It is probably too soon to expect that a recipe for effective social support interventions will emerge, especially in light of how limited current evaluation studies are in clarifying these ingredients and the need for long-term follow-up studies. But such a recipe should be a long-range goal receiving current attention by those who are involved in studying, designing, conducting, and evaluating these interventions.

Social support is essential to psychological growth, well-being, and effective coping. It is also a core element to successful preventive and therapeutic efforts to assist at-risk children and their families. Understanding how to better engage social support into the lives of those who need it remains an essential and enlivening research and clinical endeavor.

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CHAPTER 4

Poverty and the Development of Psychopathology

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RATIONALE AND BACKGROUND

Why a Chapter on Poverty in this Handbook?

Affecting more than 16 million (22%) U.S. children, poverty places children at elevated risk for most forms of psychopathology. Of all of the factors that threaten the health and well-being of children and adolescents, poverty has the widest reach. It is a largely nonspecific risk factor, one that lays fertile ground for various genetic and nongenetic etiologic factors to emerge, take hold, and compound or interact with one another. Physical and mental health disparities stemming from socioeconomic inequality and poverty are well documented (Evans, Wolf, & Adler, 2012). Although the most startling effects, such as premature death, occur mostly during adulthood (Gruenewald, Cohen, Matthews, Tracy, & Seeman, 2012), research has clearly shown that the roots of health disparities take hold during childhood (e.g., Chen, Hanson, et al., 2006; Evans, Chen, Miller, & Seeman, 2012). Poor children are at significantly elevated risk for developing a wide array of internalizing and externalizing symptoms and disorders (Grant et al., 2003), including higher rates of anxiety, depression, and aggressive behavior (Miech, Caspi, Moffitt, Wright, & Silva, 1999; Wadsworth & Santiago, 2008), as well as other types of pathology as wide-ranging as schizophrenia and delinquency (McBride Murry, Berkel, Gaylord-Hardin, Copeland-Linder, & Nation, 2011).

Poverty's pernicious effects are widespread for several reasons. First, poverty can have direct effects on children's health and development, stemming from problems such as hunger, exposure to toxins, and increased incidence of accidents and injuries (Evans, 2004). Poverty also increases a child's risk for exposure to a variety of known familial and parental risk factors, such as disrupted parenting, parental absence, interparental conflict, family violence, child maltreatment, and substance abuse, as well as parental psychopathology, such as depression, substance abuse, and antisocial behavior (Wadsworth et al., 2008). Additionally, poor children are often exposed to negative neighborhood characteristics, such as crime, deviant peer groups, poor-quality schools, and a variety of environmental hazards (Leventhal & Brooks-Gunn, 2000). An additional feature of poor children's lives is that these problems and exposures often co-occur, and Evans (2004; Evans & Kim, 2010) has shown that an accumulation of environmental and family risks takes the heaviest toll. Hence, poor children face numerous and varied risk factors in their homes, within their families, in their neighborhoods, and

in the schools that make them more likely to experience psychological distress and disorder. Unfortunately, children in poor families are also substantially less likely to have protective factors that can counterbalance the risks, such as high-quality childcare, enrichment activities, and access to alternative learning materials (Sameroff, 2006). Moreover, children from low socioeconomic status (SES) backgrounds on average have compromised personal resources including coping skills and more poorly developed executive functioning skills, such as inhibitory control and planning (Wolff, Wadsworth, & Santiago, 2010; see "Mediators and Moderators of Poverty's Effects on Psychopathology" section).

Despite these risks outlined (covered in more detail later in the chapter), there is much resilience within this population. Not all poor children succumb to school failure, experience depression, or become involved in criminal activity. Some even thrive despite great odds. Increases in income, or emergence out of poverty arising from natural and/or governmental experiments, have been linked to declines in children's psychological problems, such as aggression (Costello, Compton, Keeler, & Angold, 2003) that persist into adulthood (Costello, Erkanli, Copeland, & Angold, 2010), while other resilient children have personal strengths, a strong adult mentor, or family/cultural strengths and resources (e.g., Werner & Smith, 2001). Psychopathology stemming from poverty is not inevitable or irreversible, but attention to the problem of poverty and its mediators and moderators is required to help eliminate this highly damaging risk factor.

Mental Health Costs of Poverty

Merikangas and colleagues (2011) recently published lifetime prevalence data on psychological disorders using the National Comorbidity Study Replication adolescent supplement sample of over 10,000 adolescents aged 13 to 18. Prevalence rates were 14.3% for any mood disorder, 31.9% for any anxiety disorder, 8.7% for attention-deficit/hyperactivity disorder (ADHD), 12.6% for oppositional defiant disorder, 6.8% for conduct disorder, and 11.4% for any substance use disorder. This nationally representative sample constitutes one of the best samples to estimate the effects of SES on rates of psychopathology. In multivariate analyses accounting for family income, parental marital status, age, gender, ethnicity, and urbanicity, parental education level of less than a college degree increased the odds of all of the preceding classes of mental disorder by an overall average odds ratio of 1.6. This means that, even after accounting for a host of potential confounds, children from low-SES households were 1.6 times more likely to meet diagnostic criteria for a mental disorder than were children with college-educated parents. Unfortunately, with increasing rates of child poverty (child poverty in the United States rose from 17% to 22% between 2008 and 2012), the costs of these SES–mental health disparities are likely to continue to increase.

Estimates of the economic costs of mental health problems among the poor need to take into account not only the cost of mental health care but also the costs incurred in related areas, such as psychiatric emergency room visits and inpatient stays, academic failures, crime and delinquency, and lost productivity in adulthood. Greg Duncan and colleagues (Holzer, Schanzenbach, Duncan, & Ludwig, 2008) reviewed the results of scores of rigorous research studies examining a variety of poverty-related outcomes to estimate the monetary costs to society of childhood poverty in the United States. Factoring out a conservative estimate for genetic contributions, they estimated that the experience of growing up in or near poverty, which at the time took into account approximately 17% of children (a rate that since has gone up considerably) creates a yearly opportunity cost of 1.3% of the U.S. gross domestic product (GDP), which at the time was about $170 billion per year. Opportunity costs are lost earnings resulting from reduced productivity and lower wages in adulthood as a result of growing up in poverty. Duncan and colleagues also estimated the monetary costs associated with crime and delinquency stemming from poverty, again factoring out a conservative estimate for genetic contributions. This estimate of the costs of crime, including incarceration and costs to crime victims, accounted for another 1.3% of the GDP, or another $170 billion annually. Finally, they computed the likely economic impact of child poverty on the incidence of poor physical and mental health and their associated costs, which amounted to 1.2% of GDP and approximately $156 billion. The authors concluded that their "best estimates suggest that childhood poverty imposes costs on American society equal to nearly 4% of GDP, or about $500 billion per year" (p. 41).

Thus, poverty results in enormous losses of human and economic capital every day.

Ethical Issues and Social Justice

Although a thorough discussion of the causes and consequences of poverty is well beyond the scope of this chapter, it is important to place our findings within a socio-historical context. A well-documented SES–health

gradient begins during childhood and persists throughout adulthood; unsurprisingly, those in poverty and with the lowest incomes have the worst health (Adler & Stewart, 2010; Braveman, Egerter & Williams, 2011). What is more surprising is that the gradient in physical health exists at all SES levels, with health deteriorating even when moving from the wealthiest SES-income level to the second wealthiest. For mental health, the same is true for the middle and bottom portions of income, but Luthar's research has shown that risk for substance use and mental health problems also show elevations in children from the most affluent homes (Luthar, 2003). The full-spectrum health gradient exists in most modern industrialized societies today. The steepness of the gradient (or the severity of health loss occurring between SES levels) varies across countries, and what determines the steepness of the gradient is the degree of income inequality in a country (Wilkinson & Pickett, 2009). In other words, the larger the gaps between the wealthiest and poorest in a society are, the steeper is the relationship between income and health. Accordingly, the United States, which has one of the largest gaps between wealthy and poor, also has one of the steepest SES-health gradients in the world.

Children, who are not responsible for household incomes or economic recessions, bear a disproportionate health burden from inequality. For example, many children in the United States regularly experience food insecurity. The most recent report by the U.S. Department of Agriculture showed that 20% of households with children are characterized as food insecure, meaning that members of those households are unable to consistently access an adequate amount of nutritious food necessary for a healthy life (Coleman-Jenson Nord, Andrews and Carlson, 2011; McLaughlin et al., 2012). The effects of malnourishment on children's developing brains and bodies are well documented, and even "moderate nutritional vulnerability," such as that found in the United States, can interfere with cognitive development (Jyoti, Frongillo, & Jones, 2005). In addition, being hungry on a regular basis interferes with the ability to concentrate and sleep and causes psychological and physiologic stress to the developing organism. Research has documented serious psychological and emotional consequences of food insecurity (Chilton, Chyatte, & Breaux, 2007; Cook & Jeng, 2009). Behavior problems, hyperactivity, aggression, social withdrawal, peer problems, and school suspension are all elevated in children who experience food insecurity, as are depression, suicidal behaviors, and anxiety (e.g., Slopen, Fitzmaurice, Williams, & Gilman, 2010). Physical health is impaired, resulting in more days sick, more days absent from school, learning problems, and school failure, all of which can exacerbate psychological problems (Cook & Jeng, 2009). Moreover, the stress of financial strain on parents in conjunction with vigilance and anxiety about adequate food for children likely affects parental mental health in negative ways that have further repercussions for their children.

Poverty also robs children of opportunities. As highlighted by the striking economic costs of childhood poverty estimated by Duncan and colleagues and further examined in Duncan, Ziol-Guest, and Kalil (2010), adults who experienced poverty during their early childhoods had numerous negative work and health outcomes compared to adults whose early childhoods were not marked by poverty. On average, those who grew up poor completed 2 fewer years of schooling, worked 451 fewer hours per year, earned less than half as much income, had poorer health and higher psychological distress, were more likely to receive food stamps, and had elevated body mass indexes and overweight status. In addition, poor males were twice as likely to be arrested and poor females were six times as likely to bear a child out of wedlock compared to nonpoor counterparts. Hence, children who grow up poor are less likely to have financially rewarding careers, enjoy good health, and avoid involvement with criminal and/or social service institutions as adults.

U.S. Poverty Demographics

There are approximately 72 million children under the age of 18 in the United States at this writing. Of those, 45% (32.4 million) live in homes classified as low income or near poor, and 22% (16.1 million) live in homes with incomes at or below the federal poverty threshold (FPT). Poverty rates are even higher for ethnic minority children, with poverty rates of 34% for Hispanic and 39% for African American children. The official FPT is widely recognized to be inadequate to meet the daily needs of most families, and even the federal government provides supplemental food assistance to families up to 185% of the FPT. Research has shown that many families with incomes up to 200% of the federal poverty line cannot make ends meet even with federal in-kind subsidies such as WIC (Women Infants and Children supplemental food subsidy), SNAP (Supplemental Nutrition Assistance Program, formerly known as food stamps), and the school lunch program. Taking such information into account effectively doubles the number of children facing risk from inadequate financial resources, especially for younger children and children of color. Children under the age of 6 represent 33% of the U.S. population and 48% of the low-income population

(11.5 million). Rates decline slightly as children age, with rates of 45% (10.9 million) and 41% (10 million) for 6- to 11-year-olds and 12- to 17-year-olds, respectively. Rates also differ by ethnicity, with 65% of African American (6.5 million) and Hispanic (11 million), 63% of American Indian (0.4 million), 32% Asian (1 million), and 31% of white (12.1 million) children living in homes meeting low-income criteria (Addy, Engelhardt, & Skinner, 2013). Despite programs such as Medicaid and the Children's Health Insurance Program (CHIP), 11% of children in low-income families have no health insurance.

Poverty Metrics

Poverty and the related but separable constructs of economic inequality, low SES, and low income have been measured in a variety of manners (Diemer, Mistry, Wadsworth, Lopez, & Reimers, 2013). Much scholarship in this area has focused on family-level income, social class, or SES, but increasing research is capturing poverty in a broader context of a child's life, such as in the school and in the neighborhood. We briefly review all three types of metrics. In this chapter, we use the terms *poverty*, *low income*, and *low SES* somewhat interchangeably because findings are generally consistent across these different ways of indexing economic hardship and/or low social position. In our reviews of the research on internalizing and externalizing and on mediators and moderators, we have tried, however, to report findings along with the specific index used in the study.

Much psychological research has used either an index of social standing, such as the Hollingshead Index of Social Position, or an income-based indicator of poverty and/or wealth. Both measurement approaches have yielded important information about the size and direction of poverty's effects as well as mediators and moderators of these effects. The most basic measure is income. Duncan and colleagues (e.g., Duncan & Magnuson, 2002a) have written extensively about both the utility of income as a predictor of health and well-being and best practices for measuring income. They recommend, for example, using multiple years of income rather than a single year, because of the instability of incomes, especially among those in lower wage brackets and seasonal workers, for example (Magnuson & Duncan, 2002b). They have also developed interview questions and techniques designed to help respondents provide the best estimate of their wages (e.g., Duncan & Petersen, 2001).

An alternative way of indexing family poverty is using income thresholds originally developed by the U.S. government for the purposes of determining eligibility for public assistance programs and for tracking census data. Measures of absolute poverty (e.g., the FPT) identify the amount of income minimally required to support a family (Iceland, 2003; Roosa et al., 2005). The FPT, which is designed to capture the cost of maintaining a "minimally adequate diet," consists of a set of thresholds that vary by family size and members' ages compared to a family's pretax income (DeNavas-Walt, Proctor, & Smith, 2012). A newer supplemental poverty measure (SPM) has been developed, which takes into account the cost of clothing, shelter, and utilities in addition to food, and allows for geographic adjustments in housing costs, for example (U.S. Census Bureau, 2013). Alternatively, a child's Hollingshead Index is, for example, calculated by combining the parent(s)' educational attainment and the prestige level of their usual occupation. Such composite indices generally correlate with income, seem to be most useful in predicting family processes that mediate poverty's effects on psychopathology, and may be especially useful in samples with restricted income ranges (e.g., Wadsworth et al., 2005).

Another measure of family poverty is the income-to-needs ratio (INR), which is computed by dividing total family income by the FPT for a given year and family size. INR thereby adjusts for the number of family members requiring economic resources in a household and the FPT for that year. INR cutoffs have been proposed to nominally classify the SES continuum, including families who experience extreme poverty (i.e., an INR of .50 or lower; approximately $11,500 for family of four in 2012 using the FPT; Census Bureau, 2012), low income or near poor (i.e., an INR between 1 and 2; roughly between $23,100 and $46,000 for a family of four in 2012); and affluent (i.e., an INR greater than 4; income greater than $92,200 for a family of four in 2012) (Roosa et al., 2005).

Indices of family material deprivation and hardship (Gershoff, Aber, Raver, & Lennon, 2007; Iceland, 2003; Mayer & Jencks, 1989) capture the most bare-bones basic necessities of life: food, shelter, and clothing, or lack thereof. These measures therefore tend to be most useful in samples with incomes restricted to the poor and near-poor ranges because higher-income families are unlikely to be homeless or hungry. Measures of material hardship have been useful in identifying mediators within impoverished samples, such as a parent's ability to provide educationally rich experiences and intellectually stimulating environments for their children. Material deprivation can be captured via a sum of hardships, such as housing, food, and medical care, and can be added to broader indices of cumulative risk, such as those captured by Evans and

colleagues. Such cumulative risk measures expand the range of outcomes linked to material hardships to physiologic markers (Evans & English, 2002) and academic, social, and behavioral functioning (Gershoff et al., 2007).

At the school level, poverty can be indexed using the proportion of the student body that qualifies for or is enrolled in the school free or reduced-cost meal program. The Healthy, Hunger-Free Kids Act of 2010 subsidizes school meals and snacks for poor and low-income children, based on FPT. Children from families with incomes at or below 130% of the FPT are eligible for free meals; those from families with incomes between 130% and 185% of the FPT are eligible for reduced-price meals. The proportion of a school that qualifies for free and reduced-cost school meals is a useful gauge of a school's aggregated poverty status; an individual's receipt of free or reduced-priced lunches can be used as an additional indicator of a child's economic status (as in Wadsworth & Compas, 2002).

Finally, poverty can be assessed at a neighborhood level. For example, neighborhood disadvantage is a robust predictor of child academic failure, conduct problems, teen pregnancy, and symptoms of anxiety and depression, even in examinations spanning longer than a decade and when controlling for various measured risks and unmeasured confounds (e.g., Goodnight et al., 2012). A fairly straightforward approach to measuring neighborhood poverty, which is commonly employed in child development research, is to use the percentage of households in a given catchment area that are living below the poverty line. Neighborhoods with 30% to 40% of households with incomes at or below the FPT are generally considered "impoverished" (Leventhal & Brooks-Gunn, 2011). More complex indicators of neighborhood quality have also been calculated by capturing multiple risks within a catchment area, such as the percentage of people in a neighborhood with less than a high school education, percentage of female-headed households, violent crime rates, and percentage of unemployed adults (e.g., Santiago, Wadsworth, & Stump, 2011). Subjective assessments of the quality of a neighborhood from the perspective of current residents can also be used as indicators of neighborhood poverty, ranging from single items asking how "safe" a neighborhood is to multiple-item scales assessing social disorganization or low collective efficacy (e.g., Kohen, Leventhal, Dahinten, & McIntosh, 2008). While measures capturing multiple indicators of a neighborhood's quality tend to outperform single-item indicators, measures capturing duration of residence in addition to quality of residence tend to capture the clearest picture of neighborhood poverty (e.g., Wodtke, Harding, & Elwert, 2011). Although neighborhood deprivation relates to children's mental health, its effects tend to be much smaller in comparison to family indices of deprivations, such as income or SES (Leventhal & Brooks-Gunn, 2000).

Interrelations of Poverty and Psychopathology with Other Important Life Areas

In addition to psychopathology, poverty and low SES are strongly associated with adverse outcomes in other spheres, such as school readiness (Galindo & Fuller, 2010; Isaacs & Magnuson, 2011; Kingston, Huang, Calzada, Dawson-McClure, & Brotman, 2013). In their own right, academic failure, health problems, and social problems can lead to and exacerbate mental health problems, and vice versa. For example, poverty status was associated with lower cognitive skills and material hardship was associated with more social problems for children in a representative sample of 1,292 children in six rural counties in the United States (Kainz, Willoughby, Vernon-Feagans, & Burchinal, 2012). Not only does family poverty and income predict children's school readiness, but neighborhood poverty also predicted decrements in a composite measure of school readiness over time in three samples of Canadian kindergarteners (Cushon, Vu, Janzen, & Muhajarine, 2011). Similarly, neighborhood economic hardship was a significant predictor of children's lower mathematics and letter knowledge, academic outcomes, and social skills in a sample of 1,004 ethnically and geographically diverse 4-year olds, even after accounting for maternal education (an indicator of family SES) (Hanson et al., 2011). Finally, concentrated neighborhood poverty during the kindergarten years had a persistent negative effect on the reading comprehension outcomes of a sample of 2,648 urban Canadian children (Lloyd, Li, & Hertzman, 2010).

Indicators of physical health, illness, and disease are also patterned by SES in children. In a sample of 8,800 children followed to 48 months of age (the Early Childhood Longitudinal Study, birth cohort), poverty increased children's odds for chronic health problems, low cognitive achievement, poor social skills, and elevated behavior problems. (Hillmeier, Lanza, Lansdale, & Oropesa, 2012). Mental health relevant biomarkers such as cortisol also show patterning by SES, as highlighted by Blair, Raver, Granger, Mills-Koonce, and Hibel (2011). They found that poor housing quality and perceived economic insufficiency were both related to children's cortisol levels in the first 4 years of life, including accumulating physiologic indicators of allostatic load. Similarly, cumulative hardship based on

adequacy of food, housing, and energy predicted significantly reduced odds of health and wellness in terms of hospital visits; developmental risk; and body size, weight, and proportions in a sample of 7,141 children 4 to 36 months of age (Frank et al., 2010).

Direction of Causality

Considerable debate has waged regarding the direction of the relationship between poverty and psychopathology. Social causation, or what are sometimes referred to as the social determinants of health, clearly proposes that poverty leads to psychopathology. Social selection, however, acknowledges that individuals' own characteristics, such as their psychopathology, contributes to poverty, as a result of interference with educational and occupational attainment, for example. Consistent with selection theories, is the possibility that a third variable, such as genetics, leads to both pathology and poverty—perhaps IQ, temperament/personality, or disease-specific genes. Social selection arguments are less compelling when considering children, because children by and large do not determine their family's SES level. Here we briefly review alternative causative models.

The first model, referred to as the social selection or downward drift hypothesis, posits that adults with psychological or physical health problems drift down the SES ladder due to their problems and their resulting inability to fulfill expected role obligations. The initial causes of psychopathology or poor health are assumed to be factors unrelated to SES, such as genetic liabilities (e.g., Kendler & Eaves, 1986) or unfortunate circumstances, such as an accident. Findings from several studies suggest that SES differences in the rates of a few psychological disorders, including schizophrenia (Dohrenwend et al., 1992), and possibly ADHD (Miech et al., 1999), are consistent with this hypothesis. Thus, schizophrenia, for example, may impair people's ability to secure employment and financial status commensurate with that of their parents. Little research has addressed the possibility of downward drift with regard to physical illnesses, although the few that have looked have not found evidence in support of such selection effects (e.g., Lynch, Kaplan, & Shema, 1997).

The second model arises from observations that people living in poverty are more likely than those not living in poverty to engage in a variety of unhealthy behaviors—behaviors linked to various physical illnesses and diseases (e.g., Wray, Alwin, & McCammon, 2005). Rates of cigarette smoking, for example, are higher among the poor than the nonpoor, and the linkages between smoking and diseases such as cancer and heart disease are very strong (Ekberg-Aronsson, Nilsson, Nilsson, Löfdahl, & Löfdahl, 2007). Similarly, higher rates of overweight and obesity are found among the poor, and once again obesity is linked with a variety of poor health outcomes. This is apparently an appealing explanation—poor people smoke, drink, and overeat, and that is why they are unhealthy. Unfortunately, the data do not bear out this as a complete explanation of the link between low SES and poor health by any means. In fact, studies have generally found that health risk behaviors such as these at best explain only a quarter of the association between SES and physical health and often explain significantly less than that (e.g., Lantz et al., 2001; Månsson, Råstam, Eriksson, & Israelson, 1998). In addition, as mentioned, the robust SES-health gradient also exists for mental health problems. Yet there are no compelling reasons to suspect that smoking or overeating leads to ADHD, schizophrenia, or anxiety disorders. Thus, while health risk behaviors may add something to the picture of explaining the SES-health gradient, there is much left to be explained by some other mechanism.

The third model explores a related factor that could contribute to the SES-health gradient. In the United States, millions of poor people have historically not had adequate access to health insurance. Thus, many poor individuals and families have been forced to seek medical care only in emergencies, at which point many health problems are too far advanced to treat easily. While it is intuitively appealing to attribute the gradient to inadequate health insurance, once again, this idea is not borne out in the research that has been conducted. Studies that account for access to health care have found only small percentages of the gradient explained by health care access and usage (e.g., Sapolsky, 2004). In addition, the SES-health gradient exists in virtually every country in the world, even those with universal health care programs, such as England and Sweden. Interestingly, the gradient is steepest in countries with the greatest degree of income inequality between the rich and poor, such as the United States. Finally, the SES-health gradient exists even for diseases whose incidence is not related to access to preventive health care, such as rheumatoid arthritis and juvenile diabetes (Sapolsky, 2004). Thus, while poor access to health care is a problem and certainly does not help the situation created by the gradient, it does not appear to be the primary mechanism of the gradient.

The fourth model, called social causation, posits that poor people develop psychological and physical health problems as a result of living with poverty-related

adversity. Studies comparing social causation of psychological disorders with alternative models, such as social selection, generally find strong support for the social causation of multiple disorders, including depression and anxiety (e.g., Wadsworth & Achenbach, 2005). Because of the pervasiveness and chronicity of poverty, living with poverty is grueling and demoralizing—it literally wears one down mentally and physically, as evidenced by significantly higher mortality rates for those in poverty (e.g., Rehkopf & Buka, 2006). Research suggests that this wear and tear is not just metaphorical; chronic adversity and stress due to poverty simultaneously dysregulate the body's physiological stress response system and reduce psychological resources for coping with stress. This allostatic load eventually weakens resistance to disease-causing agents of both the physical and the psychological variety (Kahn & Pearlin, 2006; McEwen, 1998). There is considerable support for this fourth model and especially the importance of stress to the SES-health gradient (e.g., Almeida, Neupert, Banks, & Serido, 2005). Yoshikawa, Aber, and Beardslee (2012), for example, recently concluded that the evidence in support of the social causation of psychopathology supports the causal role for poverty. This evidence stands up against a variety of potential threats to validity. These authors emphasized the importance of a wide variety of mechanisms that transmit poverty's negative effects, which is consistent with the fact of poverty's long reach to almost every form of psychopathology in existence.

Using a multigenerational approach to understanding causation and selection perspectives, Conger, Conger, and Martin (2010) essentially found evidence that both are in operation, but at different points in development. Research guided by their interactionist perspective, for example, has demonstrated that characteristics of the individual prior to adulthood predict adult SES and family processes, consistent with the selection proposition, and that those social and economic family characteristics predict the functioning of the next generation, consistent with social causation. Adler, Bush, and Pantell (2012) similarly reviewed the evidence relevant to social causation and selection, concluding that "there is little doubt that low SES and its accompanying social disadvantages affect health" (p. 5). They also noted that health can affect SES, and therefore the relationship between the two is dynamic, and that efforts to improve SES, for example, will likely result in health improvements, and vice versa. Thus, current thinking on the causality issue presents a more nuanced view and draws on modern genetically informative designs and advances in neuroscience to showcase the power of the socioeconomic environment in shaping brain structures and physiologic and psychological processes related to a wide array of mental and physical health problems. We review some of the neuroscience work on SES and the brain in the section titled "Mediators and Moderators of Poverty's Effects on Psychopathology."

Current theory and research on dynamic systems models and concepts such as experiential canalization have the potential to further clarify the directionality of effects issue. For example, the experiential canalization model (Blair & Raver, 2012) proposes that as a child develops, he or she encounters a multitude of forks in the road. The pathways available to a particular child at a certain point in time are determined by both past development and current circumstances. Some circumstances promote or create a variety of pathways that lead to further growth and positive development, whereas other circumstances constrain the number of positive pathways and present more pathways with nonoptimal outcomes. This type of interactive model is not new. What is new is the idea that once a pathway is taken, the other options can become closed off, for better or worse, and subsequent forks are dependent on the previous "selected" pathway. Such models were developed in part to explain neural plasticity and the fact that some neural development will not occur for children who do not encounter the full range of pathways at a given juncture. Taking seriously the need to consider behavior at multiple levels of analysis, these models are also useful for considering how poverty may constrain positive development in some areas or amplify negative development in others. It is in this way that the expression of genes can be environmentally determined—some circumstances prevent the protein synthesis necessary to express a particular gene or the reverse (see "Future Directions" section for further discussion on genetic aspects of poverty and child psychopathology). We believe that it is in this way that poverty lays the groundwork for maladaptive pathways from developmental forks in the road, which shape a child's life pathway, neural and otherwise.

POVERTY AND PSYCHOPATHOLOGY

That poverty places children at risk for negative life outcomes is not a new idea. The first wave of psychological scholarship on the topic began in the 1960s, coinciding with the War on Poverty. This research mostly focused on IQ and how to improve poor children's IQs and life chances. Research expanded to include socio-emotional outcomes in the 1980s and 1990s (Luthar, 1999). A special

issue of *Child Development* on children and poverty was published in 1994, creating the first compilation of psychological scholarship covering studies of poverty's effects on child health, contextual moderators, family mediators, and interventions. In that volume, Duncan, Brooks-Gunn, and Klebanov (1994) presented results of rigorous analyses demonstrating substantial effects of family income, neighborhood composition, and family structure in the first 5 years of life on internalizing and externalizing problems at age 5. Since that special issue publication, research on the topic of child poverty has flourished, leading to several review articles in the last few decades (e.g., Aber, Bennett, Conley, & Li, 1997; Bradley & Corwyn, 2002; Brooks-Gunn & Duncan, 1997; Evans, 2004; McLoyd, 1998). Each of these reviews focuses on slightly different sets of outcomes, but the conclusions are generally the same—poverty and income status have large effects on IQ and achievement and substantial effects on psychopathology beginning in early childhood (Bradley & Corwyn, 2002). Although genetic contributions to internalizing and externalizing pathology have gained prominence in etiologic theories in the last several decades, most research still supports that low SES, low income, and/or poverty play an important causal role (e.g., Costello et al., 2010; Odgers et al., 2012). The effects of poverty and low SES appear as both solid main effects and in interaction with inherited characteristics, such as temperament.

Internalizing

Early Childhood

Few studies have examined the relation between poverty and internalizing symptoms exclusively in early childhood. Rather, several studies have demonstrated a relationship between poverty and internalizing symptoms across a wide age range albeit without isolating rates of internalizing symptoms in early childhood. For example, Beidas et al. (2012) investigated whether youth living in disadvantaged neighborhoods reported higher levels of anxiety and comorbid depression as compared to youth ages 2 to 19 not living in distressed neighborhoods. They found that those living in disadvantaged neighborhoods reported higher levels of overall anxiety, social anxiety, and somatic anxiety symptoms and comorbid depressive symptoms. However, these findings are not specific to early childhood and thus do not provide a clear demonstration of the linkage between poverty and internalizing symptoms in early childhood.

Of the few studies that did investigate the impact of poverty on the expression of internalizing symptoms in children in early childhood, results overwhelming indicate a positive relationship between poverty and internalizing symptoms. These findings are consistent across various poverty measures. Using measures of family level poverty (i.e., individual income) and neighborhood level poverty (i.e., percentage of households with income levels within poverty range), Duncan et al. (1994) found that youth living in persistent poverty from zero to 5 years of age had higher levels of internalizing symptoms via parent report than those who never lived in poverty. Similarly, using housing status (i.e., housed versus homeless) of families with children in early childhood, Park, Fertig, and Allison (2011) found that children who have experienced homeless episode(s) had a significantly higher percentage of internalizing problem scale scores in the clinical range than youth who were low income but housed. Strohschein (2005) found that children whose family household income at time of first evaluation (approximately 4 years of age) was higher than average had, on average, lower than expected rates of depression than those whose household income was average. Strohschein argued that these results indicate that as income increases, child depression rates decrease. This conclusion coincides with previous and more recent research illustrating the negative impact of poverty on internalizing symptoms in early childhood.

Other research has indicated that experiencing persistent poverty in early childhood has short- and long-term impacts on youth, although the findings of a positive or negative impact are somewhat mixed. For example, Eamon (2000) found that both persistent and recent poverty are positively related to internalizing symptoms, such that youth whose families recently entered poverty or have been in persistent poverty report higher levels of sadness, anxiety, and dependency than their non-poor peers. Persistent poverty in early childhood has been found to have significant impact on the emergence and continuous expression of internalizing symptoms. Najman and colleagues (e.g., Najman, Clavarino, et al., 2010; Najman, Hayatbakhsh, et al., 2010) also found that multiple experiences of family poverty across early childhood (e.g., prenatal, 6 months, 5 years) significantly increased odds of anxiety and depression during later childhood. In contrast, Strohschein (2005) found that the positive relationship between poverty and depressive symptoms attenuated over time as children matured into middle childhood. These contrasting research findings indicate that while the negative impact of poverty on internalizing symptoms in childhood is firmly established, the long-term nature of this impact is less certain.

Middle Childhood

Numerous studies with school-age children have found positive relations between poverty and internalizing symptoms in both cross-sectional (e.g., Reising et al., 2013; Tracy, Zimmerman, Galea, McCauley, & Vander Stoep, 2008; Wadsworth & Santiago, 2008) and longitudinal studies (e.g., Slopen et al., 2010; Spence, Najman, Bor, O'Callaghan, & Williams, 2002; Wadsworth, Rindlaub, Hurwich-Reiss, Rienks, Bianco et al., 2013). Longitudinal studies are particularly valuable due to their ability to clarify whether poverty status and patterns of poverty predict changes in children's internalizing symptoms over time. Longitudinal studies typically examine children at two points in time (e.g., Krishnakumar & Black, 2002; & Slopen et al., 2010), but several studies assessed children at three or more time points that span developmental periods including middle childhood (Ackerman, Brown, & Izard, 2004; Spence, 2002; Wadsworth et al., 2013). For example, findings from an ethnically diverse sample of children assessed every 2 years between prekindergarten and fifth grade showed that children who were poor in third and fifth grade had higher levels of internalizing symptoms, even when controlling for initial levels of symptoms (Ackerman et al., 2004).

Studies that target school-age children vary according to their conceptualization and measurement of poverty which, in turn, influence results. Most commonly, poverty status is defined based on parent-reported family income and is calculated as an income to needs ratio (e.g., Brody, Stoneman, Flor, McCrary, Hastings et al., 1994). However, others have defined poverty status through receipt of welfare benefits (Takeuchi, Williams, & Adair, 1998), economic strain or financial pressure (Wadsworth et al., 2013), or a combination of poverty-related variables, such welfare receipt, single-parent status, education, and household overcrowding (Krishnakumar & Black, 2002). The combination of poverty-related variables measured when children were 5 years of age did not predict changes in internalizing symptoms the following year (Krishnakumar & Black), suggesting that measures of poverty that are more closely related to income are better predictors of internalizing symptoms in school-age children. Other studies have found that poverty-related stress is associated with internalizing disorder symptoms and diagnoses (Wadsworth et al., 2008) and that both welfare and the inability to meet financial obligations independently contribute to internalizing symptoms (Takeuchi et al., 1998). These findings suggest that different features of poverty make different contributions to the prediction of internalizing symptoms, and multiple features should be independently examined within the same study to further clarify these patterns.

Several studies examining the relation between poverty and internalizing children in school-age children have taken a developmental psychopathology perspective examining patterns of poverty throughout different stages in children's development (e.g., Pachter, Auinger, Palmer, & Weitzman, 2006; Slopen et al., 2010; Takeuchi et al., 1998). For example, McLeod and Shanahan (1993, 1996) found that histories of poverty in early childhood were not associated with children's internalizing symptoms at ages 4 and 5 but did predict higher trajectories of symptoms through age 10. Furthermore, these authors found that poverty history between the ages of 4 and 10 was not associated with internalizing symptoms. These findings suggest that poverty in early childhood has a latent but significant impact on the course of internalizing symptoms throughout childhood. In contrast, Spence et al., (2002) found that chronic poverty from 6 months of age through 14 years of age predicted parent- and child-reported internalizing symptoms for girls only. These two studies differed in their definitions of poverty and their age ranges, which might in part explain their discrepant findings.

The strength of the relation between poverty and internalizing symptoms also depends on how internalizing symptoms are measured. The majority of studies measuring this relation in school-age children use parent-reported questionnaires of symptoms (e.g., Pachter et al., 2006; Slopen et al., 2010). Other studies have created composite variables using parent and child reports of symptoms (e.g., Reising et al., 2013; Spence et al., 2002), teacher-reported symptoms (Ackerman et al., 2004), or mother and father reports of depressive symptoms (Brody et al., 1994). The few studies that have used diagnostic interviews have shown poverty to be related to clinical disorders and symptom severity (Costello et al., 2003; McLaughlin et al., 2012; Tracy et al., 2008). Future research in children of this developmental time frame should focus on utilizing children's self-reports, which can be reliably obtained in children as young as 8 years old (e.g., Tilghman-Osborne, Cole, & Felton, 2012; Twenge & Nolen-Hoeksema, 2002).

Adolescence

Several studies have demonstrated mixed findings for a significant relationship between neighborhood poverty and internalizing symptoms in adolescents. In their comprehensive review of the relationship of neighborhood poverty on adolescent development, McBride Murry, Berkel, Gaylord-Harden, Copeland-Linder, and Nation (2011) found some support for direct effects of neighborhood

poverty on internalizing symptoms in youth. For example, youth from low-SES families reported higher levels of depressive symptoms than youth not living within low-SES families (Wickrama & Bryant, 2003). In contrast, some research findings did not demonstrate a significant relationship between poverty and internalizing symptoms in youth. For example, in their investigation of mediating factors in the relationship between neighborhood disadvantage (as measured by indicators of neighborhood poverty) and adolescent internalizing problems, Deng and colleagues (2006) did not find that residing in a disadvantaged neighborhood was associated with reported youth internalizing symptoms. These contrasting findings suggest that the link between poverty and internalizing symptoms may be different based on level of poverty experienced by youth (neighborhood versus individual) and/or in combination with family poverty levels.

Similar to research in early childhood, length of poverty experience has a significant impact on the presentation of internalizing symptoms in youth. For example, Slopen and colleagues (2010) investigated the effects of persistent poverty on children at two time points (baseline 4 to 14 years of age and follow-up 5 to 16 years of age) and found that, at follow-up, those youth whose family reported continued food insecurity were 1.5 times more likely to experience internalizing symptoms. Other dynamic relationships between poverty and internalizing symptoms in youth have been found. Leventhal and Brooks-Gunn (2011) found that in high-poverty neighborhoods decreasing poverty was, surprisingly, associated with an increase in male internalizing problems, while in moderate-poverty neighborhoods, increasing poverty was associated with an increase in male internalizing problems. Similar effects were not found for female youth.

Externalizing

Early Childhood

Much research on psychopathology in young children has focused on behavioral and emotional dysregulation rather than psychiatric diagnoses. In numerous studies, toddler and preschooler behavior problems occur at significantly higher rates in samples of low-income children (e.g., Barker, Copeland, Maughan, Jaffee, & Uher, 2012; Dearing, McCartney, & Taylor, 2006; Yoshikawa et al., 2012). The association exists in studies using umbrella terms such as *conduct problems*, *behavior problems*, and *undercontrolled behavior* as well as studies examining more specific behaviors, such as aggression, noncompliance, hyperactivity, and oppositionality. Moilanen, Shaw, Dishion, Gardner, and Wilson (2010), for example, examined predictors of the growth of inhibitory control (protective against externalizing problems) from 2 to 4 years of age. Extreme family poverty predicted significantly slower growth in inhibitory control in this sample of 731 youngsters. Barker and colleagues (2012) found, for example, that contextual risk (e.g., poverty) during pregnancy predicted children's subsequent age 0 to 2 behavioral dysregulation (a composite of hyperactivity, conduct problems and emotional difficulties); contextual risks during the child's first 2 years of life predicted subsequent age 4 behavior dysregulation. Henninger and Luze (2013) estimated latent growth curve models of predictors of externalizing symptoms among early Head Start enrollees (ages 0–3). A primary pathway to externalizing in this population was via poverty, and the authors identified parental stress and depression as mediators of this pathway. Gershoff and colleagues (2007) examined the ability of both income and material deprivation to differentially predict social-emotional functioning in the Early Childhood Longitudinal Study sample of 21,255 kindergarteners. They found that the combination of both family income and material hardship was the strongest predictor of child competencies (a latent factor consisting of internalizing, externalizing, and social skills).

Some research has focused on the presence and stability of clinically elevated externalizing symptoms in toddlers and preschool-age children. Hill, Degnan, Calkins, and Keane (2007), for example, found low SES at age 2 to be a significant predictor of chronically elevated clinical levels of externalizing symptoms at ages 2, 4, and 5. This type of chronic course of clinically elevated externalizing symptoms, referred to as the early starter pathway, tends to occur much more frequently in low-SES families. The early starter pathway to disruptive behavior disorders is a particularly troubling pathway that portends lifelong disorder (Campbell, 1995; Hinshaw, Lahey, & Hart, 1993). Toddlers in general engage in high levels of aggressive, antisocial behaviors that tend to desist over time as they acquire better communication abilities and ways of handling conflicts and negative emotions (Coie, Dodge & Damon, 1998). There is a subgroup of children, however, that does not desist over time and rather stays elevated into middle childhood and beyond, ultimately meeting diagnostic criteria for disruptive behavior disorders such as conduct disorder. Poverty and low SES are strong predictors of membership in this early starter pathway. Keller, Spieker, and Gilchrist (2005), for example, found that an index of ecological risk, which included family economic distress and parenting stress, predicted membership in an early starter pathway of increasing conduct problems over

time at twice the rate expected by chance, specifically for children with insecure attachments.

Studies have increasingly used rigorous quasi-experimental and genetically informed designs to isolate the causal contribution of poverty and SES to the development of externalizing problems. D'Onofrio et al. (2009), for example, incorporated comparisons of target children with genetically related and unrelated children to rule out a variety of unmeasured environmental and genetic confounds in their estimates of the causal effects of income on conduct problems in children as young as age 4. These authors found strong evidence in support of the inference that family income is inversely and causally related to conduct problems, especially for boys.

Middle Childhood

Rates of diagnosed externalizing disorders rise during the school years, in part due to children's entrance to school and the increasing compliance demands. School also often creates a context in which underlying liabilities, such as ADHD, create additional problems with peers, teachers, and parents that can contribute to further behavior problems. Lansford et al. (2006) found consistent effects of low SES on the development of externalizing trajectories over time, from kindergarten to the eighth grade, in their community sample of 585 children with and without physical abuse histories. Similarly, Slopen and colleagues (2010) found robust effects of food insecurity (highly correlated with poverty) on externalizing problems of a sample of 2,810 children aged 4 to 14 followed for 1 year. Church, Jaggers, and Taylor (2012) used data from the Fragile Families Project to test a variety of predictors of child behavior problems in this at-risk sample of more than 5,000 children. Family poverty level was a robust predictor of behavior problems, even while simultaneously accounting for neighborhood SES, gender, parenting, and parental stress. Parental stress partially mediated this pathway.

Using data on 3,259 families with a total of 5,808 children from the National Longitudinal Survey of Youth, Hao and Matsueda (2006) examined the effects of concurrent poverty as well as poverty during early childhood on externalizing behavior problems in middle childhood. They found strong evidence of negative effects of early childhood poverty on subsequent externalizing symptoms, an effect that was not mediated by current parenting behaviors. Odgers and colleagues (2012) examined the differential patterning of antisocial behavior by SES level over time in a large, nationally representative British birth cohort of 2,232 children followed from age 5 to 12. They found that rates of antisocial behavior did indeed show a patterning by SES, such that children in the "deprived" SES group had significantly higher rates of antisocial behavior than did middle-SES children, who in turn had significantly higher rates than high-SES children. These disparities persisted from age 5 to age 12 and widened over time, such that the mean difference in levels of antisocial behavior between the deprived and more affluent SES groups increased from $d = 0.38$ at age 5 to 0.51 at age 12. Odgers and colleagues also found that supportive parenting mediated the relationship between both neighborhood and family-level SES and child antisocial behavior.

Finally, Cote, Vaillancourt, LeBlanc, Nagin, and Tremblay (2006) followed 10 cohorts of children for 6 years and examined trajectories of physical aggression over the period from 2 to 11 years of age. They identified three subgroups of children, two of which exemplified a typical developmental pattern of infrequent and declining physical aggression over time. The third group of children contained mostly boys from disadvantaged families and these boys exhibited an atypical developmental pattern consisting of more frequent and stable use of physical aggression.

Adolescence

The effects of adverse environmental circumstances on the development of adolescent disruptive behavior problems are undeniable (Moffitt, 2005; Paschall & Hubbard, 1998; Thornberry, Freeman-Gallant, Lizotte, Krohn, & Smith, 2003; Wiesner & Windle, 2004). Several studies have followed children from infancy or toddlerhood into adolescence. Such studies provide strong support for causal linkages between SES and externalizing pathology. Schonberg and Shaw (2007) examined early childhood predictors of trajectories of conduct problems into early adolescence, finding that children who experienced stable poverty in early childhood were at significantly elevated risk for being classified in a chronic conduct problems group as compared to children who did not experience poverty or who experienced only temporary poverty. Fanti and Heinrich (2010) found high levels of sociodemographic risk (low maternal education, low income) predicted high and continuing levels of conduct problems in the National Institute of Child Health and Human Development (NICHD) Study of Early Childcare sample of 1,364 children followed from age 2 to age 12. Dearing and colleagues used this same data set to examine within-child associations between family income and externalizing symptoms. They also found large main effects of chronic poverty and smaller effects of income on externalizing symptoms, but, importantly, chronic poverty and income interacted such that chronic poverty amplified the effects of low income

on externalizing (Dearing et al., 2006). Finally, Stroschein (2005) used the National Longitudinal Study of Youth, Child Supplement, sample of 7,143 children age 4 to 14 to examine the dynamic effects of income and income changes over time on children's antisocial behavior. Her analyses showed that low income at entry into the study was associated with both initially high levels of antisocial behavior and with increasing levels and rates of change in antisocial behavior over time. Additionally, increases in income were associated with decreasing antisocial behavior and vice versa.

Bøe, Øverland, Lundervold, and Hysing (2012) examined the effects of several different indicators of SES in predicting externalizing disorders in a large sample of 11- to 13-year-olds (N = 5,781), and found that each of their SES indicators consistently predicted externalizing disorders. Analyses of data from the Mater-University Study of Pregnancy on 3,103 children followed from birth to age 21 revealed very strong effects of poverty on persistent aggressive and delinquent behavior (Najman, Clavarino, McGee, Bor, et al., 2010). Family poverty experienced at the 14-year follow-up, for example, predicted persistent aggression, delinquent behavior, smoking, and alcohol use at the 21-year follow-up. Additionally, the largest effects were found for children with recurrent experiences of family poverty. Children who were classified at three or four of the five assessments as living in poverty were more than twice as likely to be aggressive and delinquent at both 14 and 21 years. A compelling new study by Boyce and colleagues recently examined rates of physical and mental health problems using several different types of indicators of SES (Nuru-Jeter, Sarsour, Jutte, & Boyce, 2010). By every metric examined, externalizing problems were inversely associated with SES. A unique feature and finding of this study is that associations involving categorical representations of SES were much more pervasive and stronger in magnitude than were measures capturing monotonic gradations in SES. The authors suggested that the standard use of income and maternal education in research probing the SES-health phenomenon may be underestimating the strengths of the SES-health association by using these "less impactful" measures.

The effects of low SES and poverty have also been examined among particular high-risk groups of children. In their study of children of depressed parents, for example, Reising and colleagues (2013) found that economic disadvantage predicted externalizing symptoms, even among this at-risk group. Disrupted parenting was a significant moderator of this effect. In Kjellstrand and Eddy's (2011) study, children of incarcerated parents had consistently higher levels of problem behavior between fifth and tenth grade than children without an incarcerated parent. The strength of this association increased over time.

A growing number of studies have documented that poverty or disadvantage at the neighborhood level is also strongly associated with the development of aggression, violence, and delinquency in adolescents (e.g., McBride-Murry et al., 2011). Exposure to deviant peers and lack of collective efficacy have been offered as potential mechanisms of this effect (e.g., Haynie, Silver, & Teasdale, 2006), and gender sometimes is found to moderate these effects (e.g., Kroneman, Loeber, & Hipwell, 2004). Harrington (2003) used behavioral genetic methods to estimate genetic and environmental contributors to aggression and delinquency in the Add Health project sample of 2,434 sibling pairs of children. First, they found that aggression and delinquency were significantly higher in disadvantaged neighborhoods than in advantaged neighborhoods. In addition, they found significant shared environmental effects on aggression and delinquency, but only in the disadvantaged neighborhood context, "providing general support for the idea that disadvantaged neighborhood contexts directly affect developmental influences on adolescent aggression" (p. 233). Karriker-Jaffe, Foshee, Ennett, and Suchindran (2009) found that both neighborhood disadvantage and social disorganization predicted adolescent aggression trajectories over 2.5 years for boys, whereas only neighborhood disadvantage predicted aggression for girls.

MEDIATORS AND MODERATORS OF POVERTY'S EFFECTS ON PSYCHOPATHOLOGY

In this section of the chapter, we describe other constructs, such as stress and coping, that likely play a role in the relations between childhood deprivation and mental health. Much of the work has focused on underlying pathways or mediators that help account for the robust SES–childhood pathology link. Three predominant examples of mediators of the SES–psychopathology link in children are disrupted parenting, elevated stress, and alterations in executive functioning. Other constructs factor in as moderators or variables that alter children's vulnerability to deprivation. Gender, ethnicity, and coping strategies are the three most studied moderators of the relations between SES and children's mental health. There are even a few rare instances of moderated mediation whereby the underlying pathway linking SES to child psychopathology is moderated by some other variable. For example, we show

that a major pathway linking SES to psychopathology is parenting problems created and exacerbated by chronic poverty-related stress. The dynamics of this pathway can be altered by social support. In the "Future Directions" portion of this chapter, we outline some other mediating constructs warranting attention in investigations of SES and child psychopathology.

SES and Parenting

Low-SES parents tend to be harsher and less responsive to their children—theoretical and empirical models have suggested that these parenting problems do not necessarily reflect underlying parenting deficits (though they may in some cases) but rather that the stress and chaos of life in poverty interferes with the ability to deliver warm, responsive parenting (Conger, Conger, & Martin, 2010). These features of parenting are strongly and consistently related to concurrent and future mental health problems in children (Bradley, 2003; Repetti, Taylor, & Seeman, 2002). A large number of studies support that stress, especially economic strain and family conflict, accounts for the association between SES and parenting, as illustrated in Figure 4.1. Beginning with early work examining the role of financial difficulties during the Great Depression and child development (Elder, 1974), considerable research has uncovered support for this model. Rand Conger and colleagues, including Elder (Conger & Elder, 1994), have extended this model, suggesting that financial strains related to insufficient income for families leads to emotional distress in parents as well as interparental discord, both of which lead to more negative parenting (Conger & Donnellan, 2007).

Evidence supporting the model depicted in Figure 4.1 is impressive, including both cross-sectional and longitudinal data that cut across ethnic samples within the United States and across different countries (for reviews, see Bradley, 2003; Conger & Donnellan, 2007; Grant et al., 2003; Hoff, Laursen & Tardif, 2002; Magnuson & Duncan, 2002b). There is also a small amount of experimental research showing that supplements to family income can lead to increased parental warmth and responsiveness (Costello et al., 2003; Gennetian & Miller, 2002; Morris, Duncan, & Clark-Kauffman, 2005), presumably via reductions in poverty-related stress.

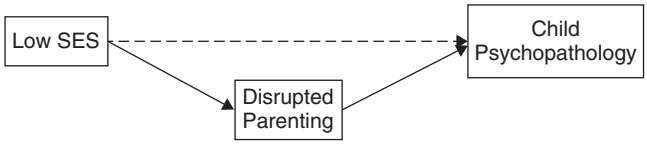


Figure 4.1 Conceptual model of SES and parenting.

In a meta-analysis of nearly 50 studies on family SES, parenting, and youth development, Grant and colleagues (2003) found an overall effect size of poverty on negative parenting of $d = .48$ (cross-sectional evidence) and $d = .55$ (longitudinal evidence). Analyses indicated that poverty had both direct and indirect effects on both internalizing and externalizing symptoms in children and youth. Grant et al.'s conclusion that a partial mediation model is the best fit to the data is in line with findings reviewed later that low-SES environments have direct effects on children. Furthermore, it is likely that the effects of a low-SES childhood are due to the accumulation of exposure to multiple risk factors. In terms of Figure 4.1, there is good evidence of additional, parallel mediating factors, which operate similarly to negative parenting, that are also capable of accounting for some of the ill effects of poverty on children's mental health.

A critical risk factor for negative mental health outcomes in children is maternal depression (Downey & Coyne, 1990; Green et al., 2010; see also Chapter on Depression/Mood Disorders. in this handbook). Low-income adults, especially women, have higher rates of depression (Belle, 1990; Green et al., 2010). Given abundant documentation that depressed maternal affect and poverty are both linked to diminished parental responsiveness, more work needs to be done on the potential critical role of parental mental health and particularly maternal depression in the relations between childhood poverty and children's development (Shonkoff & Garner, 2012). Across several studies, parents experiencing greater financial strain suffer greater emotional distress, including symptoms of depression, with a median path coefficient of .42 (Conger & Donnellan, 2007). In an interesting set of results, Harnish and colleagues (1995) showed that the inverse link between SES and externalizing symptoms in first graders was mediated by maternal responsiveness and warmth. Much of the negative covariation between SES and parenting was caused by elevated maternal depression. Among a sample of younger children (28–50 months), the adverse impacts of SES on behavioral adjustment were accentuated for those whose mothers were more depressed (Petterson & Albers, 2001).

This model of SES, parenting, and children's mental health is also robust with respect to ethnicity (Conger & Donnellan, 2007; Eccles & Gootman, 2002) and gender (Grant et al., 2007), although some research suggests enhanced benefits of warm parenting for ethnic minority children. Bradley and colleagues (2001), for example,

showed that the link between poverty and less nurturant parenting was stronger in African American families vis-à-vis white or Hispanic families in a large, nationally representative data set. Of additional interest, a Canadian national cohort study indicates that children (ages 4–11) in recent immigrant families may experience some protection, particularly for externalization symptoms, because of more positive parenting practices (Georgiades, Boyle, & Duku, 2007).

There also does not appear to be any clear pattern for ethnic variation in the direct effects of SES or income levels on psychopathology in children. In a 4-year longitudinal study of children in grades 2 through 4, Bolger, Patterson, Thompson, and Kupersmidt (1995) at the onset found that African American children manifested more internalizing symptoms as a function of persistent poverty whereas White children showed more externalizing symptoms. Costello, Keeler, and Arnold (2001) showed a stronger link between poverty and psychopathology among White relative to African American school children. An index of cumulative risk that incorporated family and neighborhood poverty along with several other risk factors that co-occur with poverty was also more strongly associated with internalizing and externalizing symptoms among White relative to African American children (Gerard & Buehler, 2004). Among young adolescents, however, Nuru-Jeter and colleagues (2010) found the opposite pattern for externalizing symptoms with stronger income effects on African American youth.

Furthermore, some studies suggest that chronic poverty may have more pronounced effects among boys than girls because of harsher parenting (Bolger et al., 1995; Grant et al., 2007). Elder, vanNguyen, and Caspi (1985) also found the impacts of economic hardship were conditioned by the gender composition of the parent-child dyad. But overall, the degree of fit for the model depicted in Figure 4.1 across gender is high. Turning to gender as a moderator of the direct effects of SES on psychopathology, again the data generally indicate weak or contradictory findings. In their longitudinal study of poverty duration and psychopathology in a sample of grade-school children, Bolger and colleagues (1995) found no effects of poverty by gender for internalizing symptoms, but boys were more vulnerable for externalizing symptoms. Henninger and Luze (2013) found the opposite effect among children with girls showing greater externalizing symptoms in relation to time spent in poverty. In a sample of Australian youth followed from birth through adolescence, girls, but not boys, with early childhood exposure to poverty manifested more internalizing symptoms (Spence et al., 2002). In a longitudinal study spanning age 9 to 17, Evans and colleagues (Evans & English, 2002; Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005) found no evidence of gender differences across a wide range of physiological stress, self- and parental ratings of children's mental health, and in behavioral probes of psychological health. Roosa et al. (2005) as well as Mrug and Windle (2009) found no gender differences in children's internalizing or externalizing responses to neighborhood poverty. Similarly, Nuru-Jeter and colleagues (2010) found no gender differences in young adolescents' externalizing responses to family income.

Summarizing, the studies on SES, parenting, and psychopathology indicate clear and consistent support for the pathway depicted in Figure 4.1. This robust pathway holds across gender and ethnicity and has been replicated several times internationally. The direct effect of SES or income on psychopathology also tends to be robust with no clear pattern emerging for variable vulnerability as a function of either ethnicity or gender. This is not to argue that these factors are unimportant in thinking about poverty and children and youth's mental health. Our point is simply that the SES → Problematic Parenting → Mental Health model is strong and well documented. At present, we do not have clear-cut indications of whether this pathway varies by gender or ethnicity. The preponderance of current data suggests that the effects of poverty or low SES early in life on children and later on adolescents appear to be similar across race and gender.

A few studies suggest that high levels of social support may buffer the ill effects of poverty on parenting (Conger & Elder, 1994; Hashima & Amato, 1994; McLoyd, 1997). Greater religiosity may have similar protective effects (Brody, Stoneman & Flor, 1996; Grant et al., 2000). Although social support and religiosity may buffer some of the ill effects of poverty on parenting, chaos can have the opposite effect. Chaos is a composite index reflecting noise, crowding, interruptions, routines, and structure in the household. Chaotic household conditions accentuated the effects of negative parenting on preschool and elementary school children's problem behaviors (Coldwell, Pike, & Dunn, 2006). The negative impact of chaos on the executive functioning of preschool mothers was exacerbated by multiple risk factors associated with poverty (Deater-Deckard, Chen, Wang, & Bell, 2012). Thus, it is also worth thinking about not only the direct effects of low SES conditions on parents which, in turn, can alter critical parenting behaviors such as warmth and responsiveness, but also factors that might undermine parental resources. Some of the conditions that covary with poverty

and deprivation, such as chaotic living situations, lower levels of social support, or food insecurity, likely also erode parental coping resources, which in turn could alter important parent-child interactions as well as the overall social climate of the family.

SES and Stress

In addition to the work reviewed earlier on SES, parenting, and children's psychopathology, multiple methodological probes indicate that children themselves experience poverty as a stressful condition. Children in low-SES households report high levels of poverty-related stress, including such things as financial pressure, family conflict, family disruption and change, discrimination, and violence (Wadsworth & Berger, 2006; Wadsworth & Compas, 2002; Wadsworth &t Achenbach, 2005; Wadsworth et al., 2008; Santiago et al., 2011; Wolff, Santiago, & Wadsworth, 2009). Many studies revealed that among low-SES children, those experiencing greater poverty-related stress also had higher symptoms of internalizing and externalizing. Moreover, Santiago and colleagues (2011) found that poverty-related stress within a low-SES sample also interacted with prior mental health symptoms, aggravating their severity over time. Wolff and colleagues (2009) also showed in a prospective, longitudinal design that the impacts of poverty-related stress on adolescent mental health symptoms were more severe for those individuals with greater reactivity to stress.

The descriptive data on high levels of poverty-related stress among children and youth from low-SES households matches comparative data contrasting low-SES children relative to middle-SES children. In comparison to their middle-SES peers, low-SES children and youth are exposed to substantially more psychosocial stressors, such as family conflict and turmoil, changes in family composition, violence, parental harshness and low responsiveness (Attar, Guerra, & Tolan, 1994; Bendersky & Lewis, 1994; Brooks-Gunn, Klebanov, & Liaw, 1995; Brown, Cowen, Hightower, & Lotyczewski, 1986; DuBois, Felner, Meares, & Krier, 1994; Dubow, Tisak, Casey, Hryshko, & Reid, 1991; McLoyd, 1998; Pungello, Kupersmidt, Burchinal, & Patterson, 1996) as well as to worse physical conditions capable of producing stress, such as toxins, noise, crowding, and substandard housing (Evans, 2004). One aspect of the settings of low-SES children and youth that appears to be especially problematic is elevated exposure to multiple stressors or cumulative risk factors. A large literature documents that exposure to cumulative risk factors relative to singular ones, leads to worse developmental outcomes, including psychopathology, physiological stress, and poorer cognitive development (Evans, Li, & Whipple, 2013; Obradovic, Shaffer, & Masten, 2012; Sameroff, 2006). Children from low-income households from birth through late adolescence are much more likely to be exposed to a high number of cumulative risk factors (Burchinal, Roberts, Hooper, & Zeisel, 2000; Deater-Deckard, Dodge, Bates, & Pettit, 1998; Evans & English, 2002; Evans & Kim, 2007, 2010; Federman et al., 1996; Felner et al., 1995; Greenberg, Lengua, Coie, & Pinderhughes, 1999; Liaw & Brooks-Gunn, 1994; Rutter, 1979). They are also more likely to be exposed to chaotic living conditions indicative of a low degree of structure, stability, routine, and predictability in daily life (Evans, Eckenrode, & Marcynyszyn, 2010). Considerable work has linked high levels of family chaos with deficits in socioemotional development in children and youth (Fiese, 2006; Fiese & Winter, 2010).

An important, emerging area of research on SES and health focuses on physiological indices of chronic stress as candidate mechanisms to account for well-documented SES gradients in health in both children and adults (Adler & Stewart, 2010; Braveman et al., 2011). This research is too voluminous to describe in detail so we summarize major findings from overviews of this work. Prior to adolescence, lower SES is associated with higher blood pressure (Chen, Matthews, & Boyce, 2002; Evans et al., 2012). A number of studies also reveal that childhood SES is inversely related to stress hormones in children, including cortisol, epinephrine, and norepinephrine; metabolic impairments, such as inefficient glucose metabolism, higher levels of cholesterol and low-density lipids; as well as elevated inflammatory responses indicative of disturbed immune function (Evans et al., 2012). Allostatic load, a marker of dysregulation across multiple response systems (i.e., hypothalamic-pituitary-adrenal axis, sympathetic adrenal medullary axis, metabolic function, inflammation, and immune function) is an exciting direction because of encouraging evidence that this marker of wear and tear on the body is a better predictor of physical and psychological morbidity than singular stress markers (Ganzel, Morris & Wethington, 2010; Juster et al., 2011; McEwen, 1998). Children from lower-SES backgrounds have higher levels of allostatic load (Evans et al., 2012).

Summarizing, there is abundant evidence that household SES is inversely related to both psychosocial and physical stressor exposures. One feature of this inequality that may be particularly important for children's mental health is exposure to the accumulation of multiple stressors or risk factors. Low-SES children and youth are much

more likely to encounter a plethora of risk factors, both psychosocial (e.g., family turmoil, negative parenting) and physical (e.g., substandard housing, toxins), in comparison to their more advantaged peers. Finally, low-SES children manifest a consistent pattern of elevated, chronic physiological stress relative to middle-SES children.

Although there is emerging work showing that chronic stress accompanying a low-SES childhood may help explain the etiology of physical morbidity later on in life (Evans et al., 2012; Evans & Kim, 2010), very little research has directly examined SES → Stress → Mental Health pathways. In a large, nationally representative sample of American kindergarten children, negative associations between household income and both cognitive skills and socio-emotional competency were partially mediated by a composite index of exposure to material hardship (Gershoff et al., 2007). (Material hardship incorporated measures of food insecurity, residential instability, inadequate medical care, and duration of financial difficulties since the child's birth.) Furthermore, the pattern of findings was similar across White, African American, and Hispanic kindergartners (Raver, Gershoff, & Aber, 2007). Higher levels of cumulative risk exposure mediated much of the relation between poverty in elementary-age school children and both elevated physiological stress and psychological distress (Evans & English, 2002). Cumulative risk consisted of an index of substandard housing, residential noise, residential crowding, family turmoil, child separation from family, and exposure to violence. Chaotic living conditions among middle school children partially mediated the link between childhood poverty and elevated symptoms of internalizing and externalizing (Evans et al., 2005). Felner and colleagues (1995) showed that the inverse relation between SES and multiple measures of internalizing symptoms among middle school children was mediated by stressful events, family supportive climate, and school belonging. Similarly, eighth-grade students from lower-SES families have higher rates of substance abuse (Wills, McNamara, & Vaccaro, 1995). This finding was mediated, in part, by a composite index of multiple risk exposures (e.g., low parental support, high negative life events, deficient youth competency, and contact with peer substance abusers). In a large sample of early adolescents, Amone-P'Olak and associates (2009) noted that the inverse relations between SES and both internalizing and externalizing symptoms were mediated by exposure to negative life events outside the personal control of adolescents (e.g., housing and neighborhood problems, serious illness/injury to family members). Sameroff, Bartko, Baldwin, Baldwin, and Seifer (1998) formed a composite index of adolescent adjustment incorporating internalizing, externalizing, extracurricular/community involvement, and academic performance that was negatively correlated to family income. This significant association, however, was reduced to near zero when exposure to cumulative risk factors was included in the model. A large number of cumulative risks across the domains of maternal competence, parenting, family structure, family social networks, peer deviance exposure, and neighborhood social capital were incorporated into their model of cumulative risk exposure. African American adolescents (ninth and eleventh grade) from poorer families experienced higher levels of depression (Hammack, Robinson, et al., 2004). For girls but not boys, these relations were mediated by higher levels of family stress (e.g., unmarried family member pregnancy, close family relative died). Finally, we also know that cumulative risk exposure appears to be an important factor underlying the robust relations between childhood deprivation and many of the indicators of chronic physiological stress already outlined (e.g., elevated blood pressure, stress hormones, allostatic load) (Evans & Kim, 2010, 2012). One study that found a different pattern of results among SES, stress, and psychological health among children was conducted by DuBois and colleagues (1994). They found a synergistic interaction between the degree of disadvantage among adolescents and exposure to daily hassles on indices of both internalizing and externalizing symptoms in a prospective, longitudinal design over the academic year among seventh and eighth graders. One possible explanation for this pattern of moderation rather than mediation indicated by the majority of studies mentioned could be the index of daily hassles used by DuBois and colleagues. They summed the ratings of hassle severity to form a composite score. This method contrasts with other studies that relied on risk exposure metrics.

SES, Executive Functioning, and Coping

Given evidence that SES is associated with levels of stress in children, there are at least three reasons also to explore executive functioning and coping as mechanisms that may contribute to the relations between SES and psychopathology. First, considerable work shows that chronic stress, in both animal and human models, is capable of damaging executive functioning (EF) (Blair, 2010; Lupien, McEwen, Gunnar, & Heim, 2009; Repetti et al., 2002). EF is a complex construct that typically encompasses self-regulation, attentional control, working memory, behavioral inhibition, delay of gratification, and planning. EF is believed to lay the early foundation that undergirds subsequent

development and maintenance of coping strategies invoked when stressors are encountered, and it increasingly plays an important role in theory and research regarding the development of various types of psychopathology (Hofer, Eisenberg, & Reiser, 2010; Rinsky & Hinshaw, 2011). In the next study descriptions, we provide thumbnail sketches of EF measures in order to convey a better sense of what processes actually are involved. The second reason why EF and coping are likely related to childhood SES is because many of the risks encountered early in life among low-SES children are chaotic and largely uncontrollable, both critical conditions that can undermine the development of coping skills (Evans & Kim, 2013; Lengua, 2012; Raver, 2004; Repetti et al., 2002; Wolff et al., 2011). Third, a large body of literature in the stress field indicates that coping strategies can moderate experiences of stress in children and adolescents (Aldwin, 2007). Thus, we would expect that how children cope with poverty and some of its accompanying risk factors has implications for mental health outcomes.

A standard approach to the assessment of EF is to use neurocognitive testing batteries with well-characterized brain correlates in the prefrontal cortex. In a program of research on childhood SES and neurocognitive development, Noble, Farah, and their colleagues uncovered consistent evidence of EF deficiencies among low- compared to middle-SES children ranging from 5 to 13 years of age (Farah et al., 2006; Noble et al., 2005; 2007). EF was assessed by standard neurocognitive batteries including measures of inhibitory control such as reaction time on the number Stroop task (say the number shown ["2"] or say the quantity of numbers shown [e.g., four "2s" are shown in a square, correct answer "4"]), and the flanker task, which measures reaction time to indicate what direction a stimulus (e.g., arrow) is pointing in when surrounded by adjacent stimuli pointing in the same or in opposite directions. They also found deficits in working memory. Utilizing an EF composite consisting of (1) working memory, (2) the classical Stroop task (say the color of ink a color word is written in), and (3) an index of planning, Hughes, Ensor, Wilson, and Graham (2010) found that family income was negatively associated with EF among 3.5-year-olds, but it did not influence their rate of improvement from toddlerhood to 6 years of age. Mezzacappa (2004) also found that 4- to 7-year-olds performed worse on the flanker task if they were from lower-SES families. Three- to 5-year-olds from lower-SES backgrounds manifested worse EF on two Stroop-like measures adapted for preschool children (Li-Grining, 2007). Raver, Blair, and colleagues (2013), utilizing a composite EF battery (working memory, attention control, inhibitory control) at 48 months of age, showed that the number of times families had incomes at or below the poverty line in the 3 previous years predicted EF among 4-year-olds. They also found that a parallel index of perceived financial strain had similar prospective association with EF, but in the latter case, the association between financial strain and EF was moderated by an index of infant emotional reactivity. Only infants high in emotional reactivity showed the expected negative association of early experiences of deprivation and EF deficits.

Five- to 14-year-old children from Colombia and Mexico performed a standard index of attentional control in which they had to classify visual stimuli according to varying dimensions (e.g., shape, color, number). Children from lower-SES households had more difficulty with the task (Ardila, Rosselli, Matute, & Guajardo, 2005). Similarly, Lipina, Martelli, Vuelta, and Colombo (2005) found that 6- to 14-month-old infants from lower-SES families were less skilled in an attentional control task in which they had to search for a hidden object either where it was originally placed or after it had been placed in a new location. This task pulls for both working memory and attentional control. Five- to 6-year-olds from low-income families had greater difficulty resisting an interesting visual distractor while sustaining performance on a visual attention task (Howse, Lange, Farran, & Boyles, 2003). Recently a team of investigators examined how EF developed throughout preschool and kindergarten in relation to income (Wanless, McClelland, Tominey, & Acock, 2011). At the initial evaluation, low-income 4- and 5-year-olds had more difficulty in a response inhibition task (Simon says), but, interestingly, these same children gained more inhibitory skills throughout the second half of their prekindergarten year on through kindergarten. Low-income children whose first language was not English, however, did not manifest this more rapid gain in inhibitory skills. It is also worth noting that despite the more rapid gains overall among the low-income preschoolers and kindergartners, their EF skills did not catch up to those of their more affluent peers by the end of kindergarten. Utilizing maternal ratings of inhibitory control (e.g., "Can easily stop an activity when s/he is told no."), the EF skills of 2- to 3-year-olds were unrelated to family poverty, but the maturation of EF skills over a 2-year period was slower for poor than nonpoor toddlers (Moilanen et al., 2009).

A few studies have looked directly at the possible role of stressor exposure in the linkage between SES and EF. In a series of studies, Evans and colleagues have shown that

poverty is related both cross-sectionally and longitudinally with deficits in the ability to delay gratification in toddlers (Evans & Rosenbaum, 2008) and in 9-year-olds (Evans & English, 2002) as well as teacher ratings of elementary school children's self-regulatory abilities in the classroom (Evans et al., 2005). The latter two studies also found that the poverty–delay of gratification link was mediated in part by cumulative risk exposure and chaotic living conditions, respectively. On a different measure among a sample of low-income preschool children, Li-Grining (2007), however, found no relation between SES and of delayed gratification. Evans and Schamberg (2009) showed that the prospective relation between early childhood poverty and working memory in young adults was mediated by elevated levels of allostatic load during childhood. Employing an EF battery consisting of working memory, inhibitory control, and attentional control tasks, Blair and colleagues (2011) showed that poverty early in life (7–24 months) is related prospectively to worse EF skills at 3 years of age. Moreover, this relation was partially mediated by elevated cortisol levels during the same period of poverty. Recently, Sarsour and colleagues (2011) uncovered evidence that negative relations between family SES and 8- to 12-year-olds' performance on indices of working memory were partially mediated by cognitive enrichment in the home whereas Stroop performance was mediated by parental responsiveness and family companionship. Finally, Doan, Fuller-Rowell, and Evans (2012) examined in a prospective, longitudinal design an index of cumulative risk that included multiple factors, such as poverty, single-parent status, high school dropout, family turmoil, and violence in relation to internalizing and externalizing symptoms in late adolescents (16- to 18-year-olds). The adverse effects of cumulative risk on externalizing but not internalizing symptoms were mediated by a multimethodological index of self-regulation. Higher risk led to lower self-regulation skills, which, in turn, led to more behavioral conduct problems.

Limited data suggest that links between SES and adverse developmental outcomes, including psychological distress and behavioral conduct disorders, may be explained, in part, by EF deficits. Examining heterogeneity in self-regulation skills, which includes both EF and emotion regulation, Garner and Spears (2000) found that more positive family expression of emotion along with parental consistency of discipline predicted better emotion regulation skills among low-income preschool children in their nursery school setting. Observers evaluated use of emotion regulation strategies, such as revenge, venting, or expression of dislike toward another child in response to anger and sadness. In a program of research on low- and working-class African American families in rural Georgia, Brody and his colleagues (e.g., Brody et al., 2006; 2013) were the first group to explore the potential role of EF and coping in children's mental health in relation to early deprivation. Household income among 9- to 12-year-olds in one sample was positively related to a standard index of children's self-regulatory abilities that largely tapped their planfulness and ability to reflect ("thinks ahead of time about the consequences of his or her actions"). Parents and teachers filled out this self-regulatory rating scale. Self-regulatory abilities, in turn, mediated adverse impacts of poverty on both internalizing and externalizing symptoms. Using similar measures, Brody and Flor (1997) showed that parents' perceived financial strain among the households of 6- to 9-year-old African American children was also associated with worse self-regulatory skills. As in the previous study, deficits in self-regulatory skill mediated the link between deprivation and psychological well-being. In a second study focused on 7- to 15-year-old, low-income African American children living in single-parent families, Brody, Dorsey, Forehand, and Armistead (2002) replicated their earlier study plus found that more positive classroom processes, such as higher organization, better rule clarity, and high student involvement, along with more positive parenting processes, contributed to better self-regulatory skills, which, in turn, led to better child adjustment. Sektnan, McClelland, Acock, and Morrison (2010) found that parental ratings of self-regulatory behaviors (staying focused and on task plus ability to inhibit inappropriate responses during tasks) in their child at 54 months along with similar teacher ratings in kindergarten were significantly related to both family income and maternal educational attainment. The adverse impacts of low maternal education and low family income on math, reading, and vocabulary scores in first grade were partially mediated by self-regulatory behavior ratings at both developmental periods. More recently Crook and Evans (2014) have shown in a large heterogeneous, national sample that poverty during infancy predicts subsequent deficits in a planning task among preschool children. The Tower of Hanoi planning task requires participants to rearrange wooden rings onto a series of vertical poles from the ring that is smallest in diameter at the top to the ring that is largest diameter on the bottom of each pole. Only one ring at a time can be transferred from one pole to another. Performance on this planning task, in turn, was linked in a prospective, longitudinal analysis to fifth-grade math and reading standardized test scores. IQ was statistically controlled throughout.

A smaller number of studies show that enhanced EF can serve as a resource enabling low-SES children to have better mental health outcomes than might otherwise be expected. Lengua, Bush, Long, Kovacs, and Trancik (2008) showed that the adverse mental health sequelae of poverty among third to fifth graders were attenuated among children with better attentional control. The EF index consisted of a composite of two different behavioral assessments of EF: the Stroop task and a Simon-says task, where the rules are periodically reversed. In a similar study, Veenstra, Lindenberg, Oldehinkel, DeWinter, and Ormel (2006) found that preadolescents from low-SES backgrounds engaged in more antisocial behaviors. This well-documented relation, however, was significantly attenuated among those with high effortful control, based on a parental rating scale. Buckner and colleagues (2003) were interested in whether resilience among low-income children and youth (8–17 years) would be influenced, in part, by better EF skills. They used a Q sort rating conducted by highly trained clinicians who were quite familiar with each participant in order to quantify EF (e.g., "Is attentive and able to concentrate"). Resilience was defined in terms of good mental health, academic performance, and overall competency as assessed on a series of standard instruments. Low-income youth who were resilient had significantly higher EF scores. Furthermore, higher EF scores predicted subsequent socio-emotional and academic outcomes over a 2-year period (Buckner, Mezzacappa, & Beardslee, 2009).

Low- relative to middle-SES children tend to have compromised EF—EF is a fundamental resource that aids in the regulation and management of stress. The direct, adverse impacts of chronic stress related to impoverished environments likely account for some of the covariation between SES and EF. A few studies also suggest that EF itself can mediate some of the mental health sequelae of childhood poverty. For older children, EF may function more commonly as a moderator, providing some modicum of protection against the ill effects of deprivation on children's mental health.

Just as self-regulatory skills can help us understand some of ways in which a low-SES childhood can lead to psychopathology, there is also evidence showing that coping strategies can alter the impacts of low SES on mental health outcomes. One noticeable omission in the SES and coping research is a paucity of research comparing coping strategies between low- and higher-SES children or youth. Neuendorf, Kim, and Evans (2009) found in two different studies that low- relative to middle-income adolescents (age 16–18) were more likely to rely on disengagement coping strategies, such as denial and avoidance, rather than on engagement coping strategies, like problem solving or marshaling social support, when dealing with an important, recent stressor in their life. Most coping and SES studies have examined linkages between different coping strategies and psychological health within low-SES samples. A smaller number of researchers have also investigated whether coping strategies help explain the relation between poverty-related stress and mental health outcomes.

Low-income children in fourth and sixth grade, who are more resilient in terms of good behavioral adjustment evidenced more effective interpersonal problem-solving skills and relied more on positive coping skills, such as self-reliance and support seeking, relative to their nonresilient peers (Parker, Cowen, Work, & Wyman, 1990). Tolan, Gorman-Smith, Henry, Chung, and Hunt (1998) investigated the relations between various coping strategies and mental health outcomes in a sample of low-income, predominantly African American and Hispanic adolescents (age 12–16) living in the inner city. Cross-sectionally, youth who relied predominantly on problem solving and quiet substance users (reliant on avoidance through substance abuse but overall low levels of coping) had fewer internalizing symptoms. At the same time, cross-sectional data also revealed that emotion-focused coping as well as youth who depended heavily on avoidance through substance abuse but who also vented emotionally (emotional substance users) had higher levels of externalizing symptoms. One year later both the quiet and the emotion-focused substance abuse users showed the greatest rise in externalizing symptoms. The quiet substance users also showed a significantly greater rise in internalizing symptoms. Gonzales, Tein, Sandler, and Friedman (2001), looking at a younger adolescent sample (seventh–eighth grade) in similar circumstances (poor, inner city, predominantly non-White), found that active coping and distraction, respectively, buffered the relation between family stress and conduct problems in girls; active coping did the same for depression in boys.

These data on coping and psychological well-being within low-SES samples are consistent with Wadsworth's program of research on poverty-related stress, coping, and mental health (Wolff et al., 2011). Adolescents from low-income families who cope with poverty-related stressors using engagement coping strategies (e.g., problem solving, emotion regulation, distraction, cognitive restructuring) tend to fare better psychologically than their low-income peers who instead rely more on disengagement strategies, such as avoidance or denial (Wadsworth & Berger, 2006; Wadsworth & Compas, 2002; Wadsworth et al., 2005; Wadsworth & Santiago, 2008).

Further analyses also suggest that some of the ill effects of poverty-related stress on internalizing and externalizing symptoms among adolescents are partially mediated by coping strategies with engagement strategies, particularly secondary control techniques, such as cognitive restructuring and distraction, which are helpful in attenuating negative impacts (Wadsworth & Compas, 2002; Wadsworth et al., 2005). Interestingly, in the Wadsworth et al. (2005) study, for parents, more engagement buffered rather than mediated the negative correlates of poverty-related stress on their own mental health outcomes. For parents, disengagement strategies had the opposite effect, accentuating the negative relations between poverty-related stress and psychological distress. The findings of coping strategy mediation among adolescents and the interaction between coping strategies and poverty stress among adults suggests the possibility of a developmental sequence with coping strategies of older individuals being less malleable in comparison to those of children and adolescents. However, in a prospective, longitudinal study of low-income middle and senior high students, Wadsworth and Berger (2006) found one interaction between poverty stress and primary control strategies. Youth higher in poverty stress had greater increases in internalizing symptoms over an 8-month period, but this was largely attenuated if they relied primarily on primary control coping strategies. This interaction between poverty-related stress and primary control coping, however, was the only moderation detected among several possible interactions between coping strategies and poverty stress.

Gonzales and colleagues (2011), however, did detect an interaction between various sources of stress (family, peer, community) and coping on mental health outcomes within their low-SES middle school sample. Both active coping and distraction buffered the adverse effects of family stress on behavioral conduct for girls. For boys, the effects of peer stress and community stress, respectively, on depression were exacerbated by more active coping. The authors suggest that boys who try to actively cope with intractable, chronic stressors like peer or community violence may suffer the frustration of invoking an instrumental coping strategy when in fact accommodation might fit better with the nature of the demands. One possible reason for the discrepancy between the absence of coping moderator effects in the Wadsworth and Berger (2006) study compared to that of Gonzales et al. is that Wadsworth and Berger examined stress directly related to poverty (not enough money to buy clothes, parents worried about paying bills), whereas Gonzales et al. examined various sources of stress (peers, community, family) in conjunction with coping strategies.

Edith Chen and Greg Miller have been conducting a program of research examining how cognitive appraisals and adjustments to the stressors accompanying low-SES childhoods can affect health and well-being. In an initial series of studies, youth who saw videotapes of simulated encounters between adolescents evaluated how threatening/hostile the situations were. Low-SES youth were more likely to attribute threat or hostile intent in ambiguous social interactions compared to their middle-SES peers. These attributions, in turn, were linked to elevated physiological stress responses (Chen & Matthews, 2001; Chen, Langer, Raphaelson, & Matthews, 2004). More recently, Chen and Miller (2012) initiated a series of studies examining a coping strategy, shift and persist, as a potential protective process among low-income children. *Shifting* refers to the ability to adjust individual responses to stressors through emotion regulation strategies, such as cognitive restructuring. *Persisting* reflects enduring adversity by strategies such as finding meaning in difficult circumstances or remaining optimistic. Asthma occurs more often and with greater severity among low-income children. In a sample of children (mean age 12) with diagnosed asthma, low-SES children who were high in shift and persist had lower levels of inflammation and degrees of impairment (e.g., school absence) compared to their low-SES peers with low shift and persist skills (Chen, Strunk, et al., 2011). In fact, low-SES asthmatic children who used this coping strategy resembled their high-SES counterparts. In a different sample, childhood SES was inversely related to allostatic load in a national sample of middle-age adults (Chen, Miller, Lachman, Gruenewald, & Seeman, 2012). However, adults from more deprived backgrounds who engaged in more shift and persist did not have higher allostatic load scores than their counterparts from higher SES backgrounds.

Another coping resource that appears capable of buffering some of the ill effects of childhood poverty on mental health is social support. As noted earlier, one reason for this could be because support appears to reduce the negative effects of stress on parenting behaviors of low-income parents. A large developmental literature demonstrates the protective effects of maternal responsiveness on socio-emotional development among children (Bornstein, 1989; Bradley, Corwyn, Burchinal, McAdoo, & Garcia-Coll, 2001; Bradley, Corwyn, McAddo, & Garcia-Coll, 2001; Shonkoff & Phillips, 2000). Studies of resilient children in the context of poverty routinely find that a strong, positive bond with an adult

caregiver is among the most protective factors (Werner & Smith, 1982; Wyman, Cowen, Work, & Parker, 1991). Maternal responsiveness attenuates several adverse effects of childhood deprivation, including elevated levels of allostatic load in adolescents (Evans, Kim, Ting, Tesser, & Shanis, 2007), the metabolic syndrome in middle-age adults (a cluster of risk factors predictive of diabetes, stroke, and cardiovascular diseases) (Miller et al., 2011), and proinflammatory processes among healthy 25- to 40-year-olds (Chen, Miller, Kobor, & Cole, 2011). There could be a link between responsive parenting and the development of children's own adaptive coping responses. Children who grew up in families with multiple problems, including poverty, but who had more responsive and nurturing parents develop enhanced self-regulatory skills (Repetti et al., 2002). They may also learn that enlisting support from others is effective. Enlisting such support may be particularly important given the well-documented inverse relation between SES and social support (Evans, 2004; Matthews & Gallo, 2010). Low-SES children and their parents typically have fewer social resources they can call on.

Both EF and coping are central psychological processes involved in the relations between SES and child psychopathology. A robust finding is that children and adolescents who cope with poverty-related stress by relying primarily on disengagement strategies, such as avoidance or denial, have worse mental health outcomes. Problem solving, emotion regulation, finding meaning, and maintaining optimism, along with the recruitment of social support, appear to be adaptive strategies that help counter some of the ill effects of impoverishment in regard to mental health.

Brain and SES

An exciting, emerging area of scholarship in the neurosciences is examining the potential role of the brain in linking SES and other forms of early childhood deprivation to psychopathology as well as cognitive outcomes (Gianaros & Manuck, 2010; Hackman & Farah, 2009; Hackman, Farah, & Meaney, 2010; McEwen, 2012; McEwen & Gianaros, 2010; Raizada & Kishiyama, 2010). Although the focus of much of this work is on exploration of cortical and subcortical mechanisms responsible for the SES-achievement gap, a small amount of the research has potentially major implications for the development of psychopathology.

Much of the initial neuroscience work examined neurotransmitter processes or conducted electrophysiological protocols, but recently the field has moved more into structural and functional neuroimaging techniques. Attenuated serotonin responsivity is related to elevated symptoms of aggression as well as depression. Lower-SES adults have attenuated serotonin responsiveness (Manuck et al., 2005; Matthews, Flory, Muldoon, & Manuck, 2000). There may also be a genetic component of the serotonin neurotransmitter system and the effects of early life deprivation. The positive association between SES and serotonin responsiveness is accentuated among persons with the short allele on the 5-HTTLPR serotonin transporter gene (Manuck, Flory, Ferrell, & Muldoon, 2004). As we discuss later, this genetic polymorphism may be a salient marker for vulnerability to chronic stress.

A small number of electrophysiological brain wave recording studies suggest that children from lower SES backgrounds have delays in development of the prefrontal cortex (PFC), which is a major cortical area responsible for executive functioning, such as the self-regulation of behavior and emotional control (Heatherton, 2011). Earlier we reviewed several studies indicating that childhood SES is positively associated with better executive functioning. The PFC is believed to operate as a top-down regulator of behavior enabling individuals to inhibit strong emotional responses and to reflect on various coping strategies in contemplation of action. Examining brain wave activity at 18, 30, and 48 months, Otero (1994, 1997) found evidence of delayed maturation in the prefrontal PFC of children from low-SES families relative to children from middle-SES families. Early extrastriate attention-sensitive components and novelty-evoked related potential (ERPs) are attenuated in low-SES relative to high-SES 7- to 12-year-olds who also had more difficulties with several neurocognitive measures of executive functioning (Kishiyama, Boyce, Jimenez, Perry, & Knight, 2008). Three- to 8-year-olds and middle school children from lower-SES compared to middle-SES families appeared to require greater effort to selectively attend to auditory stimuli while gating out distracting background stimuli (D'Angiulli, Herdman, Stapells, & Hertzman, 2008; D'Angiulli, Weinberg, Grunau, Hertzman, & Grebenkov, 2010; Stevens, Lauinger, & Neville, 2009). The positive indication from electroencephalographic research that low-SES children have depleted attentional capacity fits well with several of the EF studies reviewed earlier that showed compromised attentional control abilities among low-SES children.

Evidence from SES-related brain structural and functional imaging studies also implicates childhood SES in brain development. Similar to the electrophysiological studies on SES and brain activity, Sheridan, Sarsour, Jutte,

D'Esposito, and Boyce (2012) found that 8- to 12-year-olds from lower-SES families had more difficulty learning a response discrimination task that appeared to be related to greater activation in a portion of the PFC, the right middle frontal gyrus. Increased neural recruitment in this area may have reflected greater effort or less efficiency in the learning of the rules necessary to perform optimally on the task. In a series of studies, Gianaros and colleagues (2007) have shown both structural and functional alterations in brain development among low-SES relative to middle-SES individuals with potentially profound mental health implications. Adults who perceive themselves as lower in relative social status have lower gray matter volume in the anterior cingulate cortex, a limbic brain area centrally involved in emotional regulation as well as responsivity to stressors. Similar volumetric reductions in the anterior cingulate cortex are associated with mood disorders and depression.

As indicated, self-regulatory and executive control functions appear to be damaged in adults and children from low-SES childhoods. Adults from low-SES childhoods evidenced reduced connectivity between portions of the PFC and orbitofrontal and striatial areas of the brain implicated in reward sensitivity and impulse control (Gianaros et al., 2010). In a second study, adults who grew up in families with perceived lower relative social standing had elevated amygdala activation to emotionally threatening faces but responded similarly to their peers from family backgrounds of average and above average social standing to neutral and nonthreatening faces (Gianaros et al., 2008). Similarly, adolescents from lower-SES families evidenced greater amygdala as well as dorsomedial PFC activation in response to emotionally threatening faces (Muscatell et al., 2012). Yanagisawa and colleagues (2012) asked college graduates how much financial strain their family faced when they were growing up. Higher levels of perceived financial strain were associated with greater social distress and lower levels of activity in the right ventrolateral PFC during a social exclusion task. In the cyberball task, participants play a virtual game of catch with what they believe are two other players (whose pictures are displayed during the game); in actuality, participants are interfaced with a computer that exposes participants to two different conditions: inclusion in the game of catch and exclusion in the game of catch. The former serves as a baseline contrast for the exclusion phases of the experiment. The pattern of findings from these recent neuroimaging studies on greater threat activation when confronted with emotionally charged stimuli fits nicely with the work by Chen and colleagues, reviewed earlier, showing that low-income youth more readily attribute threat and hostile intent to ambiguous interpersonal encounters (Chen & Matthews, 2001; Chen et al., 2004).

Another area of the brain, the hippocampus, helps integrate information about emotionally laden information to past experiences and context, better enabling the organism to respond more adaptively to challenging situations. Considerable animal work indicates damage to the hippocampus at the cellular level from chronic stress as well as reduction in gray matter volume (Lupien et al., 2009; McEwen & Gianaros, 2010). Recently different teams of investigators have linked lower-SES childhoods to smaller hippocampal volumes in 5- to 17-year-olds (Noble, Houston, Kan, & Sowell, 2012), in 9- 11-year-olds (Hanson, Chandra, Wolfe, & Pollak, 2011), and in both middle-age (Butterworth, Cherbuin, Sachdev, & Antsey, 2012) and older adults (Staff et al., 2012). Recently, Pilyoung Kim and her colleagues (Kim et al., 2013) integrated these brain and self-regulatory behavior findings with the findings from stress research, finding that adults who grew up in poverty had reduced activation in the PFC and less efficient regulation of the amygdala during a task in which they had to regulate negative emotions. Furthermore, chronic stressor exposure during childhood mediated the association between poverty and PFC activity.

Taken in concert, this newly emerging literature on SES and the brain appears to hold great promise for unpacking the underlying biological mechanisms that help transmit the experience of childhood poverty and deprivation into adverse mental health outcomes. In particular, the neuroscience findings suggest that persons from low-SES backgrounds may respond more strongly to aversive and threatening stimuli in areas of the brain associated with autonomic, rapid responses to threat and emotionally negative stimuli (e.g., the amygdala). At the same time, persons from lower-SES backgrounds appear to have a less well developed top-down regulatory PFC system for controlling these rapid, automated emotion responses. Thus, individuals growing up in low-SES environments may be subject to a kind of triple jeopardy when it comes to responding to adverse experiences. First, they are likely to encounter many more psychosocial and physical risk factors that are threatening. Second, low-SES children appear to be downwardly regulated, being hyperresponsive or hypersensitive to threatening events. Third, at the same time, they are less able to monitor, regulate, and modify these rapid, emotion-laden responses to threat and other negative emotionally evocative situations. One major shortcoming of all of the neuroscience work to date on SES is the absence of direct evidence for structural or functional changes in the brain operating as mediators or underlying explanatory

mechanisms directly accounting for well-established linkages between SES and psychopathology. We currently do not have evidence for the full pathway: Low SES → Brain Alteration → Psychopathology.

PRACTICE AND POLICY

Community and/or Government Interventions: Policy

Several safety net programs were designed by the federal government in an effort to meet the goals of the War on Poverty efforts of Presidents Kennedy and Johnson in the early 1960s. These programs, collectively referred to as social welfare, have parallels in most every industrialized nation, and are designed to prevent individuals and families from starvation and homelessness. As shown in national poverty rate trends, programs such as Aid to Families with Dependent Children (AFDC, formerly known as Welfare, and now referred to as Temporary Assistance to Needy Families, TANF), WIC, and SNAP contributed to significant reductions in poverty rates, from a high of 22.4% in 1959 to a low of 11.1% in 1973. Unfortunately, despite continued increases in the GDP since the 1950s, the poverty rate has not seen further reductions since the early 1970s, in part because eligibility levels for these programs have not been adjusted for inflation and cost-of-living increases over the last four decades. Such safety net programs have also been documented to produce improvements on a variety of child health and developmental outcomes, such as reduced low-weight infant births (Kowaleski-Jones & Duncan, 2000); lower risk of abuse and neglect; and fewer nutritional deficiencies, such as anemia and failure to thrive (Lee & Mackey-Bilaver, 2007).

In 1975, the Earned Income Tax Credit (EITC) was passed to benefit low- and moderate-income working families, designed to offset the burden of Social Security taxes and to provide an incentive to work. The EITC was also successful in raising the incomes of working families, and Dahl and Lochner (2012) found that each $1,000 increase in family income stemming from the EITC was accompanied by significant increases in math and reading achievement, especially for children in the most disadvantaged families. Similarly, Strully, Rehkopf, and Xuanc (2010) found that state EITCs led to increased birthweights and reduced maternal smoking in families in poverty.

The estimate of the $500 billion annual cost of childhood poverty to the United States calculated by Holzer et al. (2008) suggests that there are large potential gains to be had by poverty-reduction programs and other types of interventions targeting the environment of childhood poverty. Holzer et al. outlined the next types of programs as having the potential to reduce poverty and have high monetary returns on the investment: programs that increase wages and incomes (e.g., increases in minimum wage, EITC), programs that increase earning potential via training and education, programs that improve neighborhood conditions and housing quality, and universal high-quality preschool programs. Calculations by Dickens, Sawhill, and Tebes (2006) suggested, for example, that making high-quality preschool programs universally available to children could increase GDP by 3.7% annually, coming close to offsetting the $500 billion price tag of child poverty in the United States. Knudsen, Heckman, Cameron, and Shonkoff (2006) similarly reviewed the range of potential benefits to be gained from early intervention programs for disadvantaged children, concluding that the estimated return on each dollar invested in early childhood programs, such as the Perry Preschool Program, exceeded 17%, which these authors noted is a much higher rate of return than standard stock market returns. With positive outcomes in adulthood spanning academic achievement and attainment, cumulative wage earnings, likelihood of owning a home, likelihood of receiving public assistance, and years spent incarcerated, early childhood interventions have a very large potential to translate into high gains in human and economic capital. Heckman (2006) estimated that the total cost of implementing the Perry Preschool Program was $16,514 (in 2004 dollars) per child and that benefits saved by implementation across earnings, special education, crime, and public assistance totaled $144,345, with a benefit to cost ratio of 8.74.

The results of Nuru-Jeter et al.'s (2010) study of categorical versus continuous measures of SES and relations with mental and physical health outcomes suggest that "efforts to alter the social conditions that drive health effects will demand mobility into meaningful strata of educational and financial well-being" (p. 17). Hence, while reducing low birthweights and reducing hunger are incredibly important and worthy goals, efforts to improve poor children's life chances must do more than marginally increase family incomes; rather, they must strive to help children achieve the education and training they need to rise in social stature.

Consistent with the message of Nuru-Jeter et al. (2010), Zaslow et al. (2002) reviewed the impacts of four kinds of welfare-reform programs on child outcomes: (1) work-first or education-first programs that make assistance contingent on getting a job or job training (e.g., Job Opportunities and Basic Skills Training); (2) imposing time limits on public assistance receipt (e.g., Florida

Family Transition Program); (3) programming delivered specifically to teenage mothers (e.g., New Chance Demonstration); and (4) financial incentives tied to working (e.g., New Hope Project). Of the four program types, Zaslow et al. found that only the programs that led to sustained financial gains for families had favorable impacts on child health and well-being. Programs that failed to increase employment and income had either neutral or detrimental effects. Similarly, in analyses making use of random-assignment experimental design and instrumental variables estimation, Gennetian and Morris (2003) found evidence that increasing income via the Minnesota Family Investment program can improve children's school engagement and social-emotional functioning. Their findings further supported the conclusion that income has a causal and reversible impact on child functioning.

A new generation of antipoverty programs has expanded on this strategy of contingent safety net provision by making public assistance contingent on poor parents performing a number of stipulated tasks designed to increase their children's human capital. Such conditional cash transfer (CCT) programs reward parents with money for taking their children to medical checkups, getting them vaccinated, and improving school attendance. Some CCT programs implemented outside the United States have demonstrated decreased rates of poverty and child illness and improved school attendance (e.g., Rivera, Sotres-Alvarez, Habicht, Shamah, & Villalpando, 2004). Fernald, Gertler, and Neufeld (2008), for example, examined child outcomes associated with the Mexican CCT program Opportunidades. A doubling of income via cash transfers was associated with better infant and toddler outcomes, such as taller height for age, less stunting, lower body mass indexes as well as higher motor, cognitive, and language development scores. CCT programs have been implemented in several other lower- and middle-income countries, including Brazil, Peru, Honduras, Nicaragua, Colombia, India, and Nepal. Overall, outcomes are mixed (Wolf, Aber, & Morris, 2013), with short-term positive effects found in some countries, but not others (e.g., Fiszbein & Schady, 2009). Only one large-scale CCT program has been evaluated in the United States (Opportunity New York; Riccio et al., 2010). Results of this evaluation showed that, while the program decreased current poverty and material hardship, it did not result in improved school outcomes for elementary or middle school students. It did however, lead to improved academic outcomes for high school students who were already meeting grade-level standards at the beginning of the study.

Implications of Poverty and Psychology Research for Policy

Not surprisingly, U.S. government programs that directly increase the income of families living in poverty have reduced poverty rates. What is surprising is that Americans have allowed these programs to lose power by not indexing them for inflation. Research on the effects of poverty on children has provided more data than needed to justify increased investment in antipoverty programs; yet the public, in general, has not prioritized such expenditures—despite the fact that most, if not all, Americans believe in an ethic of justice (Hamlin, Wynn, Bloom, & Mahajan, 2011; Masters & Gruter, 1992).

The disconnect between Americans' stated values and voting patterns suggests that developmental psychopathologists who are committed to reducing the negative effects of poverty on children might consider bringing psychological research to bear on factors affecting U.S. voting priorities. Psychological constructs, such as cognitive dissonance (Cooper, 2007; Festinger, 1957/1985) and belief in a just world (Furnham, 2003), can help explain why voters may blame others for negative experiences that would otherwise simply seem unfair (Godfrey & Lowe, 1975; Janoff-Bulman, Timko, & Carli, 1985). In the case of cognitive dissonance, for example, middle- and upper-class individuals are likely to experience discomfort associated with incongruous beliefs, such as: (a) there are children in our country who are living under life-threatening conditions of violence because they reside in urban poverty; (b) we live our lives without substantially addressing this problem; and (c) we are good, kind people. The just world belief (i.e., that those who suffer have brought that suffering upon themselves in some way; Lerner, 1980; Montada & Lerner, 1998) can reduce that cognitive dissonance. If those who are disadvantaged deserve their fate, then the rest of us can bear less guilt for not intervening (Lodewijkx, de Kwaadsteniet, & Nijstad, 2005; Loseman & van den Bos, 2012). We can eliminate the discomfort of the cognitive dissonance associated with the three statements by adding a fourth: Everyone who works hard can escape poverty and violence (Murray, Spadafore, & McIntosh, 2005; van den Bos & Maas, 2009).

Two additional psychological constructs may help explain the lack of investment in addressing poverty. The first is diffusion of responsibility (Darley & Latané, 1968; Latané & Darley, 1968). If one believes that action does not rely solely on oneself, one is less likely to act (Leary & Forsyth, 1987; Mynatt & Sherman, 1975). The second is a lack of knowledge of how one can effectively intervene (Fielding & Head, 2012). When pathways to successful

intervention are unclear and the outcome is uncertain, individuals are less likely to act (Jorm, 2012).

Most developmental psychopathologists who conduct poverty research have focused on poverty's effects on children's mental health and the mechanisms of those effects. This work lays the groundwork for psychological interventions (as summarized in the next section). Given that a lack of knowledge of how to intervene effectively reduces the likelihood that individuals will intervene, developing effective interventions also is important for policy efforts.

Furthermore, despite the fact that safety net programs can protect children from some of the most dire effects of poverty (malnutrition, homelessness), they have not proven sufficient to alter the economic trajectories of children born into poverty (or poverty would have been eradicated by now). And welfare-reform programs designed to alter those trajectories by bolstering the capacity of low-income families to increase their own incomes (through education, training, or investment in the training and education of their children) have had only mixed effects, as reviewed earlier. Thus, there is a real need for the development of effective programs that can change the economic trajectory of children born into poverty.

There is strong evidence that changing children's educational trajectories can change their economic trajectories and break the cycle of poverty (Haskins & Rouse, 2013). Since the 1980s, earnings have increased only for families that include an adult with a college degree (Haskins & Rouse). As a result, policy experts like Haskins and Rouse have proposed that federal programs focus on increasing the preparedness of low-income students for college.

Early childhood programs like Head Start have demonstrated success, but they have not succeeded in eliminating achievement or income gaps for low-income children, and programs that target older children for college have had only modest effects at best (Haskins & Rouse, 2013). So there is great need for additional intervention development and evaluation efforts. To coordinate and support such efforts, Haskins and Rouse recommend that the federal government (a) consolidate existing funding efforts into a single grant program that requires funded initiatives to be backed by rigorous research and (b) give the U.S. Department of Education the authority to plan and execute a coordinated set of studies that develop and rigorously test several approaches to college preparation.

A team of scholars and practitioners in Chicago is following the recommendation to focus on college preparedness while also addressing barriers to middle and upper-class investment in anti-poverty programs. The Chicago Public School System (CPS) is 87% low income, and only 8% of its students graduate from a 4-year college (Allensworth, 2006; Chicago Public Schools, n.d.). With the goal of changing those statistics, CPS has partnered with five major universities in the city of Chicago—DePaul University, Loyola University, Northwestern University, the University of Chicago, and the University of Illinois at Chicago—to submit a proposal to the U.S. Department of Education that is focused on both (a) supporting the academic preparedness of CPS students for college and (b) increasing the sense of responsibility for ending poverty among college students through an innovative program called Cities Mentor Project.

Cities Mentor Project provides early adolescent CPS students with (a) training in research-based strategies for engaging with academic challenges and coping with severe and chronic stressors endemic to urban poverty that impede learning (e.g., community violence); (b) connection to undergraduate mentors who support youth engagement and coping efforts in real-life situations, advocate for youth academically, and connect youth to (c) high-quality after-school and summer programming that provides additional support. Cities Mentor Project makes a long-term commitment to youth, supporting them from middle school all the way through their first year in college.

University student mentors in the program take part in a service learning course focused on training and supporting their mentoring work. The class also educates the mentors about the roots and effects of poverty in Chicago and brings the powerful cognitive-behavioral tools of Socratic questioning and collaborative empiricism (which are typically used to target mental health problems; Cohen, Edmunds, Brodman, Benjamin, & Kendall, 2012; Tee & Kazantzis, 2011) to bear on psychological barriers to moral action (Hart et al., 2009; Overholser, 2011; Palmer & Williams, 2013). Sample questions used in the class include: (a) What is the cause of poverty and inequality in the city of Chicago? (b) Who is to blame? (c) What can be done about it? (d) What should I do about it as an individual? (e) What should we do about it as a group? Thus, this program moves beyond intervention strategies characteristic of traditional psychology to include community psychology principles of empowerment and advocacy, principles that may be necessary to change policy (Dalton, Hill, Thomas, & Kloos, 2013; Speer, Peterson, Armstead, & Allen, 2013).

The CPS-university partnership plans to evaluate the effects of this new approach on a broad range of outcomes, for mentors and mentees alike, including mental health and academic achievement as well as moral understanding and civic engagement. If there are expected empirical changes on these measures, this partnership could become a model not only for changing the educational and economic

trajectories of low-income children but also for increasing a sense of responsibility for ending poverty among more highly resourced individuals. Based on our review of research and policy, it appears we need both.

Individual and Family Interventions: Practice

Numerous early intervention programs have been developed with the aim of promoting educational and socioemotional success and preventing dysfunction stemming from poverty and socioeconomic disadvantage in young children. In a comprehensive review of results from 20 rigorously evaluated programs, including a mix of home visiting, parent education, early childhood education (ECE), and combination programs (e.g., Abecedarian Project, Nurse-Family Partnership), Karoly and colleagues (2005) report positive benefits, both immediately following intervention (e.g., IQ scores, prosocial outcomes) and at long-term follow-up (e.g., educational attainment, teen pregnancy, arrests) to participating children. Successful early childhood intervention programs tend to have multiple components that target parents (e.g., job-related services), children (e.g., enrollment in high-quality ECE), and/or the parent-child dyad (e.g., parenting classes). Karoly and colleagues also identified several program elements that characterized effective programs, including well-trained program leaders (e.g., home visitation services provided by trained nurses), intensive program scope and delivery, and center-based education-focused child care in settings with small child-staff ratios and well-educated lead teachers.

Several successful large-scale programs have been in operation for several decades, allowing for evaluation of the long-term outcomes possible with high-quality ECE. Head Start (e.g., Ripple & Zigler, 2003) and the Perry Preschool Program (Weikart & Schmeinhart, 1992) are successful prevention programs targeting poor families with preschool children designed to prevent the emergence of behavioral difficulties and promote positive social skills, emotional competence, and academic achievement. Both of these programs focus on providing families with access to basic human necessities, such as food, housing, education and health care, as well as high-quality child care. These programs have produced both substantial initial effects on child IQ scores and social/emotional outcomes as well as employment, criminality, and family stability outcomes that persist until well into midadulthood (e.g., Pungello et al., 2010; Ramey & Ramey, 1998). Brooks-Gunn (2003) challenged us to find any other interventions that come close to the magnitude of these kinds of effects in the learning sciences (and beyond).

The Nurse-Family Partnership program has produced strong outcomes for families who receive perinatal and infancy home visits from qualified nurses (e.g., Olds, Sadler, & Kitzman, 2007). A recent evaluation by Eckenrode and colleagues (2010), for example, examined results of the program on the life course development of 19-year-olds whose mothers had participated in the program. Girls from the home visitation group were significantly less likely to be arrested (10% versus 30%) and convicted of a crime (4% versus 20%) and had fewer lifetime arrests (.10 versus .54) than girls in the control group. Additionally, for high-risk girls in particular, significantly lower rates of teen pregnancy and public assistance usage were found for home visitation girls in comparison to controls.

The Strong African American Families program was developed by Gene Brody and colleagues (2006) to prevent substance use, conduct problems, and depression in rural, low-income African American adolescents. This program, which built on over a decade of basic research on rural African American families and their strengths, focuses on building caregiving practices, such as limit setting, monitoring, instilling racial pride, and effective problem solving. Adolescent self-regulation is also directly targeted. Participation in the 5-session intervention was associated with a 36% reduction in the frequency of conduct problems, a 32% decrease in overall substance use, and a 47% decrease in substance use problems over the course of almost 2 years (Brody et al., 2012).

The Families Coping with Economic Strain intervention (FaCES; Raviv & Wadsworth, 2010) teaches children (age 8–12) and their parents coping strategies to effectively manage poverty-related stress. Sessions introduce various ways of coping, teach emotion regulation skills, and educate parents and children about the effects of poverty on the family and the benefits of having strategies to utilize when stressors occur. An evaluation of FaCES using a multiple baseline design, found that children increased their use of effective coping, which was accompanied by substantial decreases in internalizing and externalizing symptoms (Raviv & Wadsworth, 2010).

Parenting-specific interventions have also been shown to improve dysfunctional parenting styles by addressing the parenting practices involving appropriate discipline, promotion of prosocial behaviors, and engagement with children's schools (e.g., Brotman et al., 2011). For example, a new family-strengthening intervention developed to address the key parts of family stress model targets strengthening the interparental relationship, improving coping and reducing stress, and teaching child-centered parenting. This intervention has demonstrated

improvements on parenting, parental coping, and depression that appear to translate into improved child internalizing and externalizing symptoms (Wadsworth et al., 2013).

Similarly, the family-focused SAFEChildren (Schools and Families Educating Children) intervention targets supportive parenting, teaches parental skills for managing neighborhood challenges, and promotes school involvement among low-income parents. The program includes a tutoring component to improve child academic achievement. Program evaluation results have shown significant improvements in parents' use of stable, consistent caregiving and limit setting as well as improvements in children's behavior and attention regulation (Tolan, Gorman-Smith, Henry, & Schoeny, 2009).

Finally, some school-based interventions targeted to school-age children have also shown promise. The Fast-Track program, for example, provides a wide array of basic services to families. In addition, however, Fast-Track incorporates the teaching of basic self-regulation skills into units developed for both parents and children. Children participating in Fast-Track receive a classroom program, called PATHS (Promoting Alternative Thinking Strategies). PATHS helps children work on self-control skills by teaching emotional awareness and understanding. It also helps children enhance peer-related social skills and social problem solving to increase social competence (Bierman, 2002). The program, which began with a sample of first graders and followed them through the end of elementary school, has been successful in reducing the incidence of home and community conduct problems, involvement in peer deviance, and social incompetence (Dodge & Conduct Problems Prevention Group, 2007).

Implications of Poverty and Psychology Research for Practice

Studies on mediators and moderators of the effects of poverty are especially relevant for psychological practice focused on mitigating the effects of poverty on children's mental health, as these studies highlight mechanisms that can be targeted for intervention and indicate groups and contexts that could influence efficacy. Implications of findings from each of these literatures are summarized in the next sections.

Implications of Mediator Data for Future Interventions

Individual and Family Mediators

Basic research on mediational processes linking poverty exposure to negative outcomes is especially relevant to intervention, as findings in this area highlight pathways between poverty and symptoms that can serve as intervention targets. To date, mental health interventions have built primarily on mediational findings related to parenting and stress exposure. In particular, as outlined earlier, interventions have focused on teaching parents and children to manage poverty-related stressors in ways that support healthy family functioning and disrupt pathways linking poverty to youth psychological problems. Although coping, per se, has yet to emerge consistently as a significant mediator or moderator of poverty effects on youth mental health (Grant et al., 2006), the preliminary success of interventions targeting coping provides evidence that coping is an important intervention target (Raviv & Wadsworth, 2010).

The constructs of self-regulation, executive functioning, and mastery are all interconnected with the construct of coping. In particular, coping interventions focused on helping youth identify which coping strategies to use in a given situation require use of self-regulation and executive functioning and, if effective, are likely to build mastery and reduce helplessness. As noted, a solid body of research has established various components of executive functioning as mediators of the negative effects of poverty. Nonetheless, few intervention research studies have examined changes in mental health as a function of changes in executive functioning. There also have been few studies to examine changes in self-regulation or executive functioning or mastery (beyond coping mastery) as a result of coping training or vice versa.

A larger body of research has addressed mediation effects of executive functioning than of coping. Nevertheless, a greater number of mental health interventions have been developed to target coping. This phenomenon may reflect a belief among developmental psychopathology researchers that executive functioning interventions target academic outcomes and coping interventions target psychological outcomes. There is mounting evidence, however, that executive functioning is an important prerequisite of effective coping, especially in light of findings that selecting the coping strategy that best fits a particular type of problem is essential for coping effectiveness (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2002; Compas et al., 2010).

Additional intervention work is needed to better understand how executive functioning, self-regulation, mastery, and coping might be targeted synergistically. For example, it would be helpful to know whether there are benefits to targeting self-regulation or executive functioning in advance of coping training or whether coping training

itself is the most efficient and relevant approach to teaching self-regulation and executive functioning in the context of poverty-related stressors. In addition, it would be ideal to integrate such intervention work with basic research by testing differences in basic cognitive functioning and brain structure as a result of coping training.

Such research also is needed to help us understand how structural, physiological, cognitive, and emotional processes function together to mediate poverty. For example, the next questions remain: (1) Does poverty directly affect brain structures (e.g., through malnutrition), thereby reducing capacity to learn adaptive strategies, or do limited learning opportunities lead to reduced brain growth, or do both processes occur and affect one another reciprocally? (2) Which specific poverty-related stressors predict which mediating processes and disrupt which protective moderators? (3) In the case of multiple mediators (e.g., cortisol, cognitions, emotions, executive functioning), does one predict the other, or do they reflect different measures of the same process? Answering these questions through basic and/or intervention research will help determine intervention approaches most effective at disrupting naturally occurring pathways between poverty and negative outcomes.

Peer, Neighborhood, and Physical Environment Mediators

Far fewer poverty interventions focused on mental health outcomes have targeted neighborhood, physical environment, or peer mediators. This fact likely reflects the fact that targeting such variables requires considerably more resources than a typical mental health intervention and/or requires buy-in from large groups of individuals and/or requires shifts in social policy that fall beyond the purview of mental health providers. Nonetheless, a few housing studies have examined mental health effects of moving low-income families from low-income, low-resource neighborhoods, characterized by community violence, poor physical environments, and high proportions of aggressive peers, to middle-class, high-resource neighborhoods with fewer risk factors (Fine, 2002; Leventhal & Newman, 2010). Findings for youth mental health have been mixed (Fine, 2002; Leventhal & Newman, 2010). One reason for the lack of consistent positive findings may be that youth who move from low- to high-resourced communities experience negative effects associated with moving (e.g., disrupted social ties, being new to a school and community) and/or increased exposure to classism and racism. Much additional intervention research is needed to determine the most effective approaches for addressing neighborhood, peer, and physical environment mediators of the effects of poverty on mental health.

One potential approach would be to build on existing coping interventions as well as community psychology constructs of empowerment (Bond & Keys, 1993) to expand definitions of active coping to include activism. Current coping interventions that focus on matching particular coping strategies with particular stressors in the context of urban poverty teach youth to avoid community violence so that they do not (a) experience the internalizing distress that can result from trying to fix something beyond their capacity to fix or (b) display the externalizing behavior that may be required to stay safe under threatening circumstances (Grant et al., 2014). It might be useful, however, to teach youth that although community violence likely cannot be addressed by individually based active coping, it could be addressed by group-based active coping or activism. Such intervention would require partnerships between mental health providers and community-based organizations capable of involving youth in such work.

Such interventions would also necessitate a lengthier investment than is typical of existing coping interventions (Gaylord-Harden et al., 2013). A recent meta-analysis of coping programs with all youth provides a basis for lengthier intervention. In particular, Gaylord-Harden and colleagues (2013) found positive effects (.31/–.09) for coping interventions at the conclusion of programming but no or negative effects at follow-up (first follow-up = –.02 /–.09; second follow-up = –.08/–.17). These findings may indicate that lengthier intervention and/or booster sessions are required to help youth generalize or ingrain new coping skills. Additional intervention research is needed to test this hypothesized interpretation. If it proves valid, we may need to shift our typical approach to administering coping interventions from discrete, individually based, brief interventions provided by mental health professionals to intervention that is embedded within ongoing programming of schools or community-based organizations that includes group-based activism focused on systemic problems affecting low-income youth.

Implications of Moderator Data and Related Findings

Although results of moderator studies just reviewed provide few consistent messages relevant to intervention, related findings provide evidence that contextual variables can affect the extent to which protective factors are helpful and interventions are effective, particularly within the context of urban poverty. For example, as with the broader coping literature (Compas et al., 2002, 2010), most basic

and intervention studies of coping with poverty stressors have reported positive effects for active, problem-solving, engagement approaches and negative effects for avoidance and disengagement (Raviv & Wadsworth, 2010; Wadsworth & Berger, 2006; Wadsworth & Santiago, 2008). Nonetheless, this general pattern is tempered by findings, particularly with youth residing in urban poverty, of positive effects for avoidant, disengagement strategies, at least in the short run (Gaylord-Harden, Taylor, Campbell, Kesselring, & Grant, 2009; Gonzalez et al., 2001). For example, Gaylord-Harden and colleagues (2009) found that youth who behaviorally avoided stressors associated with urban poverty (e.g., exposure to community violence) were better off than those who actively engaged. These findings highlight the importance of matching coping strategy with stressor (Compas et al., 2002, 2010). Future intervention work would benefit from greater integration with basic moderator studies to iteratively determine which methods of coping are most effective for specific poverty-related stressors.

This body of studies also suggests not only that strategies deemed ineffective in other settings may be protective in the context of urban poverty but that generally effective strategies may prove ineffective or even problematic for low-income urban youth (Ceballo, Ramirez, Hearn, & Maltese, 2003; Hammack, Richards, Luo, Edlynn, & Roy, 2004; Li, Nussbaum, & Richards, 2007; Youngstrom, Weist, & Albus, 2003). For example, D'Imperio, Dubow, and Ippolito (2000) reported no protective effects for individual, family, or extrafamilial resources for their sample of low-income urban youth. This pattern fits with Gerard and Buehler's (2004) findings that cumulative risk across multiple domains overwhelms the effects of potential protective factors for youth and with the construct of *protective reactive effects*, defined by Luthar, Cicchetti, and Becker (2000) as the dissipation of protective effects under conditions of overwhelming stress.

More basic and intervention research is needed to determine the contexts in which coping and other protective factors are helpful and harmful. For example, Grant and colleagues found that individually based active coping strategies were, generally, counter-productive for the most severely stressed youth in their low-income urban sample (Grant, McMahon, Carter, & Carleton, in press). However, even the most severely stressed youth could benefit from active strategies if they were used in the context of supportive relationships with adults and connections to protective settings (e.g., family, school, community, or religious organization) (Grant, McMahon, et al., in press). Grant and colleagues are currently building on those findings through the development of a new intervention which teaches low-income urban youth contextually relevant coping strategies and connects them with mentors and protective settings to support their coping efforts (Grant, Farahmand, et al., 2014). This broad approach is consistent with research, reviewed earlier, on the numerous mechanisms through which poverty exerts its negative effects, including reduced interpersonal and community resources. Additional research is needed to evaluate the efficacy and effectiveness of broad approaches such as this one.

Meta-analyses of intervention effects also highlight the important moderating function context can play on effectiveness. In particular, Farahmand and colleagues' recent meta-analyses of mental health interventions targeting youth residing in urban poverty (Farahmand, Duffy, et al., 2012; Farahmand, Grant, Polo, Duffy, & Dubois, 2011) indicate that community-based interventions (.25 /–.11) are more effective than school-based interventions (.08 /–.09). School-based interventions in low-income urban communities were particularly likely to yield negligible or even negative effects if they targeted externalizing outcomes. This pattern is consistent with evidence that stressors particularly common within the context of *urban* poverty (i.e., exposure to community violence) are specifically associated with externalizing outcomes (Grant et al., 2013).

In the short run, these findings suggest that community-based interventions should be prioritized over school-based interventions when targeting externalizing problems affecting low-income urban youth. In addition, there is a need for research on systemic barriers to effective school-based intervention in the context of urban poverty, particularly for externalizing problems. Research is needed to determine what school-based factors within the context of urban poverty compromise the delivery of effective mental health intervention and what strategies might be useful in addressing these negative factors so that, in the long run, we can harness the potential benefit of school-based interventions for youth residing in urban poverty (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011).

FUTURE DIRECTIONS

Earlier we discussed several pathways that appear to be good candidates linking childhood experiences of deprivation with psychological distress and conduct disorders. These pathways included elevated parental stress and subsequent parental harshness and lack of sensitivity as

well as children's own stress responses. One of the primary reasons childhood deprivation appears to be negative for children and possibly extending later into the life course is because of exposure to a higher level of cumulative risk factors, such as family turmoil, violence, chaos, and instability as well as suboptimal physical environmental conditions (e.g., substandard housing, toxins) that often accompany poverty. We also pointed out that increasing evidence points toward compromised executive functioning and less adaptive coping strategies as difficulties accompanying childhoods with less opportunity. Finally, we provided evidence that for stress and executive functioning, very recent work has begun to illuminate the role of brain structure (e.g., smaller hippocampus) and function (e.g., more difficulty regulating negative emotions) in relation to childhood poverty/low SES. Thus, not only are low-SES children apt to be exposed to a higher level of aversive environmental demands, they may also be less capable of coping with the myriad of demands they are confronted with at home, in school, and in the community. Low-SES individuals have higher demands but often lack the intrapersonal or environmental resources to manage those demands (Gallo & Matthews, 2003).

Given what appears to be the central role of parenting in the linkages between poverty and deprived environments for children's mental health (see Figure 4.1), it is worth thinking about other ways in which poverty and low SES environments could alter the parent-child relationship. We noted that although the focus has been on the direct effects of income or SES on parenting behaviors, some work suggests that deprivation may interact with other critical aspects of parents' lives to moderate the effects of SES on parenting behaviors. In addition to expanding the small amount of work noted earlier on social support, religiosity, and chaos as potential moderators of the link between SES and parenting behavior, another topic worth considering is social capital. Many low-SES families, particularly in urban areas, also reside in neighborhoods low in social capital (Leventhal & Brooks-Gunn, 2000; Saegert, Thompson, & Warren, 2001; Sampson, Morenoff, & Gannon-Rowely, 2002). These settings tend to be low in social cohesion and social control, making it difficult for parents to connect with others who can also contribute to the development and well-being of children. Low-income women have smaller and less cohesive social networks than their middle-income counterparts (Evans, Boxill, & Pinkava, 2008). A related aspect of low social capital is the dearth of positive, informal learning and socialization opportunities, such as music, dance, and art; access to museums and other informal learning centers; after-school activities; summer programs; and organized sports and recreational activities. Such resources tend to provide greater opportunities for positive and sustained interactions with other adults and increase the probability of constructive, positive peer interactions (Eccles & Gootman, 2002). There is some evidence that high social capital can buffer some of the ill effects of childhood poverty on adolescent smoking and weight gain (Evans & Kutcher, 2011). Recall also that better classroom practices help low-income adolescents better regulate themselves, which, in turn, lead to better psychological adjustment (Brody et al., 2002).

At the same time, social capital can indirectly support more positive, productive parenting. It provides opportunities to meet and develop friendships with other adults who may have shared values and aspirations, particularly for their children. A richer network of community resources for children and youth also means their parents get some respite from child care. Evans et al. (2008) showed that the negative relation between family income levels and maternal responsiveness in a sample of low- and middle-income 13-year-olds was largely a by-product of high maternal stress and low social resources available to the mother. Each of these factors was associated with lower maternal responsiveness, but the joint pathway of low social resources and high stress was what really mattered. Furthermore, we suspect many low-SES parents feel uncomfortable and possibly even unwelcome at their child's school. Such perceptions, regardless of their accuracy, when coupled with single parenthood and/or nonstandard working hours that may also be variable, make it much less likely that low-SES parents develop relationships with school personnel or cross paths with other parents at their children's school. Parental engagement in school is strongly tied to SES (Evans, 2004). We need to learn about how community social capital can directly influence low-income children's psychological well-being directly as well as affect their parents' abilities to manage the myriad of demands associated with raising a family.

Another contributing risk factor that has not received much attention in the linkages between childhood poverty and the development of psychopathology is stigma and discrimination. Adolescents who are poor feel stigmatized (Fitchen, 1981), which in turn contributes to elevated allostatic load relative to their more advantaged peers (Fuller-Rowell, Evans, & Ong, 2012). This finding is bolstered by the persistent findings that some of the SES-health gradient can be attributed to inequality (Wilkinson & Pickett, 2009) with states or countries having the widest gaps between the rich and the poor also

having the steepest SES-health gradients (Kondo et al., 2009). How inequality translates into ill health is a topic ripe for additional research, and it is likely that stigma, bias, and discrimination play a role in SES and child psychopathology. There is also abundant evidence that racial discrimination is stressful and affects the physical and mental health of children, youth, and their parents (Mays, Cochran, & Barnes, 2007). Racial discrimination also explains some of the covariation between between minority status and ill health (Williams, Mohammed, Leavell, & Collins, 2010). The interplay of lower financial opportunity with stigma and discrimination related to poverty itself along with its interaction with racial minority status on children's mental health is an important topic worthy of much more attention. Wilson, Foster, Anderson, and Mance (2009) investigated the role of racial identity but found it did not moderate the link between poverty and psychological distress among African American youth. Grant and colleagues (2005), however, did show that exposure to violence was a mediator of linkages between poverty and internalizing symptoms among African American adolescents.

It is sobering to consider the potential indirect effects of racism on parenting behaviors in the context of poverty. It is hard to be warm and responsive or to build a wide social network when one has to be worried about how one is perceived by others. This situation is likely compounded by simultaneous efforts to be vigilant about how one's children are faring in school or the larger community because of their racial status. The degree of social isolation because of low-SES status and/or racial minority status likely also intersects with urbanity. One of the striking features of urban poverty is the concentration of low-income, racial minority families in specific neighborhoods. This concentration stands in marked contrast to rural areas, where being poor and/or being non-White makes one a distinct demographic minority (Lichter & Johnson, 2007).

Another important area for further exploration in research on childhood deprivation and the development of psychopathology is the topic of mastery or control. One of the elements inherent in nearly all of the environmental demands low-SES children and their families face is uncontrollability. A large body of literature documents that chronic exposure to negative social (Peterson, Maier, & Seligman, 1993) and physical (Evans & Stecker, 2004) conditions elevate helplessness in children and adults. Chronic experience of helplessness is a well-documented risk factor for depression (Peterson et al., 1993). Poverty and other forms of disadvantage themselves may lead to elevated experiences of uncontrollability producing helplessness. The lower the family's income, the less children believe they have mastery (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001; Battle & Rotter, 1963). Among adolescents and adults, the higher one's income and education, the higher one's perceived control (Specht, Egloff, & Schmukle, 2013). Moreover, income reductions at any point during a 6-year period led to decreased perceived control, independently of baseline income levels (Specht et al., 2013). Furthermore, lower-SES parents are more authoritarian (Hoff et al., 2002) and less likely to encourage self-directedness or autonomy in their children (Kasser, Koestner, & Lekes, 2002; Luster, Rhoades, & Haas, 1989; Whitbeck et al., 1997). Furthermore, in a sample of Head Start children, those faced with a wider array of risk factors in the home environment exhibited more learned helplessness on a standard helplessness protocol (Brown, 2009). In this protocol, participants are given an interesting, age-appropriate puzzle. The index of helplessness is persistence to solve the puzzle. Using a similar protocol, Evans and colleagues (2005) also found that children from ages 9 to13 from low-income households exhibited greater learned helplessness compared to their middle-income peers. Given the prominence of racism and discrimination in the experience of low-income African American children and their families, control is likely an important pathway in thinking about the intersection of race and class as it impacts the mental health of children and youth (Williams et al., 2010).

A few investigators have looked at the potential role of genetic processes to influence outcomes of childhood poverty. Early chronic stress exposure is capable of altering genetic transcription processes (i.e., epigenesis). One research team has examined epigenetic processes in relation to childhood SES. Work by Miller, Chen, and Cole (2009) reveals that early low SES childhoods are related to altered gene expression in the inflammatory response systems (e.g., T cells) as well as in glucocorticoid (i.e., stress hormone) receptor systems (Miller & Chen, 2007; Miller et al., 2009). Heightened reactivity to adverse stimuli is the net effect of these different changes in gene transcription profiles. Recent work by Essex and colleagues (2013) has provided some of the first evidence of differential DNA methylation (affects the protein-encoding portions of a given gene, making it more or less accessible to transcription and expression) in adolescents whose childhoods were marked by high levels of stress and adversity. These epigenetic "marks" on the genome caused by early experience are hypothesized to lead to stable changes in the expression of genes relevant to health and development.

We also know that genetic polymorphisms can alter reactivity to stressful environments, and this insight has recently been applied to childhood SES. In a twin study

with 5-year-olds, additive, genetic effects accounted for about 70% of the variation in resilience for behavioral adjustment in low-SES, resilient children (Kim-Cohen, Moffitt, Caspi, & Tayor, 2004). Moreover, genetic components also carried some of the contribution of maternal warmth to resilience. One genetic polymorphism that has generated considerable interest in clinical psychology is the serotonin transporter genotype (5-HTTLPR) because it appears to relate directly to psychopathology and can alter vulnerability to risk factor exposure. Recent work suggests some possible linkages between this genetic polymorphism and vulnerability to low-SES background. Juveniles from low-SES backgrounds who had the long/long allele of 5-HTTLPR were more prone to narcissism and callous-unemotional traits than youth with the short/short and short/long genotypes, who did not differ in narcissism or callousness as a function of SES (Sadeh et al., 2010). Gene Brody and his colleagues (2012) have been following a sample of low-SES, African American youth from elementary school through young adulthood. Among those at risk, given high levels of poverty-related stressors, a subset of young adults were resilient in terms of good psychological adjustment and academic achievement. One cluster of these resilient young adults, however, manifested very high levels of allostatic load, indicative of chronic physiological stress. The resilient subgroup who did well despite the difficult circumstances in which they grew up appeared to pay a price in the form of very high levels of chronic stress. This physical vulnerability was associated with the short allele genetic polymorphism on the 5-HTTLPR serotonin transporter genotype. Finally, it warrants brief mention that many of the chronic stressors accompanying low-SES childhoods, such as low maternal responsiveness, chaos, and financial pressure, each interact with specific genetic polymorphisms to alter children's vulnerability (Kim & Evans, 2011).

The last future research topic we wish to call attention to is the paucity of a developmental focus in much of the research. As we noted in our overviews of research on childhood SES and psychopathology, very few studies incorporate comparisons of the mental health of children of different ages, let alone follow the same child over time in a longitudinal design (see NICHD, 2005; Schoon et al., 2002; Wadsworth & Achenbach, 2005, for some notable exceptions). There are trends in the literature suggesting that both the age and the duration of poverty exposure matter for children's mental health, indicating that earlier poverty is worse than later poverty and that the longer the duration, the more adverse the impacts (Bolger et al., 1995; Brooks-Gunn, Guo, & Furstenberg, 1993; Macmillan, McMorris, & Kruttschnitt, 2004; Najman et al., 2010; NICHD, 2005; Sacker, Schoon, & Bartley, 2002; Schonberg & Shaw, 2007; Schoon et al., 2002). Furthermore, many epidemiological investigations of SES reveal that social class at birth is a robust predictor of adult morbidity and mortality. These relations hold independently of adulthood SES, and several studies suggest that adult SES has little or no predictive power for health when childhood SES is statistically accounted for (Cohen, Janicki-Deverts, Chen, & Matthews, 2010).

Two particularly elegant demonstrations of the developmental timing of poverty and children's psychological well-being come from two experimental interventions. Costello and colleagues (2003, 2010) evaluated the impacts of increased incomes from the opening of a casino on a Native American reservation comparing Native American and non-Native children who did not receive the income supplements from the casino. The supplements reduced externalizing symptoms in the Native American children, but no changes over the same time period occurred in the comparison group. These same differences maintained for the subjects as adults but only for the youngest cohort who were exposed from an earlier age for a longer time period to the income supplements. Fernald and Neufeld (2008) and Fernald and colleagues (2009) evaluated a conditional cash-transfer poverty reduction program conducted in Mexico (Opportunidades). Essentially parents are given cash supplements contingent on various positive child-rearing practices, such as school attendance and use of preventive health care. Low-income rural children and their families were randomly assigned to the interventions at different time periods but were all enrolled at birth. Eight to 10 years after the intervention, children who had been enrolled 6 months earlier in the program showed more significant improvements in psychological health compared to those who had been enrolled later on. The section titled "Practice and Policy" provides more information on conditional cash transfer programs. Overall, however, our knowledge base for understanding the differential effects of of variations in poverty's timing and duration on children's mental health is thin and does not extend over long periods of maturation. Much more work spanning multiple developmental periods and capturing the timing of income changes needs to be done in order to tease apart the differential and/or interactive effects of developmental timing of poverty and duration of exposure to poverty.

One reason it is important to examine this question more rigorously is because it speaks to the issue of whether there are particular points in development where the adverse impacts of lower financial and social opportunities matter more and then become embedded in the individual,

scarring him or her for life. Or is what really matters the accumulation of multiple insults that recur as one grows up in poverty or in a low-SES household (Shonkoff, Boyce, & McEwen, 2009)? These two models are not mutually exclusive and could both be happening. They do have different implications for interventions. If, for example, there are critical developmental periods during which scarring occurs, interventions occurring prior to these periods may have the largest impacts. If, however, the process of damage occurs over time and continues to build over time, interventions may be helpful at multiple points in development. For example, interventions targeting family income, parental stress, and parenting may be most effective when delivered as early in development as possible, whereas interventions can be added later in the developmental process to directly target older children's self-regulation, EF, and coping skills and to prevent further accumulation of damage.

Developmental issues also intertwine with our presentation of potential, underlying mechanisms to help account for why poverty and low-SES childhoods are so inimical to the development of mental health. For example, if high levels of chronic stress affect different cortical and subcortical areas of the brain at different maturational rates, then we might expect an early critical period to be more consequential for systems that largely mature early in life. In contrast, biological systems that mature over a longer time frame might be more vulnerable to the accumulation of adverse experiences accompanying poverty rather than being age dependent. The PFC and other stress-regulatory regions of the brain, such as the hippocampus, take a longer time to mature than the amygdala (Lupien et al., 2009; Tottenham & Sheridan, 2010). The amygdala is a limbic structure centrally involved in rapid, automated responses to threat, fear, and strong emotions. This way of thinking about poverty, low SES, and child development also has important implications for whether constructs like coping or executive functioning would be expected to mediate the adverse impacts of poverty on mental health or function as moderators, providing protection. Wadsworth, Raviv, Compas, and Connor-Smith (2005) found that coping strategies were more apt to mediate the links between poverty-related stress and mental health among young adolescents but to moderate the same relations for their parents. Mediation would be predicted for systems and processes that mature earlier in life whereas moderation would be predicted for those that come on line later. Consider, for example, the relations between SES and EF functioning in relation to age. As reviewed earlier, low SES tends to directly erode EF among younger children; for adolescents, however, EF often functions as a resource, moderating the ill effects of SES on mental health. A developmental perspective also encourages us to think more about the relative influence of the home environment compared to the larger school and neighborhood environment in the lives of low-SES children. Thus, the impact of poverty directly on parents relative to the impact of poverty on school and community may play out quite differently as a function of child age. Finally, all of our research programs will benefit from better implementation of multiple levels of analysis to bring together converging lines of evidence from the community, neighborhood, family, individual, and genetic realms. An integrated understanding of the risks and sources of resilience in children affected by poverty is likely to lead the best solutions for this social problem that is so very costly, both in terms of human suffering as well as losses of human and economic capital.

Our overarching goal in writing this chapter was to create a compendium of the excellent scholarship that has convincingly demonstrated the critical roles of poverty and low socioeconomic status in the development of most forms of psychopathology. What is quite clear from this review is that we have moved beyond the important but insufficient question of *Does poverty matter for developmental psychopathology?* to the essential question of *How does poverty matter for developmental psychopathology?* The research outlined here on the psychosocial and biological mechanisms of poverty's effects on a child's brain, body, and functioning is substantial, compelling, and exciting because it illuminates numerous processes and pathways that can be targeted in treatment and prevention. The consistency of findings across multiple levels of analysis and inference provides a strong basis on which to urge researchers to explicitly include and explore income and SES variables in developmental psychopathology research—controlling for or covarying the effects of income/SES relegates this critical risk factor to a nuisance variable. It is clear that poverty and low SES are more than a nuisance and instead constitute a very powerful determinant of children's mental health.

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CHAPTER 5

Determinants of Parenting

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INTRODUCTION

Each day approximately three-quarters of a million adults around the world experience the pleasures and profits as well as the trials and tribulations of becoming a new parent. Each reader of this page has had the experience of being parented, and many relive the experience when they parent their own children. Evolutionary theory distinguishes between bringing a new individual into the world and caring for an existing individual, childbearing versus child caring (Bjorklund & Ellis, 2014; Bjorklund, Yunger, & Pellegrini, 2002). Whereas species lower in the phylogenetic hierarchy are principally childbearers, mammals such as *Homo sapiens* tend to be devoted child carers perhaps because the investment in a small number of progeny is great or, altricial, newborn human children are totally dependent on their parents. Human parents are fundamentally invested in their children: their survival, their socialization, and their education. Parents are tasked with preparing children for the physical, economic, and psychosocial situations that are characteristic of the environment and culture in which children must survive and, it is hoped, thrive (Benedict, 1938; Bornstein, 1991, 2012; LeVine, 2003). In consequence, understanding parenting is becoming a high-profile endeavor, and understanding the determinants of healthy and typical as well as unhealthy and atypical parenting is of increasing and compelling interest as well. Although parenting remains a somewhat mystifying subject about which almost everyone has opinions but about which few people agree, parenting study is enjoying popularity today as never before, and consequently a surprising amount of solid science is accumulating about parenting and its determinants.

Adults already know (or think they know) something about parenting by the time they first become parents. Indeed, human beings appear to possess some intuitive knowledge about parenting, and certain characteristics of parenting may be wired into our biological makeup. For example, people almost everywhere speak to babies even though they know that babies cannot understand language, and people even speak to babies spontaneously in a speech

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register specially reserved for them. However, human beings also acquire important knowledge of what it means to parent children through generational, social, and media images of parenting, children, and family life, knowledge that plays a significant role in helping people formulate their parenting cognitions and guide their parenting practices. For example, parents from different cultures differ in their opinions about all manner of caregiving-related issues, such as the relevance of diverse competencies specific for their children's successful adjustment, the ages they expect children to reach different developmental milestones, and so forth. Direct experiences with children and self-constructed parenting also help formulate parenting attitudes and actions.

What forces affect when and how parents parent? This question of determinants goes to the heart of much of contemporary parenting science. It is the subject matter of this chapter. In consequence, the chapter does not dwell on parenting as a phase of adult development or parenting as an instrumental activity vis-à-vis children and their development. Of course, parents are concerned about themselves as parents, and parents are concerned about the everyday well-being of their children as well as their children's long-term health and growth. Nor does the chapter address the origins of parenting studies, theories of parenting, or arguments for and against parenting effects. For an introduction and overview of these important parenting issues, see the companion chapter in Bornstein (2015).

Rather, this chapter surveys central issues concerning *determinants of parenting*, both normal and typical as well as abnormal and atypical (Cicchetti & Toth, 2009); it pursues the following course. The first section of the chapter briefly overviews, *in seriatim*, cognitions and practices that principally instantiate parenting and then parents, the principal actors in the human drama of caregiving. As a transition to the main focus on the multiple determinants of parenting, the chapter next alerts the reader to a series of methodological concerns useful in understanding and unpackaging determinants of parenting and points to some gaps in the literature that suggest future directions of research. The chapter then turns to the main substance—a review of the determinants of parenting in parents, children, and contexts. The chapter then addresses translational implications and concludes.

PARENTING AND PARENTS

As judged by psychoanalysis, ethology, psychology, and neuroscience, parents engage in a peculiar kind of life's work: Parenting is a delicate blend of altruism, prosociality, devotion, and selflessness, marked by constantly challenging demands, changing and ambiguous criteria, and all too frequent evaluations. Parenting entails both affective components—in terms of commitment, empathy, and positive regard for children—and cognitive components—the how, what, when, and why of caring for children. So, thinking about the determinants of parenting demands multilevel considerations of psychobiology, cognition, emotion, and sociality as well as multidisciplinary considerations of biology, psychology, sociology, and anthropology.

According to a nationwide survey conducted by the National Center for Children, Toddlers, and Families, more than 90% of parents say that, when they had their first child, they not only felt "in love" with their baby but were personally happier than ever before in their lives (Civitas Initiative, Zero to Three, & Brio Corporation, 2000). Parents report relatively higher levels of happiness, positive emotion, and meaning in life than do nonparents (Nelson, Kushlev, English, Dunn, & Lyubomirsky, 2013). Parents find interest and derive considerable and continuing personal reward in their relationships and activities with their children. They report that spending time with their children, especially in recreation or educational child care, ranks among their most enjoyable activities (Krueger, Kahneman, Schkade, Schwarz, & Stone, 2009; Nelson et al., 2013). And they are doing more of it: Bianchi (2000), Sayer, Bianchi, and Robinson (2004), and Aguiar and Hurst (2007) concur that adults in the United States (as elsewhere in the world; Gauthier, Smeeding, & Furstenburg, 2004) are spending more time with their children today than in the past. Notably, mesocortico-limbic dopamine is involved in both reward-related learning and mammalian caregiving (Insel, 2003).

For many, parenthood enhances psychological development, self-confidence, and a sense of well-being. Parenting translates into a constellation of new trusts, provides opportunities for enrichment and learning, and unveils a panorama on the "larger picture" of life. Parenthood also gives adults ample occasion to confront new challenges and to test and display their competencies (Crittenden, 2004). Markus, Cross, and Wurf (1990) learned that feelings of competence as a parent constitute a highly common aspect of the self as desired by adults. More commonly, however, parenting is identified with its instrumental character, as acts of providing for and supporting the biological, physical, intellectual, emotional, and social development of progeny. Human children cannot and do not grow up as solitary individuals, so parents want to know how best to

take advantage of the opportunities parenting affords and cope with parenting's unrelenting demands. Some consider this instrumental construal of parenting a lifelong 24/7/365 job. Parenthood is a major phase and constituent ingredient of mature and generative adulthood, and parenthood is central to childhood, to child development, and to society's long-term investment in children. Thus, we are motivated to know about the meaning and importance of parenthood and parenting and about how parenting develops. First, however, we address two introductory questions. How is parenting expressed, and who parents?

Parenting Cognitions and Practices

Parenting is instantiated in cognitions and practices, what parents think and what they do. Child rearing entails all sorts of mentation and consists of multiple kinds of interactions of parent, child, and context; parents possess attitudes, expectations, and attributions, and they naturally engage their children in a range of diverse activities and do not only or necessarily behave in uniform ways. Parenting appears to be a social construction that judiciously combines personological consistency with situational specificity. Instead of broad styles, it may be more appropriate and valid to conceive of parenting as fine-grained domains of practices and cognitions. Parenting is therefore multidimensional, modular, and specific (Boivin et al., 2005; Bornstein, 2002a, 2006a; Bornstin et al., 2008; Bradley & Caldwell, 1995; E. Skinner, Johnson, & Snyder, 2005) and so supports the identification and empirical focus on relatively independent cognitions and practices. When the chapter turns to determinants of parenting, it is concerned with the determinants of variegated cognitions and practices.

Parenting cognitions have long held a popular place in the study of parenting, and they span a wide array of goals, attitudes, expectations, perceptions, attributions, and actual knowledge about parenthood, about one's own parenting, about childhood, and about one's own child(ren). Cognitions also form a framework within which parents perceive and interpret their children's behaviors. Parenting practices give expression to parenting cognitions and constitute a large measure of children's worldly experience. The contents of human parent-child interactions are dynamic and varied and include multiple obligatory as well as discretionary activities. Parents nurture and protect children, but they also guide children in understanding and expressing proper feelings and emotions, educate children as to actions that are acceptable for the stage of childhood they occupy, and prepare children for adaptation to a wider range of life roles and contexts they will encounter as they grow. Take protectiveness as an expression of parental warmth (i.e., affection, nurturance, and responsiveness). The developmental literature historically treated protectiveness as a unidimensional construct (Parker, 1983; Sargent, 1983). Besides trying to protect their children from physical harm, however, parents also engage in diverse behaviors to protect their children from psychological and social harm (Power, 2004). Not unexpectedly, different kinds of protectiveness show different relations with different domains of child adjustment (Power & Hill, 2008). So parent protectiveness has proved to be better conceptualized as illustrative of the multidimensional, modular, and specific nature of parenting, and the effectiveness of parent protectiveness is better analyzed with respect to its different facets and effects. In practice, of course, parent-child interaction is dynamic, intricate, and meshed, and parents regularly engage in combinations of cognitions and practices. Taken as a totality, parenting cognitions and practices constitute a varied and demanding task set, and adults differ considerably in terms of how they esteem various components of the caregiving repertoire as well as in how successful they are in executing different components.

The attitudes and actions of children's parents, and the environments of caregiving they create, matter in that they shape children and the course of children's academic, emotional, behavioral, and social development (Bates, Schermerhorn, & Petersen, 2012; Belsky & de Haan, 2011; Bornstein, 2015; Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Domitrovich & Bierman, 2001; Goodnow, 2002; Holden & Buck, 2002; Maccoby, 1992; Roksa & Potter, 2011; Sigel & McGillicuddy-De Lisi, 2002; Stormshak, Bierman, McMahon, & Lengua, 2000; Vandell, 2000). We know this from a long history and wide variety of convergent approaches from correlational designs to experiments to interventions. For example, Patterson and Forgatch (1995) reported substantial correlations between parents' disciplinary and monitoring practices and children's negative and coercive behavior both at home and in out-of-home contexts, and Chilcoat and Anthony (1996) reported significant increases in risk of adolescents' drug sampling for every unit of decrease in parental monitoring after partialing age, gender, and ethnic status. The foregoing studies, although based on correlations, illustrate associations between parenting and child development that transcend a common context and obtain above common-cause third-variable controls (Ganiban, Saudino, Ulbricht, Neiderhise, & Reiss, 2008; Knafo & Jaffee, 2013; Price & Jaffee, 2008).

Longitudinal associations, adoptive parent–adopted child associations, and other emerging conservative strategies that supplant simple zero-order correlations constitute additional design improvements on cross-sectional and genetically related parent-child approaches. For example, higher levels of warm and sensitive parenting predict later decreases in child negative reactivity, even controlling for initial levels (Bates et al., 2012), and higher levels of harsh and controlling parenting predict increases in child negative reactivity, even controlling for initial temperament (Belsky, Fish, & Isabella, 1991; Braungart-Rieker, Hill-Soderlund, & Karrass, 2010). Using an adoption design that differentiates heritable (from biological parent) and environmental (from adoptive parents) effects on the adoptee's behavior, Ge et al. (1996) found that adoptive parents' behavior was associated with the psychiatric status of the adoptee's biological parents and that this association was mediated by the adoptee's behavior: Adoptees born to parents with psychopathologies were more hostile and antisocial, and their adoptive parents used more harsh discipline and were less nurturing and involved (see also O'Connor, Deater-Deckard, Fulker, Rutter, & Plomin, 1998). Apparently having genes of parents with psychopathologies affects adoptees' behavior and thus adoptive parents' parenting as well. Adoptive parent educational achievement is associated with adopted children's schooling (Bjoerklund, Lindahl, & Plug, 2006). Rice et al. (2010) employed a prenatal cross-fostering design, including pregnant mothers who were related or unrelated to their child as a result of in vitro fertilization and surrogacy, to disentangle inherited and environmental influences. Their logic was: If links between prenatal stress and offspring outcome are environmental, the association should be observed in unrelated as well as related mother-child pairs. Associations between prenatal stress and offspring birthweight, gestational age, and antisocial behavior were seen in both related and unrelated mother-offspring pairs, consistent with environmental links being determinative. The association between prenatal stress and offspring anxiety in related and unrelated groups appeared to be due to current maternal anxiety/depression rather than prenatal stress. By contrast, the link between prenatal stress and offspring attention-deficit hyperactivity disorder (ADHD) was present only in related mother-offspring pairs and therefore was likely attributable to genetic factors.

Experimental manipulations advance beyond parent-child correlations in attempts to document causal relations between parenting cognitions or practices and children's development. Animal experiments and natural experiments, designed experiments, and experimental interventions with human beings give evidence of parenting effects. Experiments with animal populations since Harlow's (1958) studies of monkeys raised with contrasting surrogate mothers provide invaluable and unique data about parenting because many informative manipulations are unethical with human beings. Variation in maternal care by rat dams (specifically arched-back nursing and licking and grooming) during the first postnatal week affects endocrine, behavioral, and even cognitive development of offspring: Pups of maternal dams show a decreased stress response, increased glucocorticoid receptor expression and synaptogenesis in the hippocampus, and enhanced spatial memory compared to pups of nonmaternal dams (Fish et al., 2004). The same effects also appear in cross-fostered pups (I. C. G. Weaver et al., 2004), demonstrating that they are not due to genetic inheritance. Notably, these endocrine, behavioral, and cognitive effects persist to maturity.

Experiments that have randomly assigned human families to treatment versus control groups and that intervene with the parents but do not simultaneously treat the children are rare (for obvious reasons), but several have shown that treatment can change parental thinking and action toward children in specified ways and, in consequence, alter child development. For example, intranasal administration of neuropeptides can reach the central nervous system, and oxytocin (OT) is known to play a key role in regulating social behavior and supporting the parent-infant bond (MacDonald & MacDonald, 2010). Naber, van IJzendoorn, Deschamps, van Engeland, and Bakermans-Kranenburg (2010) videorecorded fathers during a play session with their toddlers once following intranasal OT administration and then after intranasal placebo administration. Fathers increased their support for learning and exploration with respect for the child's autonomy following OT administration. Utilizing a double-blind, placebo-controlled crossover design, Weisman, Zagoory-Sharon, and Feldman (2012) observed fathers and their infants twice in a face-to-face still-face paradigm following administration of OT or placebo. OT administration increased fathers' salivary OT and key parenting behaviors that support parent-infant bonding. Moreover, parallel increases were found in infant salivary OT and engagement behavior, including social gaze, exploration, and reciprocity. In other words, OT administration had parallel effects on the treated parent and untreated child.

Interventions with parents have two construals. Near the end of this chapter, interventions are discussed for their translational implications to improve parenting

clinically and to inform policy. Intervention trials also can be interpreted as experimental manipulations that test theoretical models of parenting effects (P. A. Cowan & Cowan, 2002; van Doesum, Riksen-Walraven, Hosman, & Hoefnagels, 2008). An intervention designed to facilitate maternal responsiveness enhanced children's language skills (Landry, Smith, Swank, & Guttentag, 2008); a second to improve parents' behavior support found positive effects on key indicators of children's school readiness (Lunkenheimer et al., 2008); and a third to boost parents' positive behavior practices reduced problem behaviors in young children (Dishion et al., 2008).

Parenting in one generation is consequential because it has manifest instrumental validity for the succeeding generation. Importantly, individual differences in parenting cognitions and practices tend to be stable, meaning that parenting assessed at one point can to a certain degree be assumed to reflect past as well as future parenting. Short-term "test-retest" reliabilities of cognitions ($r = .74$) and practices ($r = .59$) in parents tend to be high (Holden & Miller, 1999). Holden and Miller (1999) meta-analyzed the consistency of beliefs and behaviors of parents (mostly mothers) with both relative standing and mean level change in mind and considering three circumstances: comparisons across time, children, and situations. Consistency was found to depend on circumstance as well as parenting construct, child age, and methodological approach among other moderators. They arrived at diminishing summary levels of child-rearing stability across children ($r = .50$), across time ($r = .45$), and across situations ($r = .26$) and increasing differences across children ($d = .23$), across time ($d = .40$), and across situations ($d = .52$) (see also Bornstein, Gini et al., 2006; Dallaire & Weinraub, 2005; Haltigan, Roisman, & Fraley, 2013; Maas, Vreeswijk, & van Bakel, 2013; Porter & Hsu, 2003, for supporting instance cases since the Holden and Miller meta-analysis).

Parents

Now that the principal attitudes and actions in parenting have been identified, it is appropriate to turn to consider parenting's principal actors. Who parents children? The majority of children throughout the world grow up in family systems with more than one or two significant parenting figure guiding a child's upbringing and socialization, even if the research literature usually focuses on mothers. Mothers and fathers are not children's only caregiving agents. The conception of parenting as a set of cognitions and practices expands the discussion of determinants of parenting beyond biological parents to other related (siblings, grandparents) and unrelated (adoptive, foster, and alloparents) caregivers who may also "socially" parent children (Leon, 2002). This chapter is largely circumscribed to determinants of parenting in parents, although for completeness sake determinants of some nonparental caregiving are briefly described.

Mammals tend generally to be devoted child "carers" (Bjorklund et al., 2002), and almost all mammalian species are matrilocal, the norm in mammalian care falling to mothers (Clutton-Brock, 1991; Wilson, 1975). On this account, maternal care is much more common than paternal care (in mammals, males provide care in less than 5% of species; Moller, 2003). Most observers agree that mothers (and female relatives) normally play the more central role in human child rearing (Barnard & Solchany, 2002; Civitas Initiative et al., 2000; Holden & Miller, 1999; Leiderman, Tulkin, & Rosenfeld, 1977; Weisner & Gallimore, 1977) and in many nonhuman mammalian species (Briga, Pen, & Wright, 2012). The maternal role is better articulated and defined than is the paternal role, and in their own upbringing, women are generally afforded more opportunities to acquire and practice skills that are child centered. Mothers are primarily responsible for home and family, and they are believed to bear a heavier psychic burden in parenting (Barnard & Solchany, 2002; Calzada, Eyberg, Rich, & Querido, 2004; Metsäpelto & Pulkkinen, 2003; Verhoeven, Junger, Van Aken, Deković, & Van Aken, 2007). Even among species where males show considerable parental altruism, they commonly do less caregiving work than females (Wilson, 1975). One finds many more nonresident dads than moms (Sorensen, 1997), for example.

Homo sapiens is an alloparental species, and cooperatively breeding vertebrates (like human beings) often enlist "helpers" who take care of immature offspring who are not their own within the social group (Hrdy, 2009). Among humans, siblings sometimes care for children (Zukow-Goldring, 2002); grandparents often assume central roles in child caregiving (P. K. Smith & Drew, 2002); and numbers of young children around the world normatively participate in diverse types of nonparental nonfamilial care (Clarke-Stewart & Allhusen, 2002). Grandparental help may be indirect or direct. Increased life expectancy, decreased family size, more maternal employment, and the rise of single-parent families have conspired to increase the potential for grandparents (and others) to play greater parts in the lives of their grandchildren (Arber & Timonen, 2012; Dunifon, 2012; Kornhaber, 2002; Tanskanen & Rotkirch, 2014; Witkin, 2012). Approximately 43% of grandparents provide some child care on a regular basis (Lou & Chi, 2012; Stelle, Fruhauf, Orel, & Landry-Meyer,

2010), and in custodial grandparent families, children are reared solely by grandparents (as the result, e.g., of maternal incarceration or other parental problems; Poehlmann et al., 2008).

Many tasks associated with child care can also be purchased in the marketplace. Today children enter that kind of care early, stay for longer periods of time, and change types of care often (Burchinal, Magnuson, Powell, & Hong, 2015). Beginning in the child's first year, about 50% of the children in the United States, for example, experience regular nonparental child care, and by the preschool years, more than 75% of children have experienced some type of child care. As a consequence of contemporary social and cultural forces (mentioned earlier), the use of child care services has burgeoned, and nonparental caregivers have assumed increasing responsibility for meeting children's developmental needs and preparing children for a future in society (Gottfried, Gottfried, & Bathurst, 2002).

It has been argued that mothers and fathers and others do not necessarily share the same "investments" in parenting (Geary, 2000), and human cultures distribute the tasks of child care in different ways (Leinaweaver, 2014). Children's parents and others divide the labor of caregiving, and the content, meaning, and effects of mother-child, father-child, and other-child relationships all have significances. Indeed, researchers have reckoned that, for example, mothers and fathers make independent contributions to children's development (A. Martin, Ryan, & Brooks-Gunn, 2007; Ryan, Martin, & Brooks-Gunn, 2006), children develop attachments to different people (Howes & Oldman, 2001; Howes & Spieker, 2008), and social relationship theory posits that multiple associations are important to children because they meet different developmental needs (Vandell, 2000).

All said, it comes as little surprise that a more extensive body of information has developed about determinants of mothering than about fathering or other caregiving. However, the division of child care implies that developmental science eventually needs to consider determinants in mothers, fathers, as well as multiple other "parents."

Summary

Parenting expresses itself in both the beliefs parents hold and the behaviors they exhibit. Many conceptually separate parenting cognitions and practices have been discerned, and each is developmentally significant. Moreover, many people parent children. With parenting so demonstratively meaningful, we should ask not whether parents matter, but what makes a good parent. Parenting is important; therefore, the determinants of parenting are important.

Parenting is not an activity people normally think of as being especially scientific. Like most things, however, better parenting benefits from greater knowledge and understanding, which in turn depend on theory and research. Happily, there is a science of parenting with developing theory and growing systematic research behind it. The contemporary parenting literature, however incomplete, now contains thousands of studies. This chapter of determinants of parenting is based on that consolidating science of parenting.

SOME METHODOLOGICAL CONSIDERATIONS AND FUTURE DIRECTIONS

Measurement is an importunate challenge in contemporary parenting science (Bornstein, 2010a; Bornstein & Toole, 2010). Hurley, Huscroft-D'Angelo, Trout, Griffith, and Epstein (2014) reviewed the psychometric quality of parenting measures published from 1985 to 2009. Their initial search yielded 164 English-language measures, which was reduced to 25 that supplied some psychometric information. Considering 10 psychometric properties, out of the 25, 7 had no acceptable psychometric properties, 7 had only 1 or 2, 6 had 3 to 4, none had 5 to 6, and only 5 had strong psychometric properties in 7 or more. Only 5 measures provided norming information.

The parenting literature is also encumbered by mixed findings, and empirically there is widespread lack of agreement regarding which assessment methodology may be most effective and valid to use, as observation, test, and interview and questionnaire methods have different strengths and limitations (Bögels & van Melick, 2004; Collett, Gimpel, Greenson, & Gunderson, 2001; Dadds, Maujean, & Fraser, 2003; Gaylord, Kitzmann, & Coleman, 2003; O'Connor, 2002; Reitman, Rhode, Hupp, & Altobello, 2002; Rhoades & O'Leary, 2007). Moreover, which features of parenting are most vital to study presents a central, perennial, and sometimes vexing choice (Bornstein, 2013b). Related empirical concerns focus on the need for measurement invariance of assessments across parent gender, socioeconomic status (SES), and culture (Adamsons & Buehler, 2007; Furman & Lanthier, 2002; L. Huang et al., 2011; Locke & Prinz, 2002; Senese, Bornstein, Haynes, Rossi, & Venuti, 2012; Stolz, Barber, & Olsen, 2005). Additional challenges for the future study of determinants are to acknowledge and rectify the fact that that, up to now, the rapidly developing discipline of parenting research has

focused too narrowly on determinants of mothering to the near exclusion of other caregivers and of multiple family relationships; on selected determinants of parenting, such as SES, to the near exclusion of others, such as religion; on determinants in normative nuclear families, when the world is populated with a bewildering panoply of family compositions (Ganong, Coleman, & Russell, 2015; Perrin, Siegel, & the Committee on Psychological Aspects of Child and Family Health, 2013; Shah, Zao, & Ali, 2011); and on determinants of parenting in the minority (Western, educated, industrialized, rich, and democratic) developed world rather than the majority developing world (Bornstein, 2010b; Henrich, Heine, & Norenzayan, 2010; Tomlinson, Bornstein, Marlow, & Swartz, 2014). Future cutting-edge research designs will also account for assortative mating, control one parent in analyzing determinants on the other parent, and other areas.

Another pervasive critique of contemporary parenting science is that research in the area has not yet adequately addressed determinants of the nuanced complexities of everyday parenting, where the rubber meets the road. Parents multitask; parenting is more than feeding and teaching and being emotionally available. Parenting is planning and organizing (arranging playdates, identifying after-school activities, finding pediatricians) that consumes mental and physical energy and time. Parenting is disambiguating moment-to-moment novel, complex, dynamic, uncertain information associated with children and child rearing. Parenting is expecting of oneself and being expected by others to caregive consistently, appropriately, and effectively. Parenting is being highly motivated to succeed at these many assignments. Using nonparticipant unobtrusive naturalistic observational methods, Radesky and colleagues (2014) captured frequency, duration, and modality of mobile device use versus caregiving of people tending young children eating in fast food restaurants. Caregivers who were highly absorbed with their devices also responded harshly to child misbehavior.

Consumers of the determinants of parenting literature should consider that parenting also affects each putative determinant, and untangling direction of effects is a persistent vexing concern. This field needs to move beyond single-point-in-time cross-sectional determinant-of-parenting studies that leave the direction of parenting determinants ambiguous. Strong evidence that a given factor "determines" parenting would be a Time 1 (T1) determinant–Time 2 (T2) parenting link that (good) controls for the T1 level of the parenting variable in question and (better) also controls for the concurrent T2 association between the putative determinant and the parenting outcome. Such designs are supported by, for example, a partial correlation between T1 determinant and T2 parenting, controlling for T1 parenting or a cross-lag correlation in which the T1 determinant predicts the part of the variance in T2 parenting that remains after controlling for T1 parenting and its concurrent link to the T2 determinant or a comparable regression formulation. (Simple longitudinal precedence is only suggestive of causality; Reiss, 1995.) When is a determinant effective? Consider three possible temporal models of the effectiveness of some determinant of parenting. As described, an antecedent determinant of parenting might be effective and endure, independent of later experience with the determinant and of any earlier contribution of the parenting variable. This antecedent determinant model is consonant with a sensitive period interpretation of determinant effects on parenting (Bornstein, 1989). Alternatively, a determinant could exert a unique influence on parenting only at current points in time that override the effects of antecedent influences. Or, in a cumulative/additive/stable model, a determinant at any one time might not necessarily affect parenting, but meaningful longitudinal relations need to be structured by the determinant continually repeating and aggregating through time. To date, theoretical explanations for specific pathways and directions of associations are weak, and methodologically rigorous studies (e.g., using longitudinal data in conjunction with independent assessments of determinants) continue to be the exception.

The issue of determinants raises the important questions of multicausality. On one hand, many "causes" of parenting naturally covary, so multicollinearity is an issue that merits close attention. For example, youth is associated with less than optimal parenting, perhaps because young parents themselves are still developing executive functions or a sense of self, but people who have children early in their life career are also more likely to have low education and low SES, which adversely affect their parenting. Bandura (1997) defined self-efficacy as personal judgments about one's ability to execute a future course of action and to encompass feelings of competence about one's ability to perform a role or task. Self-efficacy has come to occupy a central role in parenting science and is linked with positive parenting. In Bandura's analysis, efficacy is influenced by a number of factors, including task difficulty, effort expenditure, vicarious experiences, physiological and mood states, social or verbal persuasion, and outcome expectancies that have been formed by past successes and failures. Self-efficacy as much as any construct exemplifies multideterminacy in parenting. As we shall see, Bandura underestimates the case, as a slew

of other factors, from depression to child care experience to social support, likewise co-construct self-efficacy in parents. To identify any one determinant of parenting, it is necessary to covary third-variable confounders.

On the other hand, it is certain that parenting has many determinants, and it is illogical and nonscientific to assert the preeminence of one cause over another when each in its own way contributes to some effect. Within complex developmental systems, it is unlikely that any single factor can be expected to account for substantial amounts of variation. Parenting effects are also conditional and not absolute (i.e., true for all parents under all conditions). More complex conceptualizations that incorporate larger numbers of influential variables will likely explain parenting better than simpler ones with fewer variables. The constructive enterprise is really to understand how all relevant forces might work in concert. Parenting is a multilevel phenomenon and will be better understood eventually by employing evolutionary, biological, comparative, behavioral, and cultural perspectives.

By 1997, Holden reported that more than 30 variables had been identified to empirically influence parenting. The literature concerning endogenous and exogenous sources of influence on parenting has since burgeoned further, but antecedents have typically been studied in isolation, and few investigations evaluate multiple influences simultaneously. Thus, the overlap of different antecedents vis-à-vis the unique contribution that any one may make to parenting remains essentially unexplored. With this limitation in mind, family systems theorists have emphasized the importance of considering the possible independence *and* interdependence of multiple organismic, environmental, and experiential determinants of parenting. Various models of action might obtain: It could be that some determinants compete with each other, others may be additive, and still others interact (Holden & Miller, 1999).

Furthermore, effect sizes for any one determinant-parenting relation, or for contingencies that operate across different components of the family system, might be small in magnitude. This is not a statement about the unimportance of small effects (see Bornstein, 2014) but rather of the need to build models of parenting that focus on the ways small effects might combine.

The number and complexity of determinants have implications for the expression of parenting. Holden and Miller (1999) pointed out that, if parenting is determined by a small number of consistent or operative variables, parenting might be characterized by great similarity. If, however, parenting is determined by a large number of influences or variables that change, parenting might be less consistent.

The still-inadequate situation of contemporary parenting research is therefore ripe for revolution and advancement. In the meantime, the account of determinants of parenting that follows must be understood in light of extant literature, and in weighing the ensuing survey, the reader is best informed by a clear understanding of these several constraints and shortfalls as well as others that arise as successive topics are discussed.

DETERMINANTS OF PARENTING

For heuristic purposes, the considerations of parent, child, and contextual determinants of parenting in this chapter treat each factor as a determinant, and each has been investigated as such. However, in an organized, linked, multicausal system, any element has the potential to moderate both the structure and the impact of other elements in the system.

Suppose (following Bronfenbrenner & Morris, 2006) that parenting is the joint product of four defining properties: Process × Person × Context × Time. *Process* refers to dynamic interactions that the parent experiences. In considering child development, Bronfenbrenner and Morris (2006) gave central attention to "proximal processes," which they posited to be most important. Applied here, such processes would consist of the parent's experiences within microsystems and include social interactions with others and engagement with particular materials in a setting. Characteristics and qualities of the parent *qua person*, factors such as age, gender, personality, and competencies, are posited to determine parenting.

Context refers to nested micro-, meso-, exo-, macro-, and chronosystems which Bronfenbrenner (1979) identified and distinguished in conceptualizing different spheres of influence on an individual. To paraphrase, he defined the microsystem as the pattern of activities, roles, and interpersonal relationships experienced by the parent in face-to-face settings with particular physical and material features. The microsystem also can encompass mass media (television, movies, or the Internet), given that these sources affect a parent's functioning. For example, based on a national U.S. sample of 1,000 parents living with at least one target child 6 to 17 years old whom Romer and his colleagues (2014) exposed to sequences of three pairs of short scenes with either violent or sexual content from popular movies, parents became progressively desensitized to both violence and sex in movies, which may contribute to their increasing acceptance of both types of content for young children.

The parent microsystem is nested under the mesosystem, defined in paraphrase as linkages and processes that take place between two or more settings containing the parent. A mesosystem is in essence a system of microsystems. For example, mothers are likely influenced by information they receive from their support networks (McConnell, Breitkreuz, & Savage, 2011) or when attending a school event affects their parenting (McIntosh, Lyon, Carlson, Everette, & Loera, 2008). The exosystem encompasses linkages between features of the environment the parent does not directly encounter but that guide parenting through their effects on the microsystem and mesosystem. For example, parents' use of computer technology to telecommute rather than work at their workplace illustrates an exosystem setting effect on parenting (Golden, 2012). At the outermost macrosystem level are overarching patterns of beliefs, values, customs, and living conditions. Bronfenbrenner (1979) highlighted the importance of macrosystem constituents, such as religion, social class, and culture. Cutting across these four levels is the dimension of time, the chronosystem, which includes minute-by-minute exposure to various processes, the periodicity of episodes over broader intervals of days or weeks, and even longer life course and historical eras. The chronosystem can be viewed in terms of the comparative salience of proximal processes occurring at different ages (e.g., critical or sensitive periods; Bornstein, 1989) or in terms of persons encountering different macrosystem events at different ages (Elder & Shanahan, 2006).

Bioecological theory provides a rich and generative framework for drawing attention to important active ingredients and features of different determinants and in formulating ways to conceptualize relations between different determinants. A crucial point is that the meso-, exo-, macro-, and chronosystems are not separate from the parent's immediate microsystem. Rather, each system permeates those inferior to it. Moreover, it is important to recognize the bidirectional nature of system linkages. For example, the interplay between parent work conditions and family functioning, a usual exosystem analysis, involves assessments of work→family (work-to-family spillover), where work demands infringe or enhance parent functioning (Hsueh & Yoshikawa, 2007; Krapf, Ursprung, & Zimmerman, 2014), as well as family→work (family-to-work spillover), where parent responsibilities infringe or enhance work performance (Buehler & O'Brien, 2011; Krapf et al., 2014). This system structure is best viewed as hierarchical in nature, with lower-order elements nested within higher-order elements and no one level predominant (Ungar, Ghazinour, & Richter, 2013). Here I adopt this scheme to model the determinants of parenting. A further important consequence of multiple linkages across system levels reinforces the probabilistic nature of parenting, given that the impact of influences from one level can be moderated by characteristics at other linked levels.

A vital step on the path to fully understanding parenting is to evaluate the many forces that structure it. The origins of individual variation in maternal, paternal, and alloparental caregiving, whether of cognitions or practices, are extremely complex, and it has long been explicitly acknowledged that parenting is multiply determined. Contexts (such as evolution, history, ecology; culture, ethnicity, religion, SES; neighborhood, networks, family, situation), children's structural and psychological characteristics, and parents' own biological and psychological characteristics work in tandem to construct a parent. Consistent with a relational developmental bioecological orientation (Belsky, 1984; Bornstein, 2006a; Bornstein et al., 2007; Bronfenbrenner & Morris, 2006; Farnfield, 2008), this vast array of determinants can be grouped roughly (following the logic of hierarchical regression) according to their proximity to the parent from proximal to distal: (a) intrapsychic and intrapersonal characteristics of parents, (b) actual or perceived characteristics of children, and (c) contextual characteristics. A thorough and thoroughly up-to-date meta-analysis sought to quantitatively synthesize what twin and adoption studies have to say about the etiology of parenting (Klahr & Burt, 2014). Unsurprisingly, this meticulous attempt to definitively catalog genetic and environmental sources of parenting identified effects attributable to parent, child, and context. Reasons of space constrain a full accounting of all possibilities, and so this exposition of the determinants of parenting in the three main sources is illustrative rather than exhaustive.

DETERMINANTS IN THE PARENT

Because securing the survival of offspring is fundamental to evolutionary pressure, it is likely that specific biological and psychological characteristics evolved in the service of parenting. Expressions of parenting have been shown to reflect biological and psychological characteristics that equip parents (an even nonparents) to interpret and respond to the kaleidoscopic requirements and responsibilities of parenting. Even if most parents face the formidable challenges of parenthood with some degree of naiveté, parents do not meet the task totally unprepared.

Biological Characteristics

Genetic endowment, neurohormonal activity, and central nervous system structure and function constitute some of the central biological characteristics identified to condition parenting.

Genetics

Behavior genetics (BG) seeks to understand biological sources of variation in human characteristics (Plomin, DeFries, McClearn, & McGuffin, 2008). By studying individuals of varying genetic relatedness (identical and fraternal twins, biological and adopted siblings who share or do not share the same experiences), behavioral geneticists attempt to estimate the amount of variation (heritability; h^2) in characteristics that can be explained by genetic endowment. Heritability denotes inheritance of DNA and refers to the main effect of genetics on individual differences but does not necessarily imply genetic determinism (for discussions of interpretations and misinterpretations of heritability, see Plomin et al., 2008; and Visscher, Hill, & Wray, 2008). BG assumes that sources of variation in a parent characteristic can be separated into independent genetic (G) and environmental (E) components that together (with error variance) add to l00% of the variance in a characteristic. G effects are additive (A) and dominant (D), and E effects are shared (C) and nonshared plus error (E). (E is not usually measured directly but estimated as the residual variance not accounted for by G; see Caspi, Taylor, Moffitt, & Plomin, 2000.)

From a BG perspective, parenting is just another phenotype that is a reflection of nature and nurture and not an eventuality of "pure" nurture (McGuire, 2003). Genetic contributions to parenting are conceptualized as evidence of genotype-environment correlations (*r*GE). Three types of *r*GE processes have been articulated: Passive *r*GE processes occur when family members share both environments and genes; evocative *r*GE processes refer to the extent to which genetically linked traits in individuals elicit responses from others; and active *r*GE processes refer to the extent to which people seek out environments that are correlated with their genetically linked traits. Studies of the heritability of parenting usually focus on passive and evocative processes because active *r*GE processes are difficult to detect in the absence of longitudinal data (McGuire, Segal, & Hershberger, 2012).

Lytton and Gallagher (2002) and McGuire (2003) introduced and discussed BG research on the heritability of parenting beliefs and behaviors. Early BG studies focused on demonstrating that some parenting cognition or practice is heritable; for example, parents' warmth (Neiderhiser et al., 2004). Current studies investigate moderators and mediators of genetic and environmental contributions to parenting (McGuire et al., 2012). Kendler and Baker (2007) meta-analyzed child- and parent-based BG studies of contributions to parenting and found that weighted heritabilities from 12 studies that were child-based were highest for parental warmth (34–37%), then protectiveness (20–26%), and last control (12–17%), and 10 parent-based studies showed higher heritabilities for parental warmth (35%) compared to other parenting dimensions (19–23%). A succeeding review (Klahr & Burt, 2014) arrived at similar conclusions with respect to heritabilities for different dimensions of parenting in mothers and fathers based on child and parent adoption and twin designs.

A full consideration of the BG literature and the controversies it raises is beyond the scope of this chapter. Suffice it to say that empirical and philosophical points have been argued to vitiate many central BG claims (Charney, 2012; Collins et al., 2000; Elman et al., 1996; Gottlieb, 1995; Rose, 1995; Turkheimer, 1998). For example, heritability estimates are often indeterminate and variable (Klahr & Burt, 2014), as estimates fluctuate depending on the dependent construct, source of information, and other methodological factors; genes may function differently in different environments and at different times (Naumova, Lee, Rychov, Vlasova, & Grigorenko, 2013; Szyf & Bick, 2013); and meta-analyses reveal that heredity rarely accounts for as much as 50% of the variation among individuals in a particular population (Klahr & Burt, 2014; McCartney, Harris, & Bernieri, 1990). Furthermore, in genetically informed adoption and twin research, degree of biological relatedness between individuals, not specific molecular markers of genetically linked characteristics, is often the primary focus, and it has proven difficult to identify genes responsible for the heritability of complex traits, such as parenting (Plomin, 2012; Wahlsten, 2012)—although this situation is changing with respect to identifying specific genes (see Bakermans-Kranenburg & van IJzendoorn, 2008; Burkhouse, Gibb, Coles, Knopik, & McGeary, 2011; S. S. Lee et al., 2010; Mileva-Seitz et al., 2011; van IJzendoorn, Bakermans-Kranenburg, & Mesman, 2008). As to how genes might manifest in parenting, it is possible they do so through hormones implicated in childbearing and child rearing or because they contribute to the mental and emotional composition of the parent (both of these determinants of parenting are discussed next). However, contemporary parenting research is concerned with a broader range of questions than concern most heritability studies.

Hormones

The expression of parenting has been linked to hormones that are sometimes homologous in females and males (Bales, 2014; Corter & Fleming, 2002; Reburn & Wynne-Edwards, 1999). In most mammals, postpartum females respond to young differently than do nulliparous (virgin) females (Numan, 2012; Numan, Fleming, & Levy, 2006; Numan & Insel, 2003). Primiparous females are attracted to infants and care for them, whereas virgins typically avoid or reject infants, suggesting that hormonal events involved in parturition prime the brain to be sensitive to a new and unique set of stimuli (Lambert & Kinsley, 2012). Such hormonal changes enter the brain and act on neurons to modify brain function (Numan & Insel, 2003). A "female mammal's physiological state primes and activates neural and neurochemical mechanisms that promote maternal responsiveness [and]... dysregulation of such mechanisms would lead to inadequate maternal behavior" (Numan, 2012, p. 105).

Perhaps the most studied hormone is oxytocin, which promotes prosocial behavior (Galbally, Lewis, van IJzendoorn, & Permezel, 2011) and is known to support the parent-infant bond in mammals (MacDonald & MacDonald, 2010). OT has been implicated in attachment and positive parenting in different species from rodent (Champagne, Diorio, Sharma, & Meaney, 2001) to monkey (Maestripieri, Hoffman, Anderson, Carter, & Higley, 2009) to human (Feldman, Gordon, & Zagoory-Sharon, 2011). Variation in the OT receptor gene is associated with maternal sensitivity (Bakermans-Kranenburg & Van IJzendoorn, 2008). Naber and colleagues (2010) videorecorded fathers during a play session with their toddlers following intranasal OT administration and then after intranasal placebo administration. Fathers increased their support for learning and exploration with respect for the child's autonomy following OT administration. Feldman et al. (2012) assayed OT from adults who were also genotyped for oxytocin receptor (*OXTR*) and *CD38* risk alleles associated with social dysfunction. (*CD38* is an ectoenzyme that mediates the release of brain OT.) Parent-infant interactions were microcoded for touch and gaze synchrony, and participants reported on parental care in childhood. Reduced plasma OT and both *OXTR* and *CD38* risk alleles were related to less parental touch, and parents who reported less parental care showed lower plasma OT, low-risk *CD38* alleles, and less touch, suggesting that peripheral and genetic markers of the extended OT pathway might underpin core behaviors associated with human parenting. In one extension of this work, the same team observed associations between baseline OT levels in mothers and fathers and different parenting behaviors (engagement, affect synchrony, and communication). OT revealed differential associations with sexually dimorphic patterns of parental behavior: Mothers' baseline OT levels were positively correlated with affectionate but not stimulatory contact, whereas fathers' baseline OT levels were positively correlated with stimulatory but not affectionate contact (Feldman, Gordon, Schneiderman, Weisman, & Zagoory-Sharon, 2010; Feldman et al., 2011). Utilizing a double-blind, placebo-controlled crossover design, Weisman, Zagoory-Sharon, and Feldman (2012) observed fathers and their 5-month-old infants twice in a face-to-face still-face paradigm following administration of OT or placebo to the father. OT administration increased fathers' salivary OT and key parenting behaviors that support parent-infant bonding. Moreover, parallel increases were found in infant salivary OT and engagement, including social gaze, exploration, and social reciprocity. In other words, OT administration had parallel effects on the treated parent and untreated child.

Several other neurohormones show associations with parenting cognitions and practices. Decreased cortisol relates to high ratings on control and warmth, decreased emotionality in responding to children, and reduced conflict with children about rules. Mothers with higher cortisol levels are withdrawn and less interactive with children (Flinn et al., 2012). Fathers' cortisol levels are elevated at home on evenings that follow more stressful interactions with supervisors and with coworkers (Repetti, Robles, Reynolds, & Sears 2012; Saxbe, Repetti, & Nishina, 2008). Sprengelmeyer et al. (2009) implicated the likely involvement of estrogen and progestogen in mothers' emotional responses to baby faces. They suggested that neural substrates involved in reward processing and maternal behavior are possible candidate structures linked to these processes (Panksepp, 1998). Increases in prolactin (PRL) levels have been implicated in the expression of parenting in females as well as males, and fathers have higher PRL levels than nonfathers (Gettler, McDade, Feranil, & Kuzawa, 2012). Variation in the vasopressin receptor 1A (AVPR1A) is associated with maternal focused support (Avinun, Ebstein, & Knafo, 2012).

Whereas estradiol plays a role in regulating maternal behaviors in female animals, the conversion of testosterone (T) into estradiol is believed to be involved in regulating paternal behavior in male animals (Trainor & Marler, 2001, 2002) and may constitute an endocrinological basis of paternal care (Fernandez-Duque, Valeggia, & Mendoza, 2009). Human fathers show different peripheral steroid hormone levels compared with childless men (Storey,

Walsh, Quinton, & Wynne-Edwards, 2000). In men, T is elevated during mate acquisition (and conspecific competition) but downregulated in parenting (Gettler, McDade, & Kuzawa, 2011). A large representative study in the Philippines showed that, among single nonfathers, men with high waking T were more likely to become partnered fathers by the time of follow-up 4.5 years later. Men who became partnered fathers then experienced large declines in waking and evening T, declines that were significantly greater than declines in single nonfathers (Gettler, McDade, Feranil, & Kuzawa, 2011). Men with higher T levels report less sympathy in response to an infant cry (Fleming & Li, 2002), and fathers with higher T engage in less caregiving (Alvergne, Faurie, & Raymond, 2009; Kuzawa, Gettler, Muller, McDade, & Feranil, 2009).

In considering the possible implications of pregnancy-related hormones and other caregiving-involved hormones, it is well to remember that many individuals who do not give birth to children—fathers, grandparents, in-laws, adoptive parents—not only parent them but come to love and develop strong emotional bonds with them too (Rilling, 2013).

The Nervous Systems

Just as genes and hormones are wrapped up in parenting, so are the structure and function of the autonomic and central nervous systems (Bridges, 2008; Brunton & Russell, 2008; Numan & Insel, 2003). Esposito and his colleagues (2014) measured autonomic physiological arousal using the novel technique of infrared thermography while Italian and Japanese adults viewed unfamiliar infant and adult faces of ingroup versus outgroup members. Both Italian and Japanese showed significant physiological activation (increase of facial temperature) for both ingroup and outgroup infant faces. Arousal responses to infants are mediated by the autonomic nervous system. These same investigators also used three convergent methodologies – Galvanic Skin Response (GSR), cardiac dynamics via Inter-Beat Interval (IBI), and right hand temperature change (RHTC) in fathers of typically developing children and non-fathers listening to the cries of infants later diagnosed with ASD compared to typical infant cries and laughter. They found that fathers and non-fathers alike show greater negative responses (increased GSR) to ASD compared to typical infant cries and laughter. Fathers showed higher IBI and greater RHTC than non-fathers while listening to typical and atypical cries. Thus, fathers and non-fathers show emotional arousal mediated by sympathetic activation while listening to cries of children with ASD (Esposito et al., 2015).

Parenthood is known to alter the adult brain (Barrett & Fleming, 2011; Bornstein, 2013a; P. Kim et al., 2010a; Leuner, Glasper, & Gould, 2010; Rilling, 2013). For example, Bornstein, Arterberry, and Mash (2013) found that just 3 months of exposure to their own infant's face changes the visual cortex evoked response potential (ERP) in new mothers. Nonhuman animal studies show that the mammalian forebrain plays an important part in the expression of reproductive behavior and specific behaviors during nursing and care of offspring, ones that are different in female and male animals and are reflected in functional and morphologic sex differences in neural forebrain circuitry (Champagne et al., 2001; Corter & Fleming, 2002; Sheehan & Numan, 2002; Simerly, 2002). The physiological state associated with parturition causes a functional rerouting of the brain circuits over which infant stimuli are processed. In virgins, infant stimuli have a negative valence and activate neural circuits that regulate avoidance and defensiveness, resulting in antisocial responses. Such mechanisms prevent the virgin from caring for young when she is not lactating. In postpartum females, infant stimuli have a positive valence and activate neural circuits that regulate attraction, approach, and acceptance behaviors (prosocial maternal responses).

In humans, the neuroscience of parenting is a cresting area of research interest (Bornstein, 2013a). Using visual (usually face) and auditory (usually cry or laugh) stimuli (of own and unfamiliar infants and children), imaging studies from electroencephalography to ERP to magnetoencephalography to functional magnetic resonance imaging have begun to expose neural activation patterns in specific regions of the brain that are associated with select parenting cognitions and practices leading to incipient models of a complex brain network hypothesized to mediate human parenting (Swain, Lorberbaum, Kose, & Strathearn, 2007). Since Bartels and Zeki (2000, 2004), programmatic research with own versus other baby photographs and videos (Bornstein et al., 2013; Leibenluft, Gobbini, Harrison, & Haxby, 2004; Noriuchi, Kikuchi, & Senoo, 2008; Ranote et al., 2004; Strathearn, Li, Fonagy, & Montague, 2008; Swain, Leckman, Mayes, Feldman, & Schultz, 2006) and with cries of own infant versus standard cries versus control noises (De Pisapia et al., 2013; Ranote et al., 2004; Venuti et al., 2012) has revealed enhanced activations in regions of mothers', fathers', and nonparents' brains associated with empathy, responsiveness, and emotion recognition and evaluation. Human mothers show neural activation in limbic forebrain structures in response to infant crying compared with neutral sounds (Lorberbaum et al., 1999) and bilateral activation of the

orbitofrontal cortex while viewing pictures of their own versus unfamiliar infants (Nitschke et al., 2004). First-time mothers activate mirror-neuron regions of the brain more strongly when observing and empathizing with their own compared with unknown infants (Lenzi et al., 2009). Connecting brain activation with cognitions, mothers viewing smiling pictures of their own versus unfamiliar infants yields brain activation that is correlated with pleasant mood ratings and affective responses to their infant (Nitschke et al., 2004). When Laurent and Ablow (2012) investigated depression-related differences in primiparous mothers' neural responses to their own infant's distress cues using functional neuroimaging, they found that nondepressed mothers activated to their own infant's cry greater than to a control sound in a distributed network of paralimbic and prefrontal regions, whereas mothers diagnosed with major depressive disorder failed to show activation. Depressed compared to nondepressed mothers also showed less striatal (caudate, nucleus accumbens) and medial thalamic activation. Experience-independent and experience-dependent neuroplastic alignments of the human brain likely subserve the biological requirements of child care, securing offspring survival and well-being and perhaps fostering reproductive fitness in subsequent generations (Bornstein, 2013a; P. Kim et al., 2010b; Rilling, 2013).

Papoušek and Papoušek (2002) advanced the notion that some parenting is likely hardwired in human beings. Intuitive parenting involves responses that are developmentally suited to the age and abilities of the child and that likely have the goal of enhancing child adaptation and development. Parents regularly enact intuitive parenting programs in an unconscious fashion; such programs do not require the time and effort typical of conscious decision making; and, being more rapid and efficient, they utilize less attentional reserve. An example of such intuitive parenting is child-directed speech (Soderstrom, 2007) whose special characteristics vary from adult-directed speech along prosodic, simplicity, redundancy, lexical, and content dimensions. Cross-cultural study attests that child-directed speech is (essentially) universal (Jacobson, Boersma, Fields, & Olson, 1983; Snow, 1977; but see Ratner & Pye, 1984). When communicating with their children, even deaf mothers modify their sign language the way hearing mothers use child-directed speech (Erting, Prezioso, & Hynes, 1994). Indeed, parents find it difficult to resist or modify such intuitive behaviors, even when asked to do so (Trevarthen, 1979). Additional support for the premise that such interactions with children are intuitive comes from observations that nonparents (males and females) who have little prior experience with children modify their speech as parents do when in the presence of a young child and even when asked to imagine speaking to one (Jacobson et al., 1983). Many parenting cognitions and practices are likewise unconscious, habitual, and possibly thoughtless, and they are enacted by parents and nonparents alike (Senese et al., 2013).

Psychological Characteristics

In addition to these (and possibly other) biological characteristics, a variety of psychological characteristics in the parent has been identified that shape parenting. They include the gender, age and stage, health status, cognition (including parenting cognitions), personality, intergenerational transmission and family of origin, and experiences of the parent.

Gender

Parent gender is a perennially important topic (Bornstein, 2013b), especially as the role of fathers has become more widely recognized (Ribas & Bornstein, 2005). Some salient distinctions between mothering and fathering already have been drawn. Mothers and fathers hold some similar and some different ideas about parenting and appear to interact with and care for children in some convergent and some complementary ways; that is, they tend to divide some of the labor of caregiving and engage children by modeling different orientations and emphasizing different types of interactions. Mothers are more often involved in direct caregiving and typically provide children with more close emotional support, whereas fathers often provide more informational and material support and involve children more in leisure activities (Collins & Russell, 1991; Parke & Buriel, 2006; Steinberg & Silk, 2002). Mothers tend to be more knowledgeable about children's friendships and their social network than fathers; fathers are more likely to be perceived as relatively distant authority figures who may be consulted for objective information (such as help with homework) but who are less frequently sought out for relationship support or guidance (such as help for problems with friends) than mothers (Updegraff, McHale, Crouter, & Kupanoff, 2001; Waizenhofer, Buchanan, & Jackson-Newsom, 2004). Boivin and colleagues (2005) analyzed the factor structure of a self-administered questionnaire designed to assess 2,122 mothers' and 1,829 fathers' self-efficacy, perceived impact, hostile-reactive behaviors, and overprotection vis-à-vis their young infants. The two parents did not differ with respect to perceived parental impact, but these researchers found significant

gender differences in other parenting self-perceptions. Mothers were more worried about the health and safety of their infants and felt more effective as parents than did fathers, and fathers were more prone to hostile-reactive behaviors than mothers. Across nine countries, mothers report more progressive parenting attitudes than fathers, and fathers report more authoritarian attitudes than mothers (Bornstein, Putnick, & Lansford, 2011). However, mothers and fathers may differ in their consistency, favoring mothers (Belsky, Taylor, & Rovine, 1984; Lytton & Zwirner, 1975).

Anticipating evolutionary considerations discussed toward the conclusion of this chapter, the bias toward caregiving in women could be evolutionally advantageous, considering that women are primary caregivers of children in most societies (Eibl-Eibesfeldt, 1989). Evolutionary psychology attributes these consistent differences in mothering and fathering among mammals principally to maternal internal gestation and obligatory postpartum suckling (Clutton-Brock, 1989). Differences in the relative costs and benefits of producing offspring are argued to play key parts in understanding the evolution of gender differences in reproductive strategies and in parental investment (Trivers, 1972): The gender with the lower potential rate of reproduction invests more in parenting efforts (Clutton-Brock & Vincent, 1991).

Age and Stage of Life

The average age at first birth in the United States is 26.0 years. The contemporary demographics of parturition in the United States indicate that the rate of teenage (15–19 years) motherhood is epidemic (273,105 live births in the United States in 2013; CDC/National Center for Health Statistics, 2015), as approximately 1 in 3 adolescent women becomes pregnant by the end of her nineteenth year. At the same time, increasing numbers of adult women are delaying conception, extending the age range for pregnancy and birth (J. A. Martin et al., 2013). In 2011, for the first time on record, for example, birth rates in Canada were higher for women in their late 30s than in their early 20s. These demographic trends might be ascribable to several factors that contribute to the decision to bear a child and so to parent (Golombok, 2002, 2013), and they apply to first-time parenthood. Parents also age as their children do, and they encounter their own life challenges along the parentway. For example, the typical parent may be 40 years of age or older when her or his first child enters adolescence, and parents at midlife often encounter unique developmental needs brought on by their own passage into midlife at the same time as their children (Bornstein, Jager, & Steinberg, 2012). This period in the family life cycle sometimes proves to be a low point in parents' marital and life satisfaction as well as a period of heightened risk for divorce (Gecas & Seff, 1990; Gottman & Levenson, 2000).

These demographic trends, in turn, raise questions about specific associations that may obtain between age or stage of life and parenting. It was once standard to believe that optimal childbearing takes place between about 20 and about 30 years of age (Rindfuss & Bumpass, 1978) and support for this ∩-shaped function still prevails (McGrath et al., 2014). Rossi (1980) proposed a "timing-of-events" model that suggests that having a child when very young or very old might represent "off-time" versus "on-time" variations in childbearing that result in decreased social reinforcement and lead to curvilinear relations between age and parenting. For example, teenage and older mothers tend to report higher levels of parenting stress compared to mothers in their 20s and early 30s (Östberg & Hagekull, 2000).

Whether and how parent chronological age relates to parenting cognitions or practices appears to depend on specifics of the assessment. For some parenting variables, age does not seem to matter. Mothers of all ages possess implicit beliefs (Holden & Buck, 2002), and mothers of all ages engage equally in child-directed speech (Papoušek & Bornstein, 1992). For many other forms of parenting, however, age matters a lot. The biopsychosocial impacts of early childbirth are fairly well established. Adolescent mothers experience more pregnancy and delivery problems, bear less healthy babies, express less desirable or realistic child-rearing cognitions, hold less realistic expectations about child development, and parent using less favorable practices than do adult mothers (Berlin, Brady-Smith, & Brooks-Gunn, 2002; Bornstein & Putnick, 2007; Bornstein, Putnick, Suwalsky, & Gini, 2006; Coley & Chase-Lansdale, 1998; Demers, Bernier, Tarabulsy, & Provost, 2010; Moore & Brooks-Gunn, 2002; Pomerleau, Scuccimarri, & Malcuit, 2003; Schlomer & Belsky, 2012). For example, in a multivariate analyses that compared adolescent (≤19 years) and adult (≥26 years) mothers, controlling for sociodemographic and other human and social capital factors, Y. Lee (2009) found that adolescent mothers were more psychologically and physically (spanking) aggressive. Lewin, Mitchell, and Ronzio (2013) used the nationally representative Early Childhood Longitudinal Study-Birth cohort data set to compare parenting practices of adolescent mothers (<19 years), emerging-adult mothers (19–25 years), and adult mothers (>25 years) when their children were 2 years of age. Controlling for socioeconomic differences,

adolescent mothers exhibited less supportiveness, sensitivity, and positive regard than emerging adult mothers, who exhibited less than adults. Adolescent and emerging-adult mothers reported equivalent frequencies of spanking and use of timeout, significantly more than adult mothers.

Some effects of aging on parenting are thus clear cut, but others not. A 35-year-old woman has a 1 in 400 chance of conceiving a child with Down syndrome, and this likelihood increases to 1 in 110 by age 40 and then to approximately 1 in 35 by the age of 45 (National Down Syndrome Society, http://www.ndss.org/). Tending and rearing children are physically challenging, and older primiparas may possess relatively diminished physical capacities to meet those demands (Mirowsky, 2002). However, older mothers are more likely to adhere to good diets and gain weight appropriately during pregnancy, to begin prenatal care in the first trimester of pregnancy, and to avoid toxins (smoking and alcohol) during pregnancy. Age is often conceived of as a marker for maturity, perspective, and patience; older-adult mothers tend to possess more experience and information and may feel more psychologically ready to assume the many responsibilities of child rearing. In the view of some, mothers' readiness to be a parent is determined by competency and maturity as measured by her age at childs' birth (Garrett, Ferron, Ng'andu, Bryant, & Harbin, 1994). The more mature and experienced mothers are, the more appropriate and propitious (it is commonly believed) their parenting beliefs and behaviors are likely to be (Bornstein, Putnick, & Suwalsky 2012; Demers, Bernier, Tarabulsy, & Provost, 2010). Even after controlling for SES, maternal education, ethnicity, intelligence, social desirability of responding, and child age and language competence, older mothers direct more praise and physical affection toward their toddlers than do younger mothers (Bornstein & Putnick, 2007). A study of European American mother-child dyads found that older mothers were more sensitive and optimally structuring with their infants and toddlers than were younger mothers (Bornstein, Putnick, & Suwalsky, 2012).

Fathers' age matters as well in these and other ways. A monotonic association obtains between advancing paternal age and risk of autism spectrum disorders (ASD) in children (Reichenberg et al., 2006), for example, and a study of genome-wide mutation rates by sequencing the entire genomes of a sample of Icelandic parent-offspring trios revealed that the diversity in mutation rate of single nucleotide polymorphisms is dominated by the age of the father at a child's conception, implicating increases of about two mutations per year (Kong et al., 2012). Advancing paternal age is specifically associated with increased genetic mutations during spermatogenesis, which may cause psychiatric morbidity in offspring. A population-based cohort study of all people born in Sweden from 1973 to 2001 ($N = 2{,}615{,}081$) revealed that paternal age is associated with increased risk of some psychiatric disorders (ASD, psychosis, and bipolar disorders) but decreased risk of the other indexes of morbidity. In another within-sibling comparison, offspring of fathers 45 years and older were at heightened risk of ASD, ADHD, psychosis, bipolar disorder, substance use problems, failing a grade, and low educational attainment compared with offspring of fathers 20 to 24 years old (D'Onofrio et al., 2014).

Of course, age is a "social address" (Bronfenbrenner & Crouter, 1983), and age usually stands only as a proxy for underlying processes. More proximal intrapersonal factors likely play the meaningful roles in parenting, and it is possible to identify some critical developmental phenomena that would help to mark mature caregiving. For example, developing executive functions (discussed later) coordinate metacognitive processes through monitoring and controlling the use of knowledge and strategies that redound positively to parenting (Barkley, 2012; Yeager & Yeager, 2013).

Health Status

To parent well, a parent's own needs must be met. When women are inadequately nourished, for example, their health and social development may be compromised, and their abilities to bear and rear healthy children are jeopardized (Houck, Rodrigue, & Lobato, 2007). Malnourished women fall ill more often, and they have smaller babies, whereas women whose diets are rich in protein have fewer complications during pregnancy, transit shorter labors, and bear healthier babies. Deficiencies in zinc, folic acid, and protein have been linked to central nervous system dysfunction, prematurity, and low birthweight (Keen, Bendich, & Willhite, 1993). In many regions of the developing world, malnutrition is a chronic problem (UNICEF, 2006), but this problem is not limited to poor countries. The U.S. Special Supplemental Food Program for Women, Infants, and Children (WIC) provides food packages, nutrition education, and health care to low-income pregnant women and new mothers. More than 8 million people receive WIC benefits each month (Lino, 2013). Severe malnutrition in early pregnancy (especially lack of folic acid, a B vitamin) increases the risk of neural tube defects, such as spina bifida, in which the spinal cord does not close completely, or anencephaly, in which part of the brain does not develop. Malnutrition later in pregnancy is associated with low birthweight. But the long-term prognosis for children chronically malnourished in utero is not entirely

bleak. If children receive nutritious diets before age 2, they can rebound. Near the end of World War II, western (but not northern or eastern) Holland endured a food blockade that provided an unfortunate but important natural experiment in maternal health. Unlike other famines, the so-called Dutch Hunger Winter struck during a precisely circumscribed time and place and in a society that kept comprehensive and meticulous health records. As a result, researchers later identified children who were exposed to fetal malnutrition in different trimesters and could follow them through adolescence and well into adulthood. In general, children born during this time of famine did not suffer pervasive long-term physical or mental disabilities (Hoek, Brown, & Susser, 1999; Susser, Hoek, & Brown, 1998). Relative to those who received proper nutrition, however, malnourished children suffered more nervous system congenital abnormalities as well as increased risk of schizophrenia.

Health effects are not restricted to mothers. Diet folate deficiency is associated with giving birth to a child with a birth defect. Male mice that were fed a diet containing less than 15% of the recommended amount of folate for their lifetime (from the time they were fetuses through to their reproductive maturity) showed deficiencies in fertility as well as litter offspring with approximately 30% more birth defects than controls (Lambrot et al., 2013).

Cognition

Parents' attentiveness, intelligence, mental functioning, and (as we see later) even memories of their own childhood help to create a "strategy frame" or "affective lens" that influences parenting (Putallaz, Costanzo, & Smith, 1991). Attention at neurobiological levels is heightened in new mothers (Purhonen, Valkonen-Korhonen, & Lehtonen, 2008); policewomen report enhanced vigilance following the birth of their first child (Fullgrabe, 2002); and women's improved attentional processing of infant emotions during pregnancy relates to their later relationships with their infant (Pearson, Lightman, & Evans, 2011). Analyzing data from the Massachusetts site of the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care and Youth Development, Mulvaney, McCartney, Bub, and Marshall (2006) learned that mothers' verbal intelligence predicted the effectiveness of their scaffolding collaborations with children (which in turn uniquely predicted later cognitive capabilities of the children).

Executive functions include self-regulation, sequencing, flexibility, response and inhibition, planning, and organization of behavior (Butterfield, Albertson, & Johnston, 1995; Denckla & Reiss, 1997; Eslinger, 1996). The orderly approach to problems, maintenance of problem solving sets for future goals, control processes for organizing behavior over time, flexibility and effectiveness of verbal self-regulation, skillful use of strategy, and behaviors that alter the likelihood of later events are all executive functions . . . and describe well the requirements of parenting. Grattan and Eslinger (1992) suggested that mental flexibility and perspective-taking are cognitive prerequisites to empathic understanding; impulse control, temporal integration, and synthesis of multiple pieces of information are cognitive prerequisites to identity formation; and symbolic thinking, weighing alternative possibilities, and considering consequences among alternatives are cognitive prerequisites to moral maturity. Thus, executive functions exert powerful and pervasive influences on social behavior, and immaturity or impairment of executive function can lead to demanding and self-centered behavior, lack of social tact and restraint, impulsive speech and actions, disinhibition, apathy and indifference, and absence of empathy, all of which are hallmarks of dysregulated parenting.

The neuropsychological underpinnings of executive functions are usually assigned to the prefrontal cortex and its extended networks (Pennington, Bennetto, McAleer, & Roberts, 1996). Notably, individuals with localized prefrontal injury display poor parenting (Eslinger, Grattan, Damasio, & Damasio, 1992). Consider patient DT, who:

> proved unable to anticipate and meet her child's needs, such as planning meals, changing clothing, and providing nurturance and comfort. . . . Her performance [was] erratic, impulsive, and marked by poor follow through on required tasks, failure to learn from mistakes, and very negative reactions to criticism. . . . She [had] very limited capacity for empathic understanding, inadequate identity development, difficulties in vocational adjustment, and a concrete level of moral reasoning. (Grattan & Eslinger, 1992, p. 185)

DT shows how the want of executive functions profoundly undermines parenting in an individual who otherwise possesses normal motor and sensory functions and broadly normal intellect, perception, language, and memory. To this point, it is important to note that the prefrontal cortex shows a prolonged course of development, with changes in synaptic density detectable even into the mid-20s (Shaw et al., 2006), and so could very well underlie the well-known challenges commonly associated with adolescent parenting. As indicated earlier, teenage mothers display notable parenting deficits (Loeber, Burke, Lahey, Winters, & Zera, 2000). Younger mothers score lower than older mothers on a construct called cognitive readiness

to parent (aggregated knowledge of child development, parenting attitudes, and parenting style), and cognitive readiness to parent predicts parenting, at least during infancy (Whitman, Borkowski, Keogh, & Weed, 2001), and accounts for relations between early maternal interactions and 1-year attachment status (Lounds, Borkowski, Whitman, Maxwell, & Weed, 2005).

Parenting Cognitions

As reviewed earlier, parenting cognitions come in many flavors and are generally believed to serve many functions: They affect parents' sense of self, help to organize parenting, and mediate the effectiveness of parenting. Cognitions help to structure parents' practices and determine how much time, effort, and energy to expend in parenting. To begin at the beginning, however, cognitions instigate whether to become a parent. Because of the widespread availability of contraception and assisted reproductive technologies, decisions to bear and rear children are elective. Changing cultural mores also permit (15%–19% and increasing) people to remain voluntarily childless (Letherby, 2002; Livingston & Cohn, 2010). Today, the rates of unintended and intentional pregnancies are about the same (~50% of each in the United States; Finer & Zolna, 2011). Notably, unplanned pregnancies are associated with many poorer forms of parenting (Treyvaud, Rogers, Matthews, & Allen, 2010), including increased likelihood of perinatal mood problems and reduced well-being in the postpartum period (Grussu, Quatraro, & Nasta, 2005; Lachance-Grzela & Bouchard, 2009; Yanikkerem, Ay, & Piro, 2013), less time and attention paid to infants (Barber, Axinn, & Thornton, 1999), and more negative parenting (East, Chien, & Barber, 2012).

How parents see themselves vis-à-vis children generally can lead to their expressing one or another kind of affect, thinking, or behavior in child rearing. According to the Civitas Initiative et al. (2000) survey, for example, 90% of new parents in the United States have confidence in their abilities and think of themselves generally as good parents. Parents with a low perceived balance of power within the caregiving relationship may see unresponsive children as behaving with intent, an interpretation that easily fosters in parents a sense of helplessness and ultimately anger (Bugental & Happaney, 2004). Especially salient self-perceptions of parents have to do with their feelings of competence in the role of caregiver, satisfaction gained from caregiving, investment in caregiving, and balance of caregiving with other social roles. Most is known about parenting competence (Bornstein, Haynes, et al., 2004; Bornstein, Hendricks, et al., 2003). Among low-income families, mothers with lower levels of belief in parents as teachers are less likely to elaborate appropriately with their children during shared book reading (DeBaryshe, 1995). Functionally, perceptions of competence in parenting are associated with parents' use of effective parenting strategies (Johnston & Mash, 1989; Teti & Gelfand, 1991). Self-efficacy theory posits that adults who evaluate themselves as competent, who know what they can do, and who understand the likely effects of their actions will, as parents, more likely act as constructive partners in their children's development (Bandura, 1986, 1989; Coleman & Karraker, 1998; Conrad, Gross, Fogg, & Ruchala, 1992; King & Elder, 1998). Eccles and Harold (1996) reported that parents' confidence in their ability to influence their children's academic performance and school achievement is associated with parents' school involvement and predicts parents' helping with their children's academic interests (Epstein & Sanders, 2002; see, too, Hoover-Dempsey & Sandler, 1997). Mothers who consider themselves efficacious and competent in their role as parents tend to be more responsive and empathic and less punitive and hold more appropriate developmental expectations (De Haan, Prinzie, & Deković, 2009; Meunier, Roskam, & Browne, 2011). Parents who believe that they can or cannot affect characteristics in children likely act accordingly. The Civitas Initiative et al. (2000) reported that approximately 25% of parents in the United States thinks that a baby is born with a certain level of intelligence that cannot be increased or decreased by how parents interact with the baby. How parents see their own children has specific consequences as well, of course. Mothers who regard their child as being difficult, for example, are less likely to pay attention or respond to their child's overtures (Putnam, Sanson, & Rothbart, 2002).

Other prominent parenting cognitions likewise influence parenting. *Attitudes* refer to an individual's predispositions, reactions to, or affective evaluations of the supposed facts about an object or situation. *Expectations* about a child as well as developmental norms and milestones—when a child should achieve a particular skill—affect parents' appraisals of their child and their parenting. Expectations also generally bias observations so that information consistent with the expectancy is more likely to be attended to, processed, and acted upon. Jamaican mothers expect their children to sit and to walk early, whereas Indian mothers living in the same city expect their children to crawl later. In each case, children's actual attainments of developmental milestones accord with their mothers' expectations (Hopkins & Westra, 1989, 1990). *Attributions* are interpretations of causations of events

and behaviors, and parenting attributions refer to assigned meanings and definitions of a child's behavior and so can affect parents' caregiving practices (Bugental & Happaney, 2002). Parental attributions typically distinguish between the internal (intentional) and the external (situational). An internal attribution might refer to parental interpretations of a child's behavior as dispositional and deliberate, whereas an external attribution might refer to parental interpretations of a child's behavior as contextual, transitory, and even accidental (Coplan, Hastings, Lagacé-Séguin, & Moulton, 2002). In certain circumstances, parents might believe a child is behaving purposefully, when the child's behavior may in fact be developmentally typical. For example, higher levels of internal attributions of child misbehaviors are more prevalent among neglectful, abusive, and authoritarian mothers (Z. Wang, Deater-Deckard, & Bell, 2013). Investment in, involvement with, and commitment to children is foundational to positive child rearing; indeed, Baumrind and Thompson (2002) defined ethical parenting "above all [as] requiring of parents enduring investment and commitment throughout their children's long period of dependency" (p. 3). Invested parents are more responsive and view their children more positively (Greenberger & Goldberg, 1989). In turn, parental investment in children's lives and parental responsibility for children's care help to ensure that parents provide children with medical attention, physical activity, and proper nutrition they require for wholesome development (Cox & Harter, 2003). Finally, how parents balance their multiple roles in life—parent, spouse, and employee—reflects on their effectiveness in those diverse roles, including their parenting (Perry-Jenkins, Repetti, & Crouter, 2000). Mothers who are happy with their roles are more accepting of their children (Stuckey, McGhee, & Bell, 1982). Parenting satisfaction affords a sense of well-being in the parenting role that translates to positive emotionally available parent-child interactions (Bornstein, Putnick, et al., 2012).

Whereas goals, attitudes, and other similar cognitions may or may not be factual, parenting knowledge draws on the science base as well as social construction and is thought to be valid and reliable by members of the clinical and research communities (Bornstein et al., 2010). Parenting knowledge of child rearing and child development encompasses many domains, including fulfilling the biological and physical as well as socioemotional and cognitive needs of children as they develop, understanding of normative child development, and awareness of practices and strategies for maintaining and promoting children's health and coping effectively with children's illness (Bornstein & Cote, 2004b; Scrimin et al., 2009). The general state of parents' knowledge affects their everyday decisions about their children's care and upbringing and guides parents' decisions about how to maintain child health and when and how to seek care if children fall ill (Hickson & Clayton, 2002; Melamed, 2002; Zuckerman & Keder, 2015). Parenting knowledge equips parents with information they need to interpret children's abilities and accomplishments and to tailor their interactions accordingly. In turn, parenting knowledge is associated with enhanced parental self-perceptions of competence, satisfaction, and investment in parenting (Bornstein, Hendricks, et al., 2003). For example, the relation between parental self-efficacy and parenting competence is moderated by parenting knowledge: Parental self-efficacy and parenting competence are positively associated when parenting knowledge is high; by contrast, self-efficacy and competence are inversely associated when knowledge is low (Hess, Teti, & Hussey-Gardner, 2004). Parents who harbor unrealistic developmental expectations that are not informed by accurate knowledge experience greater stress as a result of mismatches between expectations and actual child behaviors (Teti & Gelfand, 1991), whereas knowledgeable parents have more realistic expectations and are more likely to behave in developmentally appropriate ways with their children (Grusec & Goodnow, 1994). Mothers' specific knowledge of child rearing and child development explains variations in their emotional relationships with children (Bornstein, Putnick, et al., 2012). Safety is measured in terms of awareness of health care, the identification and treatment of illnesses, and accident prevention, and these beliefs guide parents' decisions about how to maintain child health. Using the prospective longitudinal study data set of a low-birthweight preterm cohort from the multisite Infant Health and Development Program, Benasich and Brooks-Gunn (1996) found that maternal knowledge of child development and child rearing conditioned the quality and structure of the home environment mothers provided (which in turn affected child cognitive and behavioral outcomes). Sudden infant death syndrome (SIDS) is the leading cause of reported neonatal mortality in the United States (http://www.cdc.gov/sids/), and sleeping prone or on too-soft bedding that may cover an infant's mouth and nose increases the likelihood of asphyxiation (Scheers, Rutherford, & Kemp, 2003). Still, approximately 20% of parents place infants ages 1 to 3 months on their stomachs during sleep (Gibson, Dembofsky, Rubin, & Greenspan, 2000).

In all these different ways, parents' cognitions can lead to different transactions with children. In what may be

called the standard model of parenting (widely assumed but seldom appropriately tested), parents' cognitions are hypothesized to prompt or direct parents' practices and, ultimately, children's development. That said, relations between beliefs and behaviors are historically an unsettled area in social psychology (Armitage & Conner, 2001; Festinger, 1964; Green, 1954; LaPiere, 1934; Wicker, 1969), and relations between parental beliefs and behaviors specifically are equally elusive (Bornstein, Cote, & Venuti, 2001; Coleman & Karraker, 2003; Cote & Bornstein, 2000; Holden, 2002; S. G. Miller, 1988; Okagaki & Bingham, 2005; Sigel & McGillicuddy-De Lisi, 2002). Many researchers have reported no relations between mothers' professed parenting attitudes and their activities with their children (Cote & Bornstein, 2000; McGillicuddy-De Lisi, 1992), where others have reported associations between parents' beliefs and behaviors that are relatively weak or positive but nonsignificant (Coleman & Karraker, 2003; Mantzicopoulos, 1997; Sigel & McGillicuddy-De Lisi, 2002).

Those parenting beliefs and behaviors whose consonance has been evaluated have often been very general, giving little reason to expect an association. When more circumscribed and conceptually corresponding cognition-practice domains are studied, however, some maternal child-rearing beliefs have been found to relate to some self-reported or observed child-rearing behaviors, supporting expected links in the putative standard model causal chain (Coplan et al., 2002; K. Y. Huang, O'Brien Caughy, Genevro, & Miller, 2005; Kinlaw, Kurtz-Costes, & Goldman-Fraser, 2001; Strassberg & Treboux, 2000). For example, the Benasich and Brooks-Gunn (1996) study just reported found that maternal knowledge of child development and child rearing conditioned the quality and structure of the home environment mothers provided, which in turn affected child cognitive and behavioral outcomes. The strength of the association between parents' cognitions and practices appears to depend, therefore (at least in part) on alignment of conceptual links between the respective contents of their beliefs and their behaviors, as for example between authoritarian attitudes and discipline strategies and between intuitions about parenting effectiveness and competence. European American mothers endorse the importance of independence and self-assertiveness when asked to describe their ideal child, whereas Latina mothers accentuate obedience and respect for theirs (Harwood, Leyendecker, Carlson, Asencio, & Miller, 2002; Tamis-LeMonda & McFadden, 2010). In accord with these expressed values, in real-time interactions, U.S. mothers encourage their children to feed themselves as early as 8 months of age, whereas Latina mothers hold their children close on their lap and control feeding from start to finish.

In brief, beliefs do not always map to behaviors directly, but the two coexist in complex ways, and meaning assigned to each is critical (Bornstein, 1995). Parenting beliefs provide parents with a framework for interpreting their children's behaviors, guiding parents' interactions with their children and determining the activities and opportunities that parents supply. Ethnographic interviews of mothers with infants between the ages of 2 and 18 months revealed that some mothers avoid using physical punishment with infants because they believe that infants are not able to clearly understand right and wrong, whereas other mothers believe that infants can misbehave intentionally and need to be punished to stop their bad behavior and learn to respect the mother's authority. Subsequent quantitative analyses revealed that mothers who expressed concerns about bad behavior and spoiling interacted less positively with their infants (Burchinal, Skinner, & Reznick, 2010).

It is especially noteworthy how early cognitions may function in the development of parenting. Siddiqui and Hägglöf (2000) found that mothers' antenatal attachment expectancy toward their unborn child predicted mothers' sensitivity at 3 months postpartum (see also Thun-Hohenstein, Wienerroither, Schreuer, Seim, & Wienerroither, 2008). Similarly, Haltigan and colleagues (2014) determined that mothers' attachment representations assessed prenatally predicted observed maternal sensitivity at 6 months postnatally. Using an equivalent longitudinal design, Dayton, Levendosky, Davidson, and Bogat (2010) learned that mothers who professed affectively disengaged prenatal representations of their children were at 1 year more behaviorally controlling; mothers whose representations were affectively distorted were hostile; and mothers with balanced representations demonstrated more positive parenting.

Personality

Two general orientations have guided theory and research linking personality to parenting: One concerns a factor structure thought to compose normal personality, and the other concerns more specific personality characteristics, from anxiety and stress to depression and psychopathology. Sigmund Freud (1949), the father of psychoanalytic theory, speculated that a parent's personality would determine the nature of parenting as well as the parent-child relationship and the child's development. Another consistent theme among psychoanalytic theorists is that, if

parents' emotional needs are not met during the course of their own development, then their own psychological makeup would reflect in their parenting (Cohler & Paul, 2002; Holden & Buck, 2002). Anna Freud (1955/1970) described mothers who rejected their children, sometimes due to psychosis but more often because of their own neurotic conflicts.

Personality therefore has a significant part to play in parenting: "One cannot take the 'person' out of the parent" (Vondra, Sysko, & Belsky, 2005, p. 2). Contemporary views derived from personality psychology assert that some parenting cognitions and practices reflect general and stable personality characteristics (Belsky & Barends, 2002). Bronfenbrenner and Morris (2006) opined that personality factors constitute person "force characteristics" likely to influence children's development because personality affects parenting directly and because it colors other social contextual factors that influence parenting, including spouse selection and marital relationships.

Personality is currently conceptualized as a profile of five broad-band factors (the so-called Big Five), each with lower-level facets (McAdams & Pals, 2006), that may be "universal" (Allik & McCrae, 2004; McCrae et al., 2005). *Openness to Experience* reflects a tendency to have a broad perspective and to approach life in intelligent, creative, philosophical, and inquisitive ways. Mothers who are more open are also more emotionally expressive with their children (C. L. Smith et al., 2007). *Neuroticism* reflects a proneness to psychological distress, unrealistic ideas, excessive cravings or urges, maladaptive coping responses, and a perturbable, insecure, and vulnerable orientation to life. Mothers who are neurotic display high levels of negative affectivity toward their children, are less responsive to their children's needs, engage in more physical and verbal power assertion, and are less encouraging of their children's autonomy (Clark, Kochanska, & Ready, 2000). Kotov, Gamez, Schmidt, and Watson (2010) reported that Neuroticism shows associations with internalizing and externalizing psychopathology (see also Decuyper, De Pauw, De Fruyt, De Bolle, & De Clereq, 2009; Ruiz, Pincus, & Schinka, 2008). Likewise, more neurotic fathers are more negative with their children, whereas less neurotic fathers seem to be less behaviorally and emotionally involved with theirs (S. Wang, Repetti, & Campos, 2011). *Extraversion* reflects the quantity and intensity of interpersonal interaction, activity level, need for stimulation, and capacity for joy, control, and assertiveness. Extraverted mothers are more nurturant and supportive of their children's autonomy (Clark et al., 2000; Losoya, Callor, Rowe, & Goldsmith, 1997; C. L. Smith et al., 2007) but also more controlling (i.e., power assertive and forceful in disciplinary style) than those who are less extraverted (Clark et al., 2000; Kochanska, Clark, & Goldman, 1997). *Agreeableness* reflects an interpersonal orientation in feelings, thoughts, and actions along a continuum from compassion to antagonism, the high end of which is characterized as cooperative, trusting, and warm. Agreeable mothers express higher levels of positive affect, support, and warmth with their children, are more sensitive and responsive to their children's needs, and are less likely to be affectively negative, uninvolved, and overreactive than less agreeable mothers (Belsky, Crnic, & Woodworth, 1995; Browne, Meunier, O'Connor, & Jenkins, 2012; de Haan, Prinzie, & Deković, 2009; Kochanska et al., 1997; C. L. Smith et al., 2007). Finally, *Conscientiousness* reflects the extent to which a person is well organized, responsible, decisive, dependable, hardworking, and even ambitious. Conscientious mothers provide more structure and use less forceful disciplinary styles than less conscientious mothers; however, conscientiousness is also associated with restrictive and overcontrolling child rearing (Clark et al., 2000; Neitzel & Stright, 2004; Verhoeven et al., 2007).

A burgeoning literature explores relations between one or more of the Big Five and parenting (e.g., Koenig, Barry, & Kochanska, 2010), and a critical mass has accumulated to allow Prinzie, Stams, Dekovic, Reijntjes, and Belsky (2009) to conduct a meta-analysis that examined associations between parental personality and parenting practices. Results revealed only modest associations between parental personality and parenting warmth, behavioral control, and autonomy support. Additionally, this meta-analysis showed that several moderators (e.g., parent age) explained variability among effect sizes reported across individual studies.

Only a small number of studies has assessed all five personality factors in relation to parenting cognitions and/or parenting practices, controlling for one another. Factor analysis of a personality inventory completed by a community sample of European American mothers of firstborn 20-month-olds who also responded to multiple measures of parenting cognitions (knowledge, self-perceptions, and reports about behavior) and observed in interaction with their children for diverse parenting practices (language, sensitivity, affection, and play) replicated extraction of the Big Five personality factors and showed, controlling for sociodemographic characteristics, that the five personality factors (as variables and in patterns as clusters) related differently to diverse parenting cognitions and practices (Bornstein, Hahn, & Haynes, 2011). In a parallel

cross-cultural study, mothers of firstborn 20-month-olds from seven countries (Argentina, Belgium, Israel, Italy, Japan, South Korea, and the United States) completed all the same procedures (Bornstein et al., 2007). The Big Five factor structure was extracted when the cross-cultural personality data were analyzed, and again the Big Five were found to relate differently to diverse parenting cognitions. Likewise, C. L. Smith et al. (2007) examined longitudinal relations among maternal personality, emotional expressions, and parenting sensitivity and intrusiveness: Conscientiousness and Agreeableness were positively associated with observed positive emotional expressions at T1, and Agreeableness, Openness to Experience, and Extraversion at T1 were positively related to positive emotional expressions at T2. Maternal positive emotional expressions at T1 and T2, in turn, were associated with more sensitive parenting observed at T3. In addition to first-order associations between maternal personality and maternal parenting, other factors (e.g., emotional expressiveness) may constitute possible pathways for explaining second-order relations between personality and parenting. Maternal personality in the normal range is often neglected in parenting research, but it appears to be operative in everyday parenting.

Other specific features of normal personality favorable to good or poor parenting likely include empathic awareness, predictability, nonintrusiveness, and emotional availability. Lack of self-centeredness and adaptability might also be especially pertinent to parenting; so, parents who are more focused on relieving their own discomfort may resort to insensitive parenting strategies, such as minimization and punishment, and become dysregulated and try to end a child's distress abruptly (Fabes, Poulin, Eisenberg, & Madden-Derdich, 2002). Some states of mind, perhaps in the normal range but still troubling, are regularly identified with poor parenting (Whisman & Baucom, 2012; Zahn-Waxler, Duggal, & Gruber, 2002). Mood is one, and mood states predict parenting self-efficacy (Leerkes & Burney, 2007; Porter & Hsu, 2003; C. M. Weaver, Shaw, Dishion, & Wilson, 2008). Stress, in its many forms, has a rich history of untoward influence on multiple aspects of well-being in parenting (Crnic & Low, 2002; Deater-Deckard, 2004). The upbringing of children is highly emotional for both parents and children (Pomerantz, Wang, & Ng, 2005). Adult adaptability is likely vital, not only in the first few months, when infants appear unpredictable and undifferentiated, but through adolescence. Mothers and fathers report increased parenting stress across their child's transition to adolescence, and stress seems to arise from parent-adolescent interactions rather than qualities of the parent or the child per se (Putnick et al., 2010).

Stress, as in coping with daily hassles, predicts less maternal positivity (Crnic & Low, 2002); for example, depressed mothers experience more parenting stress (Coyl, Roggman, & Newland, 2002), and stress likely negatively affects parenting through disruptions in the parent-child relationship (Ciciolla, Crnic, & West, 2012; Crnic, Gaze, & Hoffman, 2005). Parenting stress is related to specific parenting behaviors (Putnick et al., 2008), and the stability of stress over time likely maintains adverse influences (Östberg, Hagekull, & Hagelin, 2007). Stress is also commonly related to diminished psychological well-being in parenting (Deater-Deckard, 1998). Abidin (1992) conceptualized parenting stress as resulting from many different relationships and contexts. Parents who are more stressed in the parenting role are more likely to behave in an authoritarian manner (Tan, Camras, Deng, Zhang, & Lu, 2012), whereas parents who report low levels of stress are more likely to be authoritative (Woolfson & Grant, 2006). Less stressed parenting is linked with better parent-adolescent communication (Joshi & Gutierrez, 2006), whereas more stressed parenting is associated with harsh discipline (Anjum & Malik, 2010; Fang, Wang, & Xing, 2012; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000) and, under chronically high conditions, even with child abuse (Taylor, Guterman, Lee, & Rathouz, 2009).

It has been argued that self-centered parents would be less likely to put children's needs before their own (C. P. Cowan & Cowan, 1992; Dix, 1991), so that women who are more preoccupied with themselves, as measured by physical and sexual concerns, likely display less effective parenting (Grossman, Eichler, & Winikoff, 1980). Still other possibly untoward characteristics include "parenting perfectionism"—the degree to which parents hold excessively high standards (M. A. Lee, Schoppe-Sullivan, & Kamp Dush, 2012; Snell, Overbey, & Brewer, 2005). Whereas psychological well-being is associated with parenting competence (Fujiwara, Okuyama, & Izumi, 2012), psychological distress (anxious or depressive symptomatology short of outright psychopathology) appears to undermine parenting. Maternal anxiety predicts self-reported diminished warmth toward children (Drake & Ginsburg, 2011), and anxious mothers may be disengaged or intrusive and overstimulating (Feldman, Granat, Pariente, Kanety, Kuint, & Gilboa-Schechtman, 2009; Kertz, Smith, Chapman, & Woodruff-Borden, 2008; for a meta-analysis, see van der Bruggen, Stams, & Bogels, 2008). For example, mothers who are anxious or angry in response to their infant's crying may misread these distress

cues or believe that crying is a nuisance that interferes with their own goals, and so are unlikely to respond sensitively when their infants are distressed because they prioritize their own needs over those of their infants.

Whether fleeting, as in response to transient economic circumstances or even the birth of the baby, or chronic, depression affects parenting adversely (Field, 2010; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Murray, Halligan, & Cooper, 2010; Zahn-Waxler et al., 2002). Epidemiologically, postnatal depression is surprisingly common with a prevalence of 10% to 15% (Gavin et al., 2005). Heron and colleagues (2004) even found that 44% of women with postpartum depression (and 36% of the women with postpartum anxiety) did not experience depression (or anxiety) in pregnancy. Depressed mothers fail to experience—and convey to their children—much happiness with life. Depression's associated mood disturbance, worry, and rumination compromise mothers' ability to attend, diminish their responsiveness, and discoordinate their interactions with infants and children (Dix & Meunier, 2009; Manian & Bornstein, 2009; Murray et al., 2010; Pearson et al., 2012; Stein et al., 2012). Mothers who present with depression likely show increased negative affect and cognitions, apathy and lack of energy, and decreased engagement with children (Campbell, Matestic, von Stauffenberg, Mohan, & Kirchner, 2007; Kertz et al., 2008; Mertesacker, Bade, Haverkock, & Pauli-Pott, 2004; Niccols & Feldman, 2006; van Doesum, Hosman, Riksen-Walraven, & Hoefnagels, 2007). Overall, meta-analysis of this literature points to small but significant associations between maternal depression and negative (coercive, intrusive) and disengaged (withdrawn, uninvolved) parenting (Lovejoy, Graczyk, O'Hare, & Neuman, 2000).

As with other psychological symptomatology, the effects of depression are not exclusive to mothers. Prenatal and postpartum depression manifest in about 10% of men (Paulson, Bazemore, & Sharnail, 2010); postpartum paternal depression is predicted by maternal depression (Goodman, 2004; Wee, Skouteris, Pier, Richardson, & Milgrom, 2011); and depression exerts untoward effects on paternal parenting as it does on maternal parenting (R. N. Davis, Davis, Freed, & Clark, 2011; Wilson & Durbin, 2010). Happily, most cases of postpartum depression remit; unhappily, treatment of depression in those who do not is less than successful in repairing parent-child relationships (Forman et al., 2007).

Outright psychopathology, such as mental illness, phobias, substance abuse, and antisociality, seriously impairs thinking, affect, and behavior, and consequently parenting cognitions and practices. Vesga-López et al. (2008) estimated prevalences of postpartum psychopathologies to range from 12% for substance use to 15% for mood disorders. Fewer studies of psychopathology and parenting populate the literature (Berg-Nielsen, Vikan, & Dahl, 2002). However, mothers diagnosed with major psychopathologies display detached parenting, spend less time with their children, show less affection, and provide less structure (Brook, Brook, Ning, Whiteman, & Finch, 2006; Champion et al., 2009; Gerdes et al., 2007); and mothers who engage in antisocial behavior are, on the one hand, less likely to employ optimal parenting practices (Jaffee, Belsky, Harrington, Caspi, & Moffitt, 2006) and, on the other hand, more likely to demonstrate hostility toward children (Bosquet & Egeland, 2000) or even abuse them physically (Kim-Cohen et al., 2006a).

Intergenerational Transmission and Family of Origin

Winnicott (1948/1975) and Spitz (1965/1970) detected the roots of aggressive, impulsive, immature, self-centered, and self-critical caregiving in parents' own experiences growing up. Likewise, Bowlby (1969) and successive attachment theorists subsequently proposed that, arising out of their early interpersonal experiences with caregivers, young children develop "internal working models" of their caregivers that incorporate both sides of the caregiver-child relationship. Attachment theory asserts that, on the basis of repeated experiences of characteristic patterns of interaction, children develop expectations regarding the nature of social interactions that endure long after they depart their family of origin. Representations of interactions with parents thus model individual differences in attachment security in childhood and reverberate at later ages in associations with others (Fraley & Shaver, 2000; Mikulincer, Shaver, & Pereg, 2003) as, for example, in the quality romantic relationships (Dekovic & Meeus, 1997) and in own parenting. For instance, evidence from nonhuman animal research shows that the experience of being neglected or abused can affect infant brain development, with the result that inadequate parental behavior is exhibited in adulthood (Champagne, 2008; Maestripieri, 2005; Numan & Insel, 2003; Numan & Stolzenberg, 2009). Mothers with lower maternal care in childhood have larger gray matter volumes in key brain areas related to parenting and show lower activation there in response to infant cries; members of high-risk families fail to show patterns of activation in brain regions associated with empathy and collaborative behavior (Atkinson, 2012; P. Kim et al., 2010b).

Intergenerational continuities in parenting have been detected in many different mammalian species, including

rats, rhesus monkeys, and human beings (Conger, Belsky, & Capaldi, 2009; Jensen & Champagne, 2012). A lay belief supported by an emerging science is that the way parents rear their offspring results to a significant degree from the child-rearing parents experienced when they were growing up (Conger, Schofield, & Neppl, 2012). In animals, the quality of parental care received in infancy is a significant predictor of offspring and even grand-offspring parental behavior, suggesting that intergenerational effects persist (Jensen & Champagne, 2012). Parenting styles are often similar from one generation to the next. In laboratory rats, mothers, daughters, and granddaughters lick and groom their litters at similar frequencies (Champagne & Meaney, 2007), and cross-fostering studies support the hypothesis that the behavioral transmission of maternal behavior is not dependent on the transmission of specific DNA variants (Champagne et al., 2003). A mother's reported family-of-origin emotional expressiveness is important to understanding the manner in which she socializes emotion in her child. Baker and Crnic (2005) examined the role of mothers' reports of their family histories of emotional expressiveness for the manner in which they socialized emotion in their children: Systematic relations between reports of family-of-origin expressiveness and current parenting emerged for certain forms of expressiveness.

Through intergenerational transmission, via interlocked genetic and experiential pathways, purposefully or unintentionally, then, one generation (G1) appears to influence the parenting beliefs and behaviors of the second generation (G2) and thus the experiences and even child rearing of the third generation (G3). Fraiberg, Adelson, and Shapiro (1975) once referred to these inspirations as "ghosts in the nursery." In two early studies, Ruoppila (1991) reported significant correlations between grandparental and parental child rearing in a Finnish sample, and Vermulst, de Brock, and van Zutphen (1991) documented similarities in parental functioning across generations in a Dutch sample. Maritally dissatisfied couples are more likely to have had unhappily married parents (Amato & Booth, 2001); marital violence in the family of origin tends to repeat in the successive generation (Stith et al., 2000); and when parents abuse their children, their children are at risk of repeating abuse as parents with their own children (Cicchetti, Toth, & Maughan, 2000; Newcomb & Locke, 2001; Pears & Capaldi, 2001). Kovan, Chung, and Sroufe (2009) provided a "longitudinal" illustration of intergenerational transmission when they recorded interactions of parents (G1) and their 2-year-olds (G2) and then waited and recorded interactions of those 2-year-olds as parents (G2) of their own 2-year-olds (G3). Even accounting for confounds, a relatively strong correspondence emerged in parenting between generations. A variety of studies now documents similarities across generations for harsh parenting (Capaldi, Pears, Patterson, & Owen, 2003; DiLillo & Damashek, 2003) and poor supervision (C. A. Smith & Farrington, 2004) as well as for positive (Hofferth, Pleck, & Vesely, 2012; Thornberry, 2005; Thornberry, Freeman-Gallant, Lizotte & Krohn, 2003) and constructive caregiving (Z. Chen & Kaplan, 2001; Kerr, Capaldi, Pears, & Owen, 2009). Using data from grandparents (G1) and parents (G2), Bailey, Hill, Oesterle, and Hawkins (2009) examined continuity in parental monitoring and harsh discipline across generations. Parental monitoring and harsh discipline demonstrated continuity from G1 to G2. Thus, parenting in G1 vis-à-vis G2 predicts parenting in G2 toward G3.

Attachment is lifelong (Mikulincer & Shaver, 2010), and the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1985) assesses an adult's (G2) model of his or her own relationships with his or her parents (G1). Unsurprisingly, adult attachments are conceptualized as relatively stable patterns of feelings, thoughts, and behaviors that characterize a person's current close relationships (Shaver & Mikulincer, 2002). For example, attachment avoidance reflects discomfort with closeness and intimacy. People who avoid try to minimize their distress, are uncomfortable depending on others or having others depend on them, and are reluctant to disclose feelings or information to relationship partners that might suggest vulnerability (Mikulincer & Shaver, 2010; Shaver & Mikulincer, 2002). Adult attachment insecurity, particularly avoidance, is associated with more negative responses to infant distress in females (Leerkes & Siepak, 2006) and less sensitive and comforting responses to children in mothers (Edelstein et al., 2004).

Strong predictive links have emerged between the G2 mother's AAI classification vis-à-vis parents in G1 and the G3 child's attachment with the G2 mother (P. K. Smith & Drew, 2002). G2 mothers who report having secure and realistic perceptions of attachments to their G1 mothers, for example, are themselves more likely to behave sensitively with their G3 children and have securely attached G3 children (Cummings & Cummings, 2002). Van IJzendoorn (1995) reviewed AAI studies and reported 75% concordance between the parent's autonomous/nonautonomous classification and a child's secure/insecure classification in Ainsworth's Strange Situation. Indeed, some claim that G2 maternal attachment to her primary G1 caregiver is a better predictor of her parenting skills than G2 representations of her G3 child or experiences directly with

the G3 child (Biringen, Matheny, Bretherton, Renouf, & Sherman, 2000). Thus, adults' caring for their offspring may have roots in their own early-life experiences with primary caregivers such that people who experienced quality parenting as children may express stronger compassion and altruistic behaviors towards others. This conclusion is supported by the continuity of parent-infant attachment styles into adult relationships (Fraley, 2002).

Parents appear to draw on the legacy of their families of origin for models of parenting, often emulating the same patterns of parenting and couple interaction they were exposed to as children, so mothers' positive memories of their family of origin's coparenting relationship are associated with their own supportive approach (Stright & Bales, 2003). For obvious reasons of longitudinality, the field of parenting in human beings has made only modest progress on what is an extraordinarily challenging problem: namely, establishing that patterns of parenting in G1 are internalized and carried forward to be reactivated in G2. Just collecting two or three generations of data is formidable, so it is to be expected at this stage that the field is far from settled on the mediational processes by which parenting transmits intergenerationally. Both genetic and experiential pathways of various types have been proffered. For example, a parent's experiences with and memories of his or her own parents may reverberate in his or her own parenting via direct (possibly ascribable to G2's observational learning of G1 parenting) or indirect (experiencing G1 parenting as a child affects mature behaviors in interaction with others, including one's own children) means (Campbell & Gillmore, 2007; Capaldi et al., 2003; van IJzendoorn, 1992). Whether the epigenetic activation of maternally related genes is transmitted across multiple generations of female offspring is not known, but cycles of parenting clearly repeat across multiple generations (Bower-Russa, Knutson, & Winebarger, 2001; Champagne, 2010; Gonzalez, Lovic, Ward, Wainwright, & Fleming, 2000; Kaffman & Meaney, 2007; Veenema, 2009).

A prospective, intergenerational study considered multiple influences on fathers' constructive parenting. Fathers in G2 were recruited as boys on the basis of neighborhood risk for delinquency, and they were assessed through early adulthood. The fathers' parents (G1) and the G2 mothers of G3 children were also studied. A multiagent, multimethod approach measured G1 and G2 constructive parenting (monitoring, discipline, warmth, and involvement) and G2 positive adolescent adjustment. Path modeling supported direct transmission of G1 constructive parenting of G2 in late childhood to G2 constructive parenting of G3 in middle childhood. G1 parenting also indirectly influenced G2 parenting through G2 positive adjustment. G1 parenting influenced G2 parenting in both early and middle childhood of G3. Positive father involvement in terms of caring for the child and sharing decision making when sons are young is associated with warmer and more positive parenting of their young children by the same sons as parents themselves in young adulthood; even in a high-risk sample, young men whose fathers were involved became better fathers to their own children (Hofferth et al., 2012). These intergenerational continuities in parenting persisted, even when additional influences were considered.

Transmission pathways of constructive parenting are maintained, in part, by engendering positive adjustment in offspring (Kerr et al., 2009). Two important questions in this literature ask, first, whether similar intergenerational continuities obtain for positive as well as negative aspects of parenting and, second, what types of processes or mechanisms might account for these associations (Conger et al., 2012). Using observer reports of parent-child interactions in the home, Neppl, Conger, Scaramella, and Ontai (2009) evaluated G2 parenting of their G3 children. With regard to the first question, these researchers found continuities between G1 and G2 harsh parenting (angry, hostile, and uncaring behaviors) and between G1 and G2 positive parenting (interest, concern, and clear communication). However, G1 positive parenting did not predict G2 harsh parenting after controlling for harsh parenting in G1. These findings help to identify specific mediating pathways that might explain intergenerational continuities in both styles of parenting, and they are consistent with earlier research demonstrating that negative parenting behaviors in G1 are related to the same behaviors in G2 through more general conduct problems of G2 parents (Caspi & Elder, 1988). Neppl and her colleagues (2009) also showed that G1 harsh parenting predicted G2 externalizing or antisocial behaviors, which then led to G2 harsh parenting. That is, when G2 youth experienced harsh parenting as adolescents, they were more likely to engage in antisocial behaviors during late adolescence and early adulthood, and these antisocial tendencies were directly related to their harsh parenting behaviors with their children. The authors proposed that positive or constructive parenting by G1 would be related to the same type of parenting in G2 through the competencies that positive parenting promotes during childhood and adolescence. G2 academic attainment mediated the relations between G1 and G2 positive parenting. Externalizing behaviors did not mediate continuity in positive parenting, and academic attainment did not mediate continuity in harsh parenting. It appears

that these intergenerational continuities are explained by processes or mechanisms specific to the type of parenting being considered. Conger (2013) showed that continuity in harsh parenting is partly a function of the partners that one chooses. People who have been harshly parented in childhood are more likely to partner with those who parent harshly, which in turn increases the parent's own risk of harsh parenting.

In brief, specific styles of parenting demonstrate continuity across generations. A special section of *Developmental Psychology* (Conger et al., 2009) was devoted to the issue of the intergenerational transmission of parenting, including evidence regarding the intergenerational transmission of positive parenting and developmental mediators that seem to be involved in that transmission. Evidence for intergenerational continuity in parenting has emerged as robust across diverse study samples, types of measurement, lengths of time, and after consideration of a variety of confounders. These studies also raise important questions about genetic and epigenetic processes that might contribute to similarities and dissimilarities in parenting across generations.

Epigenetics and Parent Experiences

Epigenetics constitute regulatory layers "on top of" DNA that may be experiential and modulate gene expression. For example, male mice learned to fear the smell of cherry blossoms (through associative conditioning with foot shocks); they were then mated with females. Their offspring, raised to maturity without ever having been exposed to the scent of cherry blossoms, demonstrated fearfulness the first time they were exposed to cherry smell and had a lower threshold for cherry blossom detection, and their brains had more neurons devoted to the scent. Moreover, the pups of females artificially inseminated with sperm of fear-conditioned father mice showed similar effects (Dias & Ressler, 2014). Thus, characteristics outside DNA appear to be inherited from parents (see also Vassoler, White, Schmidt, Sadri-Vakili, & Pierce, 2012).

Summary

Likely most proximal to parenting are determinants in the parent, including biological characteristics of the parent (such as genetic endowment, hormonal activity, and nervous system structure and function) as well as psychological characteristics (such as the parent's gender, age and stage of life, health status, cognitions, personality, family of origin, and perhaps parents' own idiosyncratic experiences). All of these factors (and others in the child and context detailed in the next sections) need to be taken into consideration when attempting to divine sources of individual differences in parenting cognitions and practices in mothers, fathers, and other child caregivers.

DETERMINANTS IN THE CHILD

When rat dams are given a choice between a chamber that has been associated with pups and one where they may receive an injection of cocaine, there is a period of time after parturition when new dams prefer the company of pups and succumb to power of offspring, spurning even the allure of narcotics (Mattson, Williams, Rosenblatt, & Morrell, 2001; Pereira, Seip, & Morrell, 2008; Seip & Morrell, 2007).

Thinking about parent-child relationships naturally highlights parents as agents of child socialization, and there is ample evidence, especially in the early years, that, between parents and children, children have little agency and parents exert more sway (Kochanska & Aksan, 2004; Maccoby, 1992; Vygotsky, 1978). There is initially asymmetry between parent and child contributions to parenting, but children from infancy affect parents. Parenting is a two-way street, and it has long been appreciated that development in children is a catalyst for transformations in parenting (Baldwin, 1946) and that children actively select, modify, interpret, and create their own environments, including their parenting (Bell, 1968; Scarr & Kidd, 1983). As the child ages, the parent-child relationship becomes more mutual and less hierarchical, providing adolescents and adult children with opportunities that help to redefine their relationships with their parents (Bornstein, Jager, et al., 2012). Contemporary theorizing readily acknowledges the effects of children on parents (Bell, 1968, 1970; Sameroff, 2009). Often what parents think or do depends on many child factors, and subtle as well as not-so-subtle biological and physical, psychological, and social characteristics of children influence parenting (Hodapp & Ly, 2005; Karraker & Coleman, 2005). Child effects answer the manifest behavioral adjustments parents make to children's age and gender and appearance, temperament, and activity. Child effects have several construals; from attachment theory, they signal need for care or alternatively they prompt or cause parenting (Sroufe, 1985). Some child effects are universal and common to all children; others are unique to a particular child or child-related situation. In early childhood, maternal sensitivity is in part defined by the reciprocal nature through which parents respond to their children, suggesting flexibility in parenting

practices to adjust to minute-by-minute demands of a situation (Ciciolla et al., 2012). The extent to which parents are sensitive depends on how well they are able to mold their responses and interactions to the needs of the child (Ainsworth, 1969; Leerkes, Blankson, & O'Brien, 2009); thus, determinants in the parent and in the child interact.

From the start, the birth of a child stirs the emotions and rivets the attention of adults. By their very coming into existence, children alter the sleeping, eating, and working habits of their parents; and they change who parents are and how parents define themselves. Moreover, parent and child activities are characterized by intricate patterns of mutual attunement and transaction (Bornstein, 2009, 2013a). Infants cry to be fed and changed, and when they wake, they let parents know they are ready to play and to learn; through social referencing and attachment relationships, infants and young children regularly deploy parents as agents. Many parenting initiatives are proactive; very often, however, parents behave reactively. When Anderson, Lytton, and Romney (1986) experimentally paired conduct-disordered boys with mothers of normal boys, the mothers behaved negatively. Adolescent problem behaviors may more powerfully determine parenting practices than parenting practices provoke subsequent adolescent problem behaviors (Huh, Tristan, Wade, & Stice, 2006).

Bell (1968; Bell & Harper, 1977) was among the first developmental theorists to emphasize the key role that bidirectional effects play in child socialization. By virtue of their unique characteristics and propensities—genetic endowment, physical features, state of arousal, perceptual awareness, cognitive capacity, emotional expressiveness, and individuality of temperament and personality—children actively contribute to the parenting they receive. Children influence which experiences they will be exposed to, and they interpret and appraise those experiences and so (in some degree) determine how their experiences affect them. Even within the same family and home setting, parents do not behave toward their different children in the same way, parenting is not perceived by different children in the same way, and parenting does not affect different children in the same way (Suitor et al., 2009; Turkheimer & Waldron, 2000). Some researchers have pointed to the relatively important role of children's perceptions of parenting in examining effects of parenting (Barry, Frick, & Grafeman, 2008). For example, Demo, Small, and Savin-Williams (1987) found that children are influenced more by their perceptions of parental practices and less by the actual practices.

The mere presence of offspring can be efficacious. When Kenkel et al. (2012) exposed reproductively naive male prairie voles (*Microtus ochrogaster*) to infants or control manipulations and measured plasma concentrations of OT, they found that simple pup exposure increased activation of neurons that stained for OT. Becoming or being a parent affects adults, females and males alike. Males in the biparental marmoset species *Callithrix jacchus* engage in high levels of parenting and express enhanced circulating reproductive hormones, such as arginine vasopressin. The brains of first-time and experienced marmoset fathers have greater abundance of arginine vasopressin V1a receptors and greater density of V1a receptor-labeled dendritic spines on pyramidal neurons in prefrontal cortex than nonfathers (Kozorovitskiy, Hughes, Lee, & Gould, 2006). Woller et al. (2012) examined the release of several reproductive neurocrines, including OT and PRL, in cultured explants of the hypothalamus of paternally experienced male marmosets compared to naive paternally inexperienced males. OT and PRL levels were higher than levels found in inexperienced males, suggesting that paternal experience prompts secretion of neurocrines in a male biparental primate.

Biological Characteristics

Physical features of children likely affect parents everywhere, perhaps in similar ways. By 18 to 20 weeks of gestation in their first pregnancy (16–18 weeks in repeated pregnancies), fetuses are felt to move in utero ("quickening"), a significant marker in the lives and psyches of the child's parents (Cunningham et al., 2010). Newborns have large heads dominated by disproportionately large foreheads, widely spaced relatively large eyes, small snub noses, exaggeratedly round faces, and weak chins. The ethologist Lorenz (1935/1970) hypothesized that these physiognomic *Kindchenschema* incite adults to express nurturant reactions. Adults are biased to respond quickly to human infant faces in positive ways (Esposito et al., 2015; Parsons, Young, Kumari, Stein, & Kringelbach, 2011; Senese et al., 2013) and are strongly motivated to caregive by them (Glocker et al., 2009a), just as human infant faces increase activation in select brain regions associated with empathy and responsiveness (Caria et al., 2012; Glocker et al., 2009b). Cuteness in infant faces modulates mother-infant interaction (Langlois, Ritter, Casey, & Sawin, 1995), and cuter babies are rated as more friendly, cheerful, likable, healthy, and competent (Casey & Ritter, 1996; Karraker & Stern, 1990; Ritter, Casey, & Langlois, 1991; Stephan & Langlois, 1984). A female's willingness to adopt a baby (Volk & Quinsey, 2002) and a mother's sensitivity toward a baby (Langlois et al., 1995)

in part reflect facial cuteness. Viewing a picture of one's own child activates brain areas associated with reward and motivation (Mascaro, Hackett, & Rilling, 2013).

Idiosyncratic characteristics of individual children are no less stimulating to parents. Every child is an original, and general developmental functions in children unfold in the context of wild individual variation. Some individual differences are rooted at deep biological levels. For example, a polymorphism of the *DRD*4 gene is associated with disorganized attachment (Gervai et al., 2005; Lakatos et al., 2000, 2002). Among carriers of the 7-repeat *DRD4* allele, there is no relation between quality of maternal communication and infant attachment; however, a strong relation exists between maternal disrupted communication and attachment in infant carriers of the *DRD*4 7-repeat genotype. That is, an individual-differences genetic trait in the child moderates the relation between maternal caregiving and infant attachment (Gervai et al., 2007). Similarly, low maternal sensitivity in infancy predicts higher levels of mother-reported externalizing behavior problems at 2 to 3 years of age but only if infants carry the 7-repeat allele of the *DRD4* gene (Bakermans-Kranenburg & van IJzendoorn, 2006). Caspi and colleagues (2002, 2003) reported that the relation between childhood maltreatment and later psychological maladjustment is moderated by genetic factors. The functional polymorphism of the regulatory region of the monoamide oxidase A (*MAOA*) gene moderates the relation between early maltreatment and later antisocial behavior, and a regulatory polymorphism of the serotonin transporter (5-*HTT*) gene moderates the effect of early maltreatment on adult depression (see also Foley et al., 2004; Kaufman et al., 2004; Kim-Cohen et al., 2006b). O'Connor et al. (1998) identified two groups of adoptees: one at genetic risk for antisocial behavior (their biological mothers had a history of antisocial behavior) and the other not at risk. At several points during the adoptees' childhood, O'Connor et al. assessed the children's characteristics and the adoptive parents' child-rearing methods. Children carrying a genetic risk for antisocial behavior were more likely to receive negative socialization from their adoptive parents. Jaffee, Caspi, Moffitt, and Taylor (2004) found that 5-year-old twins' experience of corporal punishment was mediated by the same genetic factors that predisposed them to aggressive and oppositional behavior; children's antisocial behavior evoked physical maltreatment. Likewise, Pener-Tessler et al. (2013) learned that boys' self-control mediated the association between their serotonin transporter gene polymorphism (5-*HTTLPR*) genotype and their mothers' positivity (warmth, autonomy support, responsiveness) toward them: Boys who carried the short allele of 5-*HTTLPR* exhibited higher levels of self-control and received higher levels of positive parenting.

Other biological characteristics of children, even if seemingly hidden, appear to affect parents. Vagal tone indexes heart rate and breathing changes and, as a physiological marker of emotion regulation, estimates parasympathetic nervous system influences on the heart. Mothers are concordant with their children in vagal tone (Bornstein & Suess, 2000), and higher vagal tone (more parasympathetic regulation) in children predicts more supportive and less restrictive mothering, even controlling for earlier mothering (Kennedy, Rubin, Hastings, & Maisel, 2004).

Normal development may be nonlinear in nature, stalling sometimes or even regressing temporarily (Bever, 1982; Harris, 1983; Strauss & Stavey, 1982). Parenting a child is thus akin to trying to judge a moving target, the ever-changing child developing in fits and starts at his or her own pace. Interest in the origins and expression of their child's individuality occupies a central position in parental thinking. Twin, adoption, and sibling studies indicate that child temperament and developmental competence are both instrumental in affecting the nature of parenting (Plomin, Reiss, Hetherington, & Howe, 1994). A persisting parenting challenge is that, at base, parents are constantly trying to divine what is inside their children's heads, what they want, what they know, how they feel, and what children will do next vis-à-vis the people and things around them. Thus, parents seem constantly in search of patterns, often inferring them on the basis of single transient events. For example, the ages at which individual children achieve a given developmental milestone typically vary enormously (some children say their first word at 9 months, others at 29 months), just as children of a given age vary dramatically among themselves on nearly every index of development (at 20 months, some toddlers speak 1 word, some 487; Bornstein et al., 2004). Of course, when and how their children talk, reach puberty, and so forth exercise strong psychological and behavioral impacts on parents.

Psychological Characteristics

Individual-difference characteristics of children stimulate parenting beliefs and behaviors, which then influence children's adjustment and development. Goldberg (1977) usefully taxonomized three salient child characteristics that affect parents: responsiveness, readability, and predictability. *Responsiveness* refers to the extent and quality of child reactivity to stimulation; *readability* refers to the definitiveness of child behavioral signals; and *predictability* refers

to the degree to which child behaviors can be anticipated reliably. Each child varies along each of these dimensions and manifests a unique profile of these characteristics (and others) that will influence parenting. For example, an "easily read" adolescent produces unambiguous cues that allow parents to recognize the adolescent's state quickly, interpret signals promptly, and thus respond appropriately.

Age and Stage

Some aspects of parenting are frequent or significant from the get-go and wane as children develop; others wax in importance over the course of child development. There is a general reduction in time devoted to parenting activities, especially caregiving, as children grow and develop and puberty distances adolescents from their parents. Parents of younger children (0–6 years) spend twice as much time in child care activities as do parents of older children (6–17 years; U.S. Bureau of Labor Statistics, 2013), and the sheer frequency with which children are exposed to parent cognitions and practices changes markedly from infancy to adolescence (Bradley, Corwyn, McAdoo, & García Coll, 2001). Child age predicts maternal reports of their own positive and negative parenting in a Canadian cohort study of children aged 4 to 11 years (Jenkins, Rasbash, & O'Connor, 2003) as it does parental reports as well as observations of parenting (Browne et al., 2012). As their susceptibility to peer influences peaks, adolescents experience a concomitant decline in susceptibility to parental influence, more and more determine how much time they spend with their parents, and the extent to which their parents are involved in and know about their lives outside the family (Bornstein, Jager, et al., 2012; Kerr, Stattin, Biesecker, & Ferrer-Wreder, 2003). Mothers and fathers alike report increased parenting stress across their child's transition to adolescence (Putnick et al., 2010), and adolescents and parents contest control over different types of issues as adolescents age (Smetana & Villalobos, 2009). Younger adolescents tend to endorse parental responsibility and care, whereas older adolescents tend to justify expression of rights with appeals to personal choice and rights (Cherney, 2010). Thus, adolescents come to consider some behaviors and actions to fall outside the bounds of parental regulation (Smetana, 2000), such as personal issues (e.g., hairstyle or favorite food), multifaceted issues (containing aspects of both personal and conventional domains), and prudential issues (involving potential harm to an actor). Parents, by contrast, continue to view these issues as within the scope of their authority, defining them as social conventions or matters of safety. These discrepant interpretations can lead to increases in everyday conflicts that ultimately serve as opportunities for adolescents and parents to renegotiate boundaries of authority (Smetana & Villalobos, 2009). Adolescents reportedly experience negative moods more often than either children or adults (Larson & Asmussen, 1991; Larson, Csikszentmihalyi, & Graef, 1980; Larson & Lampman-Petraitis, 1989), and the increase in negative affect during adolescence challenges parents of teenagers. One cross-sequential study that spanned ages 6 through 18 reported that positive aspects of parenting decreased markedly through middle adolescence even though parent-child communication changed little (Loeber et al., 2000). As a result, parents need to calibrate their reactions to adolescents' emotions.

Young children's interactions with their context are normally controlled by their parents, whereas older children and adolescents may engage more closely with other people, institutions, and physical aspects of their contexts (Leventhal, Dupéré, & Shuey, 2015). For example, children's developmental status makes different neighborhood social processes more or less salient for their parents (Skinner et al., 2014). Neighborhood social cohesion may be more important for parents when their children are young because of parenting demands, but parents may become more focused on neighborhood disorder as their children age and have greater direct exposure to neighborhoods.

Parents adjust relative to both child age and stage and child capacity and performance (Bellinger, 1980). Children's achieving certain milestones—standing upright and walking, for example—completely alters the nature and quality of adult caregiving (Campos et al., 2000), just as do many other rites of passage, such as children going to school for the first time, receiving communion or getting bar or bat mitzvahed, driving and dating, attending college, getting married, and all the events in between. With each such child development, parenting changes in some corresponding ways. Parents talk to the walking as opposed to the crawling toddler differently, just as they interact with the pubertal adolescent differently from the prepubertal. It is an understatement to say that adolescents' initiation of dating and sexual relationships have consequences for parents. Sensitive parents tailor their parenting to match their children's developmental progress (Adamson & Bakeman, 1984; Carew, 1980), for example, by providing more didactic experiences as children become more competent (Bornstein & Tamis-LeMonda, 1990; Bornstein et al., 1992; Klein, 1988). Mothers of infants in many cultures use affect-laden speech, but as their young children achieve more sophisticated levels of motor exploration and cognitive comprehension, mothers increasingly orient, comment, and prepare them for the world outside

the dyad by infusing maternal speech to children with increasing amounts of information (Bornstein et al., 1992). The mean length of mothers' utterances tends to match the mean length of those of their 12- to 32-month-olds (McLaughlin, White, McDevitt, & Raskin, 1983).

Childhood is change—development involves rapid growth in biological, mental, emotional, and social spheres; understanding, anticipating, and responding to these dynamic changes continuously challenge parents. Parents need to know about and keep vigilant to all the complications and subtleties associated with their child's development. With each child advance, parenting changes in some corresponding ways. Individual parents seem to maintain their standing relative to one another from day to day: Parents who talk to their children more on Monday likely talk to their children more on other days of the week. Over longer periods, of course, group mean levels in parenting change, and they certainly do so in response to children's development. Thus, stability does not negate age-appropriate parenting. Nonetheless, keeping an eye on a toddler in the park when the child is beginning to walk and giving a cell phone to a teen who is beginning to drive a car appear superficially different but may be conceptually similar in the sense of reflecting continuity in parental monitoring. As Holden and Miller (1999, p. 243) concluded, "the nature of child rearing is simultaneously enduring and different."

Birth Order

Survival rates for primate infants are higher among experienced multiparas compared with primiparas (Hrdy, 2009). For example, 63% of baboon infants of experienced mothers survive versus 29% of infants born to first-time mothers (Altmann, Hausfater, & Altmann, 1988). In human beings, multiparas report higher self-efficacy than primiparas (Fish & Stifter, 1993).

Although a substantial proportion of developmental science has been constructed on mother-firstborn relationships (Hoffman, 1991), roughly 80% of families in the United States will have more than one child (Dye, 2010), and most children in the United States grow up with siblings (Kreider & Ellis, 2011). Family structure, especially parity, has been thought to play a signal role in the development and expression of individual differences in parenting at least since Francis Galton (1874) and Alfred Adler (1928). A dramatic change in family dynamics takes place when a second baby is born into the family, and parenting differs in some ways for first- versus laterborns (J. Dunn & Plomin, 1990; Sulloway, 1996). Mothers engage, respond, stimulate, talk, and express positive affection more to first- than to laterborns, even when first- and laterborns show no differences in their behavior, indicating that some parenting does not (necessarily) reflect child behavior but parity (Belsky, Gilstrap, & Rovine, 1984). Combined with variation in genetic makeup, within-family variation in parental thinking and treatment is a potent factor in accounting for why children in the same family differ from one another (Caspi et al., 2004). This line of thinking culminates in parental differential treatment (Solmeyer, Killoren, McHale, & Updegraff, 2011) of siblings, which occurs when siblings are recipients of different child-rearing cognitions and practices. Parental differential treatment follows from children's individual characteristics (e.g., gender, age, personality, or special needs) and because of parental characteristics and family functioning (e.g., favored child versus scapegoat; McHale & Pawletko, 1992; Mekos, Hetherington, & Reiss, 1996). Thus, a parent may feel more affinity with or be more effective with one child than another. Parental differential treatment implies that parents do not have the same attitudes or act towards all of their children simularly. Indeed, there is research that supports the supposition that parents' cognitions and practices are less favorable in families with greater numbers of children (Furman & Lanthier, 2002).

Gender

Although there is evidence that parenting girls and boys is surprisingly similar in many ways (Bornstein et al., 2015; Hyde 2005, 2014; Lytton & Romney, 1991), child gender broadly organizes many parent descriptions, impressions, and expectations of children from the start of life (Bornstein, 2013a): Parents tend to interact with children differently by child gender. Classic "Baby X" studies (where the gender of the infant is not known to study participants) in the United States have shown that unidentified infants are judged more frequently to be male (Condry & Condry, 1976; J. Z. Rubin, Provenzano, & Luria, 1974; Seavey, Katz, & Zalk, 1975) and that parents conceive of and behave toward infants differently depending on whether they think they are interacting with a girl or a boy (Seavey et al., 1975; Sidorowicz & Lunney, 1980). Newborn nurseries provide uniformly gender-appropriate blankets, accessories, and the like; baby showers carefully respect child gender; and infants are fastidiously dressed in gender-appropriate clothing (Shakin, Shakin, & Sternglanz, 1985). Parents have been reported to purchase gender-stereotyped toys for their children within a few months of the child's birth—prior to when children could express gender-typed toy preferences themselves (Pomerleau, Bolduc, Malcuit, & Cossette, 1990). Mondschein,

Adolph, and Tamis-LeMonda (2000) found that mothers of 11-month-old boys would overestimate how well their babies could crawl down a sloped pathway, whereas mothers of 11-month-old girls would underestimate how well their babies could do, even when subsequent tests of crawling ability on the sloped path revealed no sex differences in infant crawling. Later, parents speak more frequently about emotions with their girls than with their boys, they speak about emotions differently, and they differentially reward and punish different emotions in daughters versus sons (Garside & Klimes-Dougan, 2002). Mothers respond differently to their "difficult" sons than to their "difficult" daughters, even when boys and girls do not differ on an independent measure of difficulty (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006). Daughters are apt to engage in more relational and less autonomous play than boys, possibly fostering more sensitive responding from mothers (Ruble, Martin, & Berenbaum, 2006). Continuing on in development, although parents encourage participation in sports with no gender differences, parents are more likely to encourage participation in youth organizations, religious activities, and summer situations with sons than with daughters and are more likely to encourage participation in art programs with daughters than with sons (MacDonald & Parke, 1984). Parents also tend to give adolescent boys more decision making leeway (Daddis & Smetana, 2005), whereas adolescent girls report more stringent rules regarding socializing with friends, and caregivers are more likely to become involved in peer relationships because of misbehavior of their sons than of their daughters (Greene & Way, 2005; Way & Greene, 2006). Parents also appear to be more consistent in the ways they socialize their daughters than in the ways they socialize their sons (McGue, Elkins, Walden, & Iacono, 2005). For example, Kagan and Moss (1962) reported a higher cross-time correlation ($r = .77$) for maternal control of girls than boys ($r = .24$). Gender stereotypes influence parents' reports of adolescent problems; consequently, parental attributions reflect their differential expectations for boys versus girls (Bornstein, Putnick, et al., 2011; Bugental & Happaney, 2002; Lansford et al., 2011). Although conflicts with parents reportedly increase in intensity as warmth decreases across adolescence, these changes appear to be greater for girls than boys (McGue et al., 2005).

Girls may spend more time with their mothers than do boys, becoming closer and more positively involved with them (Bornstein et al., 2008; Clarke-Stewart, 1973). Girls are recipients of greater warmth than boys (Atzaba-Poria & Pike, 2008), more positive parenting practices (Lloyd & Devine, 2006), and less harsh parenting and physical punishment (Lytton & Romney, 1991). In addition, girls are yelled at and smacked by their parents less often than boys are. Of particular relevance here is that a meta-analysis by Lytton and Romney (1991) found stronger effect sizes for parental physical punishment (strongly associated with parent rejection) for boys than for girls. Studies also have shown differences in the quality, pattern, and impact of mother-child and father-child interactions. All that said, the specific mechanisms that drive the influences of child gender on parenting cognitions and practices remain largely unknown (Ciciolla et al., 2012) as do the parenting dynamics of gender-same versus gender-different siblings (Jenkins et al., 2003).

Health Status

Child medical risk factors, such as low birthweight, prematurity, illness, developmental disability, and ASD, to name only a few, are associated with parenting stress (Eisengart, Singer, Fulton, & Baley, 2003; Goldberg & DiVitto, 2002; Hodapp, 2002; Kuhn & Carter, 2006; Saigal & Doyle, 2008; Zuckerman & Keder, 2015), and (unsurprisingly) the more severe the child's symptoms, the greater the parenting stress (Williford, Calkins, & Keane, 2007). Even multiple births pose problems (Damato, 2005; Lytton & Gallagher, 2002). Early developmental risk, such as prematurity and developmental delay, is associated with increased negative emotionality and behavior problems, less competent social interactions, and unclear emotional expression (Boström, Broburg, & Hwang, 2010; Feldman, 2007). In turn, these circumstances and behaviors are associated with greater parenting stress and more psychological distress in the parents (Baker, Blacher, Crnic, & Edelbrock, 2002; Baker, Blacher, & Olsson, 2005), perhaps resulting in the lower levels of maternal sensitivity often reported in families of children with developmental challenges (Feldman, 2007; Fenning, Baker, Baker, & Crnic, 2007; Niccols & Feldman, 2006). Preterm children have difficulty regulating interpersonal engagements, as evidenced in their increased gaze aversion, decreased play, and lower levels of joint attention: in compensation, mothers of preterms are more active and directive (Goldberg & DiVitto, 2002; Winstanley et al., 2015). Similarly, children's problem behaviors affect parents: For example, children's cry-fuss/sleep problems contribute to maternal depression and stress, and repeated problems have the greatest impact (St. James-Roberts, 2008). Mothers of children with developmental delay are less sensitive than mothers of typically developing children, especially under conditions of challenge (Ciciolla et al., 2012; Niccols & Feldman, 2006). If, as the Centers for Disease Control and

Prevention's Autism and Developmental Disabilities Monitoring Network Surveillance Year 2010 Principal Investigators (2014) estimate, about 1 in 68 children in the United States is diagnosed with an ASD, consider the range of parenting challenges numerous parents now face.

Cognitive Development

Mother-child dyads from the Massachusetts site of the NICHD Study of Early Child Care and Youth Development participated in a home-based instructional task through which their scaffolding effectiveness was assessed. Cognitive characteristics of both mothers and children, as well as dyadic characteristics from infancy, were examined as predictors of effective dyadic scaffolding when the children were in first grade. Children's early mental development predicted the effectiveness of parent scaffolding collaborations over and above children's concurrent cognitive capabilities (Mulvaney et al., 2006). Likewise, toddlers who demonstrate more effortful control at age 18 months evoke more frequent use of cognitive tactics in their mothers in a teaching task at 30 months, controlling for initial values, and their effortful control at 30 months predicts mothers' cognitive orientation at 42 months (Eisenberg et al., 2010). More generally, the effectiveness of much parenting (e.g., discipline that emphasizes communication and reasoning) depends on children accurately construing parents' communications (Grusec & Goodnow, 1994).

Reciprocally, simple child inattentiveness alters observed parenting (Browne et al., 2012), and mothers of children with a cognitive impairment are characterized as less sensitive and are more likely to engage in directive behaviors (Atkinson et al., 1999; Fenning et al., 2007; Moran, Pederson, Pettit, & Krupka, 1992; Niccols & Feldman, 2006). Children with early developmental delay in cognitive functioning are especially at risk of showing increased negative emotionality and behavior problems; in turn, these behaviors are associated with greater parenting stress and more psychological distress in their parents (Baker et al., 2002; Baker et al., 2005). Families face additional challenges when rearing children with impairments related to education, adaptive behavior, discipline, and the potential need for long-term care (Hodapp, 2002).

Temperament and Personality

There is growing correlational and experimental evidence to suggest that child temperament and behavior influence parental cognitions and practices (Bates & Pettit, 2014). When, as mentioned earlier, Anderson et al. (1986) paired conduct-disordered boys with mothers of conduct-disordered boys and with mothers of normal boys, conduct-disordered boys elicited negative parenting practices from both sets of mothers. Clearly, in this experimental setting, which controls for genetic effects, temperament and personality characteristics of the child contributed to the parenting displayed. Across the infant's first year, evidence for bidirectional relations between infant temperament and parenting emerge. Infants who score low on a smiling and laughing temperament scale from ages 4 to 12 months have mothers who use more negative parenting (more mother-reported lax, overreactive, and overtalkative discipline) at 18 months, controlling for earlier mother personality (Bridgett, Laake, Gartstein, & Dorn, 2013), and having a temperamentally easy child or perceiving a child as temperamentally easy (relatively happy, predictable, soothable, and sociable) enhances mothers' feelings of competence and efficacy (Cutrona & Troutman, 1986; Dixon & Smith, 2003; Porter & Hsu, 2003; Putnam et al., 2002) and promotes warmer and more responsive parenting, whereas challenging children evoke parenting stress and harsh parenting (Balge & Milner, 2000; Deater-Deckard & Dodge, 1997; Gershoff, 2002; Mammen, Kolko, & Pilkonis, 2002; Rodriguez & Green, 1997).

Difficult temperament reflects a child's tendency to react to stressors with negative emotions, including anger, irritability, fear, or sadness (Mertesacker et al., 2004; Rothbart, 2011). Early infant difficultness is associated with more parenting stress and less supportive coparenting across time. Paulussen-Hoogeboom, Stams, Hermanns, and Peetsma's (2007) meta-analysis revealed that child negative emotionality tends generally to be associated with lower parental warmth (in infancy and for high-SES families, negative emotionality may be associated with higher levels of parental warmth; Bates, Olson, Pettit, & Bayles, 1982; Crockenberg, 1986). One study (with autoregressive controls) found that high levels of infant distress at 1 year predicted reductions in mother supportive parenting from 1 to 2 years (Scaramella, Neppl, Ontai, & Conger, 2008). Children with more difficult temperaments often require more external, parental support and usually are recipients of less sensitive parenting (Belsky, 1984; Ciciolla et al., 2012). More generally, child temperament and behavioral styles that challenge parents may elicit harsher, less sensitive parenting behavior (Mills-Koonce, Propper, & Al-Yagon, 2007; Neppl et al., 2009; van den Boom & Hoeksma, 1994), although it is possible (albeit controversial) that negative emotionality also promotes more sensitive parenting in some situations (Leerkes & Crockenberg, 2002). Unsociable infant temperament predicts diminished maternal self-esteem (Farrow & Blissett,

2007), and child negative affectivity and conduct problems predict maternal reports of their own parenting as well as observations of parenting (Browne et al., 2012; Jenkins et al., 2003). Not unexpectedly, parents become warmer and less hostile in response to positive child and adolescent development and less warm in response to problematic child and adolescent functioning (L. R. Williams & Steinberg, 2011). Children's fearfulness and inhibition predict more maternal warmth, even controlling for earlier parenting (Lengua, 2006; Lengua & Kovacs, 2005). Parents' perceptions of child shyness at age 2 predict lower levels of parents' self-reported encouragement of child independence at age 4, even controlling for initial levels of encouragement of independence and stability in child shyness (K. H. Rubin, Nelson, Hastings, & Asendorpf, 1999). High child social wariness at 18 months predicts lower levels of structured parenting at 27 months, even controlling for parenting at 18 months and for changes in child social wariness (Natsuaki et al., 2013); this particular study used adoptive children and their parents, thereby ruling out a shared-genes explanation for the child temperament effect.

Children's developing personality continues to exert effects on parents. Using cohort-sequential latent growth curve modeling, Van den Akker, Deković, Asscher, and Prinzie (2014) studied mean-level personality development in children from 6 to 20 years of age and longitudinal bidirectional associations between child personality and maternal overreactive and warm parenting. In their 5-wave study, child personality predicted changes in both aspects of parenting.

As every parent knows (too well), children's social successes lighten parents' burdens and hearten them, just as children's social difficulties stress and distress parents. Parents worry about their adolescents' participation in delinquent activities (Pasley & Gecas, 1984). If adolescents turn to deviant peers and increase their involvement in antisocial activity, parents often disengage (Dishion, Nelson, & Bullock, 2004; Dishion, Poulin, & Medici Skaggs, 2000). Thus, in response to children's antisocial behavior, negative parental control increases, and positive parent behaviors decline (Albrecht, Galambos, & Jansson, 2007; Ge et al., 1996; Reitz, Dekovic, & Meijer, 2006; Rueter & Conger, 1998; Stice & Barrera, 1995). Adolescents' antisocial behavior disrupts effective parenting, and parents become hostile and rejecting in the face of adolescent delinquency (Conger & Ge, 1999; Conger & Simons, 1997). Some authorities have argued that the impact of adolescent deviance on parenting is stronger than that of parenting on deviance (Albrecht et al., 2007; Jang & Smith, 1997; Kerr & Stattin, 2003). In brief, child temperament plays a pervasive role in family processes (E. F. Davis, Schoppe-Sullivan, Mangelsdorf, & Brown, 2009).

Behavior

Children's behaviors are important for adults' evaluations of children, and children's behaviors affect their parents in all sorts of ways. For example, mothers' disciplinary responses depend on the nature of the child's transgression more than their belief about how to discipline the child (Grusec & Kuczynski, 1980). Parents readily change their child-rearing practices in the face of children's behaviors (Holden, Thompson, Zambarano, & Marshall, 1997). From the moment of birth, certain baby signals effectively influence parenting: Infant cries motivate adults to approach and soothe (Ainsworth, Blehar, Waters, & Wall, 1978; Del Vecchio, Walter, & O'Leary, 2009; Konner, 2010; Soltis, 2004; Stallings, Fleming, Corter, Worthman, & Steiner, 2001), and their smiles encourage and reward adult proximity (Eibl-Eibesfeldt, 1989; Konner, 1991). Indeed, as to be expected in an alloparental species such as ours (Hrdy, 2009), child stimuli that activate parental brain systems in mothers (Rilling, 2013) activate many of the same parental brain systems in fathers (Kuo, Carp, Light, & Grewen, 2012; Wittfoth-Schardt et al., 2012) and nonparents (Caria et al., 2012; Glocker et al., 2009a). Infant distress and nondistress cues may prompt different schema that influence how parents feel and behave in the moment. Infant cries likely activate attachment-related schema and memories of the manner in which parents' own emotional needs were or were not met in childhood, which in turn affect how aversive parents find crying, the manner in which they perceive infant cry signals, and their underlying beliefs about infants' emotions and how best to respond to them (Leerkes & Crockenberg, 2006; Leerkes, Parade, & Burney, 2010). The extent to which parent sensitivity to infant distress is distinct from sensitivity to nondistress or that both are dimensions of general sensitivity is important theoretically as well as practically. That is, if the two are distinct, they likely have different origins and may be related to different domains of child adjustment. And, if the two are distinct, intervention efforts could be developed to target the most relevant domain of parenting given the problem at hand (Leerkes, Weaver, & O'Brien, 2012).

Hearing a baby cry decreases T in men when coupled with nurturant responses (van Anders, Tolman, & Volling, 2011), and aggressive behavior elicits harsh parenting (Anderson et al., 1986; Larzelere, 2000), whereas disclosures of information improves parental monitoring (Kerr & Stattin, 2000; Stattin & Kerr, 2000). Adolescents who disclose to their parents about their lives are more likely

to have parents who refrain from reacting negatively (with sarcasm, judgment, or ridicule) to their spontaneous disclosures, and informed parents tend to be trusting parents (Kerr & Stattin, 2000; Kerr, Stattin, & Trost, 1999).

Responsibility, independence, and freedom accompany child growth. The normal drive of the child and adolescent to establish her- or himself as a separate individual may clash with parents' desires to maintain dependence and inculcate their own values.

Relationships

Parent and child exist in a dyadic relationship, and the nature of their relationship has implications for parenting. As Maccoby (1992) long ago reflected, child rearing is an interpersonal activity that reflects the constant interplay and coordination of (at least) two individuals. Mother-child dyadic characteristics in infancy predict scaffolding when children are in first grade (Mulvaney et al., 2006). Stress derived from the mother-child relationship is associated with higher levels of neglect and affective withdrawal (Suchman & Luthar, 2001). The more rewarding their mutual interactions are, the more motivated are parents to seek quality interactions with their children again (Teti & Candelaria, 2002).

Summary

Concurrent and predictive correspondences define the mutual influences that parent and child continuously exert on one another. The principle of transaction in development acknowledges that experiences shape the characteristics of the individual through time but that the characteristics of an individual shape his or her experiences (Bornstein, 2009; Sameroff, 2009). By dint of their unique characteristics and propensities—state of arousal, physical health, perceptual awareness, cognitive competence, emotional expressiveness, and individuality of temperament and personality—children actively contribute to their parenting and to producing their own development. Children influence which experiences they will be exposed to, and they interpret and appraise those experiences and so (in some degree) determine how those experiences will affect them. Child and parent bring distinctive characteristics to, and each is believed to change as a result of, their interactions; both parent and child then enter the next round of interaction as changed individuals. For example, child temperament and maternal sensitivity operate in tandem to affect one another and eventually the later development (e.g., attachment status) of the child (Rothbart, 2011); parental psychological control and adolescent depressive symptoms exert reciprocal effects (Soenens, Luyckx, Vansteenkiste, Duriez, & Goossens, 2008); parents' use of corporal punishment predicts subsequent child behavior problems, while children with more behavior problems elicit more corporal punishment from their parents (Lansford et al., 2011); and mothers' and fathers' harsh verbal discipline provokes increases in adolescent conduct problems and depressive symptoms as adolescent misconduct elicits increases in mothers' and fathers' harsh verbal discipline (M. T. Wang & Kenny, 2014).

Historically, it has been easy to assume that parents (and other adult socializers) are responsible for, say, gender-differentiated conduct in children. However, it is also the case that daughters elicit more feminine stereotypes and sons more masculine ones. Child effects on parents are in play and coexist with parent effects on children, and these mutual influences interact to consolidate socialization in children (Bornstein, 2013a). Another implicit assumption in parenting studies is that the effects of equivalent parenting are similar for all children. However, there is no reason to expect that a given parenting cognition or practice exerts the same effect on every child, and studies that pool parenting effects across children with different competencies, temperaments, and so forth might obscure child and parenting effects alike. A given parental cognition or practice likely has different effects on children with different temperaments. For example, Kochanska (1995, 1997) found that maternal responsiveness and the formation of a close emotional bond with the child fostered the development of conscience in bold, assertive children, whereas maternal gentle parenting techniques that deemphasized power assertion were more effective with shy, temperamentally fearful children.

In making attributions about their behavior and in creating opportunities and environments (or in failing to do so), parents are often influenced by and respond to their children's characteristics (Bugental & Happaney, 2002; De Los Reyes & Kazdin, 2005). Furthermore, from early infancy children recognize their parents; show preferences for their sights, sounds, and smells; and over the course of just the first year of life, children develop deep and lifelong attachments to sensitive and responsive parents (Bornstein, Arterberry, & Lamb, 2014). In essence, then, children's parents receive a great deal "in kind" for their hard work and commitment: They are often recipients of unconditional love, and through their children they access immortality. In lieu of interpreting the link between warm parenting and adolescent adjustment to indicate an impact of parental warmth on adolescent well-being, it is equally reasonable to conclude that well-adjusted teens elicit warm

parenting from their mothers and fathers (Kerr et al., 2003). Parents likely adjust to child behavior as much as they likely produce it.

In the end, effects in socialization run in both directions—parent to child and child to parent—and this consistency is mutually reinforcing. Parents and their children co-construct parenthood. Phonemes are the meaningful sound units of speech in a language, and they are constructed of subelements (so-called distinctive features). Jakobson (1941/1969) observed that the ontogenetic order of appearance of distinctive features in a Babel of languages including English, Swedish, and Japanese may be relatively fixed. Infants first produce front oral-cavity consonants (/m/, /p/) and mid- to back-vowels (/a/). Consonant-vowel combinations of these pairs are therefore frequently the earliest phonemes to appear in infant vocalizations. A well-known but nonetheless intriguing fact related to the ontogeny of vocalization is that two of these early and frequently appearing pairs, /ma/ and /pa/, tend to acquire particular meaning quite early in life. Murdock (1959) tallied the use of front-consonant/back-vowel phonemes as parental descriptors in 1,072 languages and compared their frequency with other combinations (e.g., front-consonant/front-vowel, back-consonant/back-vowel, etc.) Fifty-seven percent of languages use the early-appearing front-consonant/back-vowel class of infant sounds for initial parental kin terms. In short, parents around the world appear to adopt their infants' very first utterances as names for their own parenting role.

DETERMINANTS IN THE CONTEXT

In addition to biological and psychological factors in themselves and their children, diverse contexts condition and channel cognitions and practices of parents. *Context* refers to "any event or condition outside the organism that affects or is affected by a person's development" (Bronfenbrenner & Crouter, 1983, p. 359). The contexts of parenting are complex, multidimensional, and structurally organized into levels that are linked with each other. Contexts influence parent characteristics, and parent characteristics influence their contexts. Rather than considering parent and context in isolation, there needs to be simultaneous consideration of both parent and context. Here, for convenience sake and heuristic purposes, I distinguish three kinds of contexts in which parenting is embedded and which together encompass contextual determinants of parenting. They are proximal contexts, social group contexts, and distal contexts. Proximal contexts include situation and demand, family structure and system, support networks, employment status, and neighborhood residence; social group contexts include SES, religion, ethnicity, and culture; and distal contexts include ecology, history, and even evolution. All these contexts encourage or discourage diverse patterns of parenting attitudes and actions, and so all are meaningful determinants to parenting.

Proximal Contexts

Some prominent proximal context determinants of parenting include situations in which parents find themselves with children, tasks parents must accomplish, and immediate demands on parents as well as family structure and family systems, support networks that surround parents, their employment, and the neighborhoods where they live. Each is discussed in this section.

Situation, Task, and Demand

The supermarket checkout line is a more challenging context for the exercise of parental authority than is the playground (Lecuyer-Maus, 2000). Although parenting cognitions and practices are relatively stable (in terms of rank-order consistency), both are flexible and can and do vary with situation, task, and demand (qualitatively and in terms of mean level; Bornstein et al., 2006; A. L. Miller et al., 2002). Thus, parental behavior is normally highly situation specific, and parents believe that they need to modify their attitudes and actions relative to specifics of their situation (e.g., Catron & Masters, 1993; Dix & Reinhold, 1991; Grusec & Kuczynski, 1980). Recall that Holden and Miller's (1999) meta-analysis showed that cross-situation parenting stability was lowest of three circumstances and change was greatest. Low-challenge situations (e.g., unstructured play) prompt one kind of parenting (P. J. Miller, Wang, Sandel, & Cho, 2002), as emotional and instrumental demands are relatively minimized (Ciciolla et al., 2012), but the degree to which parents are challenged during interactions affects their practices, as parents must make additional effort to remain calm and regulated under more taxing conditions (A. L. Miller et al., 2002; P. J. Miller et al., 2002). For example, maternal sensitivity during free play is lower than during bathing (Joosen, Mesman, Bakermans-Kranenburg, & van IJzendoorn, 2012). Maas et al. (2013) examined effects of situational variables on mothers' interactions at home with their 6-month-olds. They found that levels of interactive practices of mothers (e.g., sensitivity, stimulation) varied systematically across situations of free play, face-to-face play, and diaper change: During free play,

mothers showed the highest levels of stimulation toward their infants; face-to-face interactions evoked more positive responsiveness; and in the goal-oriented diaper change situation, mothers hardly stimulated their infants and showed less positive regard. Likewise, mothers of children with and without developmental delay show similar levels of maternal sensitivity during free play; however, during a challenging task, mothers of children with developmental delay display lower levels of maternal sensitivity (Ciciolla et al., 2012). Maternal sensitivity during early childhood is therefore influenced by both the parenting context and specific child characteristics. Developmental risk and situation significantly contribute to the expression of maternal sensitivity, but their contributions depend on demands.

Chaotic (unpredictable, nonroutine, inconsistent) environments (often but not always associated with poverty) undermine parenting self-efficacy and involvement, generate marital and parental stress, and undermine support and parent-child relationships (Corpaci & Wachs, 2002; Evans, 2004, 2006; Evans, Gonnella, Marcynyszyn, Gentile, & Salpekar, 2005; Wachs & Camli, 1991) and so child health and development (directly and indirectly). Household chaos describes an environment that is high in noise and low in regularity and routines and has been associated with caregivers who are less likely to monitor children's activities and resort more often to inconsistent discipline and physical punishment (Wachs, 2005). All these sorts of contextualization further support the view of parenting as multidimensional, modular, and specific.

Few studies have attempted to manipulate parenting demands within parent-child interactions by specifically contrasting interaction contexts (S. E. Martin, Clements, & Crnic, 2002; Mills-Koonce et al., 2007; Pianta, Sroufe, & Egeland, 1989). However, studies which have indicated that the demands on parenting interact with other contextual factors. Perhaps most revealing of demand effectiveness on parenting are experimental treatments or interventions in which parents are assigned randomly to a treatment/intervention (versus a control) where beliefs and behaviors of parents change. Experiments can modify parenting cognitions and practices (Forgatch & DeGarmo, 1999). Belsky, Goode, and Most (1980) found that reinforcing mothers' didactic interactions with their young children during play in an experimental group resulted in increases in mothers' didactic interactions (and in higher exploratory play in children) compared to a control group. Van den Boom (1994) trained low-SES mothers to respond sensitively to their children and in this way modified mothers' negative responses to child irritability (and reduced avoidant attachment in distress-prone children). Recall that Slep and O'Leary (1998) demonstrated that mothers could be led to believe that their children misbehaved intentionally, and they subsequently responded to their children with more negative affectivity and harsher discipline than mothers who were led to believe that their children misbehaved accidentally. And Stein et al. (2012) primed mothers to worry or ruminate and thereby evoked more negative thoughts, higher thought recurrence, and more self-focus and so inhibited their responsiveness and vocal interaction.

As pointed out earlier, intervention trials can be interpreted as experimental manipulations that test parenting effects (P. A. Cowan & Cowan, 2002; DeGarmo, Eddy, Reid, & Fetrow, 2009; Dishion et al., 2008; Lunkenheimer et al., 2008; van Doesum, Riksen-Walraven, Hosman, & Hoefnagels, 2008). For example, Forgatch, Patterson, and DeGarmo (2005) found that fidelity to a therapy intervention protocol predicted change in parents' practices (and children's behavior). Experiments and interventions show that situation, task, and demand alter parenting.

Family Structure

Parenting is influenced by family configuration broadly construed. For example, marital status and father presence in the home moderate maternal emotional relationships with young children (Bornstein, Putnick, et al., 2012). Single-parent families typically experience less optimal interactions than do families consisting of two biological parents (Loeber et al., 2000; Sawhill, 2014). Single parenthood (Marquardt, Blankenhorn, Lerman, Malone-Colón, & Bradford Wilcox, 2012; Weinraub, Horvath, & Gringlas, 2002) and parents' separation and divorce (Hetherington & Stanley-Hagan, 2002) disrupt parenting and upset, change, and complicate family processes, as do subsequent transitions to stepparent or foster parent status (Haugaard & Hazan, 2002; Hofferth & Anderson, 2003). Notable in this connection is the incidence of child abuse in the stepparent population (Daly & Wilson, 1988). Many other vicissitudes of life (e.g., economic change) alter family structure and reverberate in changed parenting (Duncan, Magnuson, & Votruba-Drzal, 2015; Ganong et al., 2015).

A common yet still enthralling change in parenting occurs when a second baby is born into the family. As reviewed earlier, parents treat their second-born children in many ways differently than they treat their firstborn children (Sulloway, 1996), even when first- and laterborns show no differences in behavior, indicating that some maternal behaviors reflect family structure (parity), and not child effects (Belsky et al., 1984). As reviewed earlier as well, experience in parenting matters, and mothers are

prone to rate their firstborns as more temperamentally difficult (Bates, 1987), perhaps because first-time mothers are less at ease with their children and tend to perceive them as more demanding. Multiple births per se tax parenting (Bornstein & Ruddy, 1984). Parents of twins versus singletons show differences in mean levels of parenting: Parents of twins feel less effective as parents, show less concern about the health and safety of their infants, and are more likely to use hostile-reactive behaviors than parents of singletons (Boivin et al., 2005).

Evolutionary thinking suggests that parental effort expended on each successive offspring will decrease, resulting in smaller and less nourished offspring, a pattern that has been found in many different species ranging from invertebrates to birds to mammals (Mendl, 1988; Trumbo, 1996). The quality-quantity trade-off is documented in human beings in preindustrial societies, where larger family size has been linked to poorer growth and survival outcomes of children (Strassman & Gillespie, 2002), and in Western societies, where larger family size is associated with less direct parental involvement in key child care activities (Lawson & Mace, 2009). A Canadian cohort study showed that family size predicts maternal reports of their own parenting (Jenkins et al., 2003).

Family Systems

In a sense, the family system is another example of a situation effect on parenting. Parenting does not occur in a vacuum. It can be influenced by the presence of others; for example, fathers are more demanding of their sons when observed with their wives compared with father-son dyads alone (Buhrmester, Camparo, Christensen, Gonzalez, & Hinshaw, 1992). Thus, parents behave one way when interacting one on one with a child but another when the whole family is together (Cox & Paley, 2003; Deal, Hagan, Bass, Hetherington, & Clingempeel, 1999). Considerations of context and parenting necessarily invoke a family systems perspective. In family systems theory, what transpires in parenting is governed not only by the characteristics of the individual parent or child but also by patterns of transaction between the parent and others (Bornstein & Sawyer, 2005; Cox & Paley, 2003). Parenting develops and expresses itself in a family system that functions as an organized whole, composed of interdependent elements or subsystems that include individual parents as well as relationships among parents and others. Each element or subsystem within the family both affects and is affected by other elements; a change in any one element of the system can lead to changes in others. How responsive a mother or father may be at any given moment, for example, is determined not only by that parent's characteristic warmth and a child's characteristic responsiveness but also by the patterns the two parents have created jointly and therefore come to expect in their relationship.

Moreover, a full family systems approach examines parenting in the context of all relationships within the family as well as relations between the family and its many enveloping social and distal contexts (such as socioeconomic class and culture, discussed shortly). For example, mothers who report supportive relationships with "secondary parents" (grandparents and the like) are more competent and sensitively responsive to their children than mothers lacking such relationships (Grych, 2002). Fathers' education predicts the quality of mother-child engagements (Tamis-LeMonda, Shannon, Cabrera, & Lamb, 2004). Reciprocally, conflict between spouses may cause parents to miss the sometimes-subtle signals children use to communicate their needs. For their part, even 1-year-old children are less likely to socially reference their maritally dissatisfied father for information or clarification in the face of stress or ambiguity than are peers of maritally satisfied fathers (Parke, 2002).

Reflecting a family systems perspective, marital relationships affect the quality of parenting (Grych, 2002; Tamis-LeMonda & Cabrera, 2002), just as the way parents work together as a coparenting team has multiple far-reaching consequences for parenting (Teubert & Pinquart, 2010). *Coparenting* refers to ways that parents (or parental figures) relate to each other in the role of parent (McHale et al., 2002; McHale & Lindahl, 2011; Van Egeren & Hawkins, 2004). Coparenting comprises multiple interrelated components: agreement or disagreement on child-rearing issues; support or undermining of the parental role; and joint management of family interactions (Feinberg, 2003). Mutual emotional support and validation, modeling and sharing parenting skills, and buffering marital conflict or dissatisfaction from spilling over into relationships with children constitute some of the ways coparenting functions to moderate parenting. A coparent who has a positive and supportive relationship with a child tends to diminish the likelihood that the second parent will behave in a hostile manner toward the child (Conger et al., 2012).

Another illustration of the moderating effects of family systems on parenting occurs when mothering interprets and conditions fathering, as mothers frequently act as gatekeepers to children's fathers (and other caregivers), encouraging or discouraging others' involvement in child rearing (Allen & Hawkins, 1999; Cannon, Schoppe-Sullivan, Mangelsdorf, Brown, & Sokolowski,

2008). Marital dissatisfaction predicts maternal reports of their own positive and negative parenting (Jenkins et al., 2003). More generally, gatekeeping refers to how each parent regulates the other's interactions with the child (Fagan & Barnett, 2003; Rane & McBride, 2000). In certain circumstances, fathers may be more involved with their children, as when mothers are more satisfied with paternal caregiving and assess fathers to be more competent at caring. Many (but not all) paternal influences on children are indirectly mediated through the father's impact on the mother (A. J. Walker & McGraw, 2000). Thus, maternal encouragement is linked to augmented father involvement in child rearing ("gate opening"; Schoppe-Sullivan, Brown, Cannon, Mangelsdorf, & Sokolowski, 2008), and maternal discouragement with diminished father involvement in child rearing ("gate closing"; Meteyer & Perry-Jenkins, 2010; Trinder, 2008). Many additional aspects of marital relationships affect the quality of mother-child and father-child relationships (Gable, Crnic, & Belsky, 1994; Fincham, 1998; Tamis-LeMonda & Cabrera, 2002).

Support Networks

Beyond the nuclear family system, all families are also embedded in, influence, and are themselves affected by larger social systems. These social systems include formal and informal support networks. Integration or isolation from potential support networks facilitates or hampers parenting. *Support* refers to psychological and tangible resources available to individuals through their relationships with family, friends, neighbors, work associates, and others. Normally, helpful support networks have positive effects on parents.

Support from family members and other groups is associated with a successful transition to parenthood (Bird, Peterson, & Miller, 2002; Elek, Hudson, & Bouffard, 2003). Mothers in supportive relationships are less harried and less overwhelmed, have fewer competing demands on their time, and, as a consequence are more available to their children and are more competent and sensitively responsive to their children than are mothers lacking such relationships (Crnic & Greenberg, 1990; Grych, 2002). A generalized benefit of support could occur because social networks provide parents with regular positive experiences and so bolster overall well-being, because supports provide a sense of predictability and stability in one's life situation and recognition of self-worth and because supports buffer stress and mental health issues in parents (Bird et al., 2002). Members of support networks can also teach and encourage parents in more developmentally appropriate caregiving.

Several significant questions have motivated work in area of parenting supports. One concerns sources of support. In the Civitas Initiative et al. (2000) national survey, 70% of mothers of children under 3 reported that they relied on their spouse and 66% on their mothers for support. As noted previously, marital status and father presence in the home are critical to the young mother's well-being (L. D. Brown, Goslin, & Feinberg, 2011) and account for the quality of maternal emotional relationships with children (Bornstein, Putnick, et al., 2012). Emotional and child care support from a spouse (if not from other family members) are associated with well-being, greater life satisfaction, and more positive affect and competence (DeLongis, Capreon, Holtzman, O'Brien, & Campbell, 2004). Levitt, Weber, and Clark (1986) confirmed the importance of support from her spouse for mothers' well-being in intact families and extended the impact of that support to variation in the infant-mother relationship. In fact, intimate support from husbands appears to have the most general positive consequences for maternal competence (Crnic, Greenberg, Ragozin, Robinson, & Basham, 1983). When their children were 1, 3, and 5 years of age, parents reported on the emotional supportiveness they received from the other parent as well as their relationship status. Latent growth curve models revealed that, for both mothers and fathers, supportiveness was high at birth and perceived supportiveness at 1 year predicted supportiveness over time (Howard & Brooks-Gunn, 2009).

Friends and relatives constitute other major sources of information and support for new parents, especially those with little child-rearing experience. In the Civitas Initiative et al. (2000) survey, 54% of mothers reported that they relied frequently on their child's doctor/pediatrician, 25% on nurses, and 20% of child care providers for information and advice. Health care professionals are less immediately accessible, but comprise an important reserve for all ages and social classes of parent. They are consulted most often about emergent or specific medical problems (Hickson & Clayton, 2002; Hulbert, 2003). At the same time, parents report that many anticipatory guidance topics are not covered in well-child visits and that, even after such visits, they can still use more information (Sanghavi, 2005). When parents were asked whether they had any developmental, behavioral, or health concerns about their child, and whether they shared those concerns with a professional, 29% reported at least one serious concern, and more than 20% had failed to share that concern (Golan et al., 2008). To establish social support networks for information about child rearing, middle-class American parents

typically consult professionals, books, and magazines as well as relatives and friends (Clarke-Stewart, 1998; Young, 1991). Mothers in other social classes and cultures vary from this "high-brow" mode of data collection, however. Informal supports appear to be especially important for ethnic minority families (Burton & Jarrett, 2000). Both informal support systems (the extended family) and formal ones (schools, child care, parent education programs, and professionals) influence parenting (Cochran & Niego, 2002).

A second question in this literature concerns the types of support and the relative importance of the objective amount of support available to parents versus parents' perceptions of support. Support may be emotional, instrumental, or informational (Crockenberg, 1988). Quantitatively, more child care support is associated with higher-quality face-to-face interactions on the part of mothers (L. Levine, García Coll, & Oh, 1985). The more support adoptive parents receive (and the higher their expectations of life with a child), the more satisfaction they feel after their child arrives. Greater perceived support (both global and parenting support in particular) has been linked to lower levels of parenting stress, more positive parenting and relationships with children (Bonds, Gondoli, Sturge-Apple, & Salem, 2002; Izzo, Weiss, Shanahan, & Rodriguez-Brown, 2000; Suzuki, Holloway, Yamamoto, & Mindnich, 2009), and fewer negative interactions with children (Ensor & Hughes, 2010). Hashima and Amato (1994) found in a nationally representative sample that mothers' perceived social support was negatively associated with punitive and other negative parenting behaviors. The majority of existing research links global perceptions of support to indicators of parenting competence and suggests that it may matter more that parents feel support of some sort from some source than the specific amount, type, or source of support. D. M. Lee and Colletta (1983) studied support-parenting relations in adolescent parents with young children. Mothers who were satisfied with their support reported that they were more affectionate with their children, whereas mothers who were dissatisfied with their support reported more hostility, indifference, and rejection of their children. Mothers' social support moderates the effects of daily hassles of parenting (Crnic & Greenberg, 1990).

Parenting researchers have identified multiple antecedents of parenting knowledge *qua* a support (Cochran, 1993; Goodnow & Collins, 1990). Clarke-Stewart (1998), for example, reported that books and magazine articles were a popular source of advice about general child development, and their most frequent users were first-time and middle-class parents (Deutsch, Ruble, Fleming, Brooks-Gunn, & Stangor, 1988). Friends and relatives constitute a major base of information for younger parents with little parenting experience (Belsky, Youngblade, & Pensky, 1989). Mothers' own knowledge tends to relate to their formal, objective experience—exposure to books and manuals, pediatricians, and courses about child rearing—whereas previous informal or subjective experience with children (through babysitting or professional services alone) has been found to correlate not at all or even negatively with parenting knowledge (Frankel & Roer-Bornstein, 1982; MacPhee, 1981).

Today, advice on parenting from outside the family abounds. It begins well before the birth of a child in so-called preconception care whose goal is to reduce the risk of adverse effects for women, fetuses, and neonates by optimizing women's health and knowledge before planning and conceiving a pregnancy (American College of Obstetricians and Gynecologists, 2005; http://www.cdc.gov/preconception/index.html). And it can be found in professional compendia that provide comprehensive medical treatises of prenatal, perinatal, and postnatal development, such as *A Guide to Effective Care in Pregnancy and Childbirth* (Enkin, Keirse, Chalmers, & Enkin, 2000) and *The A to Z of Children's Health: A Parent's Guide from Birth to 10 Years* (Friedman, Saunders, & Saunders, 2013); in now-classic how-to books, such as *Dr. Spock's Baby and Child Care* (Spock & Needlman, 2013), *Your Baby and Child* (Leach, 2012), and *What to Expect When You're Expecting* (Murkoff & Mazel, 2008); in practical guides, such as *Baby Care Basics* (Friedman & Saunders, 2015) and *Teach Your Children Well* (M. Levine, 2013); in evidence-based academic compilations, such as the *Handbook of Parenting* (Bornstein, 2002b) and *Parenting: A Dynamic Perspective* (Holden, 2009); as well as in innumerable popular periodicals that overflow magazine racks in supermarkets, airports, and bookstores.

Internet, blogs, and other social media regularly inform parenting and allow parents to both give and receive support (Brady & Guerin, 2010; Doty, Dworkin, & Connell, 2012). Parents report using these platforms to share thoughts and ideas about parenting as well as normalize their experiences as a parent by trying to determine whether or not circumstances, symptoms, or behaviors they experience are typical and expectable (Drentea & Moren-Cross, 2005; Kirby, Edwards, & Hughes, 2008). Parents often end discussion board posts with "Is this normal?" to solicit other parents' experiences. Parents use the Internet primarily for information seeking (Nichols, Nixon, Pudney, & Jurvansuu, 2009; S. K. Walker, Dworkin, & Connell,

2011) and more specifically for gathering parenting information (Bernhardt & Felter, 2004; Blackburn & Read, 2005; Madge & O'Connor, 2006; Radey & Randolph, 2009; Tuffrey & Finlay, 2002; Warren, Allen, Okuyemi, Kvasny, & Hecht, 2010). Parents report using the Internet to help them improve how they spend time with children (26%), care for children's health (19%), and learn new things (73%; Allen & Rainie, 2002). When parents search for information online, they often seek information related to their child's normative development, specific medical diagnoses, or strategies for developmentally appropriate parenting (Bernhardt & Felter, 2004; Tuffrey & Finlay, 2002). Overall, parents report more confidence and a greater sense of empowerment in their role as a parent as a result of gathering information online (Madge & O'Connor, 2006). For example, many parents use social media to ascertain other how other parents arrive at medical decisions regarding their children (Brady & Guerin, 2010). Parents often use the Internet to find and communicate with other parents who are in situations similar to their own (Tuffrey & Finlay, 2002). Parents of children with ASD, for example, utilize e-mail to validate one another's concerns, help each other cope with uncertainty, and make sense of their experiences as a parent of a child with autism (Huws, Jones, & Ingledew, 2001).

In addition to parent education, parents access and report positive effects from online prevention and intervention programs (Lansford & Bornstein, 2007). In an evaluation of a 6-month computer-mediated social support online community targeting young, single parents (Dunham et al., 1998), 42 women accessed the online network over 16,000 times and provided social support to each other through online discussion fora. This online resource provided an environment for developing close personal relationships and creating a sense of community. Overall, single mothers who participated reported that they felt decreased parenting stress. In an experimental study of over 800 Singaporean parents with children under the age of 6, parents who accessed an online program providing information about children's development and tips for interacting with children increased in knowledge of children's speech and communication skills, children's social skills, and children's intellectual development. Parents who participated in the online program also reported feeling more confident that they were achieving their goal of being a successful parent (Na & Chia, 2008). First-time fathers who participated in an online intervention also reported significantly higher parenting self-efficacy scores than fathers in a comparison group (Hudson, Campbell-Grossman, Elek, Fleck, & Shipman, 2003). This New Fathers Network showed promise for being a successful intervention for providing nursing care knowledge to first-time fathers during the transition to parenthood.

Employment Status

Most parents work outside the home (Repetti & Wang, 2014). The nature of the workforce has changed dramatically; for example, the proportion of U.S. American mothers participating in the labor force increased from approximately 1 in 3 in 1950 to almost 2 in 3 in 2010 (U.S. Department of Labor, 2011). How individuals balance their roles in life, such as parent and employee, reflects in their effectiveness in those roles (Perry-Jenkins, Repetti, & Crouter, 2000). As noted earlier, mothers' role balance has more impact on child development than mothers' work status per se (Lerner & Galambos, 1985, 1986). Mothers who are unhappy with their work roles are more rejecting of their children, for example (Stuckey et al., 1982; Yarrow, Scott, De Leeuw, & Heinig, 1962). However, work can be affirming and have positive consequences for parenting. For example, in a sample of Korean mothers with infants, employment (both for consistently working mothers as well as for those transitioning to employment) was associated with fewer depressive symptoms and higher self-esteem, which in turn contributed to a warmer and more responsive parenting style (J. Kim & Wickrama, 2013). Thus, research tends to support a positive association between the balance struck by positive features of employment and parenting. Here, coparenting again enters the picture as a way for working women and men to balance their job and home lives (Sandberg, 2013).

Overwork and difficulties at work, however, seem to undermine good parenting. Parents tend to reduce their levels of social engagement and expression of emotion after more demanding days at work (Repetti & Wang, 2014). Video recordings of the daily reunions of employed mothers and their preschool children at a work-site daycare center over the course of a week revealed that mothers spoke less and were less emotionally engaged (e.g., there were fewer observations of caring and loving/warm behavior) following more stressful work days (Repetti & Wood, 1997). There is also evidence for short-term increases in irritability, displays of anger, and use of discipline with children after difficult days at work (Repetti, 1994). Elevated levels of negative job spillover are linked to increased use of harsh discipline in fathers (Atzaba-Poria & Pike, 2008). Fathers are less likely to know about their children's experiences and activities if they describe their jobs as highly demanding or as interfering with family life (Bumpus, Crouter, & McHale, 2006), and those who work long hours and carry high workloads have more

conflictive and less positive relationships with their adolescents (Crouter, Bumpus, Head, & McHale, 2001). More negative work environments predict more intrusive and negatively valenced parenting behavior (Costigan et al., 2003). Thus, parents' work demands impinge on family functioning (Hsueh & Yoshikawa, 2007), just as family responsibilities impinge on parents' work performance (Buehler & O'Brien, 2011). Moreover, the impact on children of one parent's work conditions also depends on how the other parent (or partner) accommodates (Barnett & Gareis, 2007).

More stressing still among women and men alike, unemployment, employment difficulties, and low earnings erode parents' positive connections to their children (Bianchi & Milkie, 2010). Indeed, at a macrosystem level, fertility itself declines in times of rising unemployment (Sobotka, Skirbekk, & Phillipov, 2011; Yule, 1906; Silver, 1965; Macunovich, 1996; R. Lee, 1990). Black, Kolesnikova, Sanders, and Taylor (2013) assessed the magnitude of long-term effects on completed fertility during the 1970s coal boom that increased male workers' incomes in coal regions of the United States and realized that that coal boom increased the completed fertility of affected cohorts by 3% while incomes were permanently increased by 6%. Analyzing more than 140 million birth records from the U.S. Vital Statistics natality data for the period 1975 to 2010, Currie and Schwandt (2014) detected short- and long-run negative responses of fertility to changes in the unemployment rate: Cohorts of women who faced high unemployment during their early 20s postponed fertility and had fewer children.

Neighborhoods

Neighbors may share norms and expectations for parenting and a collective willingness to implement both, even in the absence of close personal ties (Leventhal et al., 2015). Neighborhoods affect parents and parenting in many different ways: Neighborhoods likely influence parenting, parenting may mediate neighborhood characteristics on children, and neighborhoods can moderate parenting effects.

First, the character of their neighborhood matters for parents (Franco, Pottick, & Huang, 2010; Guterman, Lee, Taylor, & Rathouz, 2009; Molnar, Buka, Brennan, Holton, & Earls, 2003; Skinner et al., 2014). Parents who live in more disadvantaged neighborhoods experience greater depression, more stress, and worse physical health (Franco et al., 2010; Guterman et al., 2009), all of which are associated with less warm and consistent parenting and strained family relationships (Conger & Donnellan, 2007; Elder, Eccles, Ardelt, & Lord, 1995; Leventhal & Brooks-Gunn, 2005; Ludwig et al., 2012). Parents who move to middle-class neighborhoods, compared with parents who stay in low-income neighborhoods, monitor their children less stringently and are less restrictive in their control and discipline (Briggs, Popkin, & Goering, 2010). Parents who are overwhelmed and stressed by their neighborhood fail to buffer their children from the negative aspects of the neighborhood. However, neighborhood-SES associations with parenting are complex, and (as discussed later) neighborhood affluence can also undermine parenting. However, research also shows that neighborhood social processes are associated with parents' well-being, cognitions, and practices separate and apart from SES. Neighborhood social processes and parenting are nuanced and potentially moderated by structural features. For example, lower neighborhood social cohesion is associated with greater parental depression (Kohen, Leventhal, Dahinten, & McIntosh, 2008), but higher neighborhood informal social control appears to aggravate the negative association between parenting strain and parents' feelings of personal control (Carpiano & Kimbro, 2012).

Second, parenting cognitions mediate links between neighborhood characteristics (social cohesion; Kohen et al., 2008; or disorder; Mrug & Windle, 2009) and parenting practices as well as children's development. In this sense, parenting may serve as an indirect pathway for the effects of neighborhoods on parents themselves or on their children. For example, neighborhood quality predicts parental efficacy, parental efficacy predicts reported parental involvement and monitoring, and both predict academic and socioemotional adjustment of adolescents (Shumow & Lomax, 2002). Parents are less likely to allow their children to spend time outside in neighborhoods that are less safe, restricting their children's options for out-of-school-time physical activity (Schreier & Chen, 2012). Parental victimization by community violence and life stressors (parental strain) predict depressive, anxious, and hostile symptoms (parental mental health), which predict parental knowledge of their children's activities and child disclosure (parenting practices; Borre & Kliewer, 2014).

Last, parenting appears to matter differently in different contexts. That is, specific combinations of parenting and neighborhood attributes interact to influence children's development. Thus, neighborhoods and parenting may be risk or protective factors, or neighborhoods may be a risk factor and parenting a protective factor, or vice versa (Cicchetti, 2010; Simons et al., 2002; Werner, 1995). Parenting and neighborhoods sometimes work in the same direction, for better or for worse. For example, negative, ineffective, or uninvolved parenting may threaten children's

development in the context of high-risk neighborhoods (Roche, Ensminger, & Cherlin, 2007), and lower monitoring and permissive parenting in less safe neighborhoods and those with less residential stability and more disorder are detrimental for children (Beyers, Bates, Pettit, & Dodge, 2003). Similarly, harsh and inconsistent parental discipline in disadvantaged neighborhoods are associated with conduct disorder in children (Brody et al., 2003). By contrast, parenting strengths (e.g., use of authoritative control strategies) in neighborhoods where authoritative parenting is the norm may benefit children (Fletcher, Darling, Steinberg, & Dornbusch, 1995; Simons, Simons, Burt, Brody, & Cutrona, 2005). However, parental warmth, monitoring, and engagement can act as buffers in the context of low-SES or high-crime or disordered neighborhoods (Dearing, 2004; Rankin & Quane, 2002; Roche & Leventhal, 2009), just as neighborhood disadvantages can overcome advantages of typically beneficial parenting (Simons et al., 2002) or ineffective parenting is less problematic in the context of supportive neighborhoods (Browning, Leventhal, & Brooks-Gunn, 2005).

The "goodness of fit" between parenting cognitions and practices and neighborhood characteristics conditions parenting, and the match between the two may also depend on parents' individual attributes (Carpiano & Kimbro, 2012) or ethnicity (Dearing, 2004; Lamborn, Dornbusch, & Steinberg, 1996) or other factors. For example, in high-SES neighborhoods, authoritarian parenting is associated with earlier sexual initiation, but high parental authoritarian control is associated with delayed sexual initiation in youth from low-SES neighborhoods (Roche et al., 2005). The outcome matters as well to the meaning of parenting in context. Authoritarian parenting is detrimental for children's behavior in the context of disadvantaged neighborhoods (Roche et al., 2007; Roche, Ghazarian, Little, & Leventhal, 2011), but it is also associated with favorable academic outcomes (Dearing, 2004). A survey queried 3,115 adults living in 13 different neighborhoods in Texas to rate the effectiveness of different discipline strategies. Neighborhood conditions were related to the endorsement of yelling and threatening, time out and withdrawal of privileges, and explaining to children why certain behaviors are unacceptable, but they were not related to the endorsement of physical discipline. However, these associations differed by ethnicity. Neighborhood cohesion and collective efficacy were associated with decreased endorsement of yelling/threatening for African Americans and U.S.-born Latin Americans, and decreased endorsement of time out and withdrawal of privileges for European Americans. Neighborhood physical disorder, social disorder, and fear were associated with increased endorsement of time out and withdrawal of privileges among European Americans but were not associated with the endorsement of these strategies among ethnic minorities. Thus, parents' attitudes are structured by community context, but the influence of neighborhood conditions on parenting attitudes may differ for different ethnic groups (O'Brien, Caughy, & Franzini, 2005).

Parents in impoverished neighborhoods enforce a variety of rules regarding children's peer relationships presumably to avert their children from the adverse effects of risky peers (Leventhal et al., 2015). For example, parents have rules about where adolescents may meet and regulations constraining the amount of contact they may have with peers. Following a change of residence, parents report that they engage in consulting strategies, such as talking with their adolescents and encouraging them to participate in peer activities (Vernberg, Beery, Ewell, & Absender, 1993).

Social Group Contexts

Parents everywhere presumably want physical health, academic achievement, social adjustment, and economic security for their children (however those goals may be instantiated). It is likely, then, that even people in different social classes, professing different religions, belonging to different ethnicities, and from different cultures profess some similar general characteristics and competencies about parenting and wish to see and to promote some similar general characteristics and competencies in their offspring. Despite strong emphases on cultural differences, many cross-cultural studies of parent cognitions and practices report widespread similarities. In examples of the former, Mesman et al. (2015) sampled 751 mothers in 26 cultural groups from 15 countries around the globe and found strong convergence between maternal beliefs about the ideal mother and attachment theory's description of the sensitive mother across groups; Tulviste, Mizera, De Geer, and Tryggvason (2007) reported that child-rearing goals of mothers of 4- to 6-year-olds from Estonia, Finland, and Sweden were similar in all highly valuing self-maximization; Tudge and colleagues (1999) learned in a comparative study of parental values and beliefs in Estonia, Russia, the United States, and South Korea that middle-class mothers in all cultures were more likely to stress the importance of self-direction than the working-class mothers; and Posada and colleagues (1995) discovered that maternal beliefs about ideal child behavior were similar across seven Western and non-Western

countries and overlapped with attachment theory's notion of the secure-base phenomenon. African American, Dominican immigrant, and Mexican immigrant mothers in the United States reported the qualities they deemed desirable or undesirable in children age 1, 14, and 24 months. Mothers spontaneously referred to a common set of qualities, including self-maximization and connectedness; most mothers approved of desirable qualities, such as achievement, and disapproved of undesirable qualities, such as improper demeanor (Ng, Tamis-LeMonda, Godfrey, Hunter, & Yoshikawa, 2012).

In the practices domain, Bornstein, Putnick, Cote, Haynes, and Suwalsky (2015) examined rates, interrelations, and contingencies of vocal interactions in 684 mothers and their $5^1/_2$-month-old infants in diverse communities in 11 countries (Argentina, Belgium, Brazil, Cameroon, France, Israel, Italy, Japan, Kenya, South Korea, and the United States). Although they found that rates of mothers' and infants' vocalizations varied widely across communities, mothers' vocalizations to infants were consistently contingent on the offset of the infants' nondistress vocalizing, as infants' vocalizations were contingent on the offset of their mothers' vocalizing, and maternal and infant contingencies were significantly correlated. Thus, some parents' cognitions about their parenting and their children and some parents' practices are likely universal. Parenting presents the prospect of contributing to the development of a new life, and if there are universal values in this world, it is probable that nurturing, and not abusing, children falls among them. Similarities in parenting cognitions and practices could reflect evolutionary or biological bases of caregiving, the historical convergence of parenting styles, or the increasing prevalence of monistic parenting patterns through migration or dissemination via mass media.

Even where ultimate goals may be similar, however, social classes, religions, ethnicities, and cultures may differ in proximal ways to achieve them (Bornstein, 1995). Furthermore, the parenting beliefs and behaviors of one's own social group may seem natural but may actually be rather unusual when compared with those of other groups. Thus, SES, religion, ethnicity, and culture constitute social groupings each of which likely conditions parenting. That is, all social classes, religions, ethnicities, and cultures prescribe certain beliefs and behaviors in their members and proscribe others (Maccoby, 2000). For parents, some prescriptions and proscriptions, such as the requirement that parents nurture and protect their offspring, are (as suggested) essentially universal. Others, such as what kinds of emotions can be expressed in public, vary from one social group to another, and social group variation in beliefs and behaviors is always impressive. For example, parents in some cultures talk to babies and see them as interactive partners (Bornstein et al., 2015), whereas parents in other cultures think that it is senseless to talk to babies (Ochs, 1988). Different social groups possess parenting ideas, approach parenting tasks, and value parenting outcomes differently (Cote, Bornstein, Haynes, & Bakeman, 2008; Goodnow & Lawrence, 2015). For these reasons, parents from different social groups differ in their opinions about the significance of specific competencies for their children's successful adjustment, differ in the ages they expect children to reach different milestones or acquire various competencies, and so forth. Specific goals arise, in part, out of unique expectations of adult members of specific social groups. In turn, distinct belief systems provide parents with a framework for interpreting their children's behaviors, guiding their interactions with their children, and determining the activities and opportunities that they supply for their children's development. Here I emphasize parenting differences across social group contexts.

Three additional considerations are preliminary to this discussion of social group membership vis-à-vis parenting. In some respects, SES and ethnicity, and ethnicity and culture, overlap, but in other respects they differ. Here I distinguish each. The reader needs to recognize that much of the extant literature addressing ethnicity has confounded SES and vice versa. Moreover, one ethnicity or different ethnic groups may inhabit the same place, but different cultural groups normally populate different parts of the world. Although not an exclusive definition (Bornstein, 2006b; LeVine, 2003), research sometimes succumbs to the mistaken tendency to lump across SES and ethnicity or ethnicity and culture, but each is heterogeneous, and across social classes, religions, ethnicities, and cultures, different parenting beliefs, different parenting behaviors, and (not unexpectedly) different patterns of child development prevail. There follows a brief overview of some central considerations about social group membership determinants of parenting. In the context of the exosystem ring of Bronfenbrennerian pressures, the order of social groups cited is arbitrary.

Socioeconomic Status

SES comprises income, education, and occupation of householders and is broadly influential in parenting (Bornstein & Bradley, 2003). Although parents in different strata behave similarly in certain ways, SES orders a wide variety of cognitions and practices of parents toward children as it does the home environment (Bornstein, Hahn, Suwalsky, &

Haynes, 2003; Bradley & Corwyn, 2002; Hoff, Laursen, & Tardif, 2002). SES-related variation in parenting is diverse, conditioning the likelihood that parents serve their children spinach, display warmth in child rearing, and read books on child care. For example, using data from the Infant Feeding Practices study, which tracked the diets of more than 1,500 infants until age 1, Wen, Kong, Eiden, Sharma, and Xie (2014) found considerable differences in the solid foods mothers from different socioeconomic classes fed babies. Specifically, less-educated mothers from poorer households resorted to diets high in sugar and fat, whereas more-educated mothers from more resourced households adhered to diets that more closely followed infant feeding guidelines.The immediate consequence of poor infant diets is early weight gain and stunted growth. In the longer-term, the Infant Feeding Practices study analyzed data for the same children at age 6 and reported that infant feeding patterns translated into similar childhood eating habits.

Parental education is a key factor in SES (Bornstein, 2003; Bornstein, Hahn, Suwalsky, & Haynes, 2003). It is likely that lower education levels are tied to poorer awareness of proper nutrition and infant feeding practices. That is, if parents lack a proper understanding of what infants should eat and how important proper nutrition is for child health, they may not select healthy foods when less healthy ones are more convenient. When Duncan and Brooks-Gunn (1997) statistically controlled for household income and other demographic characteristics, they found higher levels of maternal education were associated with better cognitive and educational outcomes in children. More educated parents are more likely to turn to professionals (e.g., doctors, nurses) and immediate family (e.g., spouses, parents) for parenting information and advice than are less educated parents. Parents with fewer years of education are more likely to consult extended family (e.g., grandparents, aunts/uncles) for advice than are more educated parents. Lower-SES mothers refer to books or other written materials less readily as sources of information about child rearing and child development, whereas middle-SES mothers report that reading material is their primary source of information (Furstenberg, Brooks-Gunn, & Chase-Lansdale, 1989; Hofferth, 1987; Young, 1991), and they seek out and absorb expert advice about child development (Lightfoot & Valsiner, 1992). Parents with more education possess more formal knowledge about child development norms and theories and about parenting practices (Bornstein et al., 2013; Conrad, Gross, Fogg, & Ruchala, 1992; Palacios & Moreno, 1996; Parks & Smeriglio, 1986). They have more knowledge about factors that reduce the risks of illness, and they implement practices at home to improve health. More educated parents not only spend more time with their children (Guryan, Hurst, & Kearney, 2008) but use that time differently in that they read to their children more frequently (Raikes et al., 2006) and speak to their children drawing on more sophisticated language and literacy skills (Arriaga, Fenson, Cronan, & Pethick, 1998; Hoff, 2003; Rowe, Pan, & Ayoub, 2005).

Less educated mothers tend to stress traditional child-rearing goals more than mothers with higher levels of education (Tulviste et al., 2007). Similar dynamics obtain in fathers: Less educated Estonian and Finnish fathers are more likely to name desired characteristics related to conformity than more educated fathers. Educational level also drives mothers' expectations of when children should reach developmental milestones (P. D. Williams, Williams, Lopez, & Tayko, 2000). Higher-SES mothers generally give earlier age estimates for children's attainment of developmental milestones than lower-SES mothers (Mansbach & Greenbaum, 1999; von der Lippe, 1999). When Filipino mothers of preschool-age children were asked to estimate the age at which their child would acquire a variety of cognitive, psychosocial, and perceptual-motor skills (P. D. Williams et al., 2000), mothers with higher educational attainment had earlier expectations for children's cognitive and psychosocial development (e.g., emotional maturity, independence). Education also influences parental values for children. People with no more than a high school education tend to put more emphasis on teaching children obedience, religious faith, and being well mannered, whereas college graduates tend to place higher priority on teaching children empathy, curiosity, tolerance, and persistence (Doherty, Funk, Kiley, & Weisel, 2014).

In short, the positive characteristics of caregiver (especially maternal) education vis-à-vis parenting are profound and pervasive. In developing nations, maternal education, net of other family socioeconomic indicators, is positively related to mother's own health care utilization as well as the nutritional status and health care utilization for her children (Abuya, Ciera, & Kimani-Murage, 2012; Ahmed, Creanga, Gillespie, & Tsui, 2013; Burchi, 2012). Using UNICEF's Multiple Indicator Cluster Survey, Bornstein, Putnick, Bradley, Lansford, and Deater-Deckard (2015) explored relations among mother education, household resources, and infant growth in 117,881 families living in 39 low- and middle-income countries. Mother education led to improved infant growth through availability of household resources. Unfortunately, in many low- and middle-income countries around the globe, instructional

capital in the form of maternal education is limited: In 39 low- and middle-income countries, for example, the median years of education for women aged 25 and over was only 5.17 in 2010 (Barro & Lee, 2010).

Conversely, low SES and poor education are risk factors in parenting (and children's development). Low SES adversely affects mothers' psychological functioning and is associated with resort to harsh or inconsistent disciplinary behaviors (Atzaba-Poria & Pike, 2008; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000). Parents who enjoyed fewer years of formal education and those with lower income hold less favorable attitudes about parenting in general (e.g., Clément & Chamberland, 2009; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000) and sensitivity in particular (Emmen et al., 2012), and show a lower quality of actual parenting behaviors (e.g., Mesman et al., 2012). Around the globe, low- compared to middle-SES parents typically provide children fewer opportunities for variety in daily stimulation, have less appropriate play materials on hand, and engage in less total stimulation (Bornstein & Putnick, 2012). Significantly, working-class mothers converse with their children less, and in systematically less sophisticated ways, than do middle-class mothers (Hart & Risley, 1995; Hoff, 2003). These social class differences in maternal speech to children are widespread: In Israel, for example, middle-class mothers talk, label, and ask "what" questions more often than do lower-class mothers (Ninio, 1980).

Parents in higher socioeconomic strata also change more flexibly and more rapidly in response to changes in developmental theory than do parents in lower socioeconomic strata (Bronfenbrenner, 1958). Lower-SES parents believe they have less control over the outcome of their children's development than do higher-SES parents (Elder et al., 1995; Luster, Rhoades, & Hass, 1989). Kohn (1963, 1969, 1979) hypothesized that social class differences in the requirements and expectations of fathers' jobs were related to differences in fathers' goals and expectations for their children. Lareau (2003) illustrated that lower-income parents adopt a more "natural growth" approach to child development, where they do not attempt to fill leisure time with structured activities, as is more typical of middle- and higher-income parents.

Overall, financial and social stresses sap the general well-being and health of parents and demand attention and emotional energy from them (Magnuson & Duncan, 2002). In McLoyd, Aikens, and Burton's (2006) analysis, stresses on impoverished parents stemming from day-to-day struggles to find the resources to pay for food and rent, and the stresses of trying to cope with living in crowded housing and deteriorated, dangerous neighborhoods, undermine parenting skills and contribute to disorganizing family life (Toldson & Lemmons, 2013). Economic stresses thus erode parenting skills (Conger, Ge, Elder, Lorenz, & Simons, 1994) and reduce parents' attentiveness, patience, and tolerance toward children (Crnic & Low, 2002). Stress on parents is associated with decreased sensitivity to child cues, more negative feelings toward children, and harsh parenting styles (Sevigny & Loutzenhiser, 2010).

Parenting in the upper class is not immune from disadvantage, however (Luthar, 2003; Luthar & Barkin, 2012; Luthar & Latendresse, 2005; Racz, McMahon, & Luthar, 2011). Affluence is sometimes associated with parents' lower social support and higher alcohol use (Briggs et al., 2010; Chuang, Ennett, Bauman, & Foshee, 2005; Fauth, Leventhal, & Brooks-Gunn, 2008). As we see, the economics of the family is open to future study (Duncan & Magnuson, 2002). For example, standard economic theory (Becker, 1960) asserts that children are "normal goods" and fertility increases with income. However, higher female wages also make children more expensive, because childbearing and rearing have costs in terms of income lost. Empirical research supports these opposing forces (Aaronson, Lange, & Mazumder, 2011; Black, Kolesnikova, Sanders, & Taylor, 2013; Brueckner & Schwandt, 2014; Schaller, 2012).

Religion

Religion plays an central role in shaping core values and beliefs regarding family life, and aspects of religion are likely formative influences in parenting (Bengston, 2013; Gaunt, 2008; Mahoney, 2005; Mahoney, Pargament, Tarakeshwar, & Swank, 2008; Wilcox, 2002). A 2012 Gallup global poll reported that nearly 60% of the world's population self-identified as "religious" (WIN-Gallup, 2012). Most U.S. Americans describe themselves as religious (Mahoney, 2010), and 37% of all those with a religious affiliation (60% of White evangelical Protestants) in the United States say that religious faith is among the most important qualities to teach children (Doherty et al., 2014). (By contrast, just 3% of those who are unaffiliated say religious faith is among the most important qualities to instill.) In the United States, too, those with religious affiliations (particularly White evangelical Protestants) are also more likely than the religiously unaffiliated to prioritize obedience and being well mannered and somewhat less likely to say creativity, curiosity, or tolerance is important.

That said, religion is an understudied determinant of parenting. In actuality, scholars have distinguished

religiousness and spirituality as related but separate forces in parenting and family life (King & Boyatzis, 2015). Religiousness tends to refer to the extent to which an individual has a relation with a particular institutionalized religion (and is measured by, e.g., attendance at religious services), whereas spirituality is conceptualized in terms of an individual's personal quest for understanding answers to ultimate questions about life (and is measured by, e.g., perceptions of transcendence). Questions about religiousness tend to predominate in the extant literature and are usually global (Bartkowski & Xu, 2010) and too frequently overlook personal meanings derived from religious involvement (Mahoney, 2010; Mahoney et al., 1999; Volling, Mahoney, & Rauer, 2009).

Parents who are religious are likely to manifest their values and beliefs through everyday interactions with others, including family members. Indeed, if religion guides parenting, we would expect somewhat rigid and less flexible caregiving because fixed factors, such as a religious creed, and not others, such as a child's needs, would determine parenting. For example, Conservative Protestants subscribe to the belief that corporal punishment as a disciplinary practice is beneficial for young children's socialization (Ellison, Bartowski, & Segal,1996; Thompson & Miller, 1997). Stronger religiosity is related to lower convergence between the mothers' beliefs about the ideal mother and the profile of the highly sensitive mother (Emmen et al., 2012). With possible exceptions of extremists, parental religiosity is positively associated with more effective parenting, communication, closeness, support, monitoring, conflict, and peer acceptance and negatively associated with authoritarian parenting (Snider, Clements, & Vazsonyi, 2004). A meta-analysis of studies associating religion and families found that religion relates to important outcomes in marriage and parenting, including higher global marital satisfaction, family cohesion and authoritative parenting and lower rates of interparental conflict and divorce, with subsequent benefits in children's self-regulation (Mahoney, Pargament, Swank, & Tarakeshwar, 2001). DeMaris et al. (2011) assessed mothers' and fathers' reports regarding religion and parenting with infants; religious conservatism in mothers was related to higher levels of infant care, but lower levels in fathers. According to Ho (1994), Confucian ethics emphasize obligation to others rather than individual rights and provide a foundation for parent-child relationships through the notion of filial piety. Among such filial precepts are obeying, honoring, and providing for the material and mental well-being of one's parents; performing the ceremonial duties of ancestral worship; taking care to avoid harm to one's body; ensuring the continuity of the family line; and in general conducting oneself so as to bring honor and not disgrace to the family name. These underlying Confucian values are thought to be reflected in many Asian parents' goals for what it means to be a good parent and what constitutes a good or virtuous child.

Two common construals offer insights into how religion might affect parenting. *Sanctification* refers to the extent to which parents view God as evident in their relationships with other family members and so view their parenting as imbued with religious and spiritual meaning. Sanctification is nondenominational. Sanctification in parenting is one way religion is manifested in everyday interactions between parents and children (Mahoney et al., 1999). For example, sanctification is associated with constructive discipline practices and greater marital satisfaction and diminished discord and with decreased conflict with children (Mahoney et al., 1999; Volling et al., 2009). Murray-Swank, Mahoney, and Pargament (2006) evaluated mothers spanking in relation to their theological conservatism in interaction with their sanctification (how much they imbued their parent role with sacred and divine qualities and saw parenting as "God's work"). Mothers' conservatism and sanctification interacted in predicting spanking: Theologically conservative mothers who also viewed their parental role as sanctified, sacred, and holy were more likely (than other conservative mothers) to spank their children, whereas mothers who were theologically liberal and also viewed their role as sacred and holy were less likely (than other liberal mothers) to spank.

Religious coping describes the ways that individuals utilize religion to work through life challenges (Pargament, Smith, Koenig, & Perez, 1998). It concerns specific beliefs about God's role in times of distress and accounts for variance in health and well-being outcomes above and beyond the influences of nonreligious coping (Pargament, 1997). In addition, religious coping mediates the relation between general religious orientation and outcomes of life events. This functional aspect of religion might explain how sensitive and involved parents are with their children via-à-vis measures of attendance or global religiosity.

Research has rarely considered whether religion has unique associations with parenting after accounting for related constructs that also may influence parenting. For example, as indicated, individuals reporting greater religiosity also tend to report greater marital satisfaction (Mahoney et al., 2001) and greater warmth and affection toward children (Wilcox, 1998), all of which predict more sensitive and involved parenting. In an investigation to rule out third-variable explanations for associations between

religion and parenting, measures of civic engagement or conventional behavior (e.g., voting) were not found to diminish the association between church attendance and father involvement (Wilcox, 2002). Examining the roles of other potentially important constructs linked to parenting will be critical for understanding how religiousness and spirituality each specifically shapes parenting.

Ethnicity

Parenting is conditioned by ethnicity and varies in meaningful ways among people of various ethnicities (as already noted). For example, parenting values is an instance case. A national survey in the United States revealed that (69%) African Americans say it is especially important to teach children religious faith; by contrast, about half of European Americans (51%) and Latin Americans (54%) say teaching children religious faith is important. African Americans (70%) are also more likely than European Americans (57%) to place importance on teaching children to be obedient (Doherty et al., 2014). Parenting style is often assessed along two separate broad dimensions, warmth (responsiveness and child-centeredness) and control (demandingness), which combined produce four parenting types: authoritative, authoritarian, permissive, and disengaged (Baumrind 1967, 1978, 1991; Maccoby & Martin, 1983). These styles are hypothesized to contribute differentially to child identity formation and cognitive and moral development. An authoritative parenting style combines high levels of warmth with moderate to high levels of control. In middle-class European American families, it is associated with children's achievement of social competence and overall better adaptation. Parents who are supportive in this way are often identified with being emotionally and physically responsive to their children's autonomy and prepare children for a world they regard as validating, trusting, and accepting. Authoritarian parenting, by contrast, is composited of high levels of control and low levels of warmth, and among European Americans it is generally associated with poorer child developmental outcomes. However, different ethnic groups in the United States have different approaches to parenting and value different outcomes. Parental control is equated with loving concern and associated with perceptions of warmth in Asian and Latin, but not European, American families (Chao & Tseng, 2002; Harwood et al., 2002). In European American families, parental warmth protects against children developing externalizing problems, but in African American families, it is a risk factor (Lau et al., 2006; Lorber, O'Leary, & Smith Slep, 2011). African American parents hold different beliefs about the world because of racism, inequality, and residence in neighborhoods that are unsafe (Ogbu, 1981). Thus, supportive parenting and its effects may look very different in different ethnic communities (Brody & Flor, 1998; Ispa et al., 2004).

Tamis-LeMonda and Kahana-Kalman (2009) interviewed low-income, urban, African Americans as well as Mexican, Dominican, and Chinese immigrant mothers in maternity wards hours after the births of their babies. Mothers' views were assessed using open-ended questions, and their responses were coded as relevant to four main categories: child development, parenting, family, and resources. Mothers from the four ethnic groups varied in how much they spoke about child development, family, and resources. Relative to the other groups, Chinese immigrant mothers talked more about child development; African American and Dominican immigrant mothers talked more about resources; and Mexican immigrant mothers talked more about family. Latin American and African American mothers read to their children less frequently as compared to European American mothers (Yarosz & Barnett, 2001), and Spanish-speaking Latin American families have fewer children's books available in the home than their non–Latin American counterparts (Raikes et al., 2006). As discussed earlier, O'Brien et al. (2005) surveyed adults living in 13 different neighborhoods in Texas about their attitudes regarding child discipline. Neighborhood cohesion and collective efficacy were associated with decreased endorsement of yelling/threatening for African Americans and U.S.-born Latin Americans and decreased endorsement of time out and withdrawal of privileges for European Americans. Neighborhood physical disorder, social disorder, and fear were associated with increased endorsement of time out and withdrawal of privileges among European Americans but were not associated with endorsement of these strategies among ethnic minorities. Minority Latin and African American parents do not differ from one another in parenting knowledge but do differ from European American parents (García Coll & Pachter, 2002). Harwood, Miller, and Irizarry (1995) found that European American mothers underscore the importance of values such as independence, assertiveness, and creativity, when asked to describe their ideal child, whereas Latina American mothers underscore the importance of obedience and respect for theirs.

Ethnicity also plays a role in parental supervision. European American, Latin American, and African American parents all similarly encourage their adolescents to establish same-ethnicity friendships and caution their adolescents about the challenges of cross-ethnic romantic relationships (Dornbusch et al., 1987; Hamm, 2001). Latin

American and African American parents are consulted less by adolescents than are European American parents (Bornstein, Jager, & Steinberg, 2012). Asian American parents, as compared to European American parents, attribute the effort the child directs toward schoolwork as most important contributor to the child's academic success (Chao & Tseng, 2002).

Culture

Like social class, religion, and ethnicity, culture pervasively influences who parents (Leinaweaver, 2014) as well as how parents view parenting and how they parent (Bornstein & Lansford, 2010). Culture defies ready definition, but most scholars agree that culture embraces patterns of beliefs and behaviors, acquired through socialization, that distinguish social groups (Boyd & Richerson, 2005). The majority of research in parenting refers to a Western, educated, industrialized, rich, and democratic cultural database (Bornstein, 2010b; Henrich et al., 2010). Nonetheless, from extant comparative studies, we have learned that culture influences parenting (and child development) from very early in life in terms of when and how parents care for children, the extent to which parents permit children freedom to explore, how nurturant or restrictive parents are, which behaviors parents emphasize, and so forth (Benedict, 1938; Selin & Stone, 2009; Whiting, 1981). For example, in some cultures, children are reared in extended families where care is provided by many relatives; in others, children and their mothers are isolated from almost all social contexts. In some cultures, fathers are treated as irrelevant social objects ("honored guests"); in others, fathers assume complex and continuing responsibilities for children ("house husbands"). Japan and the United States maintain reasonably similar levels of modernity and living standards, and both are child-centered societies, but the two differ dramatically in terms of history as well as beliefs and behaviors with respect to parenting. Traditional Japanese mothers expect early mastery of emotional maturity, self-control, and social courtesy in their children, whereas American mothers expect early mastery of verbal competence and self-actualization in theirs. American mothers promote autonomy and organize social interactions with their children so as to foster physical and verbal assertiveness and independence, and they promote children's mastery of the external environment. Japanese mothers organize social interactions so as to consolidate and strengthen closeness and dependency within the mother-child dyad, and they tend to indulge young children (Bornstein, Cote, Haynes, Suwalsky, & Bakeman, 2012; Morelli & Rothbaum, 2007).

Parents in different cultures can differ radically in what they value. Consider play, for example: Parents in some cultures believe that play provides important development-promoting experiences; parents in others see play primarily to amuse; and parents in still others do not include play in their job description (Bornstein, 2007; Bornstein & Putnick, 2015). Tamis-LeMonda, Wang, Koutsouvanou, and Albright (2002) investigated child-rearing values in mothers of preschoolers from Greece, Taiwan, and the United States using open-ended probes and an ordering task. They identified four broad categories of values: decency (values emphasizing character), proper demeanor (values emphasizing appropriate relatedness and behaviors), self-maximization (values emphasizing the development of self potential and individuality), and sociability/lovingness (values emphasizing affective and social dimensions of relatedness). Cultural differences in all value categories emerged, echoing the unique cultural frameworks of the three societies. Likewise, expected developmental timetables in new mothers in Australia of Australian versus Lebanese heritage differ, showing that culture shapes mothers' expectations of their children much more than other seemingly more immediate factors, such as experiences observing their own children, comparing them to other children, and advice from friends and experts (Goodnow, Cashmore, Cotton, & Knight, 1984). Indeed, culturally defined beliefs are so powerful that parents sometimes act on them as much as or more than on what their senses tell them about their own children. Parents in Samoa, for example, reportedly think of young children as having an angry and willful character, and, independent of what children might actually say, parents consensually report that their children's first word is *tae*, Samoan for "shit" (Ochs, 1988).

Among European Americans, self-esteem is thought to be important to healthy development in children, but among Taiwanese, self-esteem is less important or even thought to create psychological vulnerabilities. When A. L. Miller et al. (2002) compared European American and Taiwanese mothers' beliefs about child rearing and self-esteem, unsurprisingly they found that nearly all European American mothers spontaneously invoked self-esteem and spoke about the importance of building children's self-esteem. In contrast, few Taiwanese mothers talked about "self respect–heart/mind" (a Chinese term that approximates self-esteem). Asian Indian child rearing emphasizes close family bonds with parents highly involved in their children's lives. Individuals of all ages are expected to sacrifice and to contribute to the honor and welfare of the family (Jambunathan & Counselman, 2002). Rites of

passage are associated with the onset of biological puberty, but there is no corresponding change in adolescents' status, responsibilities, or autonomy in decision making in Asian Indian families (Dasgupta, 1998), and even adult children are expected to remain at home until marriage and follow parental advice when dating or making career choices (Jambunathan & Counselman, 2002). By contrast, European American families tend to be nuclear, and children are generally viewed as transitional members who by adolescence are expected to individuate and pursue their own interests. Indeed, adolescence as it is conceptualized in Western society is a foreign concept in traditional Asian Indian society. Thus, Asian Indian parents hold negative views of their adolescents' independent and autonomous behaviors, behaviors that European American parents are trying to foster. Harwood et al. (1995) found that both working and middle-class Puerto Rican mothers valued respectfulness and proper demeanor in their children, but U.S. mothers wanted their children when grown up to possess the qualities of self-maximization. Parents in Sweden stress independence and assertiveness more than parents in India (Ekstrand & Ekstrand, 1987).

Even very basic parenting practices vary widely across cultures. Konner (1977) recorded variations in the frequencies of African Kalahari San, Guatemalan, and Bostonian caregivers' vocalization to infants; Caudill and Weinstein (1969; see also Ferguson, 1977) found that U.S. mothers talk more to their babies than do Japanese mothers; and Richman et al. (1988) reported that North American, Swedish, and Italian mothers vocalized at higher rates than Kenyan (Gusii) mothers. (Many observers have noted the relative dearth of speech among African caregivers, be they Gusii speakers in Kenya or native speakers of Sooninke or Pular from west Africa; Dixon, Tronick, Keefer, & Brazelton, 1981; Rabain-Jamin, 1994; Richman et al., 1988.) Furthermore, European American mothers in Lafayette, Indiana, speak in response to their infants' vocalizations more than mothers in Nagoya, Japan, do (Fogel, Toda, & Kawai, 1988); mothers in Boston, Massachusetts, are more verbally responsive to their infants than are Gusii mothers in west Kenya (Richman et al., 1992); and urban Berliner mothers show higher levels of contingent vocal responsiveness compared with Nso mothers in rural Cameroon (Keller, Kärtner, Borke, Yovski, & Kleis, 2005).

One dynamic attests to the influence of culture on parenting, and consequently the malleability of parenting. When parents reared in one culture migrate to another, they eventually adopt the parenting cognitions and practices of the new culture (Bornstein & Bohr, 2011; Bornstein & Cote, 2003, 2004a, 2004b, 2007; Cote & Bornstein, 2003, 2005; Cote et al., 2015). Notably, these rarely happen simultaneously, but practices seem to migrate sooner and more readily than cognitions.

Multicultural comparative studies of parenting beliefs and behaviors, and even more challenging longitudinal ones, are increasing in incidence and sophistication (see Bornstein et al., 2015a, b; Lansford et al., 2011, 2014; Putnick et al., 2012). For example, mothers from Argentina, Belgium, Israel, Italy, Japan, and the United States were asked about their attributions for parenting successes and failures—if being able to successfully comfort their child when the child cries was due to their parenting ability (e.g., "I am good at this"), effort (e.g., "I have tried hard"), mood (e.g., "I am in a good mood"), task difficulty (e.g., "This is easy to do"), or a child characteristic (e.g., "My child makes this easy to do"). Among many culturally differentiated patterns of findings that emerged, Japanese mothers were less likely than mothers from all other nations to attribute success to their own ability and more likely to indicate that, when they were successful, it was because of the child's behavior (Bornstein et al., 1992). Bornstein, Putnick, and Lansford (2011) evaluated similarities and differences in mean levels and relative agreement between mothers' and fathers' attributions and attitudes in parenting in nine countries: China, Colombia, Italy, Jordan, Kenya, the Philippines, Sweden, Thailand, and the United States. Mothers and fathers reported their perceptions of causes of successes and failures in caregiving and their progressive versus authoritarian child-rearing attitudes. Country differences emerged in all attributions and attitudes that were examined. In diverse domains of development, parenting practices relate differently to children's adjustment depending on the broader cultural context. A study of associations between parental corporal punishment and children's adjustment in China, India, Italy, Kenya, the Philippines, and Thailand disclosed that more frequent corporal punishment was linked to higher levels of child aggression and anxiety in all six countries, but the connection was weaker in countries where the use of corporal punishment was more culturally normative (Lansford et al., 2005).

Bornstein and his colleagues (2015) observed mothers and their infants in 11 societies world-wide under ecologically valid, natural, and unobtrusive conditions to study their usual routines in the familiar confines of their own homes. They videorecorded mother-baby dyads and then used mutually exclusive and exhaustive coding systems to comprehensively characterize frequency and duration of six maternal caregiving practice domains (nurture, physical, social, didactic, material, and language), and they then

asked about cultural similarities and differences in base rates of parenting in the six caregiving domains. Mothers in different cultures differed in every domain assessed. Moreover, mothers in no one culture surpassed mothers in all others in their base rates of parenting across domains.

Parents' goals for their own parenting and for their children arise, in part, out of their society's expectations of its adult members (LeVine, 2003; Rosenthal & Roer-Strier, 2001). For example, many Western societies encourage independence, self-reliance, and individual achievement among their children, whereas many Asian and Latin cultures encourage interdependence, cooperation, and collaboration among peers (Triandis, 1995). These general values are associated with differences in parenting goals (Harwood, 1992; Ogbu, 1981). Keller et al. (2004) analyzed culturally informed parenting styles during infancy, as related to the sociocultural orientations of independence and interdependence. Free-play situations between mothers and 3-month-old infants were videorecorded in five cultural communities (West Africa, India, Costa Rica, Greece, and Germany) that differ according to their sociocultural orientations. They analyzed videorecords using coding systems that focused on four parenting systems, including body contact, body stimulation, object stimulation, and face-to-face contact. Two styles of parenting (distal and proximal) emerged across cultures that could be related to the sociocultural orientations of independence and interdependence. Li, Fung, Bakeman, Rae, and Wei (2014) compared conversations between European American and Taiwanese mothers and children (6–10 years) about good and poor learning. European American mothers mentioned mental activities and positive affect more, whereas Taiwanese mothers mentioned learning virtues and negative affect more. Schulze, Harwood, and Schoelmerich (2001) found that mothers from European American and Puerto Rican backgrounds commonly valued independent socialization, but European American mothers emphasized emotional autonomy whereas Puerto Rican mothers focused on instrumental independence. Suizzo and Cheng (2007) analyzed mothers' socialization goals by parsing attributes of relatedness into family obligation and relational intimacy; relational intimacy was valued more highly by European American than Taiwanese mothers. By contrast, Taiwanese mothers were more likely than European American mothers to value agency-status goals concerning power and achievement.

Some children are relatively relaxed when confronted with an unfamiliar situation and display little distress, whereas other children react to novel objects and situations with anxiety, try to remain close to their mother, and do not easily interact with unfamiliar people. These latter actions indicate behavioral inhibition. X. Chen et al. (1998) unearthed cultural differences in mothers' attitudes toward behavioral inhibition in children. Chinese mothers, who traditionally value mutual interdependence, view behavioral inhibition in toddlers as a positive trait. Behavior inhibition is associated with maternal acceptance of the child and belief in encouraging the child's achievement. In contrast, for Canadian parents of European origin, who traditionally hold a more individualistic orientation, behavioral inhibition is negatively associated with maternal acceptance and encouragement of children's achievement. Among traditional Chinese families, children who display higher levels of behavioral inhibition have mothers who are less likely to believe that physical punishment is the best way to discipline and who are less likely to feel angry toward the child. However, maternal punishment orientation was positively correlated with behavioral inhibition in Canadian families; mothers whose children displayed higher levels of behavioral inhibition are more likely to believe that physical punishment is the best discipline strategy. In short, behavioral inhibition in children is associated with positive attitudes in Chinese mothers and negative attitudes in Canadian mothers.

In disciplining children, parents often escalate to corporal punishment. Today, 77% of American men and 65% of U.S. American women endorse the statement that sometimes a child needs a "good, hard spanking" (Child Trends, 2013), and almost 50% of American parents indicate that they had spanked their 2- to 5-year-old child in the last month (MacKenzie, Nicklas, Brooks-Gunn, & Waldfogel, 2011). Sanction of corporal punishment is widespread world-wide: A study of 30,470 families with 2- to 4-year-old children in 24 low- and middle-income countries revealed that 29% of parents reported believing that using corporal punishment is necessary to rear a child properly, and 63% of parents reported that their child had been corporally punished in the last month (Lansford & Deater-Deckard, 2012).

Parents across cultures engage in child socialization practices to cultivate values and behaviors that promote adaptation to the social, economic, and ecological conditions of their society (Quinn, 2005). However, there are cultural differences in which values are prioritized to define the optimal endpoint of child development (Greenfield, Keller, Fuligni & Maynard, 2003; LeVine, 2003). Parenting cultural knowledge is often conceptualized as naive theories about how children progress toward idealized social roles, what influences their development, how skills are

acquired, and the roles of different adults and environments in the developmental process (Keller et al., 2006; Rosenthal & Roer-Strier, 2001). Many argue that culturally distinct parenting beliefs provide parents with a framework for interpreting their children's behaviors, guiding parents' interactions with their children, and determining the activities and opportunities that parents are willing to supply for their children's development. Parenting is a response to, and is supported by cultural beliefs about, what parents should do to promote their children's development.

Distal Contexts

Distal contexts for parenting operate through proximal familial mechanisms and include, for example, ecology, time and history, and evolution. Here, I touch briefly on each.

Ecology

The ecological circumstances in which living organisms adapt and function are thought to bias them toward investing in either a relatively small number of "high-quality" offspring or a relatively large number of "low-quality" offspring. In humans, monogamy and biparental care are associated with allocation of resources toward few high-quality offspring: children who tend to have better health, survival, and developmental outcomes (Ellis, Figueredo, Brumbach, & Schlomer, 2009). Challenging, dangerous, and/or unpredictable environments favor low parental effort, and low parental effort is empirically associated with harsh, neglectful, rejecting, and insensitive parenting (Belsky et al., 1991). In an analysis of mostly preindustrial societies, Quinlan (2007) found that ecological stress, in terms of conditions of warfare, famine, and high pathogens, was associated with mothers decreasing parental care and terminating breastfeeding at earlier ages (De Baca, Figueredo, & Ellis, 2012). In reviews of maternal decision making under resource scarcity, Bateson (1994) and Hrdy (1999) concur.

Specific patterns of child rearing can be expected to adapt to specific settings and needs. Thus, geographic conditions can be expected to play a consequential role in many aspects of parenting (O. Davis, Haworth, Lewis, & Plomin, 2012). Different geographic regions have different climatic, vegetative, and living conditions, and these circumstances can be expected to contribute to parenting cognitions and practices (R. R. Dunn, Davies, Harris, & Gavin, 2010). Insofar as tropical areas are denser with pathogens that lead to infections and poor child growth and mortality, for example, parenting in those ecologies can be expected to cope with greater challenges with respect to children's health and illness. Along these same lines, father-present social systems, monogamous marriage, and wide birth spacing are all more likely among human hunter-gatherers inhabiting harsh ecologies where biparental care is substantial and important for offspring survival and reproductive success (O. Davis et al., 2012; Draper & Harpending, 1988; Geary, 2000; Marlowe, 2003). Even different adapted mazeways in proximate ecologies give rise to divergent parenting. For example, nomadic hunter-gatherer Aka are more likely to hold and feed young infants in close proximity than are settled Ngandu farmers who are more likely leave infants by themselves, even though these two traditional groups live close to one another in central Africa (Hewlett, Lamb, Shannon, Leyendecker, & Schoelmerich, 1998). Aka parents are thought to maintain closer proximity to infants because this nomadic group moves in search of food more frequently than do more sedentary farmer Ngandu.

Within small rural communities characterized by subsistence economy, face-to-face interactions in small stable social networks, and lower levels of formal education and technology, socialization favors rearing children to promote group solidarity to meet communal needs. The extent to which the severity of exposure to social risk is related to parenting in the first 2 years of life was studied in diverse samples of families in two rural poor regions of the United States. The geographic isolation of families moderated associations between risk and expressions of maternal sensitivity and warmth as well as language and learning activities (Burchinal, Vernons-Feagans, Cox, & Key Family Life Project Investigators, 2008). By contrast, in urban settings characterized by formal schooling and commercial economic conditions that yield more fleeting interactions with strangers, socialization favors independence and competition in educational and economic realms (Greenfield, 2009). When Bornstein and colleagues (2008, 2012) investigated mothers' emotional availability to their children in contrasting rural and urban ecologies in three countries, they found patterns of parenting intrusiveness consonant with this urban-rural distinction.

Time and History

The bioecological view of parenting encompasses multiple scales of time. Every parent realizes that the days are long but the years are short. As mentioned earlier, parents do not vary in themselves much from day to day—parenting cognitons and practices tend to be stable—and family values are especially conservative. For example, Bomhoff and Gu (2012) found that East Asians continue to endorse

traditional and conservative values despite their residence in economically developed nations, including Japan, South Korea, and Taiwan.

Time of day and time of year influence parenting. For example, parents are more likely to spank their children in the evening than other times of the day (Clifford, 1959; Holden, Coleman, & Schmidt, 1995), and parenting differs during summer and winter months, consistent with parents' work schedules (Crouter & McHale, 1993).

Over longer periods, parents also change on accounts of personal development, development in the child, and historical development. The ratio of adult-directed speech to child-directed speech increases across just the first postpartum year (Bornstein & Tamis-LeMonda, 1990), and parents of younger children spend much more time in child care than parents of older children (U.S. Bureau of Labor Statistics, 2013). "Parents who are highly effective at one stage in the child's life [are] not necessarily as effective at another. . . . Similar behaviors do not necessarily produce the same effects at successive stages in [a] child's life" (Baumrind, 1989, p. 189). Parenting, like children's behavior, develops to become more hierarchical, differentiated, and complex (Sroufe & Jacobvitz, 1989).

It is important to recognize that child-rearing cognitions and practices evolve and change with longer scales of time (Bronfenbrenner, 1958; French, 2002). In classical Rome, the *pater familias* dictated the literal life and death of children; later if any question arose about child care, mothers' rights prevailed; today in the postdivorce binuclear family, joint custody is fast becoming preferred law and the norm. The attitudes and actions of parents at any one time in any one generation may differ from those characteristic of parents in another. Change over time in the parent, the context, and the relation between the parent and context is expectable. Thus, parenting values change over time along with societal changes. In essence, child-rearing cognitions and practices depend on the current cultural context as well as contexts of past and future (Cole, 1996; Valsiner, 2000). Across cultures, there is a general drift toward greater individualism that emphasizes individual self-sufficiency. Unsurprisingly, in their self-representations young and middle-aged adults use more agency attributes, whereas older adults use communion attributes (Diel, Owen & Youngblade, 2004).

On account of high rates of child mortality, parents earlier in history may have cared for but resisted emotional investment in the very young (Dye & Smith, 1986), an orientation that appears to persist where especially dire circumstances reign (Scheper-Hughes, 1989). One historian theorized that parents have generally improved in their orientation to and treatment of children because parents have, through successive generations, improved in their ability to identify and empathize with the special qualities of early childhood (deMause, 1975).

Society at large is also witnessing the emergence of striking permutations in parenthood and in the constellation of the family structure that have plunged the family generally, and parenthood specifically, into an agitated state of question, flux, and redefinition (Ganong et al., 2015; Solomon, 2012). Peruse the panel of graphs in Figures 5.1 through 5.12. They evidence startling cultural shifts and social changes in central aspects of parenting even in so short a time as the second half of the twentieth century. In an analysis of parenting change from just 1989

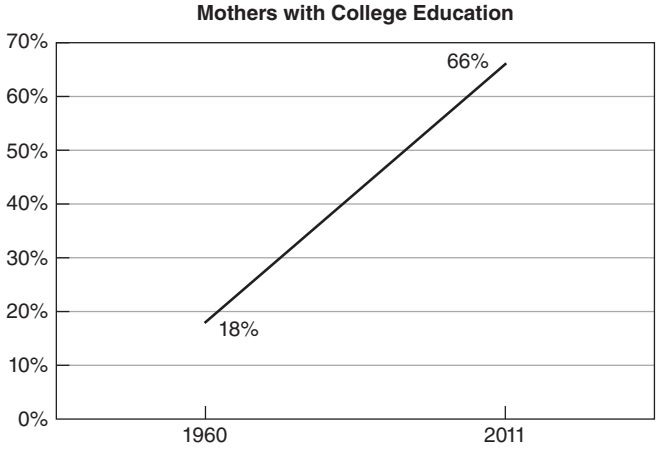


Figure 5.1 Mothers with College Education. *Source:* D. Cohn & G. Livingston (2013), Record share of new mothers are college educated. Pew Research Center. Retrieved from http://www.pewsocialtrends.org/files/2013/05/fertilityeducation_final.pdf

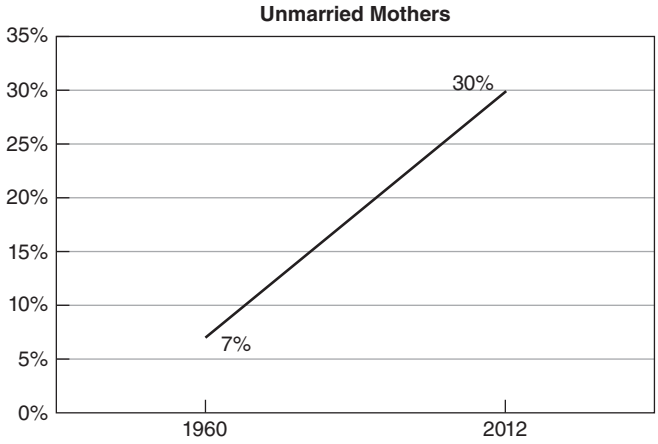


Figure 5.2 Unmarried Mothers. *Source:* A. Caumont & W. Wang (2014). 5 questions (and answers) about American moms today. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/05/09/5-questions-and-answers-about-american-moms-today

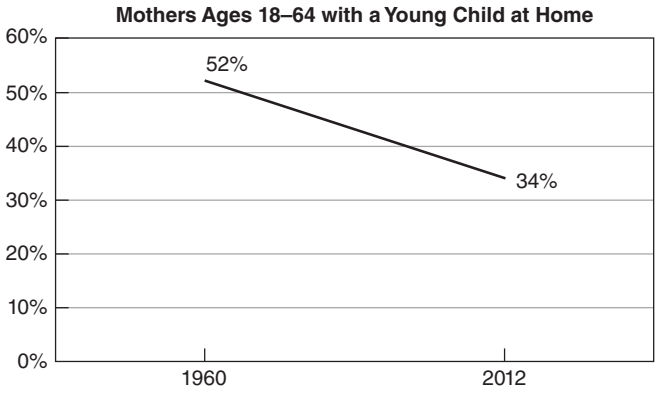


Figure 5.3 Mothers Ages 18–64 with a Young Child at Home. *Source:* A. Caumont & W. Wang (2014). 5 questions (and answers) about American moms today. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/05/09/5-questions-and-answers-about-american-moms-today

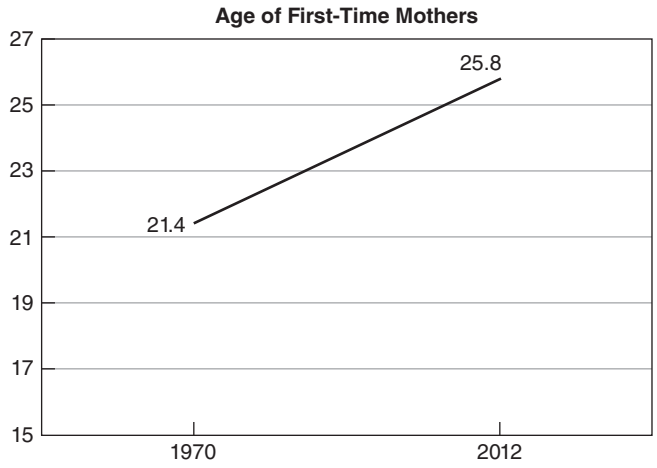


Figure 5.4 Age of First-Time Mothers. *Source:* A. Caumont & W. Wang (2014). 5 questions (and answers) about American moms today. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/05/09/5-questions-and-answers-about-american-moms-today

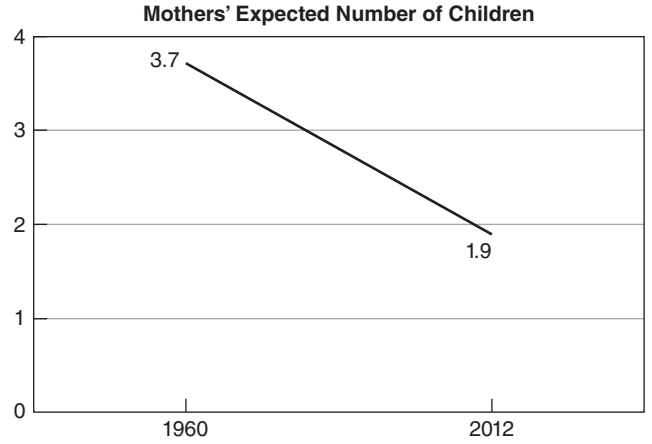


Figure 5.5 Mothers' expected number of children. *Source:* A. Caumont & W. Wang (2014). 5 questions (and answers) about American moms today. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/05/09/5-questions-and-answers-about-american-moms-today

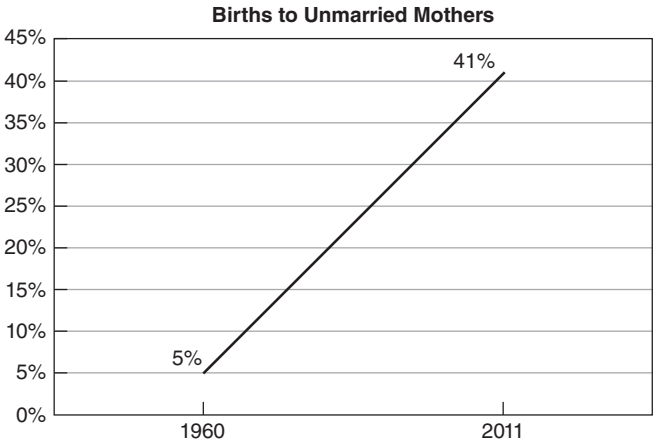


Figure 5.6 Births to Unmarried Mothers. *Source:* A. Caumont & W. Wang (2014). 5 questions (and answers) about American moms today. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/05/09/5-questions-and-answers-about-american-moms-today

to 2010, Park, Coello, and Lau (2014) noted that, relative to earlier-generation parents, later birth cohort parents in a number of Eastern and Western counties now endorse child independence, imagination, and determination and are less likely to value hard work, responsibility, obedience, thrift, and religious faith. Social change toward economic development may be associated with deemphasizing traditional mores, hierarchy, and work ethic while orienting parents to child-centered parenting. This pattern of change is consistent with emerging evidence concerning shifts toward materialism and individualism as economic fortunes increase at familial and national levels (Park, Twenge, & Greenfield, 2013). Research regarding birth cohort and social class suggests that economic development and schooling are especially influential in cultural change (Kashima et al., 2009; Inglehart & Baker, 2000; LeVine, 2003). Rapid cohort effects on child socialization have been documented in China, where social reticence formerly valued in traditionally collectivist Chinese contexts no longer appears adaptive in urban centers that favor selection of social initiative (X. Chen, Cen, Li, & He, 2005).

According to Greenfield (2009), worldwide social change associated with economic development is altering cultural values and socialization environments as parents

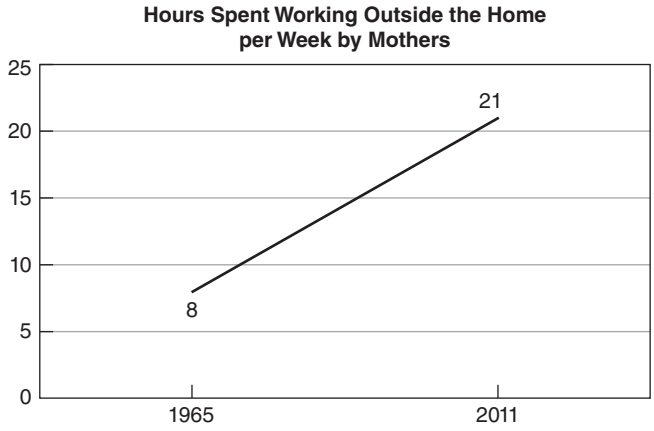


Figure 5.7 Hours Spent Working Outside the Home per Week by Mothers. *Source:* A. Caumont & W. Wang 2014). 5 questions (and answers) about American moms today. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/05/09/5-questions-and-answers-about-american-moms-today

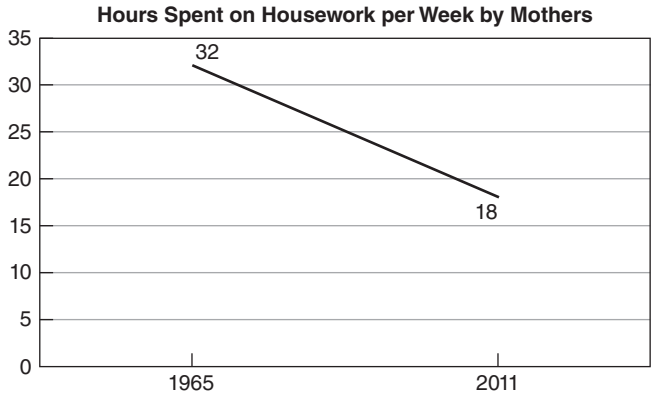


Figure 5.8 Hours Spent on Housework per Week by Mothers. *Source:* A. Caumont & W. Wang (2014). 5 questions (and answers) about American moms today. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/05/09/5-questions-and-answers-about-american-moms-today

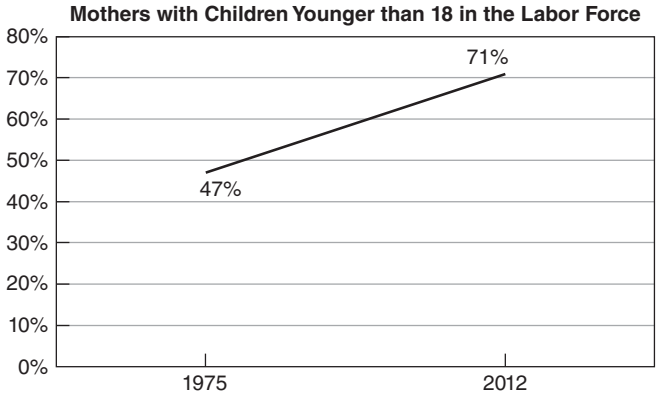


Figure 5.9 Mothers with Children Younger than 18 in the Labor Force. *Source:* A. Caumont & W. Wang (2014). 5 questions (and answers) about American moms today. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/05/09/5-questions-and-answers-about-american-moms-today

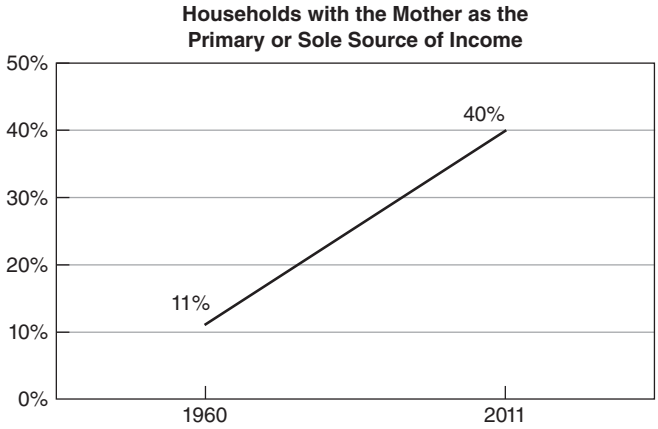


Figure 5.10 Households with the Mother as the Primary or Sole Source of Income. *Source:* A. Caumont & W. Wang (2014). 5 questions (and answers) about American moms today. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/05/09/5-questions-and-answers-about-american-moms-today

adapt to promote the success of their offspring in modernizing society. Greenfield reasoned that, as an environment shifts toward urbanization and economic development, individualist socialization waxes and collectivist socialization wanes. This line of thought echoes Inglehart's (1997) concept of transition from premodern to postmodern societal values. These kinds of studies reveal the imprint of historical time on parents' priorities in child socialization.

Evolution

This examination of determinants of parenting began with biological factors in the parent that are themselves presumptive of grander evolutionary origins. So we have come full circle and end where we began. Driven by evolutionary pressures related to survival and reproduction, parents feel compelled to care for their (biological) offspring (Dawkins, 1976). Evolutionary theory might therefore elucidate some causes of variation in parenting (De Baca et al., 2012). For example, genetic relatedness among family members is a strong predictor of parental quality and even grandparental investment (O'Connor, Dunn, Jenkins, & Rasbash, 2006). Consider too the next predictions based on evolutionary thinking.

First, as indicated, in an evolutionary perspective, a central principle governing parental effort is genetic relatedness. Parenting is selected to discriminatively favor biological offspring and to inhibit expending effort on the offspring of unrelated individuals. Research suggests that

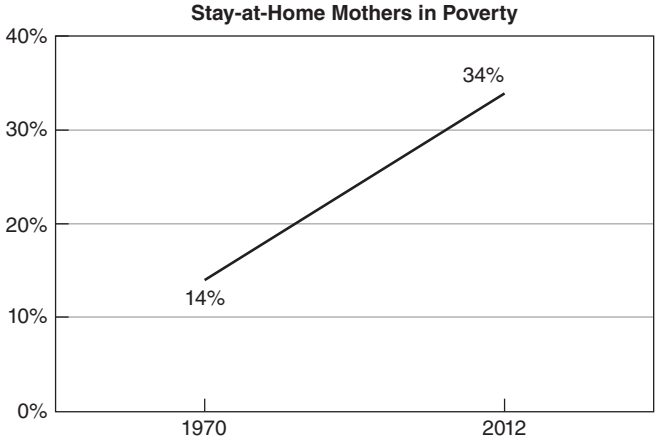


Figure 5.11 Stay-at-Home Mothers in Poverty. *Source:* D. Cohn & A. Caumont (2014) 7 key findings about stay-at-home moms. Pew Research Center. Retrieved from http://www.pewresearch.org/fact-tank/2014/04/08/7-key-findings-about-stay-at-home-moms

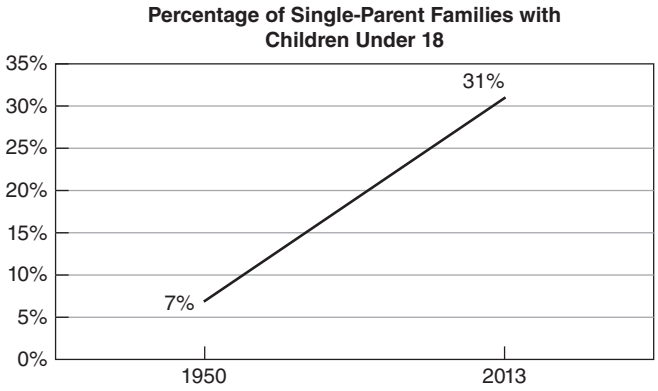


Figure 5.12 Percentage of Single-Parent Families with Children under 18.

parents tend be warmer and engage in more caregiving of their biological children compared to stepchildren (which anecdotal evidence from a host of fairy tales seems to confirm; Bettelheim, 1976). In a comprehensive study of adolescent family relationships in stepfamilies, Hetherington and colleagues (1999) learned that biological relatedness between parent and adolescent was a potent determinant of parenting. Low genetic relatedness between adults and children in a family is associated with a higher probability of neglect, abuse, and homicide of children. The child abuse literature is consistent that children in stepfamilies are at greater risk for neglect and abuse compared to families with two biological parents (Daly & Wilson, 1988).

Second, evolutionary-based research, using animal models and humans, has demonstrated that major biobehavioral reorganizations occur in the parents' physiology and behavior during periods of bond formation that lead to heightened sensitivity to infant cues, prepare parents for the challenging tasks of infant care, and give rise to expressions of the species-specific practices critical for child growth and adaptation to their ecocultural setting. Nurturance is a prerequisite for children's survival and well-being; seeing a child's survival to reproductive age enhances parents' probability of passing on their genes (Bjorklund et al., 2002).

According to life history theory, third, a fundamental trade-off faced by parents is between current and future reproduction. Effort put into reproducing now will use energy or resources that cannot be used or saved for future reproduction. Thus, the greater the parent's probability of breeding in the future, the more the parent can be expected to withhold resources from current reproduction (Ellis et al., 2009; Trivers, 1972). Because age is a determining factor limiting future reproduction in women, this evolutionary view predicts that older mothers will systematically invest more in their current offspring. Consistent with this expectation, young mothers are more likely to elect to abort fetuses (Finer & Henshaw, 2006) and to neglect, abuse, or even murder their young children (J. Brown, Cohen, Johnson, & Salzinger, 1998). Conversely, as mothers age, their levels of parental effort allocated toward offspring tend to increase. Older mothers tend to be more satisfied in their role as a parent and spend less time away from their children (Ragozin, Basham, Crnic, Greenberg, & Robinson, 1982). These effects are not explained by maternal education, parity, gestational age, or income. A common proximate explanation for the effects of parental age on parental effort presumes that compromised parenting represents dysfunction or immaturity in young parents (e.g., inadequate prefrontal development, poor judgment and planning, high impulsivity). An evolutionary explanation assumes that women of all ages adaptively calibrate their levels of parental effort in relation to future reproductive opportunities. This adaptive calibration may be instantiated at a proximate level through variation in such factors as maternal sentiments and interest in competing in nonparental activities.

Fourth, from an evolutionary perspective, the level of genetic relatedness between a man and his assumed children, including uncertainty about that relatedness, is a crucial factor in determining whether (and how much) fathers care for their children (Geary, 2000). The expenditure of limited resources in a genetically unrelated child entails large fitness costs, so natural selection can be expected to favor discrimination and differential parental solicitude by fathers (Daly & Wilson, 1988). Relevant cues to paternity uncertainty include past and current extra-pair

copulation rates, the mother's own sexual history, levels of trust and commitment in the father-mother relationship, and perceived similarities between the father and his putative children. Cues that indicate high paternity confidence support greater paternal investment and reduce the likelihood of paternal violence (Burch & Gallup, 2000). For example, across foraging groups in a representative data set of over 186 cultures around the world, monogamous societies are characterized by greater paternal investment (De Baca et al., 2012).

Articulating four types of general evolutionary questions (we can appropriate to understanding the determinants of cognitions and practices in parenting), Tinbergen (1963) contended that evolutionary explanations concern phylogeny (What is the evolutionary history of a cognition or practice, and how did it change across time and species?), adaptation (Why is the cognition or practice the way that it is, and what selective advantages does it confer, or did it confer, to the organism?), mechanism (What is the cognition or practice like, and how does it work?), and development (How did the cognition or practice come to be, and how does it change across the life span?). These "evolutionary" questions pose contemporary challenges to parenting science.

Summary

Parenting is conditioned by multiple spheres of influence in which the parent is embedded, including proximal, social group, and distal contexts. As this chapter has shown, researchers know a lot, but still not nearly enough, about the determinants of parenting. Some key questions that arise from the foregoing considerations concern the further specification of multiple processes by which parents' cognitions and practices come about and the multiple moderators that condition them (Bornstein, 2015; Bornstein, Bradley, Lutfey, Mortimer, & Pennar, 2011).

In addition, there is a host of arenas about whose effects on parenting we know embarrassingly little. Consider ideology. The public is politically polarized, and ideological disparities between liberals and conservatives presumably color the cognitions and practices parents feel are important vis-à-vis children. We know that among the never married, large majorities of women (70%) and men (62%) alike seek a potential mate who shares their ideas about rearing children and consider that characteristic as more important than finding a partner who shares their moral and religious beliefs, has similar educational accomplishments, or even comes from the same ethnic background (W. Wang & Parker, 2014). Doherty et al. (2014) conducted a nationally representative panel survey of randomly selected U.S. adults living in households that asked about the importance of teaching 12 different qualities to children that included responsibility, hard work, manners, persistence, tolerance, and faith. Respondents were also asked to choose the three traits that they felt are most important. Across ideologies, responsibility was viewed as important to teach children: 93% say teaching children to be responsible is "especially important," and 55% rate responsibility as very important. Large majorities in different ideological groups also think it is essential for children to learn independence, hard work, and good manners. However, 86% of consistent liberals say it is important to teach children empathy; far fewer consistent conservatives (55%) agree. Liberals also prioritize teaching children curiosity (82%) and creativity (85%), compared with 60% or so in other ideological groups. By contrast, consistent conservatives think it is especially important for children to be taught religious faith (81%), and 59% say it is one of the three most important of 12 top qualities, whereas among consistent liberals, just 26% rate the teaching of religious faith as especially important and only 11% regard it as among the most important child-rearing qualities.

TRANSLATIONAL IMPLICATIONS

Practically speaking, parenting has positives, such as intimacy, nurturance, and rewards, which we want to encourage, but parenting can also be encumbered with negatives, such as frustration, anger, and violence, which we want to avert. It is a sad fact of everyday life that parenting children does not always go well or right. Infanticide was practiced historically, and although it is rare today, it is not unknown (Hrdy, 1999). Short of infanticide, vulnerable young are too commonly the victims of parenting that is neglectful (parents forget children in locked cars on hot days, fail to immunize them, or abandon them to wither in orphanages) and abusive (parents bear drug-addicted children, discipline them harshly, or traffic them). Infant cries draw a parent's attention but also trigger shaken baby syndrome (C. Lee, Barr, Catherine, & Wicks, 2007) and assaults (Cavanagh, Dobash, & Dobash, 2007). Every year, child protection agencies in the United States alone receive 3 million referrals for child neglect and abuse involving an estimated 6 million children younger than 5. About 80% of the children in investigated neglect and abuse cases are not removed from the home, although about 80% of perpetrators are parents, the vast majority

biological parents. According to the National Research Council (2013), neglect and abuse amount to an estimated $80 billion per year in direct costs of hospitalization, law enforcement, and child welfare and indirect costs of special education, juvenile and adult criminal justice, adult homelessness, and lost work productivity. Many factors increase the risk of child abuse, but parental depression, parental substance abuse, and whether the parents were themselves neglected or abused as children rank high.

Although usually protected, children are still too often exposed to relatively hostile and emotionally negative climates in the home, and parents in the front seat of the car fail to recognize that children in the backseat overhear what they say. By the current standards of meta-analytic evidence, parents contribute to their children's internalizing and externalizing behavioral problems (Fearon, Bakermans-Kranenburg, van IJzendoorn, Lapsley, & Roisman, 2010; Groh, Roisman, van IJzendoorn, Bakermans-Kranenburg, & Fearon, 2012). Moreover, many parents resort to harsh verbal and physical treatment and even corporal punishment of children (Gershoff, 2002; Lansford et al., 2005; Mejia, Miewer, & Williams, 2006). From Finland and Denmark to Kenya, child-rearing violence predicts later child externalizing (Peltonen, Ellonen, Larsen, & Helwig-Larsen, 2010; A. T. Skinner, Oburu, Lansford, & Bacchini, 2014). The American Academy of Pediatrics (1998, p. 723) declared that "corporal punishment is of limited effectiveness and has potentially deleterious side effects," recommending alternative determinants in that "parents be encouraged and assisted in the development of methods other than spanking for managing undesired behavior." The American Academy of Pediatrics reaffirmed that pediatricians encourage parents to use alternate age-appropriate forms of nonaggressive discipline, such as distraction, time-outs, and offering explanations. The Convention on the Rights of the Child identifies violence toward children as a problem to be eliminated at an international level. The use of corporal punishment toward children has now been legally banned in all settings in 46 countries, and legislation is pending in several others (Global Initiative to End All Corporal Punishment of Children, 2013).

Strong secular and historical trends operating in modern society—industrialization, urbanization, poverty, increasing population growth and density, and especially widespread dual-parental employment—constitute centrifugal forces on parenting. Because these society-wide developments exert many unfortunately debilitative influences on parenthood, on parenting, and, consequently, on children and their development, a significant proportion of parents needs assistance to identify more effective strategies to optimize child care and to create more satisfying family relationships. Not surprisingly, a one-time U.S. commissioner of education preached that every child has a right to a "trained parent." Parents are usually the most invested, consistent, and caring people in the lives of their children, so providing parents with skills and supports will help them respond more positively and effectively to social and child-related challenges. Professionals are normally a positive source of information related to parenting knowledge.

As it is said, children do not come with a manual, and not all people naturally parent or know how to or can keep up with their constantly developing children. Parenting advice dates back at least to ancient Egypt, the Code of Hammurabi, and the pre-Socratics. In the *Laws*, Plato (ca. 355 BC) theorized about parenting. Many parents can use instruction. In 1914, the U.S. Children's Bureau published the first edition of the pamphlet "Infant Care," which advised, among other things, that "Sunshine is as necessary for the baby as for the plant" (M. West, 1914, p. 10). Only a fraction of parents who could benefit from parent services receive them, however. Thus, organizations at all levels of society increasingly feel a mandate to intercede in child rearing and right social ills through parenting preventions and interventions. As a result, contemporary parenting has witnessed an explosive growth in information and support programs. One implication of the increasingly sophisticated view of the origins and conduct of parenting is that many determinants of parenting cognitions and practices are modifiable; thus, what we learn about parenting holds the promise of far-reaching practical implications. Slep and O'Leary (1998) found that mothers who were led to believe that their children intentionally misbehaved responded to their children with greater negative affectivity and harsher discipline than mothers who were led to believe that their children accidentally misbehaved. As mentioned earlier, Stein et al. (2012) randomized mothers to a worry/rumination prime (WRP) or to a neutral prime (NP) and assessed mother-infant interactions before and after priming. Type of priming predicted maternal cognitions: The WRP resulted in more negative thoughts, higher thought recurrence, and more self-focus relative to the NP. Moreover, interaction effects between group and priming were significant: Compared with NP controls, the WRP inhibited maternal responsiveness and maternal vocal interactions. In the view of some critics, however, the trend to family professionalism also paradoxically leads away from a focus on parents as the proximal protectors, providers, and proponents of their

progeny and toward entrusting child rearing to experts and the state.

Nonetheless, contemporary parents from families along multiple risk continua might become more effective. Preventions and interventions designed to help parents come in a variety of venues (psychotherapy, classes, media), in a variety of settings (homes, schools, health clinics, houses of worship) and formats (individual, family, group), and with a variety of goals (from specific to universal). For example, some programs primarily target parents' cognitions and practices; others are focused on improving the quality of parent-child relationships.

Competencies are knowledge, skills, abilities, personal characteristics, and attitudes, and competencies to adequately perform a task, duty, or role are (usually) learned (Roe, 2002). Competent parenting, crucial to child development and well-being, can be learned. Profession-specific competencies provide motivation and direction for learning as well as a means to judge the adequacy of parenting programs (Epstein & Hundert, 2002). Many experimental trials and parenting intervention programs have been devised. A review of 46 randomized trials provides evidence of prevention of a wide range of problem outcomes from 1 to 20 years later. However, this literature offers a paucity of evidence concerning processes that account for program effects (Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011). Interventions to promote positive parenting have been touted to offer positive outcomes for children, but they often consume substantial resources and require rigorous appraisal. Biglan, Mrazek, Carnine, and Flay (2003) called for the integration of more science into societal parenting practices to prevent youth behavior problems and to promote "agreement on a set of consensus standards for selecting disseminable preventive interventions" (p. 438). A popular example is Triple P, the Positive Parenting Program, a multilevel behavioral family intervention (Prinz, Sanders, Shapiro, Whitaker, & Lutzker, 2009; Sanders & Kirby, 2010; Sanders, Markie-Dadds, & Turner, 2003). However, systematic reviews and meta-analyses comparing Triple P with wait-list or no-treatment comparison groups reveal only relatively small effect sizes on maternal and paternal outcomes (Wilson et al., 2012).

Some interventions on determinants to improve parenting succeed: for instance, targeted interventions to develop maternal mentalizing and sensitivity and parents' positive practices (Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2007; Lunkenheimer et al., 2008; Sadler et al., 2013). Others focus on factors that facilitate provider attitudes and skills (buy-in, support), staff selection and professional development (training, coaching), intervention and delivery (fidelity, accessibility), individual- and family-level factors (expectations, benefits), incentive and retention strategies and those designed to overcome barriers in parent and program (costs, integration, caseload, competition). (See Axford, Lehtonen, Kaoukji, Tobin, & Berry, 2013; Damashek, Doughty, Ware, & Silovsky, 2011; Eisner & Meidert, 2011; Gottfredson et al., 2006; Korfmacher et al., 2008; Lees & Ronan, 2008; Mendez, Carpenter, LaForett, & Cohen, 2009; Mytton, Ingram, Manns, & Thomas, 2014; Shapiro, Prinz, & Sanders, 2012; Randolph, Fincham, & Radey, 2009; N. L. Weaver et al., 2008.)

Unhappily, however, most interventions fail and do so for a wide variety of reasons, as when parents short-shrift intervention "homework" assignments, or when program staff fail to help parents access needed services, or when measurement is biased, or when the control group is contaminated through unintended diffusion of the parenting intervention. Some individuals or groups avoid seeking support out of embarrassment, stigma, or norms (in many communities, parents do not want to be told how to rear their children). (See Bodenmann, Cina, Ledermann, & Sanders, 2008; Fixen, Naoom, Blasé, Friedman, & Wallace, 2005; Goodson, Layzer, St. Pierre, Bernstein, & Lopez, 2000; Hebbeler & Gerlach-Downie, 2002; Okagaki & Bingham, 2005; Pinquart & Teubert, 2010; S. G. West, 2009; see Kaminski, Valle, Filene, & Boyle, 2008, for a meta-analysis of training programs.)

To overcome these barriers and challenges, interventions need to adopt creative ways to market parenting and destigmatize the idea of parenting support (Chu, Farruggia, Sanders, & Ralph, 2012; Sanders, 2010). By deconstructing reasons for failures critically, it is possible to learn ways that future parenting interventions might succeed. Happily, Powell (2013) provides solid and timely guidance on central aspects of undertaking and evaluating parenting interventions, including preliminary work, sampling, research design, options for comparison conditions, measurement of implementation fidelity, and analysis of outcomes (Boutelle, Cafri, & Crow, 2011; DeGarmo & Forgatch, 2005; Flay et al., 2005; McCall & Green, 2004; Sandler et al., 2011; Shadish, Cook, & Campbell, 2002). To summarize some main points of that tutorial, parenting interventions should be based on theoretical and empirical models that specify the overarching goal of the intervention with regard to: anticipated improvements in specific parent outcomes; how change in malleable parenting variable(s) is targeted by the intervention; and how intervention components are expected to change focal parenting variable(s). Development of a coherent, measureable theory of

change and articulation of a precise logic model are critical to an intervention functioning as intended. Randomly assigning parents or larger units in which parents are based to intervention and comparison conditions provides robust evidence of intervention effectiveness, assuming the outcome study is also well implemented. Intervention evaluations should routinely determine whether intervention effects are sustained beyond the intervention period (Olds et al., 2002). It can be guaranteed that intervention fidelity—the degree to which a program has been implemented as planned—is less than 100% ensured (Durlak & DuPre, 2008; Korfmacher, O'Brien, Hiatt, & Olds, 1999); but fidelity to an intervention protocol predicts change in parents' practices (Forgatch et al., 2005). Finally, no single intervention fits all (Barrera, Castro, & Steiker, 2011). So, for example, as an Institute of Medicine report (O'Connell, Boat, & Warner, 2009) recommended, interventions that successfully adopt and integrate cultural mazeways will experience likelier successes with both consumers and community agents (see Takanishi & Bogard, 2007).

As this chapter shows, individual factors are important determinants of parenting, and they are frequent targets of intervention. Higher reflective functioning is associated with sensitive parenting (Pajulo et al., 2009). Core concepts of reflective functioning and mindful parenting include, in addition to understanding mental states and intentions, full presence, nonjudgmental stances, emotional awareness, self-regulation, and compassion (Duncan, Coatsworth, & Greenberg, 2009). Certain mindfulness tools can help to successfully address pressing parenting requirements (Barth & Liggett-Creel, 2014; Kaminski, Valle, Filene, & Boyle, 2008; Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011).

- Parents benefit from knowledge of how children develop. For example, of three cognitive measures, maternal education, IQ, and specific knowledge of child rearing and child development, knowledge uniquely explains age differences in mother-child emotional relationships (Bornstein, Putnick, et al., 2012). Therefore, the normative patterns and stages of children's physical, verbal, cognitive, emotional, and social development should be part of the knowledge base for parenthood.
- Parents need to know how to observe children and how to interpret and use what they learn. Informed child watching helps to clarify a child's level of development in relation to how parents want their children to behave and what parents want their children to learn and to accomplish. Observing also allows parents to identify potential trouble early and may help them respond to it more meaningfully.
- Parents need all manner of skills for managing children's behaviors. Knowledge of alternative methods of managing discipline and problem avoidance, for example, is basic.
- Parents need to understand the tremendous impact they have on their children's lives through the simplest things they do: their attention, expressed pleasure, listening, and interest.
- Parents need to know how to take advantage of everyday settings, routines, and activities to create learning and problem-solving opportunities that enhance childhood and parenthood.
- Parents need to be patient, flexible, and goal oriented—to call on their personal resources and extrapersonal sources of support—and they must command an ability to extract pleasure from their encounters with children.

The responsibility for determining the child's best interests rests first and foremost with parents. Few ethical or sentient parents want to abrogate their child-rearing responsibilities (Baumrind & Thompson, 2002). Insofar as children's parents can be enlisted and empowered to provide children with experiences and environments that optimize their development, society is positioned to obviate after-the-fact remediation. In the dedication of *Some Thoughts Concerning Education* to Edward Clarke, of Chipley, Esq., the seventeenth-century moral philosopher John Locke (1692) wrote: "The well educating of their children is so much the duty and concern of parents, and the welfare and prosperity of the nation so much depends on it, that I would have every one lay it seriously to heart." On these grounds, the doctrine of parental rights remains a fundamental premise to child rights. Parents sometimes do not know what to do, but they can find out; they sometimes do know what to do, but they still do not get into the trenches and do it.

CONCLUSIONS

Even the most vocal critics of parenting admit that "parents are the most important part of the child's environment and can determine, to a large extent, how the child turns out" (Harris, 1998, p. 15). We know a lot, but still not nearly enough, about what determines good or poor parenting. Parenting is multidimensional, modular, and specific and is also multilevel and multidetermined by parent, child, and contextual factors. This chapter has endeavored to overview the main determinants of parenting from that stance. To understand sources of variation in parenting,

information about multiple domains is required, including biological and psychological characteristics of all individuals in the family, parents' families of origin, relationships between parents and between parents and children, and key individuals or institutions outside the family (including friends, peers, work, child care, ethnicity, culture, and historical era). Nuanced and complex principles of parenting, such as specificity, interdependence, transaction, and indirect and direct effects, do not make the study of determinants easy. Parenting sits at the confluence of many rivulets of influence; some flow from within the individual, whereas others spring from sources external to the parent in the child and in the multiple contexts that situate caregivers in the landscape parenting. Within complex developmental systems, it is unlikely that any single factor accounts for substantial amounts of variation in a criterion, and more multivariate and nuanced conceptualizations will explain parenting better than simpler ones with fewer variables. Parenting has many determinants, which is fortunate in the sense that in this way parenting is protected and the species continues, but parenting's multicausality is also demanding in the sense that many determinants require attention and a parent's job is never done.

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CHAPTER 6

Resilience in Development: Progress and Transformation

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INTRODUCTION

Resilience science is quintessential developmental psychopathology because it focuses on variation among individuals in relation to their experiences as they adapt and develop. Research on resilience emerged around the same time and in many of the same contexts as the study of developmental psychopathology and this is not a coincidence (Cicchetti, 1990, 2006; Cicchetti & Garmezy, 1993; Masten, 1989, 2007, 2012). Leading scholars concerned with understanding the origins and course of psychopathology and interventions to prevent and treat problems in development began to recognize that adverse experiences played an important role in the lives of many young people who developed problems; however, they also observed that there were striking variations in the adaptive function and life course of children and youth who were believed to be at risk for psychopathology. Influential scholars studying risk for mental illness in human development realized that understanding this variation in adaptive behavior and outcomes was crucial to a full understanding of the origins, prevention, and treatment of problems and disorders (Anthony & Koupernick, 1974; Garmezy, 1985; Garmezy & Rutter, 1983; Rutter, 1979, 1987; Werner & Smith, 1982).

The investigators and clinicians who would become pioneers in resilience science recognized that it was vitally important to know why some children do well under very high-risk circumstances while others do poorly in the tasks of life or develop serious mental health problems. They realized, further, that this knowledge could have profound implications for promoting positive development when conditions were not optimal and also for intervening to prevent, ameliorate, or treat symptoms and disorders of psychopathology.

The study of resilience in development has had transformational effects on the science and practice of developmental psychopathology. The perspectives and data generated by this work have overturned deficit-oriented models of mental health and intervention, opened up new directions for research, and expanded the range of strategies considered in practices and policies intended to support health and well-being (Cicchetti, 2010, 2013; Masten, 2011, 2013, 2014a, 2014b; Panter-Brick & Leckman, 2013; Prince-Embury & Saklofske, 2013, 2014; Rutter, 2013).

The study of resilience has matured and changed over the past half-century of work, in part reflecting the normal progression in any maturing area of inquiry and in part reflecting the dramatic advances in developmental theory and the technologies and methods for research in related fields (Cicchetti, 2010, 2013; Luthar, 2006; Masten, 2014a, 2014c). Resilience science advanced from basic descriptive goals to studies of processes and experiments to test resilience theory by trying to promote positive adaptation in contexts of risk or adversity. Definitions of resilience became more dynamic and multilevel as developmental systems theory became the prevailing perspective in developmental theory and science more broadly considered (Cicchetti, 2010, 2013; Masten, 2011, 2014a, 2014b, 2014c). Advances in techniques for modeling complex data, observing the human brain in action, and studying how genes work and other biological processes provided traction for more sophisticated research on processes proposed in resilience theories or models. There also was growing interest in and efforts to study resilience in more diverse cultural contexts (Ungar, 2012; Ungar, Ghazinour, & Richter, 2013).

In this chapter, we highlight the core ideas, findings, and advances in resilience science, emphasizing contributions from the past decade of conceptual and empirical work. Two previous editions of *Developmental Psychopathology* have included sections on resilience in young people (Luthar, 2006; Masten & Coatsworth, 1995). Our goal in this edition is to provide a current update on the models and findings in resilience science, with a particular focus on the changing definitions and methods emerging from this research domain. Definitions of resilience have shifted over the decades toward a much more dynamic approach, influenced by developmental systems theory. Pathway models and methods have become more prominent. Research on the neurobiology of resilience and cultural processes in resilience are expanding rapidly.

This chapter opens with historical perspectives on resilience science, focusing on the goals driving this domain of study. Then we delineate the major concepts and models that define and organize the work in this area, followed by a summary of common methods in resilience research. Next we summarize findings on psychological processes implicated by the evidence on resilience and then we discuss the roles of key socioecological contexts in the resilience of young people, including families, peers, schools, culture, and community. In the following section, we describe the rapidly expanding science on the genetics and neurobiology of resilience. The subsequent section focuses on interventions based on resilience models and the translational implications of the accruing data on resilience for practice and policy, highlighting recent intervention studies designed to test resilience models. In the concluding sections of the chapter, we discuss enduring and new controversies in resilience science and we provide a closing summary of progress and future directions.

HISTORICAL PERSPECTIVES

Research on resilience in development has many roots. Many of those roots are intertwined with the history of developmental psychopathology and the study of competence in human development (Cicchetti, 1990, 2006, 2010; Masten, 1989, 2014b; Masten & Coatsworth, 1995). These roots include psychoanalytic theory about the protective roles of the ego and mechanisms of defense, the concepts of adaptation and competence in developmental theory, studies of coping and adaptation to stress in clinical psychology and psychiatry, and many other theoretical and empirical efforts to understand variation in the adaptation or development of individuals, particularly those faced with challenges. This history has been discussed in numerous reviews of competence, risk, and resilience over the years (e.g., Cicchetti, 2006, 2010; Cicchetti & Garmezy, 1993; Garmezy, 1981, 1982a, 1985; Luthar, 2006; Masten, 1989, 2012, 2013, 2014b; Masten & Coatsworth, 1995; Masten, Burt, & Coatsworth, 2006; Masten & Garmezy, 1985; Murphy, 1962; Sameroff & Chandler, 1975).

The systematic study of variation in adaptation dates to the nineteenth century, shaped particularly by Darwinian and Freudian theory (Masten & Coatsworth, 1995; Masten, Burt, et al., 2006). The "ego" in Freud's theory functioned to facilitate internal and external adaptation amid conflicting needs and goals to meet personal (often unconscious) desires and the expectations or goals of parents and society. How well the personality of an individual managed to balance these competing or conflicting goals would later be described in terms of two dimensions in the personality concepts of Jack and Jeanne Block (1980) as "ego resiliency" and "ego-control."

World War II had a profound influence on the course of psychology and psychiatry, in multiple ways pertinent to the emergence of resilience science (Masten, 2014a, 2014b). The global devastation wrought by the war, with millions of children injured, orphaned, starving, or traumatized by bombing, separations, loss, and many other exigencies of this global conflict, motivated an outpouring of humanitarian aid for children and many efforts to help children affected by the war. These efforts included early research on the effects of traumatic experiences on children as well as intervention to help child survivors of war. Examples of intervention include the establishment of treatment centers for children, such as the Hampstead Nurseries in Great Britain, where Anna Freud and her colleagues treated children affected by the war, and also the founding of the United Nations International Children's Emergency Fund (UNICEF; later broadened to become the UN Children's Fund) in 1946 (Masten, Narayan, Silverman, & Osofsky, 2015).

Individuals who would later become leaders in resilience science experienced this war as young people in distinctly different ways (Masten, 2014b). Norman Garmey was a young foot soldier in the European theater of war, fighting at the Battle of the Bulge. After the war, he studied clinical psychology and eventually began studies of risk and premorbid competence that would lead him to observe the variation in adaptive function among children at risk and then on to studies of resilience. Emmy Werner was a young girl in Germany who lived through the bombings, hunger, and destruction resulting from the war in Europe and also experienced the humanitarian aid to children after the war (Werner, 2000). She would go to graduate school in the United States and later lead a classic longitudinal study of resilience, following into adulthood a birth cohort of children born on the Hawaiian island of Kauai in 1955 (Werner & Smith, 1982). Michael Rutter, a third pioneer in resilience science, was one of the British children evacuated to escape the bombing during the Blitz, a "seavacuee" sent to safety in America for the duration of the war. Subsequently, he returned to Great Britain to study medicine, psychiatry, and epidemiology, conducting extensive research on risk, deprivation, and resilience and publishing many highly influential papers and books, including the most cited article to date on resilience in the psychological literature (Rutter, 1987).

Resilience Science Emerges from Studies of Children at Risk

After the war, there was a rapid expansion of research in psychology and psychiatry, some of which was focused on understanding the etiology of mental illness and risk factors in development. There were studies of infants and children at risk due to low birthweight, genetic anomalies, poverty, and other disadvantages (Kopp, 1983; Sameroff & Chandler, 1975) as well as studies of children at risk for mental illness, often because they were related to family members with a known disorder (e.g., Anthony & Koupernik, 1974; Garmezy, 1974; Gottesman & Shields, 1972, 1982; Kopp, 1983; Sameroff & Chandler, 1975; Watt, Anthony, Wynne, & Rolf, 1984). In addition, there were studies of children at risk due to specific adversities, such as death of a parent, divorce, abuse, disasters, and other traumatic experiences (Garmezy & Rutter, 1983).

Risk researchers studying children and families soon realized two fundamental facts about the lives of the individuals observed in their research. First, risks and stressors

tended to pile up in the lives of many children to the apparent detriment of their adjustment or development. Scores on measures that captured this cumulative risk, including simple tabulations of risk factors or negative life experiences, were associated with less adaptive outcomes. Second, although these risk gradients were often observed, suggesting cumulative effects of adversity, there also was great variation in the adaptive function or development of children with similar levels of risk, suggesting that more was involved than risk alone.

The risk researchers who would become pioneering resilience scientists were intrigued by the variation in outcomes among children in their risk studies and particularly by the clear evidence of good adaptation in the presence of high risk for psychopathology or developmental problems. They observed striking cases of individual children who manifested health and competence in the midst of risk and adversity or aftermath of disaster. Those observations and cases motivated the early science on resilience in development (Masten, 2014b).

Four Waves of Science on Resilience in Development

Four waves of resilience science ensued (Masten, 2007, 2011; Wright, Masten, & Narayan, 2013).The first wave of resilience science was largely descriptive, as investigators tried to measure the phenomenon of resilience and gain a basic understanding of the qualities of person, relationships, or environment that were associated with better adaptation in conditions of risk or adversity. As investigators gained confidence in the replicated correlates of resilience, they shifted their attention to understanding how protective processes work, and the key question changed from What makes a difference? to How? As hypothesized processes were studied and confidence grew about key processes, attention turned to identifying and targeting *malleable* resilience processes through intervention, both in applied clinical contexts and in experiments designed to test hypothesized protective processes, such as effective parenting, mentoring, or self-regulation, discussed later in this chapter. The essential question characterizing the third wave was this: Can resilience be promoted?

The fourth wave, now overtaking all the others, emerged from a series of advances in science and technology that revolutionized the study of resilience along with many other aspects of science on development and psychopathology (Cicchetti, 2010, 2013; Masten, 2007, 2014a, b; Wright et al., 2013). These advances included methods for studying the human genome, epigenetics, and the human brain in action as well as statistical strategies for analyzing complex multivariate data. Conceptually, developmental systems theory surged to become the central model of change in human development (Lerner, 2006; Lickliter, 2013; Overton, 2013; Sameroff, 2010; Zelazo, 2013). Concomitantly, dynamic systems theory became a unifying theme in diverse sciences concerned with threats to global well-being and socio-ecological systems, including climate change, disaster, war and terror, economic crises, and computer security, among other issues (Folke, et al., 2010; Gunderson, 2010; Longstaff, 2009; Masten, 2014a; Masten et al., 2015; Norris, Stevens, Pfefferbaum, Wyche, & Pfefferbaum, 2008).

In the next sections of this chapter, we highlight concepts and studies that reflect recent advances in resilience theory and methods, particularly those that represent the still-rising fourth wave in the science. Definitions and methods have shifted to emphasize dynamic systems models. A neurobiology of resilience, long anticipated, is finally emerging as methods for studying the role of genes, stress systems, and neuroscience involved in resilience processes improved and became practical. Similarly, there are major advances in research on cultural systems in resilience, also long anticipated. In many ways, the fourth wave engages multiple systems and disciplines in the enterprise of understanding and promoting resilience in human development.

CONCEPTS AND MODELS

Concepts central to the study of resilience in development have changed as the study of resilience emerged and matured. The definitions and central ideas in resilience have become more dynamic, and they have aligned with the prevailing models of developmental science more broadly defined. In this section, we examine the central ideas and concepts of resilience science as they have evolved, focusing on the past decade of conceptual advances.

Resilience in Developing Systems

Definitions and conceptual models of resilience, basic and applied, have shifted theoretically in concert with a broader shift in human developmental sciences and related fields toward a *relational developmental systems* framework (Overton, 2013; Zelazo, 2013). This broad perspective integrates theory and ideas from ecological theory (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 1998); general systems theory (von Bertalanffy, 1968); developmental systems theory (Gottlieb, 2007; Lerner, 2006; Sameroff, 2010);

systems thinking in biology (Gottlieb, 2007; Lickliter, 2013); family systems theory (Goldenberg & Goldenberg, 2013; Masten & Monn, 2015); developmental psychopathology (Cicchetti, 2006, 2010, 2013; Gottesman, 1974; Gottesman & Hanson, 2005; Sroufe, Egeland, Carlson, & Collins, 2005); and resilience theory (Cicchetti, 2010, 2013; Masten, 2001, 2013, 2014b).

The central themes in a developmental systems perspective on resilience include these eight principles:

1. Human adaptation and development—in both low-and high-risk environments—arise from continuous interactions across levels of function within individuals and between individuals and their environments.
2. Many interacting systems shape the course of development and the processes involved in resilience.
3. The capacity for adaptation can be conceptualized at multiple levels.
4. The capacity for adaptation in challenging circumstances (resilience) depends on many interacting systems.
5. Manifested resilience emerges from many interacting systems and always reflects the current context as well as the history of the child (or system).
6. Living systems are self-organizing with emergent properties that can be surprising or unpredictable from lower levels of analysis.
7. Resilience is dynamic—always changing—because the systems involved in the capacity for adaptation are developing and changing.
8. Resilience—potential or manifested—should not be construed as a trait, although many traits could influence resilience.

Defining Resilience

Concomitant with the shift in theory about resilience, definitions have become more dynamic while at the same time becoming more scalable (Masten, 2014a, 2014b). Contemporary definitions emphasize the processes of adaptation and the distributed capacity for adaption rather than trait-like notions of inherent "hardiness" or the "ability" within a system to bounce back from difficulties.

Efforts to address mass-trauma events, such as natural disasters, war, terror, and epidemics, as well as concerns about global climate change, have spurred interest in diverse fields to consider resilience processes that involve multiple systems at different levels of analysis (e.g., Gunderson, 2010; Masten, 2014a, 2014b; Masten et al., 2015). Given goals of integrating theory and findings coming from different fields of inquiry, important for understanding and responding effectively to global challenges, interest grew in communicating findings across fields and integrating knowledge across levels of analysis. These goals motivated efforts to define resilience in ways that would work across levels and disciplines that typically may focus on one or two specific levels (e.g., resilience in neural systems, individuals, families, communities, ecologies, computer systems, etc.). Scalability of terminology can be very helpful for communication and integration.

A small group of investigators that included the first author worked on this issue of terminology and scalability in a network on resilience funded by the National Science Foundation (see Longstaff, 2009; Masten & Obradović, 2008). This group presented their ideas at Resilience 2008, the first of several ongoing international conferences on resilience sponsored by the Resilience Alliance, Swedish Academy of Sciences (the first meeting was held in Stockholm), and others. Subsequently, Masten (2011, 2014a, 2014b) adopted a systems-oriented definition of resilience that would be workable for other disciplines focused on diverse kinds and levels of systems.

Given the advantages of a scalable definition of resilience to describe the processes and capacity for adaptation of any dynamic complex system in the context of serious threats or adversities, we think it is useful to define resilience for scalability across levels of dynamic, developing systems. *Resilience* broadly refers to the potential or manifested capacity of a dynamic system to adapt successfully through multiple processes to disturbances that threaten the function, survival, or development of the system. This definition can be applied to many dynamic, developing systems, including an individual child, a family, a community, an emergency response system, an economy, or various ecological systems in the context of threats to the global climate. For the purposes of this chapter, which is focused on the resilience of human individuals, we define resilience in this way:

> *Resilience* is the potential or manifested capacity of an individual to adapt successfully through multiple processes to challenges that threaten the function, survival, or positive development.

Many systems are involved in the processes leading to successful adaptation in a child, family, or community. Moreover, systems that are interconnected across levels will influence the resilience of each other. In other words, the resilience of an individual child that is manifested and observable at the level of behavior depends on the

operation and interactions of many other systems, both within the child (immune system, stress response system, etc.), in relationships or family resilience, or in the larger sociocultural and ecological systems in which that child's life and development are embedded.

Two Judgments

Identifying resilience in the individual case or for the purposes of research requires two criteria, as noted for some time by resilience scholars (e.g., Garmezy, 1974; Garmezy, Masten, & Tellegen, 1984; Luthar, 1991; Luthar, Cicchetti, & Becker, 2000; Masten & Coatsworth, 1998). *Resilience* refers broadly to positive adaptation in a context of risk or adversity. Thus, two constructs must be considered in making inferences about resilience, whether one is simply thinking of an example of a single case of manifested resilience or one is operationalizing the core constructs in order to conduct a large-scale research project on resilience. The "risk/adversity" criteria and the "adaptation" criteria have been defined in multiple ways in the literature over the years, reflecting the complexity of the issues but making it difficult to synthesize the findings, particularly through empirical strategies such as meta-analysis. Many critiques of the resilience literature have noted this problem (Luthar, 2006; Masten, 1999, 2012, 2014b). Nonetheless, there is broad agreement that *resilience* refers to a subset of adaptive processes or outcomes when there is significant threat. In situations where there is little or no adversity experienced, we would describe children in terms of how well they are doing or developing rather than their resilience. The construct of resilience assumes that there is exposure or potential exposure to serious challenges or adversities to the function or development of the system under consideration. In the next section, we discuss the two major components for defining resilience in more detail.

The Challenge Criteria: What Are the Risks and Adversities?

Concepts and measures of risks or various threats to the well-being or development of a child have been considered for decades in the developmental sciences (Evans, Li, & Sepanski Whipple, 2013; Garmezy, 1974; Kopp, 1983; Obradović, Shaffer, & Masten, 2012; Sameroff & Seifer, 1983). As noted, the study of resilience emerged from the study of risk as investigators noted the variability in adaptive patterns among children considered to be at risk for psychopathology. A wide range of risk factors—predictors of specific problems or generally undesirable developmental outcomes—were identified, including premature birth, abusive parenting, exposure to trauma in war or disaster, and the disadvantages of poverty, among many others.

Risk researchers quickly realized that the factors associated with elevated probabilities of mental health symptoms, academic problems, health issues, and other undesirable outcomes rarely appeared in isolation and commonly piled up in the lives of the same children. This realization led the risk scholars to focus on *cumulative risk* and its effects on development (Masten, Best, & Garmezy, 1990; Rutter, 1979; Sameroff, Seifer, & Bartko, 1997). Many of the cumulative risk concepts and measures were modeled on the study of risk in medicine. Sameroff (2006) has described the history of composite risk scores dating back to the Framingham heart study, where it was observed that a cumulative total number of risk factors, rather than any one risk in particular, predicted heart problems.

Numerous studies of cumulative risk emerged, with many investigators observing *risk gradients*, where problem or symptom levels tended to risk as risk levels rose (Evans et al., 2013; Obradović et al., 2012). *SES gradients* linked health outcomes to cumulative risk scores based on socioeconomic disadvantage, with much higher mortality and morbidity rates found among those with low socioeconomic status (SES; Adler & Ostrove, 2006). In studies of war and disaster, these gradients were often termed *dose gradients* when it was found that trauma symptoms, for example, were often higher with greater exposure to danger, loss, destruction, and other indices of life-threatening intensity of adverse experiences (Masten & Narayan, 2012).

The risk researchers also recognized the complexity of the processes involved in stressful life experiences, such as divorce, death of a parent, homelessness, extreme poverty, and other adversities. Divorce, for example, was recognized as a process punctuated with many possible adverse experiences along with a number of potentially positive experiences (Hetherington, 1979; Kelly & Emery, 2003).

Two major types of measures of cumulative risk became prominent: tallying life events (weighted or unweighted by objective or subjective magnitude scales) and counting up established risk factors into a composite risk score. Rutter (1979) and Sameroff and colleagues (Sameroff, 2006; Sameroff, Seifer, Barocas, Zax, & Greenspan, 1987) were highly influential in modeling strategies for compositing risk factors.

The other main strategy utilized life event questionnaires or interviews to measure the level of adverse life

experiences that a person or family had experienced in a specified time window (e.g., past year, lifetime). The study and assessment of negative life events by questionnaire was pioneered by Holmes and Rahe (1967) and also Brown and Harris (1978), who developed a widely-used method of structured, contextual life interviews. These methods were adapted for studies of children by Coddington (1972a, 1972b), the Project Competence research group (Masten & Tellegen, 2012), and others that wanted to assess exposure to stressors in the form of heterogeneous life experiences (e.g., Compas, 1987; Goodyer, Kolvin, & Gatzanis, 1985). Hybrid methods also developed, combining methods to create more complex indices of cumulative adversity in a child's life, utilizing a combination of lifetime life event questionnaires, life history charts, and similar methods (e.g., Gest, Reed, & Masten, 1999).

A recent variation on the life event questionnaire method is the Adverse Childhood Experiences (ACEs) measures, typically a set of 10 or 11 items completed by adults about their childhood history. This approach was used initially to survey adults in California (Felitti et al., 1998); subsequently it has been used by various states in the United States to depict the rates of exposure to major risk factors in childhood (as recollected by teens or adults), such as child maltreatment or parental incarceration, and link this to adolescent or adult health and mental health indicators (e.g., Minnesota Department of Health, 2011). Research with ACEs indicates striking risk gradients where poor health outcomes are related to the number of ACEs.

ACEs and other clearly negative life experiences have negative effects when they occur but may have little or no effects on development when they do not occur. However, many of the "risk factors" associated with problems in adjustment are actually continuous variables that have a positive pole, such as good versus poor parenting. Resilience scholars have pointed out that these measures of risk are simultaneously measures of "assets" or resources because they reflect bipolar dimensions (Masten, 2001; Masten & Reed, 2002). The same measures can be flipped over to produce "asset gradients" where the probability of desirable outcomes rises as a function of cumulative assets. The Search Institute has capitalized on this reality to create a widely used measure of 40 "developmental assets" that can be used to gauge the support of communities for young people; this group recognized that it was powerful and motivating to show communities the positive side of the story—that youth with more of these assets were doing well (Lerner & Benson, 2002; Scales, Benson, Leffert, & Blyth, 2000; Scales, Benson, Roehikpartain, Sesma, & Van Dulmen, 2006; Sesma, Mannes, & Scales, 2013). Their approach underscored the importance of adding assets rather than reducing risks.

However, whether one focuses on risk gradients or asset gradients, many of the cumulative risk indices obscure the variation within a particular level of risk, high or low. Pioneers in the study of resilience brought attention to the off-gradient cases that were not well predicted by high cumulative risk scores (Masten, 2014b). Some individuals were doing much better than might be expected from their level of risk. Historically earlier diathesis–stress models of psychopathology had proposed in a similar way that some individuals were more vulnerable to adversity, doing worse than might be expected by the level of risk (Gottesman, 1974). Off-gradient cases in either direction (worse or better than expected) suggested that there might be moderating influences on risk or adversity that could not be captured by additive effects. These interaction effects became the focus of research on protective factors that might explain better-than-typical or expected outcomes as well as the diathesis studies of genetic vulnerability and other moderating influences that could lead to worse effects.

Cumulative risk scores also could mask the salient effect of particular experiences on well-being or function. These scores were designed to package risk because risk factors often co-occurred, and the number of risk factors often seemed to be more important than the nature of the particular risk exposures. However, there are situations where this may not be the case, particularly in situations of extreme trauma. In a meta-analysis of posttraumatic stress (PTS) studies, Furr, Comer, Edmunds, and Kendall (2010) were able to show that in disasters (mass-trauma events including natural disasters and terror attacks), greater PTS symptoms were found in disasters with greater loss of life and loss of loved one and friends. In a specific analysis to unpack risk in their study of Bosnian adolescents exposed to war and political conflicts, Layne and colleagues (2010) identified particular experiences as more potent risk factors, including exposure to life-threatening experiences and traumatic death. In their study of former child soldiers, Betancourt et al. (2010) described the "toxic" effects of rape and killing others on long-term well-being and adjustment.

Many of the cumulative risk models and gradients were conceptualized and tested using linear models. However, there also was consideration of nonlinear models, at least in theory (Garmezy et al., 1984; Masten et al., 1988). The "challenge" model was curvilinear, where the relation of adaptive function to stress or adversity was quadratic—with the best outcomes at mid-levels of stress

rather than very low or very high levels of challenge, akin to the familiar inverted "U" function of the Yerkes-Dodson law relating performance to arousal. The concept of possible steeling effects of some adversity exposure also was nonlinear (Rutter, 1987).

In recent years, nonlinear models of risk have become more prevalent as the statistical strategies and data collection needed for testing these effects became more widespread and feasible to execute. Intriguing data from studies of children in war and political conflict have suggested nonlinear dose effects (see Masten et al., 2015). For example, some research on child soldiers exposed to extraordinary trauma in captivity suggest that there may be asymptotic effects where the exposure is so high that everyone has passed the threshold for full expression of posttraumatic symptoms; at this level of risk, symptoms are less related to exposure dose of traumatic experiences and more related to the quality of the recovery environment (Klasen et al., 2010). Another study of youth engaged in political conflict, Palestinian youth in Gaza, by Qouta, Punamäki, and El Sarraj (2008) found nonlinear relations of engagement to conflict exposure. At lower to middle levels of exposure to the conflict, they observed a typical dose-response effect, with adaptive behavior declining as exposure levels rose. However, at extremely high levels of exposure to extreme political violence, youth appeared to rally for the cause.

Another important theme that became salient in recent studies of adversity, particularly in regard to mass-trauma adversities, was the role of media exposure in risk (Masten & Narayan, 2012; Masten et al., 2015). Evidence has accumulated that exposure to adversity through media coverage can have significant dose effects on children, and particularly young children. Moreover, studies that examine the potential risk of social media exposure are just getting under way.

The Adaptation Criteria: How Well Is the System Doing?

Resilience science focused on the processes that make it possible for some individuals to weather the storms of adversity. What are the criteria by which resistance, recovery, or posttraumatic growth are judged? Here, too, many criteria have been the focus of study, some broad and some narrow, some external and observable, others internal and subjective. To judge or study resilience, one must evaluate how well a system is doing by some kind of criteria.

In research on human resilience, positive adaptation, adjustment, or outcomes have been judged by different criteria at different levels of analysis (Cicchetti, 2010; Luthar, 2006; Luthar et al., 2000; Masten, 2007, 2014b; Masten, Burt, et al., 2006; Schoon, 2006). With the study of resilience emerging from research on children at risk for major mental disorders or antisocial behavior, sometimes the criteria were defined in negative ways, by avoiding psychopathology or manifesting few symptoms (e.g., avoiding substance abuse or conduct disorder). A study by Nigg and colleagues (2007) provides an example; they examined protective factors associated with avoiding the development of attention-deficit/hyperactivity disorder, oppositional defiant disorder, or conduct disorder in children at risk due to family adversity. However, some investigators focused on how well children were doing in the developmental tasks of childhood, adolescence, or early adulthood on multiple dimensions of competence, discussed further in the next paragraph (e.g., Masten & Tellegen, 2012). These measures of adaptation or adjustment were often behavioral (e.g., academic achievement, getting along with peers) and age-related, changing as children matured and entered new contexts. Some investigators focused on subjective well-being or happiness as key criteria for adapting well (e.g., Jordan & Graham, 2012). Studies of immigrant youth and acculturation stress often focus on both psychological well-being and adjustment in school (Motti-Stefanidi, 2014).

Developmental studies, particularly longitudinal studies, often measured adaptation by achievements in the tasks that are commonly expected for individuals to accomplish at different ages (McCormick, Kuo, & Masten, 2011). For example, success in age-salient developmental tasks were key criteria for the assessment of adaptation in three influential longitudinal studies of risk and resilience: the Children of Kauai (Werner & Smith, 1982, 1992, 2001), the Minnesota Longitudinal Study of Risk and Adaptation (Sroufe, Egeland, Carlson, & Collins, 2005), and the Project Competence Longitudinal Study (Masten & Tellegen, 2012). In early childhood, these developmental tasks include forming attachment bonds with caregivers, learning to walk and talk, and beginning to comply with rules. Older children are expected to go to school, learn to read and write and calculate with numbers; get along with peers and teachers; and follow the cultural rules and laws of their societies. Adolescents and young adults are often expected to form deeper friendships, develop romantic relationships, form their own families, and enter the workforce, higher education, or take on child-rearing responsibilities.

Although it was recognized long ago that adaptation criteria are grounded in cultural and historical context (Masten & Coatsworth, 1995, 1998), empirical attention

to cultural variations in the criteria for adaptive behavior or competence gained considerable traction in the past decade of resilience science (Masten, 2014a; Panter-Brick & Leckman, 2013; Ungar, Ghazinour, & Richter, 2013). Work of the Resilience Centre in Halifax, Nova Scotia, provides examples of the collaborative international efforts under way to study cultural similarities and differences in defining good adjustment, as well as protective processes, in resilience.

Developmental Cascades

Over the past decade, there also has been a surge of empirical studies focused on developmental cascades across domains and levels of adaptive function. *Developmental cascades* refer to progressive or spreading changes across systems, time, and even generations, resulting from multiple-level interactions in complex living systems, that have cumulative effects on the course of a system's development (Masten & Cicchetti, 2010c). These effects were noted long ago in research on the etiology and course of psychopathology and also in the literature on the development of competence (Burt, Coatsworth, & Masten, Chapter 9, this volume; Cicchetti & Cannon, 1999; Cicchetti & Tucker, 1994; Cole & Maxwell, 2003; Dodge, Greenberg, Malone, & the Conduct Problems Prevention Research Group, 2008; Hanson & Gottesman, 2007; Hinshaw, 1992; Hinshaw & Anderson, 1996; Kagan, 2005; Kohlberg, LaCrosse, & Ricks, 1972; Masten & Coatsworth, 1998; Masten et al., 2005; Patterson, Reid, & Dishion, 1992; Rutter, 1999; Rutter, Kim-Cohen, & Maughan, 2006; Rutter & Sroufe, 2000). These effects have been called snowball effects, amplification effects, positive chain reactions, and spillover effects among other terms for similar concepts. Basically, cascades describe the cumulative consequences of the interactions among systems that shape the course of development, recognizing that changes spread in dynamic, interdependent systems. Developmental systems theory forecasted and empirical findings supported the systems idea that problems or successes in one domain or level or part of interacting systems (e.g., within a person and a family or a peer group) could spread to affect other domains, levels, or people (see Masten & Cicchetti, 2010a, 2010b).

Research on resilience highlighted the cascade effects pertinent to positive adaptation, as well as promotive and protective processes. One central theme focused on the theory and findings that *competence begets competence* as children develop. Achievements in core developmental tasks in one period of development set the stage for future competence. This idea has been championed not only by developmental psychologists (Masten & Coatsworth, 1998; Sroufe, Egeland, Carlson, & Collins, 2005), but also by economists and prevention scientists concerned with benefit-to-cost analysis (Heckman, 2006; Temple & Reynolds, 2007). Investing in competence early in development was recognized as a highly cost-effective strategy for both promoting later competence and preventing psychopathology, because of cascading consequences in development.

A second central theme focused on interrupting negative cascades or intervening to prevent negative cascades from unfolding through strategic prevention or intervention efforts (Burt et al., Chapter 9, this volume; Masten & Cicchetti, 2010c). Interventions can be designed to target mediating processes in anticipated developmental cascades sequences, timed and targeted to prevent negative and promote positive consequences of system interactions. Basic research on naturally occurring resilience highlighted the potential for cascading consequences of deliberate efforts to reduce dose and mitigate negative consequences of adversity and stress on development. Examples of interventions to interrupt or generate cascades are discussed further in subsequent sections.

Adaptation through Time: Pathways of Resilience and Maladaptation

Resilience theory also highlighted *positive pathways of adaptation through time*. Pathway models of adaptive function have a long history, dating back to the work of early embryologists describing development. Examples of early pathway models include the epigenetic landscape of Waddington (1957/2014) and pathways delineated by Gottesman and his collaborators (Gottesman, 1974; Gottesman & Shields, 1982) portraying the combined effects of epigenetic processes in shaping the life course toward and away from schizophrenia. In resilience science, theoretical pathway models represented efforts to capture the course of adaptive function over time, in the relation to changes in adversity and other circumstances.

In the literature on resilience in children, Masten and Reed (2002) delineated a number of pathways that had been described in both theory and individual case histories of resilience. These included pathways of *stress resistance, breakdown and recovery, and normalization*. Later, Masten and colleagues would differentiate pathways for acute challenges, such as those observed in disasters, terrorist attacks, and accidents, from those commonly observed in chronic adversity exposures, such as family dysfunction

with domestic violence or substance abuse, entrenched poverty, and child neglect or abuse in the family (e.g., Masten, 2013; Masten, Monn, & Supkoff, 2011; Masten & Obradović, 2008). For example, Masten and Narayan (2012) illustrated a number of theoretical pathways often described in the literature on children in war and disaster. Bonanno (Bonanno, 2004; Bonanno & Diminich, 2013) have delineated similar pathway models in the literature focused on adult resilience.

A sample of pathway models are illustrated in Figures 6.1 and 6.2 showing patterns of different pathways in the context of acute trauma or a period of chronic adversity followed by a period with *improved* context (due to natural changes in adversity or interventions to reduce adversity). In the aftermath of acute trauma, these manifested resilience patterns have been observed and theoretically proposed*: stress-resistance*, where functioning remains about the same despite the challenges; *breakdown and recovery*, where there is initial decline in function followed by return to more or less the original level of function; and *posttraumatic growth*, where function improves in the aftermath of a severe challenge, sometimes following an initial decline, as if the individual's functioning is galvanized by the demands of responding to the challenge and/or the processes of recovery. During the period of severe, chronic trauma, children do poorly or decline in function, as illustrated during the first period of time in Figure 6.2. Then, when conditions improve for child function or development, as capacity for resilience builds or replenishes, resilience pathways in the form of recovery or normalization become evident.

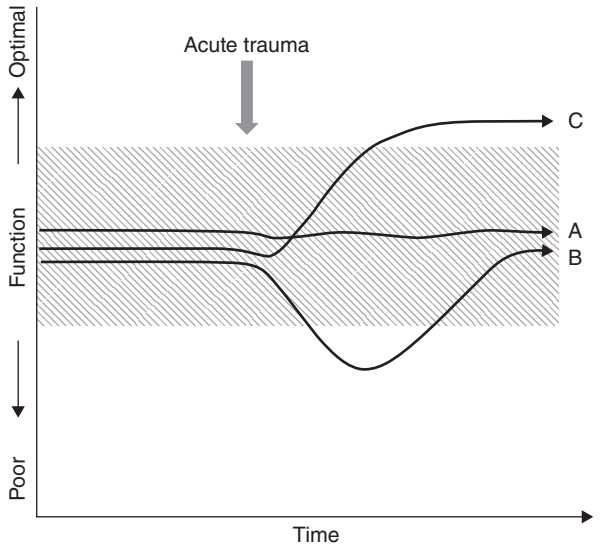


Figure 6.1 Resilience Pathways After Acute Trauma. Model of resilience pathways after acute trauma. The gray zone represents normal or typical adaptive function. Path A represents stress resistance. Path B illustrates breakdown and recovery. Path C represents posttraumatic growth. *Source:* © Ann S. Masten. Reprinted with permission.

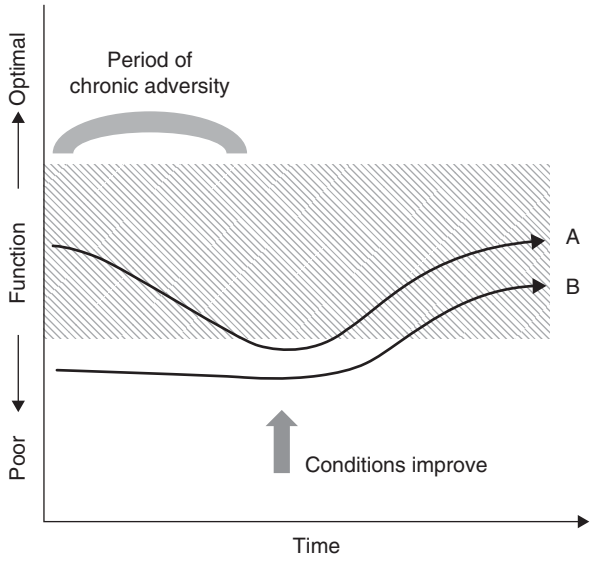


Figure 6.2 Resilience Pathways after Chronic Adversity. Model of resilience pathways showing a period of chronic exposure to severe adversity followed by a period when conditions improve. Path A shows declining adaptive function during chronic adversity followed by recovery when conditions improve. Path B shows a normalization pattern when conditions improve. *Source:* © Ann S. Masten. Reprinted with permission.

With the advent of advanced statistical modeling and more longitudinal studies using repeated measures, it has become feasible to examine and test such models empirically. Readily available methods of growth mixture modeling or group-based trajectory modeling developed by Nagin, Muthén, and their colleagues have made it possible to identify pathways followed by groups of individuals within a longitudinal sample (Jung & Wickrama, 2008; Muthén & Muthén, 2000; Nagin, 1999, 2005; Nagin & Odgers, 2010; Nagin & Tremblay, 1999). Although some of the resulting studies emphasized pathways of symptoms or problems rather than competence or positive adaptation (see Nagin & Odgers, 2010, for examples), these analyses frequently identified relatively healthy or positive trajectories too (paths with stable low levels of symptoms or trajectories with declining symptoms). In fact, studies of symptom pathways following disasters reveal that the majority of children or youth show improving or stable good functioning following acute disasters (e.g., La Greca, Lai, Joormann, Auslander, & Short, 2013). Betancourt and colleagues also observed that in a majority of cases, trajectory analyses indicated resilience in war-exposed

youth followed over time from Sierra Leone, many of them former child soldiers with extremely high and chronic exposure to trauma (Betancourt, McBain, Newnham, & Brennan, 2013). Their results for internalizing symptoms indicated four trajectories, with 41% of young people showing stable, low symptom levels and an additional 48% showing an improving trajectory over time. Only 5% showed stable, high-level symptoms, and 6% showed deteriorating patterns.

Although the advent of mixture/trajectory modeling has facilitated empirical studies of resilience pathways, it is interesting to note that there appear to be more examples modeling symptoms than positive criteria of adjustment. There are very few examples of mixture modeling to identify resilience trajectories based on positive criteria (e.g., Obradović, Burt, & Masten, 2006) even though there have been some attempts to identify trajectories of academic achievement in normative samples. Davis-Kean and Jager (2014), for example, used growth mixture modeling to analyze data from the Early Childhood Longitudinal Study-Kindergarten Cohort, a nationally representative sample. They examined achievement trajectories within racial groups, which revealed achievement gaps and interesting "catch-up" trajectories within racial categories.

Steeling Effects and Posttraumatic Growth

One of the most intriguing pathways reported anecdotally in resilience case studies is posttraumatic growth, when adaptive function appears to *improve* following exposure to adversity (particularly acute catastrophes). Some have suggested that there is an initial breakdown of function followed by a reorganization or strengthening process (Calhoun & Tedeschi, 2006). Some families report better function after dealing with a crisis or a child's illness. Colville and Cream (2009), for example, found that many parents of children who were in a pediatric intensive care unit reported posttraumatic growth after the children left the hospital. On closer inspection, they also noted that this effect was curvilinear—it was more commonly reported by parents with moderate levels of PTS than those with higher or lower perceived stress levels.

The idea that some exposure to adverse experiences and challenges is better than none or too much exposure for longer-term adaptive function also is a concept with a long history in resilience science (Masten, 2012). Rutter (1987) described the steeling effects of exposure long ago in his classic article on resilience, and he continues to garner the evidence on these nonlinear effects (Rutter, 2012). The vaccination model of prevention is built on an exposure model (to a weaker or less-threatening form of the threat; Masten, 2014b). Adaptive systems often require calibration or experience to "learn" to work properly or tune to the expected environment; this is true of the immune system and our muscles, and may well be true of behavioral adaptation. Such findings have led to a flurry of articles on the sometimes-controversial theme that Nietzsche (2013) so succinctly described in 1888: "What does not kill me makes me stronger." The controversy comes with the idea that trauma is "good for you," which is very problematic in situations of child maltreatment and other devastating adversities. Practice with adaptation may be helpful but only in modest amounts that do no harm. Surviving Ebola may provide immunity, but the risk of dying and cost to health and well-being are astronomically high.

That said, the possibility that adapting to adversity can alter the organism in positive ways for future adaptation is fundamental to preventive interventions, including stress-inoculation training as well as immunizations against childhood diseases. An overprotected child may not end up with the adaptive capacity for responding successfully to the vicissitudes of life that will inevitably come.

Nonlinear effects of early life adversities also have been studied in animal models and particularly in primates (Lyons & Parker, 2007; Parker & Maestripieri, 2011). Here too evidence has accumulated that the relation of adversity experiences to later adaptive function is quadratic rather than linear. Loss, abuse, or deprivation of caregiving can have calamitous effects on the development of primates, similar to human infants. However, some experience with brief separations in infant macaques and other primates apparently can result in better regulated stress-responses systems that yield greater resilience later in life. This effect in squirrel monkeys has been described as a stress-inoculation effect (reviewed by Parker & Maestripieri, 2011). Some experience with manageable separations, in other words, can be better for long-term adaptation than no experience with separations.

Promotive and Protective Processes

The search for factors that could account for the variation in short-or long-term outcomes among children exposed to adversity resulted in the identification of variables or conditions that seemed to make a difference. However, one of the first issues that came up in this search was distinguishing generally good predictors of positive outcomes (in various domains of function or development) regardless of risk from predictors that appeared to play a particularly important role when risk or adversity was high. Eventually these

two kinds of effects came to be called "promotive" factors (a term popularized by Sameroff, 2000) and "protective" factors.

In essence, this distinction differentiated effects observed at most or all levels of risk from those effects observed in conditions of challenge. Moreover, it was not the factors that truly mattered, but instead their *function* in varying conditions, because it was quickly observed that the same factor could function both ways. Parenting quality and good cognitive skills have been extensively implicated as both correlates/predictors of achievement in developmental tasks and also as moderators of risk or adversity (Masten, 2014b; Masten & Coatsworth, 1998).

Pioneering investigators often commented on this issue. Garmezy et al. (1984), among others, pointed out that this distinction from an analytical perspective reflected "main effects" in contrast to "interaction effects." Rutter (1987) was an early champion of keeping these functional roles distinct, and he has continued to argue (Rutter, 2012) that studies of resilience and protective processes related to resilience should be focused on what happens when adversity is high.

Promotive factors (which also can be called promoters, assets, and resources) are positive correlates and predictors of desirable outcomes. Some of these may be purely positive, but in many cases, the correlates of positive development or adjustment are actually dimensional attributes (e.g., good versus poor parenting) that could easily be "reversed" to become a risk measure, as already noted in the discussion of risk.

Similarly, moderators of risk or adversity that predict variations in adaptive behavior or other outcomes in the context of threats to adaptive function could be described as "protective" or "vulnerability" indicators in terms of their function. But in the situation of high challenge or threat to adaptive function, the "expected" norm references help to define the presumed nature of the factor's role or function. Thus, for example, if the expected typical response to increasing adversity or threat is a decline in function, and the moderating action appears to be at the high end of the purposed moderator, the variable will be described as a protective factor. If one is low on the moderator and the outcome is worse than generally expected or observed, and the action is concentrated at the other end of the dimension, that effect will be described as a vulnerability effect. And both effects could be observed. The normative levels of the moderator and adversity/threat in the general population also influence the interpretation of a moderator as a protective factor or a vulnerability. If average levels of parenting warmth or structure appear to protect children from the effects of high adversity exposure, then parenting effects will be viewed as protective. Poor parenting, in contrast, could exacerbate the consequences of even modest exposure to adversity, often interpreted as a vulnerability effect.

The essential idea in defining these effects is not the factor is protective or promotive per se but instead that it *functions in a particular way in a given context or situation with respect to a particular criterion of outcome*. This idea was emphasized in early reviews (e.g., Masten, Best, & Garmezy, 1990; Rutter, 1987), but it has been underscored by recent theory and evidence on differential sensitivity to experience, discussed further in the section on "Differential Sensitivity or Susceptibility to Experience and the Environment." In a negative environment, rife with adversity, "sensitivity" could be viewed as a vulnerability, whereas in an enriched and safe environment, or in the context of an intervention, it could be enhancing to development. The functional significance of "sensitivity" varies in different conditions.

Biological Models and Processes

Early resilience investigators were strongly influenced by the biological models prevailing at the time, particularly in medicine and public health, including psychiatry and epidemiology (Masten, 2014b). These models included numerous concepts and models already discussed, such as cumulative risk, diathesis-stressor models of disease, and vaccination, that all explained how multiple influences might account for the development of problems or illnesses and, concomitantly, how to think about prevention.

The ideas of stress-inoculation and steeling effects drew on models of vaccination, where exposure to a weaker or safer form of a dangerous biological agent could stimulate the immune system to make antibodies that subsequently would protect the organism from the worst ravages of dangerous diseases like smallpox or polio. Similarly, challenging the muscles by exertion would initially break down function but, with recovery, lead to strengthening of those muscles in the future. In these models, clearly it is not "no exposure" that is best but rather some kind of manageable exposure to a challenge that is followed by recovery and yields a more adaptive organism.

Modern examples include the hygiene hypothesis for asthma, where lower exposure to pathogens or microorganisms in development can lead to higher risk for asthma in the future. Explanations for the hygiene effect are complex (see Figueiredo et al., 2013), but the general idea is that modern lives may be "too clean" to tune or program

the individual's immune system effectively. Growing up on a farm with exposure to a range of microorganisms can be viewed as protective for some kinds of allergies (Guerra & Martinez, 2008; Okada, Kuhn, Feillet, & Bach, 2010; von Mutius & Radon, 2008). In these models, developmental timing is important because protection is conferred by early exposure that helps to calibrate the immune system whereas later exposure to the same environmental exposures can result in allergic reactions. There also is a growing body of evidence based on animal models that repeated exposures to moderately stressful experiences can have positive effects on how young animals handle future stressors (Parker & Maestripieri, 2011).

Contemporary variations of these biologically-based challenge models include child-rearing or educational ideas where parents or teachers aim to build psychological strength by exposing children to manageable challenges. Another example can be found in interventions based on stress-inoculation training that are designed to prepare children for potentially traumatic experiences, such as hospitalization or terror attacks. In Israel, for example, school children have been trained to handle attacks related to political conflict and terror, with natural experiments showing that such training can be effective for reducing the risk of PTS (e.g., Wolmer, Hamiel, & Laor, 2011).

It is noteworthy that the models and empirical evidence on the effects of challenging experiences, whether biological or psychological, suggest that it is modest levels of challenge, with adequate resources and supports for recovery, that may help to prepare a child or a primate for future challenges. There is little evidence that overwhelming trauma and adversity make children stronger.

Another early biological model was provided by sickle-cell anemia, where having two alleles for this genetic disorder caused a life-threatening illness yet having one allele could confer some protection from malaria in certain regions where the disease was endemic. One of the resilience pioneers, Michael Rutter (1987), noted this model in a classic article on resilience. This biological model indicated the importance of context for interpreting risk and protective effects, both the genetic context and the rearing environment. This example illustrated the phenomenon of a balanced polymorphism, where the heterozygous individual has a survival advantage but only under some conditions.

Over the past decade, advances in the development of increasingly accurate and practical tools to measure genes and epigenetic processes have revolutionized the science in multiple fields, including medicine and the study of adaptive function and development more broadly defined. These advances have influenced research in developmental psychopathology (Grigorenko & Cicchetti, 2012) and resilience (Kim-Cohen & Gold, 2009; Kim-Cohen & Turkewitz, 2012). Consequently, new models of resilience and resilience-based intervention have emerged.

GxE: Genetic and Epigenetic Models and Processes in Resilience

Gene–environment interaction (GxE), one of several distinct forms of gene–environment interplay (Rutter, Moffit, & Caspi, 2006), refers to observable variations in individual functions or development that are attributable to the interdependence between a specific identified variation in the DNA sequence of a gene and a well-defined and carefully measured experience or feature of the environment, often a pathogen (Caspi, Hariri, Holmes, Uher, & Moffitt, 2010; Moffit, Caspi, & Rutter, 2006). In GxE, environmental experiences moderate genetic effects (or vice-versa) on adaptive function and development, including normal, pathological, or optimal outcomes (Cicchetti & Rogosch, 2012; Rutter, 2006). For example, genetic effects on outcomes may be observed only in certain environmental contexts or in conjunction with different histories of experience; conversely, experience may relate only to outcomes among individuals with specific genetic characteristics. Risk-exposed individuals who carry the "protective" version (or allele) of a gene with respect to that risk condition develop significantly lower levels of psychopathology compared to comparably risk-exposed individuals with the "vulnerable" allele (Kim-Cohen & Gold, 2009).

Although there has been an abundance of research conducted on GxE interactions and evidence for GxE interactions in the etiological pathways of psychopathology and manifested resilience (Caspi et al., 2010; Karg et al., 2011), it is important to note that a number of criticisms have been levied against GxE research (see, e.g., Duncan & Keller, 2011; Duncan, Pollastri, & Smoller, 2014; Keller, 2014). These include small sample sizes that can yield low statistical power, failure to control for all potential confounders in all models and failure to compute all relevant interaction terms in the same model, and a paucity of replication studies (Duncan & Keller, 2011; Keller, 2014).

Advances in molecular biology have helped to usher in a renascence of interest in the contribution that studies on GxE can make to unraveling the complex pathways of adaptive and maladaptive development, including resilience processes (Cicchetti & Blender, 2006; Grigorenko & Cicchetti, 2012a, 2012b; Rutter, 2006). These advances

include the completion of the DNA sequencing of the human genome (Collins, Morgan, & Patrinos, 2003; Cowan, Kopnisky, & Hyman, 2002) and the publication of the map of human haplotypes that provides valuable information about individual genetic variation and a powerful tool for identifying both vulnerability and protective genes (D. C. Crawford & Nickerson, 2005; Insel & Quiron, 2005). As Rutter et al. (2006) articulated, an understanding of the complexities involved in comprehending normal, abnormal, and resilient patterns of development may prove useful in avoiding misleading types of stigma and biological reductionism (see also Curtis & Cicchetti, 2003; Hinshaw & Cicchetti, 2000). Moreover, comprehending the complex variation in dynamic multilevel pathways emphasizes the importance of genes in all developmental trajectories involving risk and protection.

The empirical contributions of a molecular genetic approach enable us to discover genetic elements that contribute to developmental processes of normality, psychopathology, and resilience without requiring foreknowledge of the underlying biochemical abnormalities (Ciaranello et al., 1995). These contributions make the search for the intermediate developmental mechanisms in the gene-environment-brain-behavior interconnections more accessible than ever before (Gottesman & Gould, 2003; Gottesman & Hanson, 2005; Hanson & Gottesman, 2007; Lenzenweger, 2013; Moffit et al., 2006). Moreover, progress in molecular genetics also raises hope of developing interventions to prevent and remediate mental disorder and to promote resilience (Belsky & van IJZendoorn, 2015; Cicchetti & Blender, 2006; Cicchetti & Curtis, 2006; Grigorenko & Cicchetti, 2012a, 2012b; Howe, Beach, & Brody, 2010; Masten, 2014b).

Differential Sensitivity or Susceptibility to Experience and the Environment

One of the most influential set of ideas in GxE theory over the past decade with implications for resilience science stems from the concepts of differential susceptibility (Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007; Belsky & Pluess, 2009) and biological sensitivity to context (Boyce & Ellis, 2005; Obradović & Boyce, 2009). According to the evolutionary-derived hypothesis of differential susceptibility to the environment, individuals vary in their developmental plasticity or malleability to negative or positive experiences (Belsky & Pluess, 2009). Genes that confer risk in harsh environments are thought to confer benefits in normal or nurturing environments (Belsky et al., 2007; Belsky & Pluess, 2009; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2011). In other words, the characteristics of individuals (including their gentoypes) that render them disproportionately more vulnerable to effects of experiencing adversity may also make them disproportionately more likely to benefit from supportive contexts (Belsky et al., 2007; Boyce & Ellis, 2005; Ellis et al., 2011).

Differential susceptibility in the view of Belsky and colleagues (2007) can be distinguished from related ideas, including diathesis-stressor theory (Gottesman & Shields, 1972), by evidence on effects in negative and positive environments. If susceptibility is evident only in negative environments, but not in positive environmental contexts, then "diathesis" is indicated. In contrast, differential susceptibility theory is supported by a cross-over interaction such that susceptible individuals are disproportionately affected "for better and for worse" by both positive and negative experiences (Belsky et al., 2007).

Because a simple phenotype cannot be adapted to all potential conditions, the creation of variability within families increases the probability that at least some offspring will be successful in every generation (Belsky & Pluess, 2009). Therefore, differential susceptibility to the environment presumes that individuals vary in their susceptibility to context as a result of genetic differences.

Differential susceptibility to the environment also provides a possible explanation for individual variability in responsiveness to intervention (Ellis et al., 2011). This variation is particularly important because most treatment outcome studies, even those yielding statistically significant effects and having medium to large effect sizes, include many individuals who do not benefit from the intervention (Belsky & van IJzendoorn, 2015). Thus, identifying differential susceptibility markers is a key to tailoring treatments to uniquely fit individual differences. As such markers are identified, they may be examined as potential moderators of resilience or of intervention outcomes.

Theoretically, while there may be "sensitive" children who are responsive to both bad and good environments, there also could be traits or other endogenous factors in a child that yield receptivity only to positive environments. This possibility led to a further differentiation of individual differences to describe the sensitivity to positive environments or advantaged conditions, described as "vantage sensitivity" by Pluess and Belsky (2013), along with Manuck (2011). Substantially less research has been directed toward investigating endogenous factors that are associated with variation in response to positive influences. Vantage sensitivity could be viewed as the bright side of differential susceptibility theory (Pluess & Belsky, 2013).

Vantage sensitivity is used to describe the notion that some persons are more sensitive and positively responsive to the environmental advantages to which they are exposed (Pluess & Belsky, 2013). Vantage sensitivity also can be differentiated from a general sensitivity to good or bad environments. Some individual differences in developmental responsiveness to environmental experience may emerge *only* under positive or supportive conditions. In these instances, vantage sensitivity, not differential susceptibility—which is characterized by disproportionate sensitivity to both positive and negative exposures and experiences—would be indicated (Pluess & Belsky, 2013).

Biological Models of Protective Parenting

Many other models of resilience could be drawn from the biological literature, including animal models. A complete treatment of this topic is beyond the scope of this chapter. Just one additional model example will be highlighted, which is the rat model of parenting developed by Michael Meaney and colleagues that dramatically illustrates the power of environments to moderate genetic risk through epigenetic pathways (Karatsoreos & McEwen, 2013; Meaney, 2010). Animal models have played a key role in understanding how both risk and protective influences may work. Meany and colleagues demonstrated through a series of elegant experiments that maternal behavior in rat mothers, even foster mothers, can alter gene expression, with lasting effects on the adaptive behavior and vulnerability to stressors among the pups. Additional studies in animals and humans support the idea that qualities of parenting can alter the effective genotype and thereby influence later vulnerability or resilience in the face of adversity (Karatosreos & McEwen, 2013). Here again, developmental timing matters. The high-versus low-licking behavior of rat mothers has its greatest impact during a sensitive period early in pup development.

A General Framework for Action

As resilience models and corresponding research strategies developed, a parallel resilience framework for action also emerged, because children in urgent situations cannot wait for a complete science to guide translation of knowledge into practice (Masten, 2011, 2014b). Action often may be required before the evidence we ideally would want to have is in place. In these situations, action can be guided by general principles based on the science to date.

Resilience perspectives on programs and policies usually emphasize these principles:

- Set positive goals.
- Include positive influences and outcomes in models of change as well as risks.
- Monitor and measure positive achievements and progress as well as problems.
- Increase promotive influences and mobilize adaptive systems while also reducing harmful exposure to risk or adversity.
- Consider multiple levels and systems for leveraging change.
- Intervene strategically during windows of opportunity for promoting positive cascades and interrupting negative cascades.

These principles do not ignore or neglect risk, recognizing that preventing adversity or toxic risk exposures often yields a high return on investment, both financially and socially. Additionally, these principles underscore the importance of timing, for preventing risk as well as for promoting positive processes: interventions are more effective when they are well-timed in terms of developmental plasticity or contextual transitions during periods when developing and interacting systems may be more amenable to change (Masten, 2014b).

METHODS

Resilience research required methods to explore and test hypotheses about adaptation in the context of risk or adversity. These methods included strategies for assessing the primary components of resilience models—including risk, adaptation, and potential mediators or moderators discussed in the section on models—but also methods for studying patterns and processes in the lives of people who did or may manifest resilience. In this section, we discuss two major traditions for studying resilience in children, person-focused and variable-focused in approach, as well as recent hybrid methods that combine features of both and intervention studies as a method for studying resilience.

Person-Focused Approaches

Single cases of manifested resilience have played a prominent role in the history of resilience science and continue to play key roles in inspiring new lines of work and in

communication of research findings. Scientists often report that their interest in resilience was spurred by case examples of individuals in their own or other studies, particularly the pioneers in psychology and psychiatry who propagated the first wave of research (Masten, 2014b). These pioneers set out to study the origins of psychopathology among children at risk for various reasons but often were struck by the compelling individual examples they observed of young people who were doing well despite high-risk status or exposure to severe adversity. Garmezy (1982b) wrote an article titled "The Case for the Single Case" in which he described the heuristic value of individual case examples for providing insights, inspiration, and clues for future research. He often described individual cases when he taught, spoke, and wrote about resilience, including famous examples (e.g., Queen Elizabeth I) and anonymous examples from newspaper accounts or his studies.

There are published case studies of resilience, although they are far fewer than the biographical accounts available in books, films, and other media. One example is the case of "Sara" (Masten & O'Connor, 1989), an account of a high-risk child (of a mentally ill mother) who experienced traumatic family losses around 1 year of age followed by an inadequate foster case placement with strangers. Growth failure and developmental decline in multiple areas of function followed until she was hospitalized for a full evaluation at the age of 30 months. On recommendation of the treatment team, Sara was referred for adoption and the "treatment" of an experienced, stable, loving family. Sara was followed over time, and she responded to her permanent placement with a dramatic developmental rebound, returning to a normative developmental trajectory in physical, cognitive, and social development. A blind-to-history follow-up assessment when Sara was 6 years showed a continued course of positive development.

In their book on the High Valley Resilience Study, Hauser, Allen, and Golden (2006) tell the stories of nine individuals from a longitudinal study of 67 young people hospitalized for emotional and behavioral problems during adolescence who managed to "get out of the woods" as they grew up. The authors focused more deeply in this narrative on four of these resilient youth and how they overcame a troubled adolescence, identifying three major protective factors often observed in larger studies of resilience: positive relationships, agency, and reflective self-control. By moving beyond the single case and comparing a subgroup of cases that showed resilience by their criteria, Hauser et al. illustrate the aggregated case method, which has a number of advantages over the single-case approach.

The key drawback to the single case study is generalizability. It is not clear to what degree a single life represents unique processes versus broad, generalizable findings. Although a single case can be highly compelling and heuristic, investigators are motivated to turn to the power of numbers to make a more convincing case about their hypotheses. Nonetheless, even in large studies of resilience, scientists often single out single case examples to illustrate and communicate their findings.

Aggregated case studies focus on the whole person, as do single case studies, but aim to identify larger samples of persons who show resilience as defined for the particular study. One classic approach begins with identification of a high-risk group known from past evidence to have a higher-than-normal probability of some undesirable outcome due to a well-established risk factor, high cumulative risk, or adversity exposure. Then a subgroup of individuals who are doing well is identified within the high-risk group. The High Valley Resilience Study followed this approach. Some of best-known data from the influential resilience study of a birth cohort born on Kauai by Werner and Smith (1982) also followed this approach. The investigators identified a high-risk subgroup based on biological and environmental risk factors present before the children were 2 years old (e.g., poverty, family discord, perinatal stress, mental or physical illness in a parent). Then they examined how well members of the high-risk group were doing in subsequent follow-ups on multiple criteria of adjustment. These criteria at ages 10 and 18, for example, included indicators of conduct, achievement, and social competence. Werner and Smith identified a "resilient" subgroup of 72 youth who were then compared to less successful peers from the high-risk category at different points in development in order to identify individual and family differences associated with resilience.

Focusing only on high-risk youth has some limitations. Without low-risk comparison groups, for example, it is not possible to distinguish promotive and protective factors. A difference may be found on cognitive skills, personality, or parenting quality, but it will not be clear if the effect of the factor is any different than it would be among a low-risk sample. Factors that show similar roles under low and high risk—promotive factors—have "main effects" from a statistical point of view, showing the same relation to the adaptive criterion of interest at any level of risk. In contrast, protective effects suggest a more important role when risk is high. In other words, the two groups may differ on an individual or family variable of interest in exactly the same way for a high-risk sample as they would in a

low-risk sample, which suggests a correlate of adjustment but does not suggest a special role when risk is high.

The extended classic approach adds one or more low-risk comparison groups, so that promotive and protective effects can be differentiated. The Project Competence Longitudinal Study (Masten & Tellegen, 2012) utilized this approach in some person-oriented analyses, cross-classifying participants into groups by multiple criteria of competence as well as cumulative levels of adversity. Either cluster analysis or cut-scores can be used to identify the groups. This strategy led to interesting findings on similarities and differences among the different subgroups as well as a nearly "empty cell" suggesting that there were few young people in a school-based sample with a history of low risk who were maladaptive. Results indicated many similarities in the two groups showing positive adjustment around age 20, low-risk and high-risk, and many differences between these two groups of adaptive youth and their high-risk/maladaptive peers.

In some situations, there is no comparable "low-risk" group; virtually everyone has been exposed to the risk or adversity, although there may be subgroups with lower exposure. This can happen when a population is exposed to mass-trauma events, such as hurricanes, terror, war, or disease pandemic. Studies of survivors of the Khmer Rouge genocide in Cambodia encountered this problem (Masten, 2014b). Sometimes the low-risk comparison group differs in so many ways from the high-risk group that it is difficult to control for all the ways the two groups differ other than the key difference of interest. An example might be comparing children who grow up in foster care, who often have a long and complex history of risk, to children raised in stable family situations who have lower risk but also may differ in many aspects of sociodemographic status.

A contemporary twist on these classic person-focused strategies is trajectory analysis. These strategies, discussed later in this section, are designed to extract subgroups from longitudinal patterns of adaptation among high-risk populations based on intraindividual change over time in a variable of interest, and thus they share features of person-focused and variable-focused methods (Muthén & Muthén, 2000).

Variable-Focused Approaches

Person-focused methods consider the lives and attributes of individual people as a whole organism, often comparing similarities and differences in people identified on the basis of history and current function as showing resilience. Variable-focused methods are designed to study patterns of variance and different ways that variables are linked, drawing on the power of statistical methods to identify potential clues to processes that might explain resilience. Variable-focused methods often provide more nuanced clues to key processes involved in resilience.

Common models of variable effects often investigated in resilience studies are shown in Figures 6.3 to 6.7. Figures 6.3 and 6.4 illustrate several ways of showing the roles of multiple risks (negative) or assets/promotive factors (positive) or bipolar variables in predicting a desirable or positive outcome. From a statistics perspective, both figures represent "main effects" models.

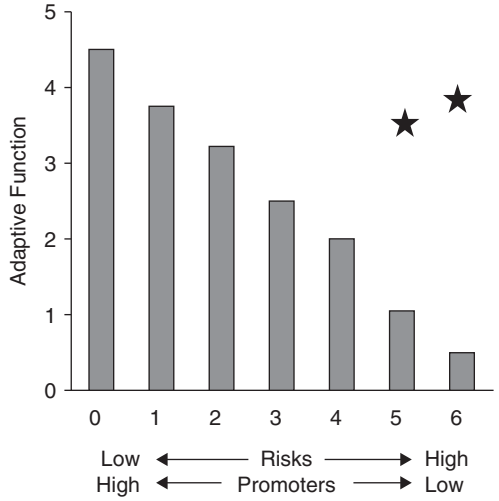


Figure 6.3 Risk or Promoter Gradient. A cumulative risk or promoter gradient illustrating how adaptive function falls as accumulating risk factors rise or promotive factors fall. Stars represent individuals who are functioning well even though their risk levels are high. *Source:* © Ann S. Masten. Reprinted with permission.

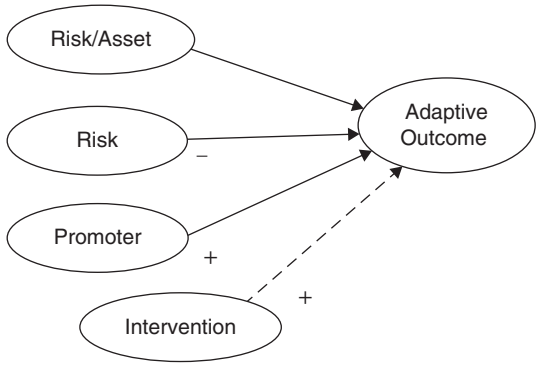


Figure 6.4 Risk and Promoter Model. Basic "main effects" model of risk and promotive factors that influence an adaptive outcome of interest. This model includes an intervention with a promoter effect. *Source:* © Ann S. Masten. Reprinted with permission.

Figure 6.3 represents a typical risk or dose gradient where adaptation is better at lower levels of risk and/or higher levels of promoters (assets or resources). In Figure 6.3, at the high-risk end of the *x*-axis (which may also indicate low levels of promotive factors or assets), adaptation is typically poor (symptoms are high or achievement is low or both). However, the stars represent two cases where an individual is doing much better than might be expected for the person's level of risk. These stars specify off-gradient cases that may signify resilience. Individuals may adapt at levels better than expected due to moderators operating to mitigate risk or unmeasured promotive influences that are in play, discussed further later.

Another way to depict these additive models with risks, bipolar predictors, or promoters is shown in Figure 6.4. This simple model includes one bipolar variable (risk/asset), one risk factor, one naturally occurring promotive factor, and an intervention intended to act as a promoter that was added to a child's life (represented by the dashed line), such as providing a tutor.

Mediating effects are illustrated in Figure 6.5. Here the effect of a risk factor (e.g., economic stress or maltreatment) on the adaptive outcome (e.g., child function or achievements; child competence) is mediated by an intervening variable, such as parenting quality or executive function skills. Mediating models set forth a hypothesis of *how* risks (or interventions to mitigate risk effects) work. An intervention (shown as a dashed line) has targeted the mediator as a strategy for changing the consequences of adversity or risk on child outcome. This intervention strategy illustrates a potential moderator effect (discussed later) on a key mediator of risk. For example, interventions have targeted parenting quality in families or executive function skills in children in an effort to mitigate the effects of disadvantage on school success or psychopathology (e.g., Zelazo & Carlson, 2012; Masten et al, 2014; Patterson et al., 2010). These types of interventions can focus on mitigating risk effects on the mediator or boosting support for the mediator.

Moderator models are shown in Figure 6.6. There are two primary forms of moderators: independent moderators of risk, such as personality factors (e.g., emotional reactivity) that enhance or reduce sensitivity to a particular kind of risk or stressor, and risk-dependent moderators, where the risk or stressor triggers or activates the moderator. The independent moderator might include individual differences in personality or biology that influence how an individual usually responds to stress (e.g., stress-reactive or calm). The risk-activated moderator is analogous to an airbag in a motor vehicle or the immune response to an infection. Emergency services for children and families are examples of risk-activated protective factors, intended to mitigate harm to children or families by providing emergency services or supports. Interventions in this model take the form of boosting the risk-independent protective influences and adding or mobilizing more or better "emergency services." Parents and teachers, for example, can learn to respond more effectively to emergencies and threats of various kinds that threaten children in their care. Stress-inoculation strategies of prevention seek to prepare children, families, or schools for what to do in emergencies in an effort to boost risk-activated protective processes.

Figure 6.7 illustrates two additional variations on moderating influences stemming from the theories on differential susceptibility or biological sensitivity to context already discussed. Differential sensitivity moderates both positive

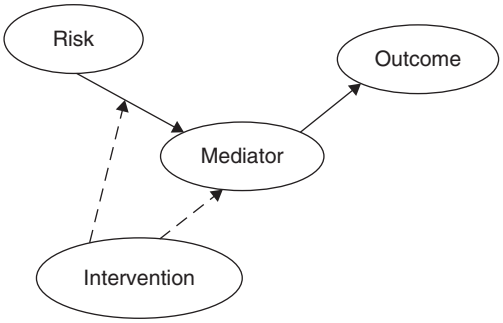


Figure 6.5 Mediated Risk Model with Intervention. Risk affects an intermediate variable that in turn changes adaptive outcome. This model includes an intervention intended to indirectly improve the outcome by mitigating risk effects on the mediator or by supporting the mediator. *Source:* © Ann S. Masten. Reprinted with permission.

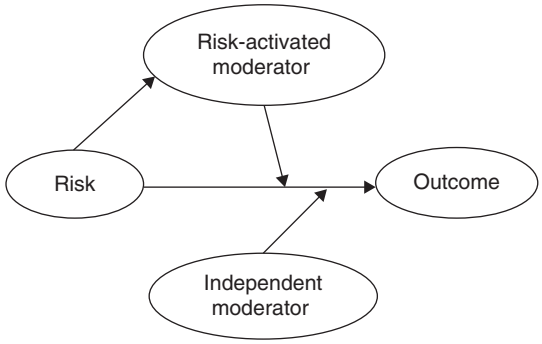


Figure 6.6 Moderated Risk Model. Moderated risk model showing one independent moderator that mitigates or enhances the effects of the risk (adversity) variable and one risk-activated moderator that is triggered by risk or adversity and then buffers or exacerbates the effects of the risk/adversity. *Source:* Adapted from "Ordinary Magic: Resilience processes in development," by Ann S. Masten, 2001, *American Psychologist, 56,* pp. 227-238.

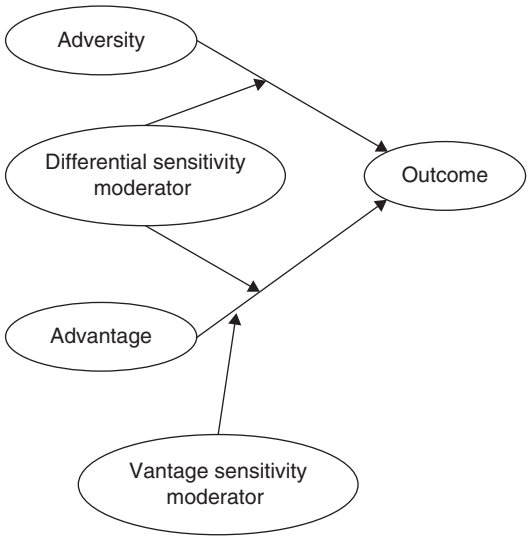


Figure 6.7 Differential Sensitivity Model. Moderator model of differential sensitivity to experience showing one "differential sensitivity" moderator that enhances or attenuates the impact of both bad (adversity) or good (advantage) experiences and a second "vantage sensitivity" moderator that moderates the impact only of good (advantage) experiences. Vulnerability (a moderator of adverse experiences) is not shown. *Source:* © Ann S. Masten. Reprinted with permission.

and negative experiences, enhancing their effects, which is good in a favorable environment and bad in an unfavorable environment. Vantage sensitivity moderates only favorable (advantaged) environments. Not shown in this figure is the third kind of moderator that enhances only negative experiences, which would be described as vulnerability.

Combined Approaches

There are two approaches to analyses of resilience that combine features of person-centered and variable-centered analyses. Some investigators conduct multiple sets of analyses to examine the data from different perspectives. In the Project Competence Longitudinal Study, for example, investigators combined methods focused on variables, including structural equation modeling and regression analyses, with classification of people into groups of high or low risk and adaptation, a classic person-focused approach (Masten, 2014b; Masten & Tellegen, 2012). This group also has presented case material from the study, carefully disguising the identity of the participants (Masten, Morison, Pellegrini, & Tellegen, 1990). In the Kauai study, Werner and Smith (1992, 2001) also reported multiple methods, some focused on person and others focused on variables. Approaching longitudinal data sets from multiple methodological perspectives can be illuminating.

A different strategy that combines both approaches is methods that examine distinct trajectory patterns of intraindividual growth and change, using the advanced statistical techniques already described, often called group-based trajectory modeling (Nagin, 1999, 2005) or growth mixture modeling (Muthén & Muthén, 2000). These methods are used to identify distinct groups of people who follow a similar trajectory or pathway of functioning on a variable of interest over time. Using techniques pioneered by Nagin, Muthén, and others (see Jung & Wickrama, 2008; Nagin & Odgers, 2010), groups of children or youth showing different patterns of function over time can be extracted from longitudinal data with repeated measures. These groups can then be compared on other variables that might explain the different patterns of adjustment. As noted in the discussion of pathway models, these mixed-model approaches have been used to identify subgroups of children and adolescents who show different recovery patterns after trauma experiences, including hurricanes (La Greca et al., 2013) and prolonged trauma as child soldiers (Betancourt, McBain, Newnham, & Brennan, 2013). In both these examples, the majority of individuals showed improving or good function over time, consistent with theoretical models of resilience pathways.

Mixed models also can be used to demonstrate treatment effects in interventions studies and to identify subgroups responding better (or worse) to treatment (Nagin & Odgers, 2010). Through propensity score matching, comparison groups can be studied of people on the same trajectory, some of whom were randomly assigned to receive an intervention. These tools are valuable for research to develop and test interventions based on resilience theory.

Intervention as Resilience Theory-Testing

One of the most powerful methods for testing theories and hypotheses about resilience is experiments with random assignment to treatment, testing a well-delineated model of change. Randomized controlled trials are the gold standard of evidence on what works to promote change and also for establishing causal evidence. Children cannot be assigned to random adversity or risk exposure, of course, but ideas about promotive and protective processes can be tested by intervention designs where the goal is to promote resilience in children or youth.

Numerous intervention studies have attempted to promote better outcomes in young people at risk by mitigating risk, boosting resources, or improving protection in order to foster resilience (Masten, 2014b). Targets of these efforts include: the reduction of premature birth and all its

consequences by prenatal care (Alexander & Kotelchuck, 2001); the reduction of insecure and disorganized attachment in maltreated youngsters through improving the quality of parent-child attachment or interaction (e.g., Cicchetti, Rogosch, & Toth, 2006; Dozier, Peloso, Lewis, Laurenceau, & Levine, 2008;); promoting school engagement (Anderson, Christenson, Sinclair, & Lehr, 2004; Hawkins, Kosterman, Catalano, Hill, & Abbott, 2005); providing after-school programming (Durlak, Weissberg, & Pachan, 2010; Lauer et al., 2006; Mahoney, Larson, & Eccles, 2005); building self-regulation skills (Diamond & Lee, 2011; Raver, 2012); and improving parenting (Patterson, Forgatch, & DeGarmo, 2010; Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011). There are numerous other examples, both of interventions designed to test resilience theory and of interventions designed with other goals in mind that provide compelling evidence that it is possible to promote resilience.

In addition, resilience theory and models suggest that change can be initiated at different system levels or multiple levels simultaneously (Masten, 2014b). Change cascades across systems, so that an intervention targeting the parent can spread throughout the family or an intervention targeting child behavior change also changes the parents, siblings, or family as a whole (Masten & Monn, 2015). Changes at a biochemical level in the brain, perhaps from medication or experience-induced epigenetic changes, can cascade upward into behavior, thereby alleviating depressed mood and leading to changes in parent behavior toward children or broader family changes (see Masten & Cicchetti, 2010).

The challenge for inducing change based on resilience science is knowing enough to optimally target the who, what, and when of leverage and opportunity for change: who to target, at what system level, and when, in terms of developmental timing or a cascade progression. Although prevention science is beginning to address this challenge, evidence to date is sparse but growing.

PSYCHOLOGICAL PROMOTIVE AND PROTECTIVE PROCESSES

Five decades of research on resilience consistently implicate a set of promotive and protective factors across wide-ranging situations and cultures, suggesting that there are fundamental adaptive systems that promote and/or protect human development and function under challenging circumstances (Masten, 2001, 2007, 2014b). Very early reviews and books (e.g., Garmezy, 1985; Garmezy & Rutter, 1983; Rutter, 1979, 1987) as well as more recent reviews and volumes on the empirical literature (e.g., Goldstein & Brooks, 2013; Luthar, 2006; Masten, 2014b; Rutter, 2013) have identified these commonly observed correlates or predictors of good adaptation among children at risk due to various adversities or risk. From a developmental systems perspective, the processes involved in these correlates and predictors of resilience would be multiple level and complex, spanning interactions from the cellular and genetic to the socioecological level. In this section we review these key adaptive systems at the level of psychosocial function, the level of focus when they were initially studied. The neurobiological processes of resilience related to these adaptive systems, which is a focus of intense interest in contemporary research, are discussed subsequently in the chapter.

Love and Emotional Security

All reviews on what matters for human resilience have pointed to the importance of relationships across the life span (Luthar, 2006; Masten, 2014b; Rowe & Kahn, 1998). The nature of the relationships varies across development, with the quality of caregiving and the attachment bonds with caregivers very salient in early development. As children grow older, relationships with other adults and friends or romantic partners become important for resilience. With respect to resilience, the theorized and observed functions of any of these relationships are multifaceted and multidimensional.

In developmental theory, attachment theorists have proposed that beginning early in development, humans (as well as other social mammals) evolved to form powerful and special bonds with their caregivers and other individuals involved in their lives (Ainsworth, 1989; Bretherton & Munholland, 1999; Cassidy & Shaver, 2008; Sroufe, 1979; Sroufe et al., 1999; Thompson, 2000). These relationships were naturally selected because of their survival and reproductive value. The human attachment system with primary and other important caregivers organizes in the latter part of the first year of life, providing emotional security, safety, and also motivation for learning. Between caregiver and the young child, attachment is bidirectional. In the event of a threat perceived by either party, the attached individual will seek proximity or other means to connect and ensure felt security. A frightened child will crawl, walk, and eventually run to the caregiver; a frightened parent, fearful for a child's safety, will also take action to ensure the child is safe or soothe the child. In the disaster literature, the physical proximity of attachment figures reduces stress

and trauma symptoms (Masten & Narayan, 2012; Masten et al., 2015).

The attachment system functions as a nurturing and safety system, but it also is strongly related to learning and exploration. A young child who feels secure is more likely to explore, play, and learn and often takes observable joy in sharing accomplishments and interacting with the attachment figure. The attachment system is linked with the mastery motivation system, discussed in the next section.

Responsive and sensitive caregiving predicts secure attachment relationships that are then carried forward into relationships with teachers, friends, or romantic partners that play helpful roles later in a person's life (Sroufe et al., 2005; Thompson, 2000). At the same time, high-quality parenting of this kind serves the immediate function of co-regulation so that children who do not yet have independent self-regulation skills to modulate arousal, emotion, or behavior have an "external" regulator at hand. Thus, good parenting also would be expected to relate to the development of self-regulation, another adaptive system implicated in research on resilience.

Parents and other caregivers serve many other functions as promoters and protectors of development (Masten 2014b; Sroufe et al., 2005). Parents function as teachers of language, life skills, and culture, and they also protect children from immediate and anticipated dangers, seek medical attention for them, and soothe their anxieties, among many other functions. Given these many roles for development in normative and dangerous situations, a capable parent/caregiver is central to healthy development and resilience. Not surprisingly, the greatest threats to the early well-being and development of a child occur when the primary caregiver is lost, disabled, or unable to serve these roles, such as when a parent is killed or neglectful. In disasters or war, when children lose or are separated from caregivers, restoring contact or functions of this system is viewed as an emergency (Masten & Narayan, 2012).

Even worse is the situation when the caregiver her- or himself poses threats to the child, when a parent is the source of maltreatment or danger. This situation can pose double jeopardy to a child who faces adversity without the protection of a fundamental adaptive system in the form of an attached and capable caregiver. Nonetheless, even in the context of maltreatment, at least one good relationship with a caregiver shows protective effects on child function and development (Alink, Cicchetti, Kim, & Rogosch, 2009; Collishaw et al., 2007; Egeland, Carlson, & Sroufe, 1993; McGloin & Widom, 2001).

Given the salience of secure attachment relationships and the effective parenting that often accompanies these relationships, it is not surprising to find that interventions for high-risk children focused on restoring, improving, or otherwise bolstering the functions and quality of parenting have been successful. Interventions to improve parenting and foster care, for example, have shown efficacy in controlled experiments for promoting better outcomes in children at risk for behavior and emotional problems (e.g., Patterson et al., 2010; Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011; Toth & Manley, 2011).

Mastery Motivation and Self-Efficacy

A powerful reward system for adaptation and learning, often described as "mastery motivation," has been linked to both competence and resilience in development (Masten, 2014b; Masten et al., 1995). People get feelings of satisfaction and pleasure from perceptions of their own agency and accomplishments, evident from an early age. Toddlers newly able to walk or to run take great delight in what they can do. Robert White described this motivation for agency as "effectance" and experience of satisfaction that accompanied perceived effectiveness in the environment as "efficacy." White (1959) argued in a classic paper on this powerful biological system was naturally selected because of its value for adapting successfully. Other psychologists and developmental scientists have studied the apparent motivation for learning and adapting in psychological concepts of "self-efficacy" (Bandura, 1997) or "intrinsic motivation" (Ryan & Deci, 2000).

Individual children and adults who score high on mastery motivation measures or self-efficacy tend to respond to challenges or failures by persisting or trying again rather than giving up (Bandura, 1997). Hauser, Allen, and Golden (2006), in their book on teens who succeeded in the years following psychiatric hospitalization, noted the importance of "agency and the quest for mastery" in the youth showing a resilient pathway. Laub and Sampson (2003) similarly were struck in their follow-up research by the role of agency and satisfaction in the lives of the men from the famous longitudinal study of delinquency by Sheldon and Eleanor Glueck (1950) who were able to desist from a life of crime.

Parents and teachers often reinforce this system by providing opportunities for children to experience pleasure in their own accomplishments (Masten, 2014b). They break down learning and other challenges into manageable steps and encourage children to try on their own so that children get a sense of accomplishment and develop a can-do attitude toward challenges.

This system has been relatively neglected compared to some of the other prominent adaptive systems associated with resilience, yet it seems likely that many of the intervention programs that promote competence in parents or children are engaging this system and aligning with the natural reinforcement and pleasure that humans gain from attempting and succeeding in something challenging but doable.

Intelligence and Problem-Solving Capabilities

Since the earliest research on resilience, the capacity for problem-solving by children (or adults) also has been identified as a key promotive and protective factor for adaptive function and development, in both low- and high-risk situations (Luthar, 2006; Masten, Burt, et al., 2006). Intelligence tests were developed to predict adaptive success, particularly in a school context, so this finding also was not surprising (Masten, 2014b). Classic studies of resilience over the years have found that cognitive skills or assessed intellectual abilities forecast better adaptation among children from high-risk backgrounds, particularly in regard to better grades and fewer behavior problems (e.g., Loësel & Farrington, 2012; Masten & Tellegen, 2012; Werner & Smith, 1992, 2001). Good intellectual function appears to afford protection for children at risk for conduct problems, possibly through multiple pathways, including school success or engagement, better planning or self-regulation skills, and greater likelihood of affiliating with prosocial rather than deviant peers. Additional pathways arise from correlated promotive or protective factors that often accompany good cognitive functioning, including competent parents and socioeconomic advantages; children with good cognitive skills are more likely to have competent families, live in resource rich and safer neighborhoods, and attend better schools.

Highly aversive environments for child development may impair cognitive development through multiple pathways, beginning prenatally. What some investigators describe as "toxic stress" can undermine brain development and the potential of a child for resilience (Shonkoff, 2011). Better cognitive skills may well reflect better nutrition, health care, parenting, and opportunities to learn, all potentially mediated by healthier brain development and the development of specific cognitive and learning skills, including various aspects of memory and cognitive control. Good cognitive function and development in a context of very high risk may be an indication that multiple aspects of child development have been protected despite adverse childhood experiences.

Recent research on cognitive development and its role in resilience has focused particularly on executive function and other self-regulation skills, discussed in the next section, as well as the role of parent-child interaction and quality of early childhood education for the development of good cognitive and self-regulation skills and school readiness (Masten, 2014b). Interventions to promote competence and resilience in young children have targeted executive functions and early literacy or numeracy (Blair & Raver, 2012; Diamond & Lee, 2011; Zelazo & Carlson, 2012).

Self-Regulation

Resilience studies often report that more adaptive children and youth from high-risk or adverse backgrounds have better self-regulation skills compared to less successful peers (Zelazo & Carlson, 2012; Masten, 2014b). Self-regulation of attention, emotion, cognition, and action is associated both with current and future competence in achieving developmental tasks and also in responding effectively to adversity (S. M. Carlson, Zelazo, & Faja, 2013; Duckworth, 2011; Masten & Coatsworth, 1998; Rothbart, 2011). Research on self-regulation is burgeoning, although the ideas linking self-control to adaptive behavior date back more than a century to concepts of the ego in psychoanalytic theory (Masten, 2014b). The multifaceted job of the ego in this theory was to regulate internal experiences of anxiety and pleasure while ensuring that external adaptation to the environment (including the rule for social conduct) was appropriate.

Over the past decade, research on executive function (EF) skills has expanded rapidly, including basic investigations and intervention research (Zelazo & Carlson, 2012). What were originally developed as laboratory tests and methods to assess or boost EF skills have moved into classrooms, homes, and even emergency shelters for homeless families in research aimed at understanding nature and roles of these skills in high-risk populations (Masten et al., 2014; Zelazo & Carlson, 2012). Interventions to promote EF skills through teacher, parent, or child training show promise as strategies for promoting resilience among high-risk children.

Meaning-Making

Human capacity for imbuing life with meaning has been implicated in autobiographies on resilience and also in empirical studies. *Man's Search for Meaning,* Viktor Frankl's (1959/2006) account of survival in a concentration

camp during World War II, provides one of the most compelling accounts of human capacity for finding beauty and meaning in the midst of great suffering. Generations of readers, including school children the world over, have been moved by Anne Frank's diary, another classic example of human ability to construct meaning in a context of great adversity and the comfort that such beliefs can hold. The act of "telling the story" or constructing a narrative may be an important form of meaning-making in action for survivors of extraordinary trauma. A recent example is provided by Elizabeth Smart's 2013 book about her life in captivity after she was kidnapped, where she tells her story of anguish, faith, and survival (Smart & Stewart, 2013). In the book, Smart described how her faith in her family's love and her religion sustained her hope in the face of ongoing imprisonment, rape, and hunger.

Religions, and associated spiritual faith of individuals following a religious system, reflect shared systems of beliefs about the meaning of life, among many other protective practices and beliefs offered by cultural systems handed down across generations (E. Crawford, Wright, & Masten, 2006). Older youth and adults in resilience studies report that their spiritual faith and beliefs that life has purpose sustained them during period of great adversity or that a religious conversion marked a turning point in their lives (e.g., Elder & Conger, 2000; Werner & Smith, 1992, 2001).

Although religious beliefs and practices can apparently serve a protective role, religion also can lead to extremism and participation in violence (E. Crawford et al., 2006). Similarly, gang leaders and war leaders in political conflicts can provide meaning for life and may recruit young people, particularly adolescents, by exploiting the need for meaning in a context of despair and conflict (Masten, 2014b). Meaning-making, like other fundamental human adaptive processes, can be directed toward goals that other people would not view as evidence of resilience but rather as destructive or immoral. Findings in research on voluntary youth participation in political violence (see Barber, 2009, 2013) indicate that marginalized young people, otherwise hopeless or oppressed, may find a sense of purpose and feelings of mastery through their active participation in political conflicts, including acts of violence. One of the most provocative issues in contemporary resilience science, as well as for societies in search of peace, is the co-option of such adaptive systems for antisocial or violent purposes.

The concept of meaning making is complex, and the empirical literature on processes that may be involved lags behind the conceptual literature (Park, 2010). Moreover, little data on young people is available. In the theoretical literature focused on adults, a person's beliefs, goals, subjective sense of purpose, and motivation have been conceptualized as key elements of a global sense of meaning (Park, 2010). Even in the adult literature, it is not clear whether preexisting meaning, searching for meaning, or finding meaning in relation to a traumatic experience is important and how (Bonanno, Westphal, & Mancini, 2011).

One of the rare domains of research focused on meaning making in youth has investigated meaning in relation to identity development. McLean and Pratt (2006), for example, studied identity development and turning points in the transition years from adolescence into early adulthood. Their study spanned ages 17 to 23, including measures of identity status and optimism along with writing a narrative about important transitions or changes in life, called a "turning point narrative." These narratives were analyzed for meaning making through a qualitative coding strategy, with the authors concluding that their results corroborated other evidence that "the redemptive story sequence is associated with meaning. . . . The management of difficult life events by using meaning-making processes to find the good within the bad is important to the development of a healthy narrative identity" (p. 721). Redemptive meaning refers to finding meaning in suffering or adversity. McLean and Pratt also found that general optimism was associated with more mature narratives on meaning.

Narrative identity is a research domain focused on the processes and adaptive significance of observations that people construct narratives or stories about their lives that provide a sense of coherence and identity (McAdams & McLean, 2013). A salient theme in these narratives is what McAdams, McLean, and their colleagues refer to as "redemptive sequences," where a negative experience leads to some kind of positive outcome. Investigators of narrative identity often code constructs such as agency and meaning making in their qualitative analysis of narratives that have played a salient role in accounts and research on resilience. McAdams and McLean (2013) also noted the influence of culture on the personal narratives of young people.

Positive mood or subjective well-being has been linked to perceived meaning in life in the studies of narrative identity in youth (McAdams & McLean, 2013) as well as in adult research on meaning in life (King, Hicks, Krull, & Del Gaiso, 2006). The direction of the causal influence is not clear yet. In numerous accounts of resilience, beliefs that life has meaning are strongly associated with positive perspectives on the self and future.

Research on narratives about the self includes studies of neural processes that may be involved in constructing these narratives and also intervention studies. In a paper

on brains creating stories of selves, D'Argembeau and colleagues (2014) used functional magnetic resonance imaging (fMRI) to study neural processes during tasks of autobiographical remembering. Their results are consistent with the idea that there are individual differences in which aspects of neural function are engaged during personal narratives, with differences in self-reflectiveness playing a role. Their findings suggest possible neural processes linked to meaning making in the context of autobiographical memory.

Finally, it is interesting to note that some evidence-based interventions for youth who have experienced trauma combine a sharing of narrative with desensitization techniques. Narrative exposure therapy (NET) and the child version of this method (KIDNET) involve symbolic and narrative accounts of the life story combined with exposure techniques of desensitization. For example, using a rope to represent the life course, rocks (bad experiences) and flowers (good experiences) are laid out and gradually discussed. Narrative exposure therapy has been effective in controlled trials with recovering child soldiers (Ertl, Pfeiffer, Schauer, Elbert, & Neuner, 2011) and child survivors of disaster (Catani et al., 2009). This approach appears to involve "remaking" of personal narrative. It is conceivable that telling one's life story in a book, art, or film about a traumatic experience may have similar effects on trauma symptoms and/or well-being.

Positive Perspectives on the Self and the Future

Survivors of adversity and better-adapting subgroups in studies of resilience frequently report a positive outlook on self, life, and/or the future. These accounts often are retrospective, so it is difficult to know whether overcoming adversity or surviving led to positive feelings and beliefs or whether optimism and hope played a causal role in adaptation or recovery. Longitudinal studies of resilience also suggest that optimism and positive outlooks on life and the future at least accompany resilience, if they do not directly contribute to it (e.g., Werner & Smith, 1992, 2001).

Valerie Maholmes published a book in 2014 on fostering resilience in children and families in poverty subtitled: *Why Hope Still Matters*. In the book, she argues that hope is the "essential mindset" that makes it possible for individuals to show resilience in the face of the adversities associated with poverty. Hope, in Maholmes's view, motivates efforts to overcome adversity and strive for a better future.

In the view of Snyder and colleagues (1997), hope is a complex construct combining cognitive and motivational aspects. They created the Children's Hope Scale to measure this construct. In their view, hope is grounded in goals and agency, such that young people with higher hope scores would be expected to have conscious goals, perceive multiple ways to reach to their goals, and be motivated to work and persist in achieving these goals. To date there is very little longitudinal data directly testing the idea that hope or optimism functions directly as a moderator or promotive factor in resilience. However, in a longitudinal study of students age 10 to 18 by Valle, Huebner, and Suildo (2006), hope scores on the Snyder measure showed moderate stability over time and predicted life satisfaction and internalizing symptoms (controlling for starting levels of life satisfaction and symptoms). There also was an interaction of hope with stressful life events. These findings are consistent with the possibility that hope has promotive and protective roles in the context of negative life experiences, although there is a clear need for additional research with more independent assessment of hope, symptoms, life satisfaction, and life events, moving beyond self-reports.

Positive ideas and beliefs about self and future are often linked to competence, as noted in many reviews of both competence and resilience (e.g., Kirschman, Johnson, Bender, & Roberts, 2009; Luthar, 2006; Masten & Coatsworth, 1998). More research is needed on the processes that may underlie these associations. Additionally, it is interesting to note that positive affect, subjective well-being, and feelings of mastery or achievement are associated with resilience, given that several of the major adaptive systems purported to play a role in adaptive function and development have been linked to positive emotions and related neural reward systems. These systems include attachment, mastery motivation, and meaning-making. Reward systems are discussed further in the section on neurobiological processes.

CHILD-IN-CONTEXT RESILIENCE PROCESSES

In relational developmental systems theory, many aspects of the social context play crucial roles in the interactions that shape development. Resilience science long has emphasized the role of multiple interconnected systems in shaping adaptive capacity. However, during the past decade, research on social systems in resilience has surged, particularly in regard to family and cultural processes. In this section, we highlight advances in research on resilience focused on social contexts, with a particular emphasis on family, school, and cultural systems, where research has been growing.

Family Systems

Although resilience has been studied at the level of the family for decades, theory and research on family resilience has not been well integrated with the literature on individual child resilience (Masten & Monn, 2015). This state of affairs is somewhat surprising, given that the study of individual and family resilience share many roots, including general systems theory (von Bertalanffy, 1968). One explanation may be that, until recently, work in family resilience focused more on family therapy and practice; family resilience theory has distinct roots in family systems theory and therapy (Goldenberg & Goldenberg, 2013; Nichols, 2013; Small & Memmo, 2004; Walsh, 2006).

In research on individual child resilience, the family always was viewed as a key promoter and protector of development. In the field of family resilience, the focus is shifted to the adaptation of the family as a unit, with challenges that threaten family functions and protective processes that sustain family resilience or facilitate family recovery to full adaptive function (Masten & Monn, 2015; Walsh, 2011). Analogous to the two components for defining resilience in an individual, family resilience can be defined on the basis of family adaptation quality or success and stress or challenges to the family (Patterson, 2002). Proponents of family resilience as a concept highlighted family strengths and protective processes in their theories and practice to help families address or recover from major family stressors, including loss, marital conflict, maltreatment, economic crisis, and divorce (Nichols, 2013; Walsh, 2006, 2011).

Families also develop over time; face changing developmental tasks as they form, change, or dissolve; and follow varying pathways of adaptive function (Hawley & DeHaan, 1996; Masten & Monn, 2015). How well a family is doing in the developmental tasks defined at a family level can have profound consequences for children growing up in that family. The resilience of children often depends on the physical and emotional nurturance of their families as well socialization from the family; if the whole family system is stressed, then the adaptive capacity for a child in that family may well be affected.

From a child perspective, families serve as promoters and protectors of development. Families provide emotional security and a sense of belonging, which in turn support learning, exploration, self-efficacy, and social development in many different ways, according to both developmental theory (Bandura, 1997; Bowlby, 1969/1982; Cassidy & Shaver, 2008) and family theory (Goldenberg & Goldenberg, 2013; Walsh, 2006, 2011). Families nurture brain development, language and other cognitive skills, self-regulation skills, and also teach their children about their culture, all of which play key roles in the growing resilience of children throughout the course of childhood (Masten, 2014b).

Many of the most dangerous hazards faced by children arise in the family, when a parent is abusive or neglectful, or unfold when the family is unable to protect their children due to death, injury, health problems, separation, or extreme poverty (Cicchetti, 2013; Dubowitz & Poole, 2012; Masten et al., 2015). Family function in crucial family roles mediates many kinds of threats and also moderates (exacerbates or buffers) child experiences in adversity. The Family Stress Model developed by Conger and colleagues (Conger & Elder, 1994; Conger, Reuter, & Conger, 2000) and supported by their empirical work described how economic recessions affect family processes, cascading to influence how children or adolescents fare. Parenting effectiveness can be undermined by depression or by catastrophes affecting the family, such as job loss or a natural disaster that destroys the home or war that leads to forced migration (Masten, 2014b; Masten & Monn, 2015). Recent research also suggests that allostatic load in families can spread to other members of the family, as chronic stress takes a toll both on individuals and on the function of the family as a whole (Repetti, Robles, & Reynolds, 2011).

Nonetheless, evidence continues to accumulate that, in times of crisis, an effective parent can mitigate the impact of family illness or economic and other disasters on child function and development (Masten & Monn, 2015; Walsh, 2013). Intervention research that aims to support parents or families in their family roles provides strong evidence that good parenting matters and also that intervention effects can spread to affect other family members (e.g., Fisher, Gunnar, Dozier, Bruce, & Pears, 2006; Patterson et al., 2010; Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011).

One of the ways that families work to mitigate stress is by maintaining family routines and regulatory roles, even in times of turbulence or after disaster (Fiese, 2006; Masten & Monn, 2015; Walsh, 2006). Family routines of everyday life, such as family meals or bedtime rituals, can be reassuring or calming to children. In contrast, chaotic family organization with little or no routine is viewed as a marker of family dysfunction that is highly stressful for children (Evans & Wachs, 2009).

In multiple respects, families can function as an external regulatory system until children develop their own self-regulatory capacity for handling challenges (Masten & Monn, 2015). Beeghly and Tronick (2011; Tronick &

Beeghly, 2011) described how coregulation processes of interaction in infancy shape the development of child self-regulation. There is growing interest in capturing these coregulation processes in research on the family processes associated with the development of competence and resilience in adversity (Herbers, Cutuli, Supkoff, Narayan, & Masten, 2014).

Families also transmit cultural practices and traditions that can promote competence and resilience in their children in multiple ways (Harkness & Super, 2012; Masten & Monn, 2015; Ungar, 2012; Ungar, Ghazinour, & Richter, 2013). These are discussed further in the subsequent section on cultural systems.

As the role of families in child resilience grows, there is increasing appreciation of the idea that communities and societies can support family resilience in order to promote or protect the well-being of children at risk of harm. Families can be supported in their role as nurturers of child resilience and moderators of child stress. In the disaster field, for example, there is widespread recognition that family resilience and child resilience are linked, and disaster preparedness and response have changed as a result of this perspective (Masten et al., 2015). Efforts by communities or societies to support child resilience through family-or community-based efforts also underscore the importance of resilience in larger social systems for both family and child resilience (Becvar, 2013; Conger & Elder, 1994; Masten & Narayan, 2012; Norris, Stevens, Pefefferbaum, Wyche, & Pfefferbaum, 2008; Walsh, 2006).

The Special Roles of Schools in Child Resilience

In most societies of the world, education systems play an enormous role in child development. School is the most organized system outside the family where children spend large amounts of their time (Eccles & Roeser, 2012). It is not surprising, therefore, that the school context holds great interest in resilience science.

Schools have multiple roles in nurturing resilience (Masten, 2014b). Schools are charged with the development of competence as defined by the community and society supporting the school. Through formal education, children learn and hone many of the psychological skills that will foster resilience later in development, including self-control and problem-solving skills. They acquire knowledge of information and values important for life in their community or culture, along with reading and mathematical skills. Schools can provide positive adult role models, routines, food, health care, opportunities to develop a talent, and other important resources or interactions missing from the lives of some children.

Effective schools, classrooms, and teachers have qualities similar to effective parents or families. These include a positive and supportive atmosphere, rules and structure, high expectations, and strong leadership (Bandura, 1997; Cohen, 2013; Doll, 2013; Doll, LeClair, & Kurien, 2009; National Research Council and Institute of Medicine, 2004; Rutter & Maughan, 2002). Schools also provide opportunities for children to experience mastery through guided and scaffolded steps as well as opportunities for relationships with competent adults outside the family.

Children spend so much time in school that numerous intervention programs have been designed for implementation in a school context or through after-school programs. One example is the Life Skills Training program developed by Botvin and colleagues (Botvin & Griffin, 2004; Botvin & Tortu, 1988), a universal school-based intervention designed to prevent substance abuse, with a strong emphasis on building social competence along with specific skills and attitudes for resisting drug use. The Seattle Social Development Project is another school-based intervention with good evidence of efficacy for promoting achievement and reducing risks of antisocial behaviors, based on fostering positive processes of school engagement and relationships (e.g., Hawkins, Kosterman, Catalano, Hill, & Abbott, 2005). Similarly, "Check and Connect," another efficacious program developed by Christenson and colleagues (Anderson, Christenson, Sinclair, & Lehr, 2004; Christenson et al., 2008) successfully has reduced truancy and school dropout by building school engagement through positive relationships. Recent meta-analyses also suggest that after-school and summer programs are effective, particularly for high-risk children (Durlak et al., 2010; Lauer et al., 2006).

There also is considerable research focused on preparing children to be more effective in school through preschool education and prevention programs. Head Start REDI (research based and developmentally informed) was designed to boost the effectiveness of Head Start programs by enhancing the curriculum, teacher training, and materials for families. Results indicate that this program is effective in promoting better social and emotional function as well as academic skills in high-risk preschoolers (Bierman, Domitrovich, et al., 2008; Bierman, Nix Greenberg, Blair, & Domitrovich, 2008). The Chicago School Readiness Project developed by Raver and colleagues (2011) for Head Start classrooms also showed efficacy in a randomized controlled trial, with a specific focus on targeting self-regulation skills as a strategy for improving

school readiness. This intervention is a successful example of recent efforts to promote resilience by improving self-regulation skills, particularly during developmental windows of opportunity, including the preschool years (Diamond & Lee, 2011; Zelazo & Carlson, 2012). The preschool years appear to be a developmental window when there is considerable brain plasticity for acquiring and improving self-regulation capabilities that provide a foundation for learning in school.

Schools routinely function to nurture human capital and provide resilience-building resources and opportunities for children from typical and disadvantaged backgrounds. However, schools also serve as a powerful symbol of recovery in the aftermath of disasters (American Psychological Association, 2010; Masten & Narayan, 2012; Masten et al., 2015). Reestablishing the routine of school for children is now widely recommended as a crucial restorative step after disasters, symbolizing that recovery is under way.

Finally, it should be noted that schools are a major "crossroads" where many important systems of child development intersect and interact, including society, community, culture, family, peers, and individuals. In addition to multiple forms of learning and socialization, many processes of acculturation also occur in the school context. Thus, schools can influence the processes that contribute to peace or conflict among cultures and peoples (Leckman, Panter-Brick, & Salah, 2014) as well as the future economic viability of a society (Lundberg & Wuemrli, 2012). Such macro-level processes in turn can alter the future resilience of children and families.

Social Networks and Peers

Play, social interaction, and friendships with peers are universal contexts of child development, and social competence with peers is widely recognized as a fundamental developmental task domain beginning in childhood (Hartup, 1996; Hartup & Stevens, 1997; Ladd, 2005; Masten & Coatsworth, 1998). Positive relationships of children with their parents forecast better peer relationships. Once children go to school, their relationships with teachers also are associated with more positive peer relations (Bierman, 2011; Hart, 2012). Interventions at school have successfully targeted peer ecology and interactions, for example, to enhance social-emotional skills (e.g., Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011) or reduce intergroup conflict (Beelmann & Heinemann, 2014).

Despite the salience of the peer context in development, there has not been much focus on the potential protective influence of peer relationships in the resilience literature. One exception can be found in the literature on antisocial behavior, where studies show a positive role of peers among high-risk children and youth with respect to delinquent behavior and violence. Having a nondeviant good friend or peer group has shown protective effects (Lösel & Farrington, 2012). Similarly, there is some evidence that high-risk adolescents who report positive peer support have better academic achievement. Gutman, Sameroff, and Eccles (2002) found that peer support moderated risk for math achievement among African-American seventh-grade students, with a significant interaction effect suggesting that peer social and academic support had a protective role at high levels of cumulative risk.

Peers also play an important role in the lives of immigrant youth in the classroom. Motti-Stefanidi (2014) and her colleagues have studied changes in peer acceptance in Greek classrooms with immigrant youth, observing that intergroup contact appears to improve peer acceptance, consistent with bidirectional acculturation effects.

Nonetheless, there continues to be a paucity of research on peer roles in resilience, which is surprising, given the large literature on peer relations in developmental science. Peers appear to be studied more often as risk factors or accelerators of risky behaviors than they are studied as protective influences (Dishion & Tipsord, 2011; Steinberg, 2008). Yet, as Dishion and Tipsord (2011) noted, there is no reason to expect that "peer contagion" or similar processes by which peers influence development would only be negative. Although there is evidence of positive roles of peers in the context of risk or adversity, the role of peer systems in resilience, either at a dyadic or larger group level, needs further study.

Cultural Systems

Over the past decade, research on resilience grounded in cultural context expanded rapidly, after decades of relative neglect (Masten, 2014a, 2014b; Ungar, 2012; Ungar et al., 2013; Wachs & Rahmann, 2013). There was more research on resilience in diverse cultures as well as efforts to understand the roles of cultural processes in resilience. The Resilience Research Centre in Halifax, Nova Scotia (see resilienceresearch.org), led two major programs to foster cultural perspectives on resilience in multiple countries and cultural contexts. A multinational team developed a new measure of youth resilience and initiated a study of about 1,500 youth across five continents, using a combination of quantitative and qualitative methods (Ungar, 2008; Ungar, 2012; Ungar & Liebenberg, 2005). This body of work has indicated common and unique promotive/protective

processes in different cultures. Common protective influences reported in many cultures include relationships (good parenting, mentoring), cultural belonging (grounded in cultural traditions), and individual characteristics, such as problem-solving or self-efficacy. As part of the Resilience Pathways Project, Theron, Theron, and Malindi (2013) contributed qualitative descriptions of resilience in Basotho youth in South Africa; their work illustrates the importance of *Botho* in this culture, a philosophy of life akin to *Ubunto* in other African cultures, where raising children is a collective enterprise and great value is placed on human interdependence, harmony, spirituality, and humanitarian practices. Youth identified as showing resilience by adults in the Basotho community were described as flexible, determined, skilled as communicators, connected to the community, respectful of community values, and accepting of things they could not control, among other qualities.

Books and articles focused on risk and resilience in low-and middle-income countries have proliferated over the past decade. These included a volume on early childhood development sponsored by UNICEF in collaboration with the Society for Research in Child Development (Britto, Engle, & Super, 2013) and another focused on risk and resilience in the face of the international economic crisis that was sponsored by the World Bank (Lundberg & Wuermli, 2012).

Research on immigrant youth and processes of acculturation also expanded rapidly at the same time. Many books and articles on immigrant youth have focused on resilience, perhaps because this is an issue of global significance for many receiving nations, with many societies depending on the well-being and success of immigrants (e.g., Masten, Liebkind, & Hernandez, 2012; Motti-Stefanidi, 2014). *Realizing the Potential of Immigrant Youth* (Masten et al., 2012) is an edited volume summarizing recent research in this area.

Multicultural societies have a vested interest in preventive and protective interventions to reduce the impact of discrimination on young people and its corrosive collective effect on society itself. There is growing research on strategies for parents, schools, and communities that reduce cultural and intergroup conflicts and foster resilience of young people in the context of discrimination (Evans et al., 2012; Fisher, Busch-Rossnagel, Jopp, & Brown, 2012; Hughes et al., 2006; Masten et al., 2012; Serafica & Vargas, 2006; Ungar et al., 2013; Ungar et al., 2013). Sirin and Gupta (2012) described the resilience of Muslim-American youth in the aftermath of 9/11, a challenging time for multicultural youth of Muslim heritage to navigate, documenting the success of young people who manage to reside happily "on the hyphen." Motti-Stefanidi and her colleagues, as noted, have studied risk and resilience among immigrant youth in Greece, which has received large numbers of immigrants from the former Soviet Union and neighboring Albania. Using hierarchical linear modeling of longitudinal data, their studies have illustrated changes in self-perceptions and peer interactions over time and the complex ways that classroom context, culture, and individual differences may influence change over time as development and acculturation proceed in concert (Motti-Stefanidi, 2014).

Research on resilience in diverse cultures can be a highly challenging endeavor. Panter-Brick, Eggerman, and colleagues (Eggerman & Panter-Brick, 2010; Panter-Brick, Goodman, Tol, & Eggerman, 2011) have studied resilience in the Afghan people as they suffered through years of political conflict. Despite considerable danger and instability, this team was able to carry out a large study of adolescents and their families, following subgroups over time to gain quantitative data along with rich ethnographic information. Their work emphasized the importance of Afghan values for their resilience, including faith, family unity, service, effort, morals, and honor.

Similarly challenging studies of resilience in wars and disasters have been undertaken around the world over the past decade (Masten, 2014a; Masten et al., 2015). These include studies of recovering child soldiers from Sierra Leone (Betancourt et al., 2010, 2013), Palestinian youth engaged in the Intifada (Barber, 2008), and disaster survivors after the 2004 tsunami in the Indian Ocean (e.g., Catani et al., 2009), Hurricane Katrina and the subsequent Gulf oil spill (Osofsky& Ososfky, 2013), the Sichuan earthquake in China (e.g., Luo et al., 2012), and studies under way of the triple disaster in Japan in 2011 (earthquake, tsunami, Fukushima meltdown (Latif, Yeatermeyer, Horne, & Beriwal, in press).

Religions are one form of cultural tradition that appears to engage many of the same adaptive systems identified as protective influences in studies of individual resilience (E. Crawford et al., 2006; Masten, 2014b). These systems include relationships, with both spiritual figures and religious leaders and with counselors, rituals to ease the pain of loss and other suffering, belief systems that give people a sense of higher purpose and meaning, and customs of social and material support for members of the religious community and the less fortunate. Religions also codify rules for living and rearing children, passing on values that their members believe will result in good behavior and success in life as defined by the religion.

Yet, like other adaptive systems, cultural systems, including religious ideas and practices, can be harmful or

dangerous to children and child development, leading to self-destruction or violence, for example. One of the great global challenges facing the world today is addressing the violence to and by children under the banner of radical religious factions or tribal affiliations. Global concerns about the numbers of children affected by war and conflict are giving rise to a growing literature on peace and peacebuilding in childhood (see Leckman et al., 2014).

Other Macro-Level Systems and Resilience

Other macrosystems implicated in threatening or supporting child resilience include communities and societal policies as well as mass media and social media (Masten, 2014b). Communities, societies, and media appear to influence resilience in multiple ways, although these processes have received less attention. For example, there is convincing research on the positive effects of economic policies, such as the Earned Income Tax Credit in the United States, showing that tax policies can have measureable benefits for child development (Duncan, 2012). The roles of community preparedness and media have been extensively considered in research and evaluation studies on the impact and recovery of children and families in disasters and war (Masten et al., 2015). Resilience of immigrant youth living in countries that vary in supports and cultural acceptance of immigrants also has been studied (Fuligni & Telzer, 2012; Masten et al., 2012).

Discussion of this expanding and diverse literature is beyond the scope of this chapter. However, it is clear that there is growing interest in research pertinent to resilience that extends across system levels and increasing appreciation of the interconnectedness of resilience among interacting systems. Child resilience depends on family resilience and many other systems that support the development and protect the function of children and families at macro-levels of the socioeconomic and physical ecology. New technologies, including social media, are changing many of these systems in ways that are difficult to study. New horizons of research for resilience science continue to appear.

NEUROBIOLOGICAL PROMOTIVE AND PROTECTIVE PROCESSES

Over the past decade, research on the neurobiology of resilience, long called for and anticipated, finally began in earnest (Cicchetti, 2010, 2013; Charney, 2004; Curtis & Cicchetti, 2003; Kim-Cohen & Gold, 2009; Feder, Nestler, & Charney, 2009; Masten, 2014a, 2014b; Southwick, Litz, Charney, & Friedman, 2011). This surge, which played a central role in propagating the "fourth wave" of resilience science, resulted in large part from major advances in the tools for research at genetic and neurobiological levels of analysis, including such breakthroughs as imaging the brain in action, measuring genes and their functional status, practical measures of stress hormones and other neurobiological variables, and the statistical means to analyze enormous quantities of complex data.

Work is proceeding on multiple fronts relevant to resilience. Only a few can be highlighted here. In this section, we describe selected research on the neurobiological processes related to the psychosocial adaptive systems strongly associated with resilience (discussed earlier in this chapter), examples of genetic studies opening new horizons for resilience science, and other promising directions for multiple-levels research on resilience that incorporates biological processes.

Neurobiological Research on Adaptive Systems Implicated in Resilience

Major psychological adaptive systems associated with resilience include attachment and caregiving, problem-solving, self-regulation, and mastery motivation. Research at the neurobiological level is beginning to illuminate how these processes develop and protect human function and development.

Meaney's groundbreaking work on the biological and behavioral effects of parenting by rat mothers on their pups was already mentioned (Meaney, 2010). Similar research on the role of caregiving in the development of stress, gene expression, and resilience or vulnerability to adversity has been conducted with primates (Stevens, Leckman, Coplan, & Suomi, 2009; Suomi, 2006, 2011). Powerful cross-fostering designs in both animal models (rodents and primates) have shown the effects of parenting and attachment bonds on individual function and development and gene expression as well as the interplay of individual differences.

There is a substantial body of work on social buffering of stress in relation to the hypothalamic-pituitary-adrenocortical (HPA) axis, based on both animal and human studies (Hostinar, Sullivan, & Gunnar, 2014). In addition, research on the "biochemistry of love" by other investigators has shown how oxytocin and vasopressin contribute to processes of social affiliation and attachment behavior in animal models and in humans (Adolphs, 2009; Carter & Porges, 2013, 2014; Porges, 2011). Carter and

Porges (2013) have posited that oxytocin plays many roles in adaptation, not only including its well-known roles in birth and lactation, but also in attachment behaviors and neurogenesis. Their ideas have been explicitly tested in prairie voles, animals that show strong attachment bonds.

There also have been many advances in understanding how chronic stress affects neurocognitive development, with investigators highlighting the "toxic" effects of severe and prolonged adversity in early development (pre-and postnatal; Gunnar & Herrare, 2013; Shonkoff, 2011). Concomitantly, neurobiological research is emerging on the protective effects of interventions on brain development, theoretically mediated by altering various processes that mitigate negative effects of stress on brain development. Experimental studies of preventive interventions to provide support higher-quality caregiving, nutrition, stimulation, and other key elements of nurturing environments have shown protective effects on brain function and corresponding cognitive skills among high-risk children (e.g., Fisher, Van Ryzin, & Gunnar, 2011; Fox, Almas, Degnan, Nelson, & Zeanah, 2011; Fox, Nelson, & Zeanah, 2014; Nelson et al., 2007; Rutter, Sonuga-Barke, & Castel, 2010). Baker, Salinas, and Eslinger (2012) suggest that school is increasingly viewed as a "neurocognitive-developmental institution."

Research on the neurobiology of self-regulation processes often implicated in resilience also is burgeoning. Examples of hot areas include work on executive function and mindfulness (S. M. Carlson et al., 2013; Zelazo & Carlson, 2012; Zelazo & Lyons, 2011) and stress regulation involving processes linked to the HPA system (Feder et al., 2011; Gunnar & Herrare, 2013; Karatsoreos & McEwen, 2011, 2013; McEwen & Gianaros, 2011).

Research on reward systems linked to resilience processes such as mastery motivation also is expanding, although these systems are highly complex. Activation of the dopaminergic reward system, for example, has been linked to positive emotions and motivation associated with resilience as well as to exploratory behavior and learning (Feder, Charney, & Collins, 2011; DeYoung et al., 2011). However, reward systems also play important roles in negative adaptive behaviors, such as maladaptive drug use (Volkow et al., 2011).

Molecular Genetic and Neurobiological Processes

Empirical investigations of resilience over the past four decades have examined a wide range of psychosocial correlates and contributors to resilient functioning. In recent years, a number of scientists have urged researchers studying the determinants of resilience to incorporate molecular genetic and neurobiological measures into their investigations of the developmental pathways to resilient functioning (Charney, 2004; Cicchetti, 2010, 2013; Cicchetti and Blender, 2006; Curtis & Cicchetti, 2003; Feder, Nestler, & Charney, 2009; Masten, 2007, 2014; Sapienza & Masten, 2011).

Since the onset of the millennium, increasing research has been conducted to discover the contributions that genetics and neurobiology might make to promoting resilience in individuals experiencing severe adversity (Curtis & Cicchetti, 2003; Kim-Cohen & Gold, 2009; Masten & Obradović, 2006). This shift in research from predominantly psychosocial models to those including biological aspects of resilience was spurred by the groundbreaking research on GxE interactions conducted by Avashalom Caspi, Temi Moffitt, and their colleagues (e.g., Caspi et al., 2002, 2003).

A high percentage of GxE interaction research conducted to date has demonstrated that child maltreatment is a strong candidate environmental pathogen (Caspi, Hariri, Homes, Uher, & Moffitt, 2010; Karg, Burnmeister, Shedden, & Sen, 2011). Maltreatment is an objectively measured, well-defined stressor, and meta-analyses have shown that robust findings in GxE investigations are more likely to occur when a specific stressor is identified (Karg et al., 2011). Much of the GxE research in the past decade relevant to resilience has focused on how genes may serve as protective factors against developing psychopathology in individuals who have experienced maltreatment.

In a longitudinal investigation, Caspi et al. (2002) first documented that the association between child maltreatment and later antisocial behavior was moderated by a functional polymorphism in the promoter region of the gene encoding the monoamine oxidase A (MAOA) enzyme. Specifically, they discovered that maltreated children whose genotype conferred low levels of MAOA expression had significantly higher levels of antisocial behavior in adolescence and adulthood compared to similar-aged maltreated individuals who carried the high-activity version of the MAOA gene.

In a subsequent longitudinal study, Caspi et al. (2003) found another GxE interaction involving a functional polymorphism in the promoter region of the serotonin transporter (5-HTT) gene. Individuals who had high stressful life events and/or child maltreatment and who had one or two copies of the 5-HTTLPR "short" allele (S or SS) had more depressive symptomology, higher rates of diagnosable depression, and more suicidality than similarly stressed individuals with two copies of the 5-HTTLPR

"long allele" (LL). In both of the Caspi et al. studies (2002, 2003), genetic variation had little or no relation to the mental health outcomes in individuals who had not experienced adversity.

Since the publication of Caspi et al.'s (2002, 2003) seminal investigations, there have been numerous GxE studies indicating that genetic variants in a number of genes, including MAOA, 5-HTTLPR, corticotropin-releasing hormone receptor gene (CRHR1), the oxytocin receptor gene (OXTR), and the dopamine receptor D 4 (DRD4) gene, may confer protection against various forms of psychopathology in individuals who have experienced maltreatment or early adversity, such as institutionalization (see, e.g., Bakermans-Kranenburg & van IJzendoorn, 2008; Bradley et al., 2011; Cicchetti, Rogosch, & Oshri, 2011; Dackis, Rogosch, Oshri & Cicchetti, 2012; DeYoung, Cicchetti, & Rogosch, 2011; Gunnar et al., 2012; Hostinar, Cicchetti, & Rogosch, 2014; Kaufman et al., 2004, 2006; Polanczyk et al., 2009). However, it is important to recognize that the absence of psychopathology is conceptually distinct from competent functioning. Consequently, in order to increase the relevance of GxE research for discovering the determinants of resilience, such investigations must go beyond relying solely on the absence of psychopathology. These studies also should include measures of competence that are likely to be influenced by genotypic variation.

GxE studies have focused predominately on how genotypic variants may moderate the effects of environmental pathogens. However, genes also may moderate positive health-promoting environments (Kim-Cohen & Gold, 2009). As such, it is important to conduct GxE research in these environmental contexts. Furthermore, the effects of the interaction of genetic and environmental factors may vary depending on the stage of development (Sroufe, 2013).

One of the first published GxE studies that explicitly investigated the relationship between genetic variants and resilience was conducted by Cicchetti and Rogosch (2012). These investigators' research examined whether experiences of child maltreatment in interaction with gene variants of specified candidate genes were related to adaptive functioning. A multicomponent index of adaptive functioning was identified in the sample of maltreated and nonmaltreated school-age children from disadvantaged backgrounds. The genetic variants of HTTLPR, CRHR1, DRD4 -521 C/T,and OXTR were investigated. These candidate genes were specifically selected for their link to behaviors associated with resilience.

An adverse main effect on adaptive functioning was consistently observed for maltreatment. Although a main effect was not shown for any of the gene variants investigated, this study identified GxE interaction effects. Nonmaltreated children with the SS genotype variant of 5-HTTLPR were significantly more likely to have higher adaptive functioning while maltreated children with the same genetic variant had significantly less adaptive functioning. Analysis of the CRHR1 genotypes presented similar findings in the comparisons between children with zero, one, or two copies of the TAT haplotype. A crossover interaction presented a differential susceptibility to environmental influences interpretation (Belsky, & Pluess, 2009; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2011) for those children with zero copies of the TAT haplotype in that they exhibited better adaptation in the context of nonmaltreatment and worse adaptation with maltreatment. Analysis of the OXTR gene variants contrasting the GG with the AA or AG genotypes produced similar results, but they were only marginally significant.

Analyses of the DRD4 -521C/T single nucleotide polymorphism (SNP) revealed a different pattern. The interaction (contrasting the TT genotype group with CC or CT genotypes) suggested that for this candidate gene, variations in genotype were more important for *nonmaltreated* children. Nonmaltreated children with the TT genotype were more likely to exhibit the highest level of adaptive function. In the context of maltreatment, which had a main effect on adaptive function, genotype variation did not appear to matter.

In further analyses, Cicchetti and Rogosch (2012) examined the relation between number of maltreatment subtypes as well as specific subtypes of maltreatment in relation to DRD4 -512C/T genotype in predicting adaptive function. Maltreated children who had experienced three or four subtypes fared dramatically worse with the TT genotype, whereas nonmaltreated children with this genotype fared the best. These results are congruent with a differential susceptibility role of the TT genotype of DRD4 -521C/T in relation to environmental variations in maltreatment.

Cicchetti and Rogosch (2012) identified different gene variants as differentially important through contrasting maltreated and nonmaltreated children in relation to adaptive function. Genotype was not generally related to adaptive function unless context was taken into account. Maltreatment, in contrast, appeared to have powerful negative main effects for adaptive function.

It is important to note that despite the multidomain assessment of adaptive functioning and the large, well-defined sample of maltreated and nonmaltreated

children, a limitation of this study was its cross-sectional nature. Given that resilience is a dynamic developmental construct that is not immutable, future investigations of gene–environment interaction and resilience should have a prospective, longitudinal, and developmentally sensitive design (Luthar, 2006; Luthar et al., 2000).

It also is important to acknowledge that other biological systems are negatively impacted by abuse and neglect (Cicchetti & Toth, 2015; DeBellis, 2001, 2005). Differences in brain structure and function (Hart & Rubia, 2012; McCrory et al., 2010), stress neurobiology, (Cicchetti, Rogosch, Gunnar, & Toth, 2010; Doom & Gunnar, 2013; Heim et al., 2008; Trickett et al., 2008) and immunological processes (Danese et al., 2008; Miller et al., 2011) are not innate features of children but rather are consequences of child maltreatment.

Maltreatment experiences also may influence other developmental processes, including epigenetic processes involving the extent to which genes are expressed (Tyrka, Price, Marsit, Walters, & Carpenter, 2012); however, these effects are not examined when focusing exclusively on GxE interaction. Future investigations of molecular genetic contributions to resilience also should pay more attention to the process of development (D). These GxE, GxD, and DxExD studies could discover how a particular genotype may operate differently depending on developmental period or environmental period or environmental context (see Sroufe, 2007). Moreover, genotypic variation for genes other than those utilized in the Cicchetti and Rogosch (2012) investigation may be related to higher resilient functioning in maltreated children. Thus, broader approaches to genetic influences associated with resilience in maltreated children must occur.

Epigenetic Studies of Resilience

Epigenetic research pertinent to resilience is rapidly expanding, although it likely will take some time for this knowledge base to mature. The field of epigenetics has demonstrated that DNA is not the static entity it was once thought to be (Mill, 2011). Epigenetics is the study of heritable changes in gene function that do not alter the DNA sequence but instead provide an extra layer of transcriptional control that regulates gene activity and plays an important role in the acute regulation of genes in response to environmental changes. Research on epigenetic processes hold high promise both for basic research investigations and translational intervention research on the determinants of resilience, providing a potential mechanism by which environmental experiences (natural or in the form of intervention) may exert their impact on gene expressions that can last throughout the life span or even across generations (Lenroot & Giedd, 2008).

Epigenetic mechanisms may be a realistic target for intervention due to their reversibility (Ramchandahl, Bhattacharya, Cervoni, & Szyf, 1999). However, some epigenetic changes are long lasting across the course of development. Moreover, some of these methylation changes can be transmitted across generations (Roth, 2013). Research on early adversity, such as child abuse and neglect and living in impoverished environments, has demonstrated that there are individual differences in DNA methylation patterns. Methylation assays can be conducted genome-wide or at site-specific regions of candidate genes whose functional properties are known. For example, several investigations have used a candidate gene approach to examine the effects of child maltreatment on methylation. Epigenetic regulation is a viable candidate mechanism through which caregiving behavior, including child maltreatment, may exert long-term effects on HPA axis activity and neuronal function (Szyf & Bick, 2013). Candidate genes utilized in this regard include the serotonin transporter gene (5-HTT), the glucocorticoid receptor gene (NR3C1), and the binding protein 5 gene (FKBP5). These studies have found that child maltreatment was associated with increased methylation in both the serotonin transporter and the glucocorticoid receptor genes (see Yang et al., 2013). Increased methylation (hypermethylation) is commonly associated with decreases in gene expression. Decreased methylation (hypomethylation) is associated with increases in gene expression—often of genes that should *not* be expressing.

Epigenetic mechanisms may help to elucidate pathways of risk and resilience and illuminate how interventions work. The dynamic nature of epigenetic processes demonstrates that genetic influences on behavior are responsive to experience and the environmental surround. Protective factors in the environment may bring about alterations in gene expression and thereby set in motion a cascade of positive adaptation to stress that is promotive of resilience (Bowes & Jaffee, 2013; Masten & Cicchetti, 2010c).

Multiple-Levels in Developmental Reorganization and Plasticity

As emphasized throughout this chapter, several cogent and extensive summaries of resilience theory and research have been published that have explicated the need to examine the processes leading to resilience from multiple levels of analysis, in particular from the level of brain and neurobiological functioning (Cicchetti, 2010, 2013; Cicchetti &

Blender, 2006; Feder, Nestler, & Charney, 2009; Luthar, Cicchetti, & Becker, 2000; Masten, 2001, 2007, 2014b). Advocates of a self-organizing systems theory viewpoint of neurobiological and psychological development contend that individuals actively participate in the creation of meaning by structuring and restructuring experience through self-regulated mental activity (Cicchetti & Tucker, 1994; Mascolo, Pollack, and Fischer, 1997). Early experience and prior levels of adaptation neither doom the individual to continued maladaptive functioning nor inoculate the individual from future problems in functioning. Change takes place in a system as new needs and environmental challenges destabilize the existing organizations, necessitating the emergence of new organizations that may prove to be more adaptive than the preexisting ones in the current context. The reorganizations that occur both within and between developmental domains (e.g., between emotion and cognition) provide critical opportunities for changes in capacity for adaption, thus influencing prospects for resilience (Cicchetti & Tucker, 1994).

The reorganization that takes place is often dramatic, with observable changes in the neural substrate that are translated into changes observable at the behavioral level (Cicchetti, 2002; Curtis & Nelson, 2003). The brain can change in a number of ways, including: (a) endogenous changes that take place in the organization of the remaining intact circuits in the brain; (b) the generation of new neural circuitry; (c) dendritic outgrowth and the formation of synapses; (d) the strengthening and weakening of some neural circuits through the processes of synaptogenesis and synaptic removal, respectively; (e) the sprouting of new axons, regenerating old ones, or elaborating their dendritic surfaces; and (f) the generation of new neurons and glia to replace at least some lost neurons (Cicchetti, 2015; Kolb & Gibb, 2001). Such central nervous system changes that are the hallmarks of plasticity can occur on one or more levels of analysis, including molecular, cellular, neurochemical, and anatomical and at the level of brain systems (van Praag, Kempermann, & Gage, 2000; Nelson, 1999). Plasticity also plays a prominent role in neurodevelopmental processes (Cicchetti & Cannon, 1999; Cicchetti & Walker, 2003; Cowell, Cicchetti, Rogosch, & Toth, 2015).

Biological factors influence psychological processes; however, social and psychological experiences also exert actions on the brain by feeding back upon it to modify gene expression and brain structure, function, and organization (Cicchetti & Tucker, 1994; Eisenberg, 1995; Kandel, 1998; Kolb & Wishaw, 1998). It has also been discovered that alterations in gene expression induced by learning and through social and psychological experiences produce changes in patterns of neuronal and synaptic connections and thereby in the functioning of nerve cells (Kandel, 1998). Such neuronal and synaptic modifications not only exert a prominent role in initiating and maintaining the behavioral changes that are provoked by experience but also contribute to the biological bases of individuality, as well as to individuals being differentially affected by similar experiences, regardless of their positive or negative/adverse valence (Kandel, 1998). Because the brain is only diffusely structured by gene-driven processes and the eventual differentiation of the brain is very reactive to the individual's active coping in a particular environment, the normal, abnormal, and resilient outcomes of this developmental process should encompass a diverse range of neural, synaptic, and associative networks that are the physiological determinants of many possible individual psychological organizations (Cicchetti, 2007; Kandel, 1998).

Diversity in process and outcome are hallmarks of the developmental psychopathology perspective (Cicchetti, 1990; Cicchetti & Rogosch, 1996; Sroufe, 1989). The application of equifinality to resilience requires that researchers must understand that the maintenance or improvement in a system's function, just as is true with its breakdown, can occur in many ways, even in the face of significant adversity. In particular, because the organizational model of development that undergirds much research in developmental psychopathology and resilience takes into account environment-organism interactions and transactions, it becomes quickly apparent that a variety of developmental progressions may eventuate in maladaptive or adaptive outcomes (Luthar et al., 2000). Clearly, biological and psychosocial factors both can play a role in the pathways to diverse outcomes. Furthermore, the relative contributions of biological and psychosocial contributions to these diverging pathways will vary among individuals.

Likewise, the concept of multifinality alerts resilience researchers to the fact that individuals may begin on the same major developmental trajectory and, as a function of their subsequent "choices" or experiences, exhibit very different patterns of maladaptation or adaptation (Cicchetti & Rogosch, 1996; Sroufe, 1989; Sroufe, Egeland, & Kruetzer, 1990). Pathways of psychopathology or resilience are influenced by a complex matrix of the individual's level of biological and psychological organization, current experience, social context, timing of the adverse event(s) and experiences, and developmental history.

As the developmental process proceeds, neural plasticity appears to be guided by events that provide information to be encoded in the nervous system (Greenough, Black, &

Wallace, 1987). These experience-dependent processes involve the adaptation of the brain to information that is unique to the individual. An important central mechanism for experience-dependent development is the formation of new neural connections. Because all individuals encounter distinctive environments, each brain is modified in a singular fashion. This variability in experience-dependent plasticity is likely to emanate from existing differences between neural subsystems in rates of maturation, the extent and timing of redundant connectivity, and the presence of the neuromodulators and receptors that are critical for neural modifiability. Unlike the case with experience-expectant processes, experience-dependent processes do not take place within a stringent temporal interval because the timing or nature of experience that the individual engages or chooses cannot be entirely and dependably envisioned (Black, et al., 1998; Cicchetti, 2002).

Given that experience-dependent processes can occur throughout the life span, social interactions, behavioral interventions, and pharmacotherapy, in conjunction with individuals' self-righting tendencies, have the capacity to repair brains that are afflicted with disorders (Black et al., 1998; Cicchetti, 2002). There is growing evidence that successful intervention modifies not only maladaptive behavior but also the cellular and physiological correlates of behavior (Cicchetti, Rogosch, Toth, & Sturge-Apple, 2011; Dozier et al., 2008; Fisher, Stoolmiller, Gunnar, & Burraston, 2007; Kandel, 1998). Such interventions are critical to implement because abnormal perturbations at a particular stage of brain development may lead to the development of aberrant neural circuitry and often compound themselves into relatively enduring forms of psychopathology (Arnold, 1999; Nowakowski & Hayes, 1999).

In self-organizing brain development, some regions of the brain serve to stabilize and organize information for other areas, whereas other regions utilize experience to fine-tune their anatomy for optimal function (Singer, 1995). In this manner, individuals can benefit from the interaction of genetic constraints and environmental information to self-organize their highly complex neural systems. Thus, children manifesting resilience, who develop in a positive and adaptive ways even though they have experienced adversity, may be likely to function adaptively in a wide array of environments. Children play an active role in seeking and receiving the experiences that are developmentally appropriate for them. Through experience-dependent processes, children who function adaptively are likely to seek out experiences that serve to modify and/or protect their brain development in ways that foster future adaptive developmental outcomes and generate resilience. In effect, the individual is helping to create his or her capacity for adaptive development. At one level, different functional units of the brain may attempt to compensate for dysfunctions in another functional aspect, and at another level, the organism may seek out new experience in areas where it has strength (Black et al., 1998). Because experience-dependent plasticity is a central feature of the mammalian brain, neither early brain anomalies nor aberrant experiences should be viewed as determining the ultimate fate of the organism (Cicchetti & Tucker, 1994).

Normative Biological Processes in Resilience

The biological processes implicated in resilience and discussed briefly in this chapter are in fact normative processes. Neural plasticity, for example, is an inherent property of the central nervous system. This observation represents an interesting parallel to Masten's (2001) suggestion that resilience is common and typically emerges through the operation of ordinary human adaptational systems. Likewise, at the biological level of analysis, normative processes may mediate most pathways of resilience, as long as these systems are functioning within normal parameters. This viewpoint underscores the importance of the interaction of normative systems at all levels of analysis in the promotion of resilience.

Empirical Studies on the Biological Contributors to Resilience

In 2004, Charney proposed an integrative model of vulnerability and resilience that encompassed the neurochemical response patterns to acute stress and the neural mechanisms mediating reward, fear conditioning and extinction, and social behavior. Charney identified 11 potential neurochemical, neuropeptide, and hormonal mediators of the psychological response to extreme stress. He concluded that the neural mechanisms of reward and motivation (e.g., hedonic capacity, optimisim, and learned helpfulness), fear responsiveness (e.g., engaging in effective behaviors despite fear), and altruism were relevant to the personality/character traits associated with resilient functioning. It will be important to conduct empirical research relating the neurobiology of these systems to a multidomain assessment of resilient functioning (Masten, 2014b).

In the context of normative conditions, the connections of the medial prefrontal cortex with the amygdala are immature during childhood and become more mature during adolescence. Gee et al. (2013) found that children who

were previously institutionalized, thereby experiencing early maternal deprivation, exhibited an early emergence of mature medial prefrontal cortex connectivity and resembled the adolescent/adultlike phenotype. This pattern of connectivity, which was mediated by the cortisol hormone, may confer some degree of enhanced emotion regulation because maternally deprived children with adolescent/adultlike phenotypes manifest less anxiety than their counterparts with immature phenotypes. Gee et al. conjectured that the accelerated amygdala-prefrontal development may serve as an ontogenetic adaptation in individuals in response to early adversity.

Peterson et al. (2014) used fMRI to compare brain function during the performance of an attentional, self-regulatory task. They studied a large community sample of multigenerational families enrolled specifically to be at either high or low risk for developing major depressive disorder (MDD). The sample was comprised of individuals who were at higher or lower risk for developing MDD based on being a biological offspring of persons with MDD or a control sample of persons drawn from the community who had no discernible lifetime illness. Peterson and colleagues discovered a risk endophenotype that included greater activation of cortical attention circuits and a protective endophenotype that included a greater activation of the dorsal anterior cingulate cortex. Thus, neural systems were identified that increased the risk for depression, protected individuals from the illness, and that endured following illness onset.

Few multilevel, multidomain empirical studies of the predictors of resilient functioning have been conducted. Curtis and Cicchetti (2007) investigated whether the positive emotionality and increased emotion regulatory ability associated with resilient functioning would be related to greater left frontal electroencephalogram (EEG) activity. Hemispheric asymmetries in EEG activation index a neural system that has emotion-specific influences such that the two hemispheres of the cerebral cortex are differentially involved in emotions (Davidson, 2000). The left hemisphere has been shown to be associated with positive emotions/approach behavior, and the right hemisphere has been linked to negative emotions/withdrawal behavior. Positive emotion and good emotion regulatory abilities have consistently been associated with resilience (Bonanno et al., 2007; Masten, 1986). Thus, the potential connection of hemispheric EEG asymmetry with resilience lies in its common linkage with emotion and emotion regulation. The investigation of a neural-level phenomenon such as hemispheric EEG asymmetry in the context of resilience underscores the point that no one single characteristic will be ascendant in resilience processes of adaptation over the course of development.

EEG asymmetry across central cortical regions distinguished between children with high and low resilience manifested in adaptive functioning, such that left-hemisphere activity characterized those maltreated children who were adapting well based on a multilevel, multidomain competence composite index (e.g., effective peer relations, adapting successfully to school, low levels of depressive symptomatology, low externalizing and internalizing psychopathology). In addition, a behavioral measure of emotion regulation, based on 35 hours of observation of the children, also independently contributed to the prediction of resilience in maltreated and nonmaltreated children.

In a multilevel investigation of another sample of low-income maltreated and nonmaltreated children, resilient functioning in relation to the regulation of two stress-responsive adrenal steroid hormones, cortisol and dehydroepiandosterone (DHEA), as well as the personality constructs of ego resiliency and ego control, was examined. A composite measure of adaptive success was utilized in this study of resilience that included multidomain, multimethod, multi-informant assessments of competent peer relations, school success, and low levels of internalizing and externalizing symptomatology. Cicchetti and Rogosch (2007) found that the personality characteristics of ego resiliency and moderate ego overcontrol, and the adrenal steroid hormones associated with stress (i.e., cortisol and DHEA) made independent and noninteractive contributions to resilience. Although operating at different levels of analysis, behavioral/psychological and biological factors each made unique contributions to resilience.

Cicchetti and Rogosch (2007) also discovered that higher morning levels of cortisol were related to lower levels of resilience evident in the functioning for the nonmaltreated children. High basal cortisol may indicate that nonmaltreated children are experiencing greater stress exposure and consequently are constrained in their ability to adapt competently. Physically abused children with high morning cortisol had significantly better functioning than physically abused children with lower levels of morning cortisol. The positive role of increased cortisol for physically abused children is divergent from the more general pattern of higher cortisol being related to lower competence in functioning that was discovered in the nonmaltreated and sexually abused children in this investigation.

Prior research on neuroendrocrine regulation has indicated that physically abused children generally exhibit

lower levels of morning cortisol secretion (Cicchetti & Rogosch, 2001a), especially those children who experience physical abuse early in life (Cicchetti, Rogosch, Gunnar, & Toth, 2010; Cicchetti, Rogosch, & Oshri, 2011). It may be that the subgroup of physically abused children who had elevated cortisol to cope with stressful vicissitudes in their lives were demonstrating a greater capacity for positive adaptation that signifies resilience in progress. In contrast, the larger subgroup of physically abused children with lower levels of morning cortisol may have developed hypocortisolism over time in response to chronic stress exposure. As a result, these children may have a diminished capacity to mobilize the HPA axis to promote positive adaptation under conditions of ongoing stress. Finally, maltreated children with good adaptive functioning exhibited a unique atypical pattern of a relative DHEA diurnal increase. Maltreated children who have evinced elevated DHEA over the course of the day may be better equipped to cope with the demands of high chronic exposure to stress and to adapt competently. In contrast, the nonmaltreated children who functioned well did not exhibit the pattern of diurnal DHEA increase; instead, they displayed the lowest levels of DHEA across the day. DHEA has been shown to generate effects that are associated with resilience. For example, DHEA counteracts the harmful effects of hypercortisolism, thereby potentially conferring neuroprotection to the brain (Charney, 2004).

The experience of childhood maltreatment has been shown to be related to changes in the structure of the brain (Hart & Rubia, 2012; McCrory et al., 2010; Teicher, Tomoda, & Andersen, 2006). Little is known about the neurobiological contributors that protect against the negative sequelae that commonly occur with child maltreatment (Cicchett & Toth, 2015). Van der Werff et al. (2013) obtained resting-state fMRI scans in a sample of 33 adults. Twenty-two of these individuals had been maltreated, and the remaining 11 served as controls. Eleven of the previously maltreated adults formed the resilient group, whereas the other maltreated individuals form the vulnerable group. Van der Werff and colleagues sought to identify resting-state functional connectivity patterns specific for resilience to the effects of child maltreatment. Resting-state functional connectivity patterns were discovered that were specific for individuals in the resilient groups. The regions of interest that were implicated were related functionally to declarative memory and the processing of emotional stimuli.

Sheinkopf et al. (2007) examined the predictors of better outcomes in children with prenatal cocaine exposure (CE). A 15-item risk index of prenatal and postnatal experiences was developed for children with and without CE. Preschool cognitive outcomes, problem behaviors, and adaptive behaviors were assessed. Vagal tone (VT) was assessed on two occasions—at an infant exam at 1 month and toy exploration at 36 months. Children were classified as having consistently high, consistently low, or fluctuating VT. Moreover, children were also classified as high versus low risk. High-risk children were found to have lower IQ scores, more problem behaviors, and lower adaptive behavior ratings than low-risk children. The investigators also conducted a risk-by-VT stability interaction that indicated that the high-risk children who had stable low VT had higher ratings of adaptive behaviors at 36 months. These results were viewed as consistent with theory that links reduced VT during tasks to adaptive regulation and suggest that such regulatory function may serve as a protective factor for children with prenatal CE.

Nigg and colleagues (2007) classified children as showing resilience if they avoided developing attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), or conduct disorder (CD) in the face of family adversity. Neuropsychological response inhibition and a composite catecholamine genotype risk score were chosen to be potential protective factors because of their potential relevance to prefrontal brain development. Resilient children showed more effective response inhibition. Moreover, the high-risk genotype index that was comprised of allelic variants of three genes chosen that express in the prefrontal cortex (i.e., dopamine transporter, dopamine D4 receptor, and noradrenergic alpha-2 receptor) was a reliable indicator of resilience with respect to the development of ADHD and CD but not ODD in the face of significant psychosocial adversity. Thus, neurobiological and genetic factors related to prefrontal cortex development may serve as protection by enabling children to avoid developing ADHD and CD in the context of significant adversity.

Avoiding Biological Reductionism

Future research on the determinants of resilience should increasingly contain both biological and psychological measures. We want to stress, however, that our viewpoint does not reduce resilience to biology, let alone to a unitary biological variable. A multiple levels of analysis perspective on resilience should not be misinterpreted as equating resilience with biology. The incorporation of a biological perspective into research on resilience still requires adherence to a dynamic, transactional view that acknowledges and respects the importance of context and the interplay through interactions across multiple levels of

function. Biological and psychological domains are both essential to include in basic research on resilience and in resilience-promoting interventions. If we are to grasp the true complexity of the concept of resilience, then we must investigate it with a commensurate level of complexity.

TRANSLATIONAL RESEARCH AND IMPLICATIONS

Resilience science has had transformative effects on interventions and practice aiming to promote better outcomes or function among children at risk for many different reasons. The initial stage of transformation occurred at a conceptual level as many applied fields shifted toward strength-based models and away from deficit-oriented disease models and then rapidly infused more positive models, measures, and goals into their practices (Masten, 2011). This shift can be observed in: school psychology and school counseling (Akos & Galassi, 2008; Masten et al., 2008); family therapy (Goldenberg & Goldenberg, 2013; Walsh, 2006, 2011); disaster preparedness (Masten et al., 2015); training and services for military families (Cozza & Lerner, 2013; Masten, 2013; Park, 2011); positive youth development and out-of-school programming (Lerner, 2009); child welfare reform (Flynn et al., 2006, Masten, 2006); social work (Anthony, Alter & Jenson, 2009); medicine (Szanton & Gill, 2010; Southwick et al., 2011); and the practices of humanitarian agencies (Ager, 2013; Lundberg & Wuermli, 2012; Masten, 2014a).

Luthar and Cicchetti (2000) observed that research on resilience has substantial potential to guide the development and implementation of interventions for facilitating the promotion of adaptive function and development in diverse high-risk populations that have experienced significant adversity. Prevention scientists have contended that it makes far more sense to promote the development of adaptive functioning as early as possible in the course of development than it does to implement treatment strategies designed to repair existing disorders among high-risk individuals.

From its inception as an integrative science, developmental psychopathology spurred investigators to discover the most effective means of preventing and ameliorating maladaptive and pathological outcomes (Cicchetti, 1984; Rutter & Garmezy, 1983; Sroufe & Rutter, 1984). An early stated goal of developmental psychopathology was to help reduce the schism between empirical research and its application to the treatment of individuals struggling with adversity and mental disorders (Cicchetti, 1990). In reflecting on the past achievements and future promises of developmental psychopathology, Cicchetti and Toth (2009) stated that "one of developmental psychopathology's potential contributions lies in the heuristic power it holds for translating facts into knowledge, understanding, and practical application" (p. 17). Knowledge of developmental norms, appreciation of how developmental level may vary within same age groups, sensitivity to changing meaning that problems have at different developmental levels, attention to the effects of developmental transitions and reorganizations, and understanding of the factors that are essential features to incorporate into the design and implementation of preventive interventions all may serve to enhance the potential for optimal intervention efficacy and the promotion of resilience. The principles of developmental psychopathology (Cicchetti, 1993; Cicchetti & Toth, 2009) lend themselves to fostering translational research that has implications for society and for policymakers. The very subject matter of developmental psychopathology necessitates thinking clearly about the implications of the work and devising intervention strategies that will promote competent functioning and positive developmental pathways in challenging contexts (Masten, 2014b).

In this vein, efforts to prevent the emergence of psychopathology or to ameliorate its effects also can be informative for understanding processes involved in the development of resilience and adaptive functioning (Cicchetti & Blender, 2006; Masten, 2014b). For example, if the developmental course is altered as a result of a preventive intervention and the risk for negative outcomes is reduced, then prevention research helps to specify processes that are involved in the development of psychopathology or other outcomes. As such, prevention research can be conceptualized as true experiments in altering the course of development, thereby providing insight into the etiology and pathogenesis of disordered outcomes and to the promotion of resilience (Cicchetti & Hinshaw, 2002; Howe, Reiss, & Yuh, 2002).

The experimental nature of randomized clinical trials (RCTs) provides an unparalleled opportunity to make causal inferences in resilience research. Independent variables manipulated in RCTs may be several steps removed from underlying etiologic factors because such trials are primarily concerned with alleviating suffering and promoting competence. Nonetheless, careful research design and assiduous measurement of ancillary process variables through which intervention effects may occur can shed light on the theory-driven mechanisms underlying pathways of pathological and positive adaptation (Cicchetti & Hinshaw, 2002).

Intervention Research Based on Resilience Models

Reviewing even the past decade of intervention research based on resilience models is beyond the scope of this chapter. However, selected examples can highlight major trends in resilience-focused intervention science.

Throughout this chapter we have noted examples of interventions that target promotive or protective processes in order to foster positive development or recovery in children exposed to adversity. Examples of resilience-based interventions include carefully controlled experiments to test programs designed to: promote parenting skills among parents with children or youth at risk for antisocial and other high-risk behavior (e.g., Brody et al., 2004; Patterson et al., 2010); improve parenting in families at risk for child maltreatment (e.g., Toth & Gravener, 2012) or in foster parents (e.g., Dozier et al., 2008; Fisher et al., 2006); implement foster care or adoption as an alternative to institutional care (Nelson et al., 2007; Rutter, Sonuga-Barke, & Castle, 2010): and improve executive function skills among disadvantaged preschoolers (e.g., Raver et al., 2011).

The best of these studies provide a theory of change that delineates the process targeted for change. Executive functions were the mediator targeted by Raver et al. (2011) in their intervention for high-risk preschool children. Their intervention improved school readiness, and their study further indicated that this change was mediated, as hypothesized, by improvements in cognitive self-control skills. Similarly, experiments to promote resilience in families with children at risk for maltreatment from the parent have targeted the quality of parent-child interaction and the attachment relationship, showing better outcomes in children. Illustrative randomized control trials are highlighted in the next section.

Interventions that showed cascade effects were particularly noteworthy over the past decade. In their intervention to promote better outcomes in foster children, discussed further later, Fisher et al. (2006) intervened at the parenting level and measured the outcome in the biological stress system of the child, finding that the intervention had a normalizing effect on the child's HPA system. The Strong African American Families Program (Brody et al., 2004; 2006) intervened with families to alter the risky behaviors of their adolescents. The Oregon Social Learning Center group, led by Patterson, Forgatch, and DeGarmo (2010), showed spreading effects of their Oregon model of parent management training (PMTO) on multiple members of the family over multiple domains over time.

Intervention studies also are beginning to test genetic moderating effects of response to intervention. In their intervention with African-American families, Brody et al. (2009, 2013) tested gene by intervention effects of intervention in their randomized controlled trial. They found evidence of genetic moderating effects, some of which are congruent with a differential susceptibility hypothesis (Brody et al., 2013). Such research on genetically (or epigenetically) moderated treatment effects in resilience science are in the early stages but are likely to be an important area of growth in the coming decade.

Randomized Controlled Trials Targeting Parent-Child Relationships

Interventions successfully targeting the quality of caregiver-child relationships in RCT designs with high-risk families offer powerful evidence of promotive or protective roles of this relationship in child resilience. Groundbreaking RCT experiments have been conducted with children and their caregivers at risk due to maternal depression, maltreatment, and foster care.

In a study of families at risk due to maternal depression, Cicchetti, Toth, and Rogosch (1999) conducted an RCT with families of 20-month-old toddlers. The mothers suffered from Major Depressive Disorder (MDD), which poses serious risks to child development (Cicchetti & Toth, 1995). Half of these youngsters and their mothers with MDD were randomly assigned either to toddler-parent psychotherapy (TPP; Lieberman, 1992) or to an enhanced community standard control group. A third group was comprised of demographically comparable toddlers whose mothers had no past or present MDD or other psychopathology (normative controls; NC). The intervention lasted 16 months. At baseline, there were no differences found in attachment security between the two groups with mothers who had MDD; both groups of MDD offspring had significantly more insecurity than the toddler offspring of well mothers. At the conclusion, Cicchetti et al. (1999) found that the TPP intervention increased attachment security in the MDD group receiving this intervention to a percentage comparable to that seen in the toddler offspring of well mothers. The MDD group with the community standard of care did not show improvement in attachment security. The results of this investigation are noteworthy; they were one of the first to suggest that attachment security is malleable and can be modified through the provision of an intervention informed by attachment-theory.

In a later and larger RCT investigation of mothers with MDD and their toddlers by Toth, Rogosch, Manly, and Cicchetti (2006), attachment security was assessed in the Strange Situation (Ainsworth, Blehar, Waters, & Wall,

1978) rather than with the Attachment Q-Sort (ASQ) that had been used in the 1999 study by Cicchetti and colleagues. The Strange Situation is the gold standard measure of attachment security in the field. Moreover, security of attachment as assessed in the Strange Situation has been shown to relate to a number of later positive outcomes (e.g., autonomous self-development, effective peer relations, ego-resiliency, fewer behavior problems, etc.; Cicchetti & Roisman, 2011; Sroufe, Egeland, Carlson, & Collins, 2005).

To further elucidate the impact of TPP on attachment organization, Toth et al. (2006) conducted an RCT with mothers who had MDD and their toddlers. The toddler offspring of MDD mothers were randomly assigned to either TPP or to a community standard intervention control. A third group of mothers who had never experienced psychopathology and did not differ from the two groups with MDD (intervention and control) demographically served as a normative comparison group (NC). The TPP intervention lasted approximately 18 months. At baseline, toddlers in the two groups with mothers who had MDD were significantly more likely to be insecurely attached to their mother than were toddlers in the NC group. The percentages of Type D disorganized attachment at baseline were 45%, 37%, and 20% for the MDD control, the MDD TPP intervention group, and the NC groups, respectively. At postintervention, statistically significant differences were obtained in security of attachment between the mothers with MDD who received TPP intervention (67%) compared with the community standard control (17%) group. Furthermore, the TPP intervention group had significantly more attachment security than the NC group (48%). The percentages of Type D disorganized/disoriented attachment at postintervention were 11%, 41%, and 21% on the TPP, community standard, and NC groups, respectively.

The results of the TPP intervention for toddlers of mothers with MDD provide compelling support for the potential malleability of attachment insecurity. The TPP intervention was effective not only at modifying attachment insecurity but also in maintain existing security in the toddler offspring of depressed mothers. Conversely, offspring of mothers with MDD not receiving the TPP intervention were less likely than intervention offspring to maintain secure attachments at the postintervention assessment. Thus, even if offspring of mothers with MDD are securely attached, the parenting milieu and the emotional climate of the home that accompany maternal depression, even once an active episode has remitted, may mitigate against the continuance of their secure attachment.

The malleability of insecure and disorganized attachment among infants from maltreating families also was investigated through an RCT (Cicchetti, Rogosch, & Toth, 2006). Findings from research on the effects of maltreatment on infant attachment were incorporated into the design and evaluation of the intervention (V. Carlson, Cicchetti, Barnett, & Braunwald, 1989; Cicchetti & Barnett, 1991; Cyr, Euser, Bakermans-Kranenburg, & van IJzendoorn, 2010). One-year-old infants from maltreating families and their mothers were randomly assigned to one of three intervention conditions: (a) child-parent psychotherapy (CPP), (b) psychoeducational parenting intervention (PPI), and (c) community standard (CS) controls. A fourth group of infants from nonmaltreating families and their mothers served as an additional low-income normative comparison (NC) group. At baseline, mothers in the maltreatment group, relative to the nonmaltreatment group mothers, reported greater abuse and neglect in their own childhoods, more insecure relationships with their own mothers, more maladaptive parenting attitudes, more parenting stress, and lower family support, and they were observed to evince lower maternal sensitivity. Infants in the maltreatment groups had significantly higher rates of disorganized attachment than infants in the NC group. At postintervention follow-up at age 26 months, children in the CPP and PPI groups demonstrated substantial increases in secure attachment, whereas increases in secure attachment were not found for the CS and NC groups. Moreover, disorganized attachment continued to predominate in the CS group.

Following the tenets of an organizational perspective, it is expected that these maltreated youngsters, now that they are traversing a more positive developmental trajectory, will be more likely to continue on an adaptive pathway and successfully resolve future salient developmental tasks (Sroufe, 1983). The preventive interventions have demonstrated that behavioral plasticity is possible, at least in the early years of life.

The parenting education intervention and the CPP intervention were both found to be equally efficacious in fostering secure attachment and in reducing disorganized attachment in infants from maltreating families. However, when examining the sustained efficacy of these intervention models, only CPP was found to be efficacious in promoting quality of attachment over time (Pickreign Stronach, Toth, Rogosch, & Cicchetti, 2013). These results suggest that, in cases of extremely maladaptive parenting such as child maltreatment, more intensive models of intervention that go beyond parent skills training may be necessary as increasing developmental complexity unfolds over time.

The extremely high stability of attachment insecurity in the group receiving the community standard of care is especially alarming. These results portend that the maltreated infants in this group are at exceedingly high risk of maladaptive outcomes on subsequent stage-salient issues of development. The typical intervention services provided to maltreated infants are not sufficient to remediate their early developmental difficulties. Without the receipt of theoretically derived, intensive interventions, maltreated infants are likely to embark on a negative developmental trajectory. Clearly, case management focused on monitoring the physical safety of maltreated children is inadequate to foster positive socioemotional development. Moreover, these results underscore the critical importance of providing evidence-based services to maltreating families to interrupt this negative cascade.

The results of this randomized prevention trial are both heartening and sobering. The fact that plasticity is possible during infancy and that even the most disorganized form of attachment is modifiable in extremely dysfunctional mother-child dyads offers significant hope for thousands of young children and their families. By fostering secure attachment, costlier interventions, such as foster care placement, special education services, residential treatment, and incarceration, can be averted. Unfortunately, these results also shed light on the harsh reality of ineffective services currently being provided in communities throughout the nation. It is critical that professionals, government officials, social policy advocates, and mental health insurers recognize the necessity of investing in the delivery of theoretically informed, evidence-based interventions. Although this may appear to be a costly endeavor in the short term, the long-term benefits with respect to enhancing positive child development, preventing the dissolution of families, and decreasing the burden of mental illness in society cannot be overstated.

Randomized Control Trials Targeting Caregiving with Neurobiological-Level Evaluation

RCTs to promote child resilience by targeting the quality of caregiving also can measure effectiveness at biological levels of function in children. Research on the impact of early caregiving adversity in humans has revealed that the HPA axis is highly likely to exhibit evidence of dysregulation and that this dysregulation may entail both hyper-and hypofunctioning (Cicchetti & Rogosch, 2001b; Cicchetti, Rogosch, Gunnar, & Toth, 2010; Gunnar & Vazquez, 2001; Heim et al., 2008). Levels of cortisol, the final hormonal product of the neuroendocrine system, that are chronically elevated during development when neural circuits are still in the process of maturing exert an impact on brain development by affecting neurotropic factors and regulating gene transcription, thereby influencing the manner in which neural circuits perceive and interpret environmental threat and the magnitude and duration of future stress responses (Tarullo & Gunnar, 2006). In addition, chronically low levels of basal cortisol also can eventuate in harmful effects on the brain as well as on physical and mental health and behavior (Juster, McEwen, & Lupien, 2009; Juster et al., 2011; Lupien et al., 2006). Both hyper- and hypocortisolism can reflect allostatic load, typically defined as the result of chronic exposure to fluctuating or heightened neural or neuroendocrine responses that emerge in response to chronic environmental challenges that are perceived as especially stressful (McEwen & Stellar, 1993). Stressful experiences in early life are vital in the determination of the capacity for flexible/resilient adaptation or the lack thereof (McEwen, Gray, & Nasca, 2015).

The plethora of studies documenting the neuroendocrine disturbances following child maltreatment, in concert with the likely harmful developmental sequelae of these HPA axis disturbances and the accompanying sustained allostatic load, have underscored the potential importance of RCTs to try to modify and reorganize alterations in HPA axis functioning (Cicchetti & Gunnar, 2008). In the human literature, evidence is beginning to accrue suggesting that efficacious interventions with children in foster care may modify not only maladaptive behavior but also the neuroendocrine correlates of behavior (Dozier et al., 2008; Fisher, Gunnar, Dozier, Bruce, & Pears, 2006; Fisher, Stoolmiller, Gunnar, & Burraston, 2007). Methodologically rigorous RCTs that incorporate a multilevel measurement battery have begun to provide a unique lens through which the processes responsible for the development, maintenance, and modification of both typical and atypical functional neuroendocrine outcomes can be discerned (Gunnar, Fisher, & the Early Experience, Stress, and Prevention Network, 2006).

In an innovative illustration of the capability of psychosocial interventions to modify diurnal cortisol activity, noted briefly earlier, Fisher et al. (2007) conducted a 6- to 9-month RCT of a family-based foster care therapeutic intervention for preschool children. The therapeutic intervention was compared to a regular foster care condition and a demographically comparable group of same-aged, nonmaltreated preschool children from low-SES families. Fisher et al. (2007) collected and assayed early-morning and evening cortisol levels from the preschool children

(mean age = 4.4 years) on a monthly basis from the baseline until the end of the interventions. One common disturbed cortisol pattern that emanates from disruptions in caregiving is a low early-morning cortisol that displays minimal change across the day. Fisher and colleagues found that the foster children who received the family-based therapeutic intervention exhibited cortisol activity that became comparable to the nonmaltreated comparison children over the course of the intervention. In contrast, children who received routine services in state foster care (e.g., weekly individual psychotherapy; developmental screening for delays with the subsequent provision of special education services, if needed) displayed an increasingly flattened pattern of early-morning to evening cortisol activity throughout the course of the RCT. The results of this psychosocial intervention demonstrate that improvements in caregiving following the experiences of early adversity have the potential to reverse or prevent disturbances in the HPA system (Fisher et al., 2007).

The study of child maltreatment as a "natural experiment" provides a valuable lens into the relations between sensitive caregiving and stress regulation and reveals insights for translation of basic empirical findings into RCTs aimed at reorganizing and normalizing these relations. Moreover, the conduct of RCTs, such as that already described, yields important knowledge regarding the malleability of developmental processes. Psychosocial randomized preventive interventions with previously maltreated children placed in foster care provide important opportunities for children who have transitioned into a changed environment to manifest competence in biological and behavioral functioning. For children in foster care, there may be variability with respect to the presence of continued stressful experiences. For example, the move to foster care may be traumatic for some children even in they have been placed in a better setting than their previous home or foster care experience.

Longitudinal effects of child maltreatment on cortisol regulation in infants from 1 to 3 years were investigated in the context of an RCT (Cicchetti, Rogosch, Toth, & Sturge-Apple, 2011). Thirteen-month-old infants and their mothers were randomly assigned to one of three intervention conditions: child-parent psychotherapy (CPP), psychoeducational parenting intervention (PPI), and a control group involving standard community services (CS). A fourth group of infants from nonmaltreating families and their mothers comprised a nonmaltreated comparison (NC) group. The two active interventions were combined into one maltreated intervention (MI) group for statistical analyses. Saliva samples were obtained from children at 10:00 a.m. before beginning a laboratory observation session with their mothers when the children were 13 months of age (preintervention), 19 months (midintervention), 26 months (postintervention), and 38 months (1-year postintervention follow-up). At the initial assessment, no significant differences among groups in morning cortisol were observed. Latent growth curve analyses examined trajectories of cortisol regulation over time. Beginning at midintervention, divergence was found among the groups. Whereas the MI group remained indistinguishable from the NC group across time, the CS group progressively evinced lower levels of morning cortisol, statistically differing from the MI and NC groups. These results are consistent with those of Fisher et al. (2007) and Dozier et al. (2008) and highlight the value of psychosocial interventions for early child maltreatment in normalizing biological regulatory processes.

Random assignment to adversity or trauma is not possible, but random assignment to intervention is. If biological systems recover in response to an RCT intervention, then this provides support for arguments that the systems under study are sensitive to environmental input during development. Furthermore, if randomized interventions alter neurobiological systems associated with disorders, and it can be shown that they mediate positive changes in psychosocial functioning, then these intervention studies can foster a better understanding of the neurobiological contributors to resilience.

The Bucharest Early Intervention Project (BEIP) is a landmark multilevel RCT preventive intervention informed by developmental theory (Nelson, Fox, & Zeanah, 2014). The project has three major goals: (1) to document the impact of institutionalization on child development across a number of salient domains; (2) to ascertain the extent to which children in foster care can recover from experiencing early adversity; and (3) to assist the Romanian government in building alternative means to institutionalization of caring for children experiencing adversity.

BEIP is a foster care intervention for children who had been abandoned at or shortly after their birth and placed in an institution for young children in Bucharest, Romania (Fox et al., 2011; Nelson et al., 2007; Zeanah et al., 2003). Half of a group of 136 children residing in an institution in Bucharest were randomly assigned either to high-quality foster care designed specifically for the BEIP, and the other half were randomly assigned to remain in institutional care (care as usual group). A group of never-institutionalized children serves as community controls. Over time, the purity of this experiment was affected by naturally occurring changes in child status. However, it

remains an extraordinarily rare effort to test the effects of foster care in comparison to institutional and typical family care.

On average, children in the high-quality foster care group entered into foster care at 22 months and were assessed longitudinally at stage-salient developmental periods at 30, 42, 54, and 96 months. A follow-up assessment at age 12 years is under way, focused on early adolescence, which represents another critical developmental transition. A variety of psychological and biological domains were assessed at various developmental periods, with each transitional turning point thought to provide both opportunities and challenges for the developing child.

Among the major findings of BEIP, it was demonstrated that children who were placed into foster care early in life showed improved cognitive, emotional, and behavioral functioning. In contrast, children randomly assigned to remain in institutionalized care showed ongoing developmental deficits across all domains assessed. Thus, early placement into foster care resulted in the most optimal outcomes for the formerly institutionalized children. Interestingly, children who were randomly placed in foster care demonstrated increases in cognitive functioning (IQ) and in brain development, whereas children who remained in institutions displayed lower levels of electrical activity across all brain regions (Vanderwert, Marshall, Nelson, Zeanah, & Fox, 2010).

The inclusion of a normative community control group was an important addition to the BEIP design. It provided a more stringent test for evaluating the efficacy of the foster care interventions than would a foster care versus care as usual comparison. On several of the domains assessed in the BEIP, children randomly assigned to foster care performed similarly to children in the never-institutionalized group; however, for other domains, children in foster care were functioning in between the institutionalized (care as usual group) and never-institutionalized groups (e.g., on measures of IQ, emotional responsiveness and reactivity, attachment security, and anxiety disorders).

Miller, Brody, Yu, and Chen (2014) investigated whether a psychosocial intervention, focused on improving parenting, strengthening family relationships, and building youth competencies could reduce inflammation in low-SES, African American families residing in poverty. Families were randomly assigned to a 7-week psychosocial intervention or to a control condition. When youth reached age 19, peripheral blood was collected to quantify six cytokines that orchestrate inflammation, the dysregulation of which contributes to many of the health problems known to pattern by SES. Youth who participated in the intervention had significantly less inflammation on all six indicators relative to controls. Inflammation was lowest among youth who received more nuturant-involved parenting and less harsh-inconsistent parenting as a consequence of the intervention. These findings have theoretical implications for research on resilience to adversity and the early origins of disease. If substantiated, they may also highlight a strategy for practitioners and policymakers to use in ameliorating social and racial health disparities.

Moving toward RCTs in Multiple-Levels-of-Analysis Research on Resilience

Developmental psychopathologists have advocated a multiple-levels-of-analysis approach to the investigation of maladaptation, psychopathology, and resilience (Cicchetti & Blender, 2006; Cicchetti & Curtis, 2006, 2007; Cicchetti & Dawson, 2002; Masten, 2007, 2014). Thus, the examination of multiple biological and psychological systems, domains, and levels of the ecology on each individual participant in an RCT preventive intervention should eventuate in a more complete understanding of individual patterns of maladaptation, psychopathology, and resilience. We think it is essential that this multiple-levels-of-analysis approach is adopted by prevention scientists who are conducting RCTs. For example, the inclusion of molecular genetic methods (e.g., sequencing DNA and utilizing functional polymorphisms to examine genetic and epigenetic methylation and moderation of intervention), neuroimaging techniques (e.g., to investigate brain structure, function, and connectivity, pre-and post-intervention), and stress-reactivity paradigms (e.g., to ascertain whether neurobiological stress systems are modifiable as a result of intervention), in conjunction with the incorporation of psychological/behavioral outcomes, will enhance the understanding of interventions on brain-behavior relations (Cicchetti & Blender, 2006; Fishbein, 2000; Zeanah et al., 2003). Similarly, the inclusion of biological measures into the research armamentaria of researchers investigating pathways to adaptive functioning in the presence of significant adversity, as well as the translation of this integrative research into resilience-promoting interventions that assess biological and psychological measures concurrently, will contribute to reducing the schisms that exist between the study of normal and abnormal development and between research and practice (Beauchaine, Nehaus, Brenner, & Gatzke-Kopp, 2008; Cicchetti & Toth, 2006; Masten, 2014b).

The utilization of a neurobiological framework and the incorporation of genetically sensitive designs into

interventions seeking to promote resilience or to repair positive adaptations gone awry may contribute to the ability to design individualized interventions that are based on knowledge gleaned from biological and psychological levels of analysis. If assessments of biological systems are routinely incorporated into the psychological measurement batteries employed in resilience-promoting interventions, then researchers will be in a position to discover whether the nervous system and psychological processes have been modified by experience. A challenge that will need to be surmounted involves the determination of the mechanisms whereby different levels of analysis interact and transact across developmental time. Furthermore, researchers conducting their work at each level will need to develop theories that are consistent or coherent with respect to other key levels of analysis. Although investigations that focus solely on the behavioral level of resilience remain valuable, it is now important that researchers who examine the determinants of resilience integrate empirical work conducted on the behavioral level with the genetic and biological levels, study their coactions, and investigate the relations among these mutually influencing systems.

Determining the multiple levels at which change is engendered through RCT prevention trials will provide more insights into the mechanisms of change, the extent to which neural plasticity may be promoted, and the interrelations between biological and psychological processes in maladaptation, psychopathology, and resilience (Cicchetti & Curtis, 2006). Moreover, preventive interventions with the most in-depth empirical support, based on integrative multilevel theories of normality, psychopathology, and resilience, can be implemented in effectiveness trials in community or real-world settings to reach the broadest number of people and prevent, alleviate, and ultimately cure suffering from mental disorders. Furthermore, the inclusion of biological assessments in evaluations of interventions designed to foster resilience will enable scientists to discover whether the various components of multifaceted interventions each exert a differential impact on separate brain systems. It is thus possible to conceptualize successful resilience-promoting interventions as examples of experience-dependent neural plasticity.

Finally, although resilience is a dynamic developmental construct that, theoretically, is changing throughout the life course, it nonetheless is important to ascertain whether and, if so, when there are optimal timing windows for efforts to promote resilience. Specifically, it will be extremely important to know which resilience-promoting interventions are more effective when implemented in the early years of life and which interventions need to be timed later for optimal effect. Likewise, are such interventions more likely to achieve their goal of promoting resilience if they are instituted as closely as possible to the identification of the adverse event(s) or experience?

Genetic and Epigenetic Moderation of Intervention

Despite rapid, promising advances, our understanding of genetic moderation of intervention outcome remains in its early stages. Most interventions have aimed to change the environment with little to no consideration for genetic involvement. Thus, interventions that consider both genes *and* environment are in a nascent state. In a meta-analysis of 22 RCTs, van IJzendoorn and Bakermans-Kranenburg (2015) found clear-cut experimental support for genetic differential susceptibility. A recent Special Section of the journal *Development and Psychopathology*, edited by Belsky and van IJzendoorn (2015), was devoted to examining genetic moderation of intervention efficacy. The focus of the Special Section was to test differential susceptibility by examining the RCTs conducted to date on genetically moderated RCT interventions. To provide an example, Cicchetti, Toth, and Handley (2015) examined the genetic moderation of interpersonal psychotherapy (IPT) efficacy for economically disadvantaged women with MDD. Specifically, Cicchetti et al. examined whether genotypic variation in the corticotropin-releasing hormone receptor 1 gene (CRHR1) and the serotonin transporter gene (5-HTT) moderated effects of IPT on depressive symptoms over time. Cicchetti et al. also tested genotype moderation of IPT mechanisms social adjustment and perceived stress. A diverse sample of nontreatment-seeking urban women at or below the poverty level with infants was recruited from the community and randomized to individual IPT or enhanced community standard. Results revealed that changes in depressive symptoms over time depended on both intervention group and genotypes (5-HTTLPR and CRHR1). Moreover, multiple-group path analysis indicated that IPT improved depressive symptoms, increased social adjustment and decreased perceived stress at posttreatment among women with zero copies of the CRHR1 TAT haplotype only. Finally, improved social adjustment at postintervention significantly mediated the effect of IPT on reduced depressive symptoms at 8 months postintervention only for women with zero copies of the TAT haplotype. Post-hoc analyses of 5-HTTLPR were indicative of differential susceptibility, albeit among African American women only.

Prevention scientists have recently begun to consider epigenetic mechanisms within the context of understanding the efficacy of intervention on developmental outcomes and resilient functioning. As noted earlier, epigenetic mechanisms may be a realistic target for intervention because of their reversibility. Epigenetically informed RCT preventive interventions can include methylation assays in their measurement batteries to evaluate the effects of the interventions on these mechanisms and to refine theory.

Nothing can be done to prevent the DNA sequence variations that eventuate in the emergence of risky phenotypes. Yet DNA methylation changes in response to experiences such as child abuse and neglect could help to bring about the design, implementation, and multilevel prevention and intervention strategies that change expression of risky genes through reversal or demethylation and thereby promote healthy physical and mental health development. Szyf and Bick (2013) concluded that DNA methylation adaptations early in life are system-wide and that they involve multiple gene circuits. Methylation assays also can be conducted at the level of site-specific regions of candidate genes with known functional properties, such as the glucocorticoid receptor gene (Bick et al., 2012). Thus, because responses to social adversity such as child maltreatment are not limited to the brain and also likely affect peripheral tissues, it is also possible to assess the efficacy of an intervention in peripheral cells.

Prevention and intervention strive to alter the environment in order to bring about positive outcomes. Research on epigenetics suggests that prevention and intervention also may change the epigenome and that this could result in improved outcomes. If researchers are to understand the processes thorough which early adverse experiences such as child maltreatment and institutionalization impact maladaptation, psychopathology, or resilience, then it is critical that genetic variation (functional polymorphisms) and epigenetic modifications are examined.

Research on GxE and on epigenetics needs to incorporate, as well as to emphasize, a developmental perspective (GxExD; Sroufe, 2013). Genes may influence how environmental experience affects development, and this moderating role may operate differently at various developmental periods. Moreover, the effects of genes and experience at a particular period may be influenced by the effects of prior development. Environments may affect the timing of genetic effects and gene expression. In addition, there are experience effects on the epigenome, and these effects also would operate differently across the course of development.

Genetic effects on intervention efficacy can occur in a number of ways. Are some individuals, based on genetic variation, more susceptible to the positive effects of intervention? Are different interventions more effective with different individuals based on genetic differences (i.e., matching intervention to genotype group)? Does intervention affect DNA methylation, resulting in changes in gene expression? DNA methylation changes in response to experience could lead to the design of both prevention and intervention strategies that change the expression of genes to promote healthy physical and mental health outcomes. Given that the demethylated epigenome would be transmitted to the next generation, it will be important to determine if decreased child maltreatment risk through efficacious intervention alters the epigenome, which in turn results in a "less risky" epigenome being transmitted to offspring. The design and conduct of longitudinal multilevel RCTs that incorporate baseline pre-intervention, postintervention, and postintervention follow-up assessments of psychosocial, neurobiological, and epigenetic processes through the collection of DNA and RNA over developmental time represent an exciting direction for future intervention studies.

Implications of Resilience Science for Policy

Resilience science has many implications for policymakers at many levels of governmental and nongovernmental organizations, and there is growing evidence that policymakers are taking notice, with surging popularity of the concept in initiatives and products of humanitarian and governmental agencies at local, state/provincial, national, and international levels (Ager, 2013). UNICEF (2011), for example, published the *Humanitarian Action for Children: Building Resilience* (2011) report. The World Bank published an edited volume on *Children and Youth in Crisis: Protecting and Promoting Human Development in Times of Economic Shocks*, with a strong emphasis on concepts and findings from a resilience perspective for mitigating the effects of economic shocks on child development (Lundberg & Wuermli, 2012). Educational policies and practices have adopted positive more models of practice, often drawing directly on resilience science (e.g., Cohen, 2013; Doll, 2013).

The impact of a resilience perspective on child welfare reform was well documented in a conference and subsequent publication, *Promoting Resilience in Child Welfare* (Flynn, Dudding, & Barber, 2006). The global movement to shift child welfare toward a positive, strength-focused, and developmental approach was highlighted in the

conference and book, which also underscored the appeal of this approach to the stakeholders involved, including young people as well as social workers and funders.

Disaster preparedness and response approaches have also begun to incorporate resilience perspectives at multiple levels, underscoring the interconnectedness of resilience at the child, family, and community levels, with important effects on policies (Institute of Medicine, 2014; Masten et al., 2015). Data from studies of resilience in children following disaster consistently indicated the importance (for minimizing harm and facilitating recovery) of keeping families together, restoring child care and school, and providing opportunities for children to play and return to other childhood and family activities, and these have become guiding priorities in disaster preparation and response policies.

As noted, prevention science has incorporated many of the models and findings from resilience science, expanding the focus from preventing problems and interrupting negative progressions to promoting positive development, building assets, and facilitating competence cascades (Cicchetti, 2013; Gest & Davidson, 2011; Luthar & Cicchetti, 2000; Masten, 2014b; Zimmerman et al., 2013). Universal prevention programs, as well as targeted programs for high-risk families or children, now often emphasize building resources in the family, school, or community (or all three) and competence skills in individual children, parents, or teachers (National Research Council and Institute of Medicine, 2009; Winslow, Sandler, Wolchik, & Carr, 2013).

There appears to be a broad consensus among many stakeholders involved in policy that resilience approaches are valuable. The evidence base grows stronger for efficacy of interventions in many domains of adaptive development and for different situations that can be harmful to children. In addition, parents and policymakers alike find models appealing that focus on promoting positive development and achieving success (Ager, 2013; National Research Council and Institute of Medicine, 2009; Sandler et al., 2011). At the same time, evidence is building that well-timed and targeted intervention can have high long-term returns on public investments, benefiting the individual children or families as well as society (e.g., Cunha & Heckman, 2011; Heckman, 2006; Reynolds, Temple, White, Ou, & Robertson, 2011).

As resilience science moved toward dynamic models of interacting systems, the implications for policy have concomitantly shifted to encompass more systems and the idea of integrated interventions that address more than one system at a time in order to generate synergy (Masten, 2011, 2014b, 2014c). Policymakers often must choose where and when to invest most strategically to promote the well-being of their constituents in the near and distant future. Research on the economics of human capital investment, naturally occurring resilience, and prevention science is aligning in helpful ways for applications in policy, although it still remains crucial to communicate the evidence and its implications effectively (Winslow et al., 2013).

At the level of global intervention and investment in children, momentum is growing to raise the bar of humanitarian aid beyond child survival to children with the capacity to thrive, even in a world still plagued by war, epidemics, and extreme poverty (Masten, 2014a). Early in 2014, the U.S. National Academies launched a new international forum, "Investing in Young Children Globally," to assemble evidence about best practices worldwide for strategic investments in children to promote lifelong health and well-being in individuals and societies (see their website at http://iom.edu/Activities/Children/InvestingYoungChildrenGlobally.aspx). This international network of scientists, clinicians, policymakers, and other professionals convenes workshops and other meetings around the world to evaluate, integrate, and disseminate promising data and strategies for governments and nongovernmental organizations to invest effectively in young children in order to promote the healthy development of children and their societies. This effort produces workshop reports, infographics, and other products for widespread distribution to policymakers and funders worldwide.

Also in 2014, a consortium of partners from multiple countries initiated a new set of three initiatives as part of the ongoing global "Grand Challenges" effort launched originally a decade earlier by the Bill and Melinda Gates Foundation, the Canadian government, and others. "All Children Thriving" is one of the new Grand Challenges initiatives with the goal of helping mothers and children thrive in the developing world.

CONTROVERSIES OLD AND NEW

Beginning with the first generation of resilience science, controversies emerged (Masten, 2012, 2014b; Rutter, 1987). Some of these controversies have waned as the science matured, some have returned in new forms, and some new issues have surfaced. All these trends are expectable in a maturing science and actually may reflect real progress. Here we highlight several of the enduring controversies and issues for research on resilience in human development.

Theoretical Issues

From early in the study of child resilience, there were debates about how to define the concept, and these issues continue to be the subject of debate (Masten, 2014b; Panter-Brick & Leckman, 2013; Southwick, Bonanno, Masten, Panter-Brick, & Yehuda, 2014). Although there is general agreement that resilience science is focused on understanding adaptation in contexts of challenge or adversity, definitions of resilience vary, which leads to issues in operationalizing the concept in research (Luthar, 2006; Masten 2014b). Some definitions continue to focus on a traitlike concept of resilience (see later discussion) while others focus on capacities for, processes of, or outcomes of positive adaptation in the wake of adversity or contexts or risk. Even for those who accept a systems definition, where resilience refers to capacity or processes of a system engaged in adapting in response to a significant challenge, there are issues about focusing on internal function of the system or its adaptation to the environment. These issues reflect the nature of adaptation in living systems, which are always functioning as a unit embedded and interacting with other systems. Methodologically, this situation leads some investigators to focus on psychological well-being or internal indicators of function, such as allostatic load, while others focus on competence in the environment (e.g., social and academic competence) and still others include both kinds of adjustment indicators.

Striking consistencies in findings have emerged in the resilience literature despite the variations in concepts and methods (Masten, 2014b). It is nonetheless problematic that the variations in conceptual approaches make it difficult to integrate theory and findings on resilience. Greater effort to harmonize research concepts, designs, and measures would greatly facilitate gains in knowledge in resilience science.

Empirical Issues

Numerous methodological issues flow from the conceptual variations in resilience science and also from the inherent complexity of research on dynamic living systems. Any competent and reflective researcher engaged in studies of resilience must confront these issues and make choices about concepts, models, measures, and methods.

One of the major issues confronting resilience researchers is how to define and measure the core criteria of "risk" and "adaptation" delineated in the theoretical section of this chapter. Some investigators study a single risk marker, such as "homeless" or "premature" or "maltreated," fully cognizant that these indicators represent a cumulative index of risks and resources. Other investigators deliberately assess cumulative risk or adversity indicators, and they must make choices about how to aggregate them for purposes of analysis (Evans et al., 2013; Obradović et al., 2012). These may include counts or other kinds of composite scores on sociodemographic indicators, perceived stress, or adverse experiences. Similarly, choosing what to assess on the adaptation side of the equation also is challenging. Some investigators focus on success in age-salient developmental tasks while others focus on symptoms of mental illness or psychological distress.

Investigators are more aware now of the cultural influences on these choices, which often were ignored in early studies (Masten, 2014b; Panter-Brick & Leckman, 2013; Ungar et al., 2013). In international research, much more attention is given now to the issue of defining and measuring resilience in culturally meaningful ways.

Many choices are made by investigators when they define resilience and choose measures of risk/adversity, adaptive function or outcome, and potential promotive or moderating influences. These choices have yielded an incredibly diverse and wide-ranging set of findings and also posed challenges for empirical methods of compiling the findings, such as meta-analysis. Again, coordinated studies could be extremely valuable in future resilience research.

Is Resilience a Trait?

One of the most tenacious and wrong-headed issues in resilience science is the idea that resilience is a trait (Masten, 2012, 2014b; Panter-Brick & Leckman, 2013; Rutter, 1979). This enduring idea may stem from the origins of the word *resilience* itself, in that it often refers to a property of a thing or substance—the resiliency of a spring or a rubber band for instance. Early concepts of "hardiness" (Kobasa, 1979) and "ego resiliency" (Block & Block, 1980) in personality theory also contributed to this notion.

While traits have been implicated in the observed capacity of human individuals to withstand or recover from major blows or challenges, there is no single trait that could be construed as "resilience." The idea that resilience is a trait ignores overwhelming evidence that the adaptation of individuals to adversity depends on relationships and many other systems external to the individual. Moreover, this is a dangerous idea because it implies that children or adults who struggle to adapt or have not yet recovered from traumatic experiences are somehow lacking the "right stuff," in effect blaming the victim when the causes of stress or breakdown have much more to do with overwhelming

adversity exposure and lack of socioecological supports or protections.

Furthermore, there is ever-growing evidence that the same trait that functions in one set of conditions as a protective influence on function or development can function as a vulnerability in another context or at another point of time in development. Early examples identified by resilience investigators included individual differences in temperament as well as the biological example of sickle-cell trait (Rutter, 1987; Masten, 2012, 2014b). Recent research on differential susceptibility or biological sensitivity to context described previously in this chapter underscore the point that a trait may have different roles in different contexts.

Do Genes Determine Resilience?

The trait debate has returned in a new guise with the research on genotypes as singular promotive or protective factors. This deterministic view is completely unreasonable and simplistic, given that *all* human function and development is influenced by many interactions of genes with context and many forms of experience. The capacity of any individual for adaptation is highly complex, develops over time as a result of many interactions of the individual with the environment, and at any given time is distributed across multiple systems, including social systems external to the person.

Is Adversity Good for Children?

The idea that challenges can promote growth or, to paraphrase the famous words of Nietzsche quoted earlier that "whatever does not kill you makes you stronger," is another concept that keeps returning as an issue in resilience science. As discussed in the section on steeling effects and posttraumatic growth, there is some evidence suggesting that modest challenges and the recovery that follows can strengthen capabilities involved in resilience. This idea was captured by the challenge model of resilience early in the science (Garmezy et al., 1984) as well as in the notion of steeling effects (Rutter, 1987). Contemporary data on adaptive systems (e.g., the immune or stress-reactivity systems) are congruent with the idea that some challenge is helpful for adaptive systems to organize and calibrate themselves effectively for the expected environment. However, we want to emphasize again that there is no evidence that severe adversity and trauma is good for development. As in the situation of surviving Ebola as a method for achieving immunity, the risks and costs of severe threats to development, exemplified by child abuse and other forms of child exploitation or suffering, far exceed any conceivable benefit. When severe adversity does occurs, though, certainly it is the case that support and recovery are better for development than continued adversity or neglect.

Is There a Cost to Resilience?

A final example of enduring issues in resilience science is raised by the intriguing question of whether there is a price to pay for resilience (Masten, 2014b, Masten & Coatsworth, 1998). A number of influential studies raised the possibility that the stress or strain of overcoming adversity could cause current distress or later health issues (Luthar, 1991; Luthar, Doernberger, & Zigler, 1993; Werner & Smith, 2001). Some of these "costs" may be attributable to the adversity itself, akin to scars from battle, whereas others may result from the strains of setting high goals and related adaptive efforts. Recovering child soldiers and survivors of severe maltreatment, for example, would not be expected to come away from terrible experiences with no residual effects, but these effects may be better described as the costs of chronic trauma rather than resilience.

This question has resurfaced in recent work on allostatic load. In a provocatively titled article ("Is Resilience Only Skin Deep?"), Brody and colleagues (2013) reported that some of the most successful young people in their study of high-risk African American youth were showing signs of high allostatic load despite their positive psychosocial adaptation. They raised the possibility that overcoming the risks of economic strains and racism may take a toll on the body in the form of chronic wear and tear, indexed by high blood pressure or body mass index. As they follow these young people, it will be important to track their adaptation at multiple levels of analysis to see if success at one level continues to have costs at another level.

PROGRESS AND FUTURE DIRECTIONS

Progress and transformation in resilience science over the past decade is marked in many ways by implementation of a dynamic, multiple-levels perspective in conceptual, methodological, and empirical gains. This is the hallmark of the fourth wave, and it has set the stage for the coming decade.

Advances in Models and Methods

In conceptual models, the shift toward dynamic, transactional theory transformed resilience science to reflect the

growing prevalence of relational developmental systems theory as the core perspective in developmental science (e.g., Overton, 2013, Zelazo, 2013). Definitions of resilience, although still sometimes criticized and controversial, dramatically tilted toward systems-based definitions that are compatible with related concepts in other sciences that focus on other system-levels, including family resilience, community resilience, and ecological resilience. With this shift, the idea of resilience as a trait lost support, and interest grew in the processes linking multiple systems to influence development.

Among the most prominent conceptual drivers of theory and research on resilience in the past decade were GxE concepts and particularly the roles of epigenetic processes in adaptation that could influence resilience (Cicchetti & Rogosch, 2012; Karatsoreos & McEwen, 2013; Kim-Cohen & Gold, 2009; Kim-Cohen & Turkewitz, 2012). Conceptually, these ideas renewed theoretical and empirical interest in the programming of adaptive systems important for resilience (as well as vulnerabilities) and also sparked new thinking about intervention.

The concept of individual differences in the openness of an individual to environmental influence, combined with recognition of developmental windows of greater or lesser plasticity and sensitive periods for adaptive tuning of the individual to the expected environment, is transforming theory and research on the roles of both genes and experience in resilience (Del Giudice et al., 2011; Ellis et al., 2011; Masten, 2014b). These ideas and the empirical studies they inspire remain a key frontier for resilience research in the coming decade, particularly for intervention experiments designed to promote resilience through strategic timing and targeting or to program/reprogram adaptive systems to increase resilience.

The concept of developmental cascades, where function at one system level can spread to affect other levels through intersystem interactions, attracted considerable interest, including two special issues of the journal *Development and Psychopathology* (Masten & Cicchetti, 2010a, 2010b). These cascades can be bidirectional with neurobiological changes influencing psychosocial processes or vice versa. In addition, there was growing interest in delineating and testing models of how resilience in contextual systems of a child's life, such as a family or school, spreads to boost the resilience of individual children within the family or school. These resilience cascades can be naturally occurring or result from deliberate efforts to induce a cross-system cascade, as in interventions to foster better parenting as a means to normalize the biological stress regulation system (e.g., Fisher et al., 2007). Empirically, we would expect research on these intersystem, multiple-level cascades to expand.

Methodological advances also reflect improved capabilities in the science to measure and analyze multilevel and multivariate models (Masten, 2014b). For example, testing for developmental cascade effects requires repeated measures over time and statistical approaches that can account for inevitably missing data and multiconcept, transactional models. In addition, practical advances in structural equation techniques and software for analyzing interindividual growth and linking such growth to other variables or growth parameters at other levels also became feasible.

Tools for assessing neurobiological function and change also spurred research on processes that might account for resilience (Masten, 2014b). Perhaps most dramatic was the rapid increase in genetic tools for assaying DNA and epigenetic change at a more reasonable cost. Additionally, new tools for assays of cortisol in hair as well as saliva were helpful in research on stress and adaptation, and strategies for safely and meaningfully imaging brain function in very young children also advanced. We expect these tools to be put to even more use in resilience science going forward.

Advances in the Knowledge Base

Research on resilience has expanded dramatically at the biological level of focus, as noted. After many calls for greater attention to the neurobiology of resilience, numerous studies were undertaken with many more doubtless in progress. Psychosocial findings on resilience are now being studied at multiple levels to shed light on how change occurs, through both biological and social processes and intersystem interactions, and we expect the knowledge base to expand.

At the same time, there also has been remarkable progress in conceptual and empirical work on resilience in sociocultural context, in two major ways. First, there is simply more research in more diverse cultures focused on resilience, ranging from studies of resilience in child soldiers of Africa to survivors of disasters in regions all around the world, from China to Chile and Finland to South Africa. There is particularly more research on resilience in children of low-and middle-income countries, long neglected heretofore.

Second, there is more research focused on cultural similarities and differences in resilience processes. Specific areas of expanding science on resilience in cultural contexts include multinational studies, research on immigrant youth, research on investing in children globally,

and studies of children in ongoing political conflicts and war, including refugees (Masten, 2014a, 2014b). Research from diverse cultures supports to a surprising degree many of the major findings from earlier generations of resilience studies limited to a few cultures or economically developed countries. However, culturally focused research also highlights cultural differences in resilience and the culturally-grounded practices of communities designed to promote resilience (Ungar et al., 2013; Ungar, 2012).

This decade witnessed many additional and higher-quality intervention experiments pertinent to resilience, often in the form of gold standard RCTs (Cicchetti et al., 2006; Cicchetti et al., 2015; Masten, 2014b; Masten et al., 2015). Examples have provided throughout this chapter of intervention trials, including examples that illustrate how RCTs are beginning to include multiple levels of assessment that make it possible to study GxE and GxI effects and multiple-level cascades. We expect these directions of research, with their triple benefits—to theory, practice, and policy—to continue and expand in the coming decade.

More broadly, there is a surge of resilience-oriented research focused on investing in children and particularly children at risk globally, in both developing and developed nations (Lundberg & Wuermli, 2012; Masten, 2014a). Investment models for international organizations like UNICEF and the World Bank increasingly appear to reflect a focus on promoting competence and resilience, moving beyond survival. Additionally, international aid organizations are seeking evidence-based practices that build human capital and integrate resources across system levels to promote positive child development in very disadvantaged populations.

The past decade also is characterized by increasing attention to resilience in policies aimed at the well-being of children and adults at the local, national, and international level (Ager, 2013; Masten, 2014a; Panter-Brick & Leckman, 2013). We also see this translational application of resilience science continuing and also hope that it will be guided by the best possible research.

Future Directions

Given the progress and transformations we have documented in this chapter, we anticipate a fruitful decade of resilience science to come. We expect a continuing focus on multiple-level processes in models and methods that will fill in the many blanks in our understanding of how resilience works within and across levels, from the molecular level to the levels of individuals, families, schools, communities, cultures, media, and global policy.

As knowledge and tools continue to improve on the human genome and epigenetic processes, we expect a surge in theory-building and studies of resilience processes, particularly those that explain how naturally- and experimentally-induced adaptation influence resilience. We also expect more research on effective timing and targeting of interventions with respect to individual and cultural differences, biological programming, developmental cascades, and recovery pathways. We anticipate that there will be growing attention to the synergistic effects of integrated interventions that address multiple processes simultaneously to change the odds in favor of resilience and positive development.

In the coming decade, we also hope to see evidence that adaptive systems that developed in less optimal ways due to high adversity and inadequate protections can be recalibrated by new experiences. It will be exciting to see interventions that build resilience in the lives of children whose development may be compromised by residual effects of adversity or lack of protection.

Finally, we expect that the developmental study of resilience over the life span will become more integrated. A number of longitudinal studies are following cohorts later into adulthood, and the research on resilience in late life is expanding. Long-term studies of resilience have the potential to illuminate the benefits and costs of both adversity and resilience for future health and well-being.

The future of resilience science at this juncture appears to be bright with promise. No doubt critical evaluations of the theory and evidence will continue, as expected in a mature science. Challenges and effective responses to such challenges can build a stronger science. Thus far, resilience science appears to be robust in the face of challenges and contributing in meaningful ways to practice and policy that benefits children and societies, just as the pioneers envisioned.

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CHAPTER 7

Vulnerability and Resiliency of African American Youth: Revelations and Challenges to Theory and Research

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Until lions have their own historians, tales of the hunt shall always glorify the hunters who tell it.
—Ewe-mina (Benin, Ghana, and Togo) Proverb

Everybody is a genius. But if you judge a fish by its ability to climb a tree, it will live its whole life believing that it is stupid.
—Albert Einstein

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For the nation's citizens of color, 150 years following President Abraham Lincoln's signing of the Emancipation Proclamation and notwithstanding Barack Obama's election during the interim as the first African American and forty-fourth President of the United States of America, unequal access to supports and opportunities persists. The relationship between the presence of accessible supports and the level of challenge confronted (i.e., given myriad risks), considered together, potentially makes the fact of individuals' unavoidable human vulnerability status both more complex and potentially critical for pursuing (traditional) human development tasks (see Havighurst, 1953). The specific level and character of vulnerability is necessarily fluid, context linked and, thus, demonstrates plasticity. Although this fact is uncomfortable for some to acknowledge, and infrequently evidenced in the design of research and in its interpretations, at any given time irrespective of gender, race, ethnicity, skin color, and place of birth, all humans' daily experiences represent some level of vulnerability.

HISTORICAL AND CONTEXTUAL FRAMING OF VULNERABILITY AND RESILIENCY

Individuals' lives represent ever-changing exposure to assets and resources as well as experiences of risks and challenges (see Spencer 1995, 2006; Spencer, Harpalani, Cassidy, et al., 2006). For America's minorities, the insufficiency and uncontrollability of assets and the challenges confronted have much to do with their identifiability as "the other" and persistent situations of high risk.

Multiple studies explicitly express the role of resiliency among African American youth and also acknowledge

the need for them to cross "cultural boundaries" and to use achievement as a way of coping with stress linked with socially constructed conditions (Phelan, Davidson, & Cao, 1991; Pollard, 1989; Siddle-Walker, 1996). From the program of research conducted by Pollard (1989), the character of findings resulted in recommendations targeted to educators which suggested that they encourage students to have high expectations and reward youth for their achievement efforts. During the same time, Werner's (1989) study reported longitudinal findings on the developmental trajectory of children that had experienced high-risk pre- and perinatal births. By the mid-1990s, several studies were examining resiliency for African American youth. Since that time, these studies have evolved with increasing attention to theoretical orientations, considerations of environmental influences inclusive of, but beyond that of the family, and nuanced methodological and statistical approaches for analyzing complex phenomena. Despite these advances and recommendations, for many African American youth, outcomes have declined in education, in physical health, in mental health, and in more general well-being. To address these contradictory trends, this chapter provides a sociohistorical framing in reviewing research that has informed the field, with specific attention on African American youth vulnerability and resilience.

Contextual Background: America's Race Salience Dilemma

Obtaining achieved good outcomes while facing significant obstacles is generally viewed as demonstrations of resiliency (see Spencer & Swanson, 2013). Accordingly, human vulnerability and resiliency are inherently intertwined; the former represent our human experience of normative and nonnormative challenges and supports, and the latter indicate successful outcomes albeit achieved under conditions of significant risk. Of course, efforts to achieve resiliency for self and others is not without dire consequences, as Sherman James and colleagues argued (e.g., see James, Keenan, Strogatz, Browning, & Garrett, 1992). Their patterned findings as epidemiological reports suggested an inverse relationship between socioeconomic status (SES) and hypertension. This paradoxical relationship between effort and health-challenging outcomes is associated with prolonged exposure to stress and is called John Henryism; their characterization follows.

> John Henryism is a strong behavioral disposition to cope in an active, effortful manner with the psychosocial stressors of everyday life. The latter include financial pressures, job demands, parenting, and managing interpersonal conflict, among other things. Persons manifesting the John Henryism coping style believe that daily stressors of this kind can be effectively managed (and high levels of psychological stress thus avoided) if they work hard and are determined to succeed. (p. 15)

Implicit in the James et al. (1992) analysis is that adult daily stressors may compromise the adequate provision of supports needed for carrying out developmental tasks due to racial gap differences for hypertension, diabetes, and oft-deadly stroke outcomes. Thus, adults' efforts to successfully meet developmental tasks relevant for themselves, their children, and others for whom they have responsibility are complex (see Havighurst, 1953). Life course efforts and goals designed to meet developmental tasks are not independent of the noted effort described by James et al.

Also relevant is the widely disseminated perspective by Swedish economist sociologist Gunnar Myrdal (1944), who posited a particular European perspective. In fact, virtually 50 years before the James et al. (1992) theory, Myrdal framed racial gap differences as an American dilemma and linked it to group membership. With a focus parallel to that of James et al., Myrdal also noted the significant physiologically adaptive costs for minority-status individuals. The analysis of African American historian Ralph Ellison (1944), a contemporary of Myrdal, posited that the process of living in a democracy and adhering to inherent democratic ethos represents the actual dilemma; thus, with a focus on the historical context, Ellison posited that the considerable physical and psychological costs hypothesized are related to the American Creed, which promises success with hard work. Our synthesis of the points of view salient for African American youth resilience and vulnerability implies that the extreme stress-creating dilemmas experienced by socializing adults and youth cannot be isolated from their efforts to tackle normative, stage-specific traditional lifelong developmental requirements. Tasks relevant to the life course call for a variety of supports and accessible assets (i.e., physical, social, economic, and historical)—both for youth and for socializing adults.

Research shows that African American parents embrace both American and African-based values and endeavor to instill both value systems in their children (Spencer, 1990b). Parents' values and history of sociocultural experiences with discrimination affect the socialization strategies instituted (D. Hughes & Johnson, 2001; McHale et al., 2006). Parents value honesty, academic success, and family responsibility and teach these values to their children. In addition, adults are likely to embrace culturally distinct values, which include among others kin networks, respect for the elderly, and mutual cooperation and sharing

(S. A. Hill, 2001; Murry, Berkel, Brody, Miller, & Chen, 2009). An underreported perspective is that parenting adults emphasize humanistic values over more ethnic specific parenting practices and values (Marshall, 1995). African American parents want to raise children with values and expectations common with all parents. At the same time, however, they recognize that although they raise their children to treat others with respect, they will not always encounter respect from others or have access to the same resources and supports as others. Accordingly, adults of color and particularly African American socializing agents have the additional and unique task of communicating to youth that the American Creed may not apply to their experiences. Relative to John Henryism (see James et al., 1992), also critically important to socialization effort and character is the reality that minority adults are required to communicate the socialization-relevant message noted without jeopardizing youth motivation, effort, and hope.

Relatedly, education has historical value linked to the belief that knowledge represents power and serves as a mechanism for obtaining economic stability. Parental experience with controlled access and lack of receptivity in schools has strained their own efforts for engaged involvement (Hanlon, Simon, O'Grady, Carswell, & Callaman, 2009). Given the wealth of research supporting the impact of parental involvement on positive academic outcomes for students, Black parents' perceived lack of involvement, as inferred by school personnel and defined largely as responding to calls from school and appearing for teacher conferences, is characterized as disinterest in the education of their children (Deslander & Bertrand, 2005; Gutman & McLloyd, 2000). The distancing of parents from the school also compromises the parents' access to information and informal factors relevant to resources. D'Agostino, Hedges, and Borman (2001) suggest that schools, specifically Title I schools designated as schools with a high enrollment of low-income students, create comprehensive procedures to engage parents who may also be confronting a myriad of unacknowledged circumstances critical to the socialization and support of students of color. Such procedures continue to be minimally implemented, creating limited accessibility for supportive educational opportunities for students and their families.

Patterns of asset accessibility (or not) may be connected with group membership and assumptions concerning social status that suggest inherent group value (e.g., given race, faith group, immigration status, national origin, skin color, and ethnicity). Unfortunately, the historically linked and broadly diverse challenges confronted by individuals and communities of color remain largely invisible, unacknowledged, and, in fact, minimally addressed by the social science and policy communities. Silencing discussions of disparity etiologies from a human vulnerability perspective, in fact, actually communicates the salience and dilemma of the persistent uneven resource distribution between groups of North Americans residing in the 50 states. In many ways, the situation is well illustrated by the African proverb cited at the beginning of this chapter. Specifically, the silencing of devalued points of view, particularly evident when pertaining to race/ethnicity comparisons and suggested shortcomings, matters; the situation determines whose "voice" is used for framing the experiences associated with one's racial group and thus the character of policies intended to be supportive. The situation contributes to the American dilemma as described by Myrdal (1944). Ellison's (1944) review of the work, however, noted that the continuing social ambiguity of the nation specifically concerning Blacks had more to do with the nation's Whites experiencing a clash between the American creed and what were actually everyday anti-American practices.

The lack of resolution of the conundrum described is not unexpected and influences the interpretation and framing of reports of patterned "gap" findings. The patterns of broadly disseminated between-group racial differences and outcomes, in fact, are merely further stereotypes of already maligned groups. Specifically, and as a case in point, the problematic descriptions and general pathologizing of African American males' life course experiences demonstrate the conceptual dilemma described.

The highly negative reporting and limited historical conceptualizing of the lives of African American males is evident as early as the preschool years and persists across the life course. For minority-status individuals more generally, the framing of gap findings frequently adds to active "problematizing" of lives rather than seeking and achieving insights as to contributing forces and persistent social conditions; thus, the dilemma suggests intergenerational significance. The work by Gibbs (1988) on Black males as an endangered species was designed to shock the nation into recognizing the impact negative and persistent societal conditions were having on their life trajectory. The emphasis was designed not to problematize but to create urgency for mitigating action. Rather than the latter, further stigmatizing occurred, creating heightened stress for caring adults who wished to protect youth from experiences that undermine their opportunities. Irrespective of the success level achieved, the stress associated with the experience of group stereotyping, oppressive situations, socially limiting conditions, and adverse health consequences of adults as a

function of the proffered efforts required, in fact, persistent and subsequently remain problematic.

For example, the literacy rates for Black boys at third grade are framed and disseminated broadly as the critical statistic used for determining the number of prisons requiring construction (see Neal & Rick, 2014). Similarly, the frequently disseminated statistical descriptions that note the existence of more Black males in prison than in college could be framed differently. That is, given that prenatal experiences and neonatal status of Black boys are not unlike those of other groups, literacy rate differences by third grade could be framed in ways which (a) question disparate and persistent contextual experiences, (b) consider accessible supports, and (c) evaluate opportunities had (or not) within the first 8 years of life. For example, a curious and consistent finding is that the status of Black boys is frequently linked to family SES. What is it about a low-resource socialization context that increases the high vulnerability of Black boys over that of girls (e.g., see Swanson, Cunningham, & Spencer 2003)? Given James et al.'s (1992) speculations concerning the dilemma of John Henryism and the racial differences in mortality and morbidity rates, it can be inferred that the social and contextual character of the life course suggests a dire prognosis for males of African descent. Accordingly, questions might inquire about: (a) the extraordinarily untoward social, emotional, and achievement-relevant experiences of Black boys in the first 8 years of life (e.g., achievement gaps, "special needs" labeling patterns, too few fathering figures, and context-linked coping responses to environmental experiences that label them as dangerous); (b) the character of and supportive capacities available in low-resourced communities (e.g., disproportionate contact with police for male adults and youth); and (c) compromised adult health status and socialization capacity to meet developmental task requirements. As indicated, the prenatal developmental status and perinatal experiences had by Black boys do not suggest anticipated gaps in cognitive, affective, or physiological differences by third grade. However, the compromising economic and stress relevant experiences had in the first 8 to 10 years appear impactful and significant in enough character for offsetting inferred developmental advantages evident at birth (i.e., given the absence of early gaps). Reports indicate neither physiological nor cognitive statuses of Black boys at birth that would indicate untoward middle childhood and early adulthood disparate outcomes (e.g., disproportionate Individualized Education Program assignment in school, contact with the criminal justice system, and more adult "prison time" convictions than college attendance when compared proportionally with similarly situated White youth). As suggested by the epigraph by Albert Einstein, erroneous criteria or descriptors may be used for assessing youth of color and particularly Black boys.

Frequently, undifferentiating explanatory labeling used for describing gap differences, such as "structural factor" effects, is, in fact, not helpful as it impedes serious proactive discussions. Alternatively, the unhelpful "explanatory devices," may actually limit consideration of serious and substantive queries having to do with (a) the nature of vulnerability, (b) the role of context and its persistency of compromising conditions, (c) the salience of culture as adaptive traditions, (d) the nature of assets required for resiliency, and (e) the myriad consequences of inadequate supports. Given James et al. (1992) theorizing, the lack of supports, in fact, may suggest a large and underacknowledged impact of John Henryism and influences due to the nature of microsystem experiences of youth. Additionally needed are insights about the salience of long-term challenges that represent persistent conditions of high risk in contexts which assume the same supportive impact of the American Creed for everyday experiences of all citizens.

The varieties of conceptual dilemma concerning the American Creed and the lack of equal access noted diminishes the production and availability of authentic information required concerning the specific character of resources actually needed and adequate for African American youth resiliency. Also affected and minimally understood is the impact of misinformation on youth performance. The situation impedes the design and delivery of adequate supports. Strangely, the shortcomings suggested are not represented in research strategies, overall project conceptualizations, or methodological techniques implemented. Nor are the challenges described evident and considered in questions asked by social scientists for determining their contributions to the broadly disseminated disparity findings that impact funding decisions. The dilemma is particularly salient for the developmentally relevant, conceptually unavoidable, and cognition-linked perceptions inferred by study participants themselves.

Although the impact of accrued individual insights might vary according to the group's status, all the factors are critical for youth, irrespective of race/ethnicity and SES. In addition and quite recently, social bias denial (e.g., given the election of the nation's first African American president) provides yet an additional source of social stress requiring coping and adaptations to alleviate psychological, physiological, and social impact. Failing to acknowledge social and racial stigma linked to group membership remains problematic, especially in the absence

of critical supports. The situation contributes to traditional "culture blaming" social science research explanations (see Small, Harding, & Lamont, 2010). Additionally, another postelection perspective suggests that the United States became "postracial" virtually overnight—that is, the American Creed is similarly experienced by all. At the least, the widely and rapidly disseminated assumption of a postracial America may have served to exacerbate the previously noted conceptual challenges.

The broadly aired, continuing, and social media–assisted conceptual strategy of framing the United States of America as a postracial nation attempts to reverse the U.S. identity as a race-conscious society wherein the American Creed and everyday race linked practices are at odds. The long-term program of research demonstrating race consciousness beginning in early child development was highlighted by Kenneth and Mamie Clark (1939, 1940) and Horowitz (1939). Research replications and extensions (e.g., Spencer, 1976, 1985; Spencer & Horowitz, 1973;), racial identity theorizing (e.g., Cross, 1991, 2003), and synthesis theoretical statements continued over the next several decades; see work by Spencer (1985, 1990a) and associates: Spencer and Dornbusch (1990); Spencer and Markstrom-Adams (1990); and Swanson, Cunningham, Youngblood, and Spencer, 2009. The focus has continued into the current period, although the research is plagued by problematic methodological strategies (see Brown & Bigler, 2005) and Kinzler and colleagues (Kinzler & Dautel, 2012; Kinzler & Shutts, 2008; Kinzler, Shutts, & Correll, 2010).

There is no question that even very young children are unavoidably aware of differences in values about and treatment by race. Changes in cognitive growth and development include the learning of stereotypes and objective concepts, given opportunities for learning the alphabet, colors, gender role expectations (representing similarities and differences), number recognition, as well as the treatment, values, and labels associated with racial/ethnic group membership; concurrently, the learning of "color-blind" attitudes by White children (e.g., see Brown & Bigler, 2005) might, in fact, belie their exposure to models and the learned expectations of White privilege (which is infrequently acknowledged or assessed in developmental science). With progressive increases in cognitive maturation during middle childhood and continuing into adolescence, progressively sophisticated analyses are evident and unavoidable, particularly with regard to color-associated evaluative judgments and attitudes and beliefs concerning group membership (e.g., see Fegley, Spencer, Goss, Harpalani, & Charles, 2008; McGee & Spencer, 2013; Spencer, 1990b; Swanson, Cunningham, Youngblood, & Spencer, 2009; Way et al., 2008). At the same time, there continues to be a penchant to ignore the significance of racial consciousness findings, maturation-associated patterns, contributions of such patterns to stereotyping and stigma, and myriad historical events leading up to the perspective of the twenty-first-century postracial America as the context for human development more generally.

Perspective and Significance

Lincoln's signing of the Emancipation Proclamation in 1863 was an important legal achievement. Nonetheless, regarding its everyday manifestation and influence on contemporary American life, the decree fails to provide the implied equity and fairness-valuing beliefs, attitudes, and practiced character traits assumed as the achieved outcome formally called the American Creed. Shortcomings include slight awareness of and concern about the psychological impact and challenges encountered over the life course on individual and group-level social experiences and policy-relevant consequences moving forward. The fact of the conundrum and its stability over time aids in explaining the high-risk contextual experiences had for some and a status of "invisible privileges" for others. For the most part, and as another contributing factor to this conundrum, the state of affairs is not acknowledged in formal social studies curriculum and disparate race-relevant academic experiences. Nor is the fact evident in the varied systems purported to afford myriad supports. In fact, social situations described as unequal conditions communicate a peculiar North American history.

Generally understated is another critical context-relevant development pressure on youth: the historical fact and persistence of inequality influencing the conduct of science. The shortcomings impact the research questions posed, the character of the theoretical and conceptual framing of the work posited, and interpretations of findings (as well as the conceptual framing of the scientific enterprise itself) (see Fisher et al., 1993, 2002; Graham, 1992; Guthrie, 1976). All these problems significantly undermine potential supportive impact (or not) of social policy and opportunities for fair practices intended to shore up equalizing conditions for all youth and, for the most part, their support-intending families. Consistent with the African proverb cited, a highly critical element of the persistent American inequality includes the limited conceptual framing of human development research and theorizing for those considered "other" (see

Harris, 1995). For example, the design of significant numbers of studies on American youth of African descent is frequently troubling. As an example of one major research flaw, methodological strategies too frequently compare low-income minorities with middle-income Whites. One result has been a conceptual pattern for minority status to be viewed as synonymous with lower income status, no matter families' actual social class status. The consistency of this pattern reveals the American Creed fallacy; in fact, housing restrictions, employment discrimination, loan procurement traditions by banks, and "redlining" (housing) practices continue to control the neighborhood opportunities, including quality-of-life concerns (e.g., healthy food options and services), available to working-class and middle-income families of color independent of their actual earning capacity and income bracket. Accordingly, the attendance of nonpoor minority children in schools characterized by percent of participation in free lunch programs is never disaggregated from school-level labels (i.e., level of participation in free lunch programming). Among other disadvantages, the practice contributes to the assumption of homogeneity among residents within the Black community, an assumption that ultimately fuels stereotyping and synonymous (low) expectations. As suggested, notwithstanding long-term critiques of comparative practices in research (i.e., along with other similar methodological oversights), the undifferentiating and stereotypical conceptual associations made about minority life—and particularly the development of African American children—continue as routine and troubling traditions (e.g., see Fisher et al., 1993, 2002; S. Graham, 1992; Guthrie, 1976; Spencer, 1990a; Spencer, Brookins, & Allen, 1985). The conceptual orientation and patterned research tradition encourages a level of superficiality of knowledge garnered about the context of human development processes for varied individuals of color as well as many diverse generational immigrant groups. These underacknowledged practices compromise perspectives about the risks and challenges confronted by children of color and thus normative levels of high vulnerability. Additionally, the frequent and a priori "strengths- or asset-free" character of such research minimizes contributions to non–problem-focused questions about life experiences of minority children and adolescents.

Our approach posits that all humans are unavoidably vulnerable (i.e., are confronted by challenges and risks) but have access to myriad supports and unique protective factors (see Spencer, 1995, 2006, 2008a; Spencer et al., 2006; Spencer, Swanson, & Harpalani, 2015). Thus, given the balance between accessible supports versus challenges and risks, appropriate ways of describing situations include statuses of high versus low vulnerability. Resilient individuals are those burdened by high risks and challenges but are able to take advantage of high (and often unique) supports. Privileged individuals may have challenges and risks but simultaneously benefit from superordinate levels of accessible and numerous supports and protective factors. The history of the social sciences has generally associated minority status with high vulnerability conceptualized narrowly as high risk level; Whites and favored minority-status (i.e., particular subgroups of Asian Americans) individuals have been associated with "normalcy." The privileged American status of the latter groups is generally unacknowledged. The former situation is an added source of social risk and conceptual challenge for research and policy on African Americans; the latter circumstance is viewed as an additional component of an individual's knapsack of privilege, as described by Peggy McIntosh (1989) and other critical race theorists. Historical critiques of research traditions on minorities have been explicit although generally insignificant impacts on the conduct of social science (e.g., see Guthrie, 1976). As indicated, contemporary methodological and conceptual dilemmas linked with the framing and implementing of research on minorities of color continue to represent a "flat learning curve" (e.g., Fisher et al., 1993, 2002; S. Graham, 1992; Spencer, Brookins, & Allen, 1985; Spencer & Spencer, 2015; Swanson, Spencer, Harpalani, Noll, Seaton, & Ginzberg, 2003).

In fact, the dilemma is clearly illustrated by a recent large-scale, positive youth development (PYD) study (see Lerner et al., 2011). Representing an impressive scope, the long-term, large, and much-needed undertaking included virtually 7,000 participants, living across 42 states, and represented at least eight repeated sequential points of data collection; in fact, given the sensitivities and sensibilities of the collaborators, the multiyear national data collection project included a variety of minority participants. However, the implementation of even this carefully conceptualized study, which suggested a critical consciousness concerning minority representation, still failed to include adequate numbers of minority youth to successfully accomplish within- and between-group analyses.

As indicated by the *Commentary* on the recent publication of project outcomes (see Spencer & Spencer, 2015) and particularly given the PYD emphasis, what could be conceived as a research implementation failure represented much more than a missed opportunity. If analyzed from an ecological perspective (see Bronfenbrenner, 1992), which acknowledges the contributions of the chronosystem and thus historical forces on the character of ecologies navigated by young people, missed opportunities were

numerous. These missed opportunities were particularly salient for African American male youth, given that preexisting circumstances require close attention to understand contemporary everyday inequalities and long-term representational inequities in the conduct of science. In fact, across the life course, living as a Black male is fraught with myriad and unique challenges (e.g., see Barbarin, 2013a, 2013b; Barbarin et al., 2013; Boykin, 1986; Cunningham, Swanson, Spencer, & Dupree, 2003; Lewis, Butler, Bonner, & Joubert, 2010). The perspective described and methodological inadequacies noted (e.g., sampling flaws) are consistent, as well, with the Einstein epigraph. Accordingly, if vulnerability is defined as a universal human characteristic wherein everyone has both protective factors or assets and risk characteristics or challenges, having available assets or accessibility to resources matters. That is, protective factors must be present and prominent to offset the dilemma and extraordinarily high-risk situations.

When it comes to racial group membership in the United States, and as described by Cooley (1902) over a century ago, the context character for one's evolving sense of self matters. In fact, Cooley noted, "The thing that moves us to pride or shame is not the mere mechanical reflection of ourselves, but an imputed sentiment, the imagined effect of this reflection upon another's mind" (p. 152). Although represented as varying realities consistent with the individual's stage of development, mechanisms associated with biologically determined maturation experienced in multiple layers of social context are unavoidably unique, influential, and heighten awareness of self-relevant perceptions. For example, the egocentrism of young children associated with normal maturation protects the self from troubling race/ethnicity associated feedback of the type described by Cooley (i.e., particularly during the sensorimotor and preoperational periods of cognitive development) (see Spencer, 1976, 1982a, 1982b). However, as children move into middle childhood and adolescence, changes in inference-making capacities occur. Appropriate, expected, and diminished cognitive egocentrism takes place. Progressive cognitive shifts change the character of manifested egocentrism (see Elkind, 1966, 1967). This, in turn, reverses the ego-protecting function of children's developmentally appropriate level of cognitive development (see Spencer, 1985, 1990a). Thus, when linked with Cooley's perspective, Einstein's quote demonstrates overlapping and synergistic links between maturation-based cognition, socio-emotional functioning, and unavoidable human biological processes of youth; children's intellectual (cognitive) processes are associated with their emotional life, which are collectively connected recursively to biology and thus are unavoidable aspects of human development and functioning.

Given the context of development and recursive experiences had with others—and as suggested by the Cooley (1902) quote—identifiability with and/or membership in a particular racial group or ethnicity still matters in twenty-first-century America. Accordingly, when considered long-term from a chronological perspective (the chronolevel of the ecology), the history and treatment of minority groups must be factored into analyses for achieving authentic insights and understanding of group members' contemporary life experiences. Thus, history provides insights about the problem of persistent inequality—as context—and individuals' daily experiences. Appreciating the character and expressions of human vulnerability and resiliency of North American children and adolescents of African descent must be framed from a historical standpoint, which provides interpretive framing for contemplating needed supports, policies, and enveloping practices. That said, and as an opportunity to situate and emphasize the fact, race/ethnicity (i.e., identifiability with group membership) represents a source of significant risk for some (thus, increasingly high vulnerability) and, at the same time, corresponds with unacknowledged privilege for others (thus, lowered vulnerability).

The next major segment of the chapter highlights the concepts of vulnerability and resiliency, providing a necessary perspective inclusive of all humans. In particular, it provides broadened perspectives and interpretations of development for youth of color. The section includes a discussion of the residual problem of slavery and its enduring character, which determines the context for human development while also serving as an influence on implemented policies and practices (i.e., the "what" and "how" of policies and practices intended to support and assist). The historical perspective also considers the persistency of privilege as Whiteness and African Americans' treatment as property associated with protected legal rights (see Harris, 2002) and describes contemporary colorism themes as well. The chapter discusses an ecological systems human development theory (i.e., phenomenological variant of ecological systems theory, PVEST). As an identity-focused cultural ecological perspective, PVEST is a unique life-course human development theory. Its context and culturally inclusive character accommodates the experiences of diverse humans (i.e., both minority and majority group members) as each navigates unique and traditional tasks associated with specific periods of the life course. The distinctiveness of the dynamic and recursive systems perspective lies in its ability to represent, address,

and explain the mechanisms of human development (i.e., both as processes and as outcomes) of minority as well as majority group individuals; thus, it explains development of humans (i.e., not only individuals of color). Accordingly, as an identity-focused cultural ecological perspective, PVEST encompasses the minority life-course experience and majority group meaning-making processes, thus affording a strategy for examining the vulnerability status and resiliency patterns of African American children and youth while, at the same time, acknowledging the role of the American Creed and historical contributions that reified "Whiteness."

HUMAN VULNERABILITY AND RESILIENCY

Before providing as background the role of history in the everyday contemporary lives of African American youth, a discussion of vulnerability and resiliency is critical. Consistent with all stages of the life course and as suggested elsewhere (Anthony, 1974; Spencer, 2006; Spencer, Harpalani, Cassidy, Jacobs, et al., 2006; Spencer & Swanson, 2013; Spencer et al., 2015), adolescence unfolds in contexts influenced by the particular historical moment, physical space, sociocultural traditions, and distinct interactions among them. As part of their efforts to achieve adulthood status, adolescents strive to attain progressively abstract academic and career-linked competencies as well as socioemotional-relevant relational skills. Their efforts may occur in generally underacknowledged conditions of stress and risk as well as with broad arrays and levels of support. Nonetheless, expectations for youth stage-specific outcomes and adulthood-supporting competencies are broadly disseminated by the media, which also aid in their reinforcement and maintenance. Thus, the socially constructed and historically linked variations in levels of support are frequently overlooked or not recognized in media portrayals of the many within- and between-group gap findings. Group membership as social identifiers, including gender, race, immigration status, skin color, ethnicity, and socioeconomic position, influences the availability and accessibility of resiliency supports. The American Creed frequently prevents candid discussion of social differences in group-associated treatment. The absence of authentic ways of acknowledging the salience of identifiability and stigma is problematic. Accordingly, also missing are options to discuss the impact of the shortcomings and unavoidable implications—to name a few—such as the training of professionals (e.g., teachers, health professionals, criminal justice personnel), the conduct of research (e.g., the nature of the sampling technique), the design of programming (e.g., social and health delivery services), and the framing and ultimate implementation of policies. The exemplar categorical associations noted impact statuses of privilege and, at the same time given one's particular categorical position(s), support insufficiency. These associations are both alarming and informing. The possible impact of supports and challenges for groups of individuals have the potential to widen gaps by further privileging situations for some while simultaneously and potentially adding to the challenging conditions endured by others.

The theoretical stance taken emphasizes the shared human experience of vulnerability. The level of vulnerability indicates the balance (or imbalance) between protective factors accessible versus risk level present; both vary, and thus human vulnerability shows significant plasticity. The fact of human plasticity reinforces the importance of accessible supports and the impact of risk conditions (i.e., both perceived and in fact).

Accordingly, our view posits that as a life-course fact, all humans experience a variety of risks as well as secure benefits from protective factors of one sort or another as each individual navigates the world (see Spencer, 2006, 2008a; Spencer & Swanson, 2013; Spencer et al., 2015; Spencer & Tinsley, 2008). The framing suggests that human vulnerability does not reflect most traditional research perspectives but instead, consciously or unconsciously, situates privilege (including generally unacknowledged benefits) as the status of all citizens. The assumption implied is one of equal accessibility to supports, thus implicitly reifying the genuineness of the American Creed for all. More specifically, equity as fair competition and equal opportunities for advancements are seen as uniformly attainable. Given actual lack of credibility and legitimacy of this view for the everyday lives of particular citizens (i.e., especially those of color and/or highly impoverished individuals), the assumption demonstrates shortcomings. The inference of equal access promotes the conclusion that disproportionality or failure for some, and the patterned successes for others, are legitimate and "earned" achievements or group status outcomes. That is, some of a society's citizens, as success stories or assumed earners of superior performance, are portrayed as the norm. Individuals' disproportionate access to protective factors and supports (i.e., those enjoyed without full acknowledgment of them) is seldom noted. Given the inequalities that characterize experiences by group membership, theorizing for those having experienced such sensitivities has been helpful.

An Inclusive Perspective: Phenomenological Variant Of Ecological Systems Theory

Providing new conceptual strategies of salience to all humans, phenomenological variant of ecological systems theory (acronym pronounced: P-VEST) is a human development framework that acknowledges the critical role provided by individuals' own perceptions (Spencer, 1995, 2006, 2008a; Spencer, Harpalani, Cassidy, & Jacobs et al., 2006; Spencer, Swanson, Harpalani, 2015). It focuses on identity formation while considering structural factors, cultural influences, and individual perceptions of self, significant others, life experiences, and the environments in which one lives and copes; the processes unfold for individuals or groups while they navigate across myriad social and physical contexts. As such, the system's framework is conceptualized as an identity-focused cultural ecological perspective, which represents significant and unavoidable plasticity. Identity formation takes place across the life course and is especially relevant for adolescents, given their heightened self-consciousness during that period of development. PVEST combines its emphasis on individual perceptions with Bronfenbrenner's ecological systems theory (1979), thus linking context and perception. While Bronfenbrenner's model provides a means for describing the ways in which multiple levels of context can influence individual development, PVEST illustrates life-course development within and between contexts and group membership. In doing so, it emphasizes the individual's meaning-making processes that underlie identity development and responsive behavioral processes and outcomes (Spencer, 1995, 2006, 2008a); both are linked with the developmental tasks and maturational themes salient for the particular developmental period. As typical and atypical risks and challenges are confronted, the character and level of accessible supports play critical roles.

Supports and challenges matter particularly for youth development. The theoretical perspective of PVEST helps situate work by McIntosh on privilege and the concept of John Henryism detailed earlier. McIntosh (1989) designated the frequent (but unarticulated) association of support with high status. Characterizing the advantages as having to do with "Whiteness," she described the association of Whiteness with privilege and indicated an individual possessing or having access to (or not) a knapsack of privilege. McIntosh suggested that benefiting from a "knapsack of assets and privileges" makes a difference; appropriating greater success with less effort, developmental tasks are handled with greater ease. However, the lack of easy access and "assumed privileges" and greater exposure to attendant tension (i.e., given minority-group status and social stigma) is infrequently acknowledged or considered in programs of research or the evaluation of research. Importantly, patterns associated with persistently high-risk status and hurdles related to multiple contexts matter as well. Additionally, the dilemma associated with high risk status, in fact, multiplies the problem of patterned adversity, given that significant challenges are perceived as "ordinary" life-course experiences. The dilemma virtually explains the physiological adversity described by James et al. (1992) as "John Henryism." More troubling, assumptions concerning legitimate outcomes of meritocracy accompanied by assumed parallel individual-level investments of labor, hard work, and intrinsic motivation (believed expended) reinforce stigma; they compound the state of privilege as "norm level" and reaffirm assumptions concerning effort expended for particular—and, in fact—privileged individuals. For some, widening outcome gaps reinforce stereotypes of laziness, lack of motivation, and intellectual deficits assumed to represent native capacities for the particular undervalued referent group.

In contrast to these views, a conceptual commitment to the universality of human vulnerability and its dual contributors as protective factors and risks allows for greater exploration of the "how" of outcomes and not just the "what" as a development-specific product. The suggested alternative conceptual frame connects risks as pitted against individuals' diverse strengths and protective factors. The PVEST framing allows for consideration and analysis of particular levels (and character) of supports and protection. The framework affords a nuanced analysis that makes explicit both culturally specific and shared protective factors, strengths, and supports (e.g., intergenerationally based resources, religious beliefs, social connectedness, spirituality, faith traditions, cultural socialization practices, social connectedness, etc.). Also critical and a conceptual benefit of the framework is that a group's high vulnerability due to significant social risks (and neglect) are acknowledged (e.g., reversed policy impact, low school resources, significant levels of stigma and stereotyping, inadequate health resources); the emphasis is different from that of traditional social sciences and specifically developmental stances, which ignore their salience (see Spencer & Tinsley, 2008).

In fact, Spencer & Tinsley (2008) indicate that there are at least two strategies for interpreting standards upon which programs of research are implemented and findings are evaluated and interpreted. One considers primarily protective factors for certain youth and groups; in parallel fashion, strengths of other youth are viewed as basically

inferior or invisible in regard to salience. The latter group of young people, in fact, are represented in the literature as possessing primarily and narrowly defined risk factors; their availability of protective factors is not acknowledged (e.g., both as familial and group traditions and shared strengths). Accordingly, this shortsighted perspective is associated with assumptions of meritocracy for some and presumptions that high-risk-status individuals are devoid of strengths and supports. The clear bonus of the PVEST conceptual strategy is its inclusiveness of experiences representing culturally diverse communities and making explicit how the traditions are protected or challenged by specific opportunities or burdens. Accordingly, these research values or perspectives contribute quite different insights into the policy, research, and practice (e.g., as pedagogy) traditions which are present at any historical point in time, impacting life course outcomes. The conceptual strategy and framing of PVEST not only explore and acknowledge significant imbalances in human life experiences but potentially introduce significant dissonance when one reflects on the conduct of social science research, theorizing, and everyday policy-relevant practice.

Challenges to Youth Development

Irrespective of supportive conditions, biological, cognitive, and affective changes still have the potential to enhance youth vulnerability, thus contributing to findings that suggest typical or atypical patterns of outcomes. As described, this fact also suggests that human vulnerability includes the relationship between frequently unacknowledged risks and frequently ignored privileges as protective factors. Supports matter, given the obligation to confront the requirements of developmental tasks (see Havighurst, 1953) and the psychosocial needs to support them (see Swanson, 2010). There are few points in life beyond adolescence (as well as the neonatal period) when the invisible or unacknowledged fact and character of vulnerability have more dire implications. Erik Erikson (1950) described human development across the entire life course and emphasized the need to focus on ego identity development as the defining characteristic of adolescence (e.g., see Muuss, Porton, & Velder, 1996).

Erikson (1950) explained that "psychosocial development proceeds by critical steps—'critical' being a characteristic of turning points, moments of decision between progress and regression, integration and retardation" (pp. 270–271) and proposed eight distinct stages of development. Police officers may perceive Black males' extended good-byes with friends or with group of youth as threats, no matter how they are intended. Being experienced as a threat is associated with Black males understanding of how they are perceived by the world around them, thus shaping turning points relevant in their development (Stevenson, 1997). For Erikson, each stage is characterized by a conflict between two opposing forces; the primary goal of development is the acquisition of ego identity. Stage 5, which occurs during adolescence, is defined by a conflict between identity and role confusion. Strategies by which adolescents resolve the identity conflict impacts their development through the final stages from early to late adulthood. With the onset of puberty, adolescents are "primarily concerned with what they appear to be in the eyes of others compared with what they feel they are, and with the question of how to connect the roles and skills cultivated earlier with the occupational prototypes of the day" (p. 260). Given the problem of unequal access to opportunities for minority youth (African Americans particularly), stage 5 experiences for African American youth might provide quite different identity resolution opportunities.

Without question, an accrued sense of ego identity is accomplished when "inner sameness and continuity prepared in the past are matched by sameness and continuity of one's meaning for others" (Erikson, 1950, p. 261). The danger of stage 5 is role confusion, a state in which individuals temporarily overidentify with peers held in high regard and, in doing so, seem to lose their own sense of identity. As a defense against role confusion, adolescents tend to be "clannish, and cruel in their exclusion of all those who are 'different,' in skin color" (p. 262) and other arbitrary characteristics. The differences in accessible supports matter. At the same time, inordinately high levels of challenge and stress variation make the identity processes (i.e., given coping supports) quite different for youth even if they appear to share "similar contexts." For example and relative to identification processes, the election of White presidents has not represented the same challenges and assumptions about "Whiteness" for European American youth as it has for people of color, given the nation's election of its first president of African descent (e.g., broad media-disseminated assumptions of the achievement of a postracial status hours following the election of Barack Obama).

To further illuminate the complex processes experienced during Erikson's fifth stage, James Marcia (1966, 1980) described and empirically validated four distinct modes in which adolescents react to the identity crisis. The four modes differ along two variables—whether the subjects have undergone a crisis and whether they have committed to a particular occupational, political, or religious

ideology. Identity achieved individuals have experienced a crisis or exploration period in which they were forced to reevaluate their beliefs and have emerged from the crisis with a commitment to a particular identity. Exposure to myriad privileges would be expected to impact the process. Foreclosure individuals have also committed to particular ideologies or occupations but have not experienced the crisis period. These individuals tend to exhibit identities that mirror those of their parents or other socializing adults; these identifications are potentially dissonance producing for youth of color, given the extra stress and strain on parents and a potential John Henryism level of effort required for carrying out societal roles (see James et al., 1992). Thus, the greater challenges associated with minority status (including relational processes with parents) makes the identification processes of minority youth more nuanced (at best). McIntosh's (1989) knapsack analogy suggests that high-privileged parents may experience adult developmental tasks differently, given their access to unacknowledged privileges linked to Whiteness. Obviously such experiences are quite different from the support insufficiency situation described by James et al.

Moratorium individuals are actively engaged in the adolescent crisis period; that is, they explore different paths and question belief systems. From moratorium experiences, individuals may reach a point of commitment and identity achievement or may disengage from the crisis without making a commitment, thus entering the next stage, identity diffusion. Of course, the extrarelational challenges associated with minority status indicate that the comfortableness of engaging primarily in experimentation may not be an option for youth of color. Identity-diffusion individuals are characterized by their lack of interest in committing to a professional, political, or religious path. For youth whose participation may be associated with membership in a stigmatized group or living under support insufficiency conditions, their options may be more limited; thus, diffusion may well be more constrained or show unexpected variations for youth of color. Not surprising, atypical trajectories may be observed more often, and researchers who perform uncritical analysis may infer simplistic conclusions that further promulgate stereotypes.

According to Marcia's (1966, 1980) identity status framework, identity achievement is a dynamic process, which means that an identity-achieved individual can regress to a state of moratorium many times over the life course. When the environment changes and individuals are faced with dissonant value systems (e.g., questionable and dissonant feedback about the self and beliefs about what is possible), they may return to a state of moratorium. At any point, the moratorium individual has the potential to become either identity achieved or identity diffused. These shifting processes require psychic energy and supportive environments for productive resolution. Of the four modes of Marcia's framework, identity achievement is associated with the highest self-esteem and greatest resilience in the face of negative feedback. It is important to avoid value judgments when comparing foreclosure and moratorium. Each may be adaptive, depending on social context and individual differences. However, the level of misinterpretation of the achievement gap fomented by Fordham and Ogbu's (1986) "acting White" characterization provides a case in point. Alternative interpretations have posited identity-focused but culturally and ecological-sensitive perspectives relevant to meaning-making processes of youth. The more general historical events reportedly experienced immediately following the end of slavery suggest a perspective not consistent with the Fordham and Ogbu perspective (see Spencer, Cross, Harpalani, & Goss, 2003). As described by Cross (2003) and by Siddle-Walker (1996), historical documents as contextually relevant evidence suggest an overall valuing of education by Black educators and communities. Cited historical data and research reported by Cross and by Siddle-Walker reveal a general activist orientation by Black educators in support of the development of competence formation among youth. The observations are generally not included in the design of research for implementation, which emphasizes the role of teachers (i.e., attitudes, beliefs, social and emotional connectedness, and values) and may aid in explaining the findings of the atypical late-twentieth- and early-twenty-first-century achievement gap.

Another strategy that links contextual factors with typical and atypical findings for Black youth is Boykin's (1986, 2000) analysis, which makes clear the potential impact of the context on tensions experienced in learning environments. His approach describes the source of and reason for heavy psychic energy misuse as the "triple quandary." Boykin's characterization is consistent with PVEST (Spencer, 1995, 2006, 2008a); he reaffirms the role of cognitive mechanisms, coping processes, and identity pursuits. Boykin describes the three elements of the achievement triple quandary identity dilemma as the need of youth to balance identities; the three identities include a "mainstream White experience," the minority [status] experience, and the specific (and frequently highly devalued) Black culture experience (see Boykin, 1986, 2000). Boykin's analysis, which is focused on identity and coping, suggests that the issue may not be youths' association of school-linked competencies with "acting

White" identifications. From a PVEST perspective, the efforts of African American students indicate ego resiliency attempts to protect the self, given cultural values and the lack of contextual experiences that provide for a seamless inclusion, for example, in their school.

According to Spencer and Harpalani (2008), Fordham and Ogbu (1986) were not the first to characterize the minority achievement gap as "acting White." That perspective had been argued over a dozen years earlier by McArdle and Young (1970). Counter to the perspective emphasized by Ogbu and Fordham, Spencer and Harpalani suggest that "gap findings," in fact, represent a virtual "youthful pushback" from values designed to demean, devalue, and disgrace. Youth of color, frequently in environments of stigma and stereotyping, push back from accepting school-linked preferences and values. More specifically, youth consider the oft-dominating values as focused efforts to denigrate Black culture, values, and beliefs (Spencer & Harpalani, 2008). Spencer and Harpalani concluded that youth need to resolve the counteridentifications noted (i.e., consistent with the triple quandary analysis proffered by Boykin) while simultaneously coping with school-relevant competencies.

In regard to the acting White perspective, it appears fair to speculate that at any given time, youth have a finite amount of psychic energy for responding to school-relevant developmental tasks. The emotional combating of self-relevant (mis)labeling by youth represents a significant misuse of psychic energy. Efforts by African American youth to protect their "cultural heritage" and race-relevant "selves" is energy consuming. The process may leave less psychic energy available for satisfying or resolving the tasks at hand (i.e., an academic learning orientation, productive school record, and achievement outcomes). Further, and as implicated by Marcia's (1966) identity status perspective, identity processes for stigmatized group members require more adaptive processes (i.e., both reactive and stable coping) and, accordingly, would be expected to be significantly and behaviorally nuanced. And as a function of unavoidable plasticity, adaptive processes suggest many more opportunities for producing atypical outcomes relevant to ego identity.

Commensurate with the reactive and stable adaptive coping processes required when framed by a PVEST perspective, achievement outcomes for Blacks are often "explained" by "event labeling" (e.g., acting White or stereotype threat). Event-specific labels fail to acknowledge the complexity of the process and the contributions of supportive cultural traditions (e.g., religious identity [Brittian & Spencer, 2012]), the designation and importance of "referent others" (e.g., an elderly, culturally affirming next-door neighbor) who represent important sources of cultural identification and allegiance (see McGee & Spencer, 2013).

In addition to informing convictions regarding careers, religion, and politics as normative tasks toward productive citizenship, racial and ethnic minority youth must also adopt an identity congruent with their group membership that offers the foundation of group strengths in contrast to the stereotyped societal messages promulgated in the media. Various models exist for explaining and assessing the relationship of these identity processes on youth outcomes (Cross, 1991; Sellers, Smith, Shelton, Rowley, & Chavous, 1998). Although there are between-group influences and differences in how identity formation develops, nonetheless, there is consistency regarding the impact on viewing the world from a Eurocentric lens versus a secure racial and ethnic identity. The former situates youth for internalizing stereotypic messages, while the latter may contribute diverse perspectives without youth risking their own identity. Luthar and Lattendresse (2002), in contrast, describe maladaptive coping of privileged youngsters who lack adaptive coping practice opportunities. However, from a developmental science perspective, few studies examine privilege, "fear of differences," and commensurate identity processes in the case of White, middle-income youth.

Thus, the contributions of historical circumstances, particularly the institution of slavery, assist the current conceptual task by linking the history of North American slavery to contemporary and frequently highly challenging experiences of youth and the impacts of Whites' perceptions of their own privilege as it functions and represents the context for others' human development. Another interesting revelation is the infrequent acknowledgment of the significant and positive impact, historically, that the Black community had on its residents and their children (see Siddle-Walker, 1996). In contrast to the historical role of the Black community and Black schools as described by Cross (1991) and Siddle-Walker (1996), the lack of an ego-supporting environment for Black youth in contemporary school and neighborhood settings is described by Stevenson (1997) as resulting in youth feeling "missed, dissed and pissed." That is, no matter the historical relationships of Black youth in their schools and neighborhoods (see Cross, 2003; Siddle-Walker, 1996), legitimate inferences and unavoidable meaning- making processes of contemporary youth in hostile environments are important (e.g., see Chestang, 1970). Such cognition-, psychosocially-, and biology-dependent processes matter for oft-reported findings of achievement gaps. The situation serves to

compound school-associated relational and identity challenges for both students and families.

Historical Placement

It is important to acknowledge that the 2015 publication of the third edition of the *Developmental Psychopathology* handbook also marks the 150-year anniversary of the passing of the Thirteenth Amendment to the Constitution, which marked the December 1865 abolishment of American slavery. The maintenance of the institution of slavery contributed to significant levels of dissonance.

Historical Relevance of Slavery for Contemporary Cultural and Social Traditions

The institution of slavery was viewed by Thomas Jefferson, one of the nation's Founding Fathers, as a necessary evil. The views held about African slaves and their economic benefit, particularly to the South, resulted in the establishment of the Confederacy and the waging of the Civil War. There is no doubt that slavery was seen as an economic benefit but also represented frequent concerns about potential social consequences of freed slaves, given the less-than-human labeling assigned to them. It is critical to acknowledge that the passing of the Thirteenth Amendment to the United States Constitution in 1865 was an enactment of policy. It did absolutely nothing to contain or change the broadly held assumptions, values, assessments, and beliefs concerning people of color as fellow humans residing as equal citizens of the nation. As suggested by the Chestang (1970) analysis, the inhumane labeling solidified the socialization task for parents of Black children to engage in supportive parenting and positive youth development efforts, albeit under multilayered hostile ecologies and practices regarding home, school, and neighborhood experiences. Situations and strategies to change thought processes concerning color-associated "difference" were neither acknowledged as fundamentally needed nor formally enacted. In sum, policies were fomented and filed as the law of the land, which—of course—was no small feat. However, continuing attitudes, beliefs, and feelings about the price paid for the freedom of "unlike others" were left virtually unaddressed for over 140 years. More specifically, during the recent half dozen plus years (and following the passage of the Thirteenth Amendment in 1865), several reconciliation-relevant resolutions were passed. In 2007, the State of Virginia Assembly was the first state to pass the House Joint Resolution (Number 728) acknowledging "with profound regret the involuntary servitude of Africans and the exploitation of Native Americans, and call for reconciliation among all Virginians." On July 30, 2008, the United States House of Representatives passed a resolution apologizing for American slavery and called for reconciliation for the subsequent discriminatory laws. The United States Senate followed suit on June 18, 2009, also apologizing for the "fundamental injustice, cruelty, brutality and inhumanity of slavery." However, assuming no real damage or long-term harm, the latter statement also noted that the resolution passed could not be used for requesting restitution. It is important to concede that before the Virginia resolution in 2007, 142 years passed when absolutely no responsibility was taken for the nation's institution of slavery and treatment of Blacks during the interim. Further, one might infer that the general opinion continues to be that the sustained beliefs and traditions about people of color during the interim were not salient in the design of supports, or contemporary race relationships, requiring redress of any kind.

Unlike the end to the institution of American slavery, at the end of apartheid in South Africa, truth and reconciliation public hearings provided opportunities for psychological processing of its long-term and heinous character as an unjust and brutal social and political system. The tribunals at Nuremberg at the end of World War II served a similar purpose. In fact, contemporary efforts continue to support the efforts of kin to obtain valuables confiscated from ancestors brutally killed in Europe.

As noted, however, and for over 140 years following the end of slavery and passage of the Thirteenth Amendment, responsibility was never assigned nor guilt acknowledged moreover than political resolutions generated and filed. The amendment provided rights but without accountability for protecting individuals' rights against exclusionary practices. Accordingly, one perspective about the persistent adverse attitudes and identity construal of Black Americans is that unaddressed and residual attitudes, assumptions, and beliefs continue to contribution to contemporary contextual and psychological conditions. The unacknowledged circumstance results in the enjoyment of privileges for some and enduring threat as sources of significant everyday risk and challenge for others (i.e., leading to multilevel support insufficiency). The conundrum has implications for practices and traditions across the life course and at all levels of social ecologies, including implications for conducting research, implementing practice, and shaping policies. For the nation's youth, the lack of attention has added to the complexity of experiences evident both within and between groups' everyday developmental experiences (i.e., particularly youth of color). Identifiable resources and access to them matters; thus,

protective factors such as Whiteness for Caucasians and skin tone differences for African Americans (as well as cultural socialization experiences needed for coping with persistent and nuanced discrimination) have implications for the character of treatment, risk level confronted, and accessible or experienced supports. Color and race still matter for African American youth.

Historical Framing of Challenge and Opportunity from a Critical Race Perspective

Critical race theory affords a late-twentieth-century and early-twenty-first-century lens for framing the design and interpretation of research on African American youth (i.e., particular patterns of findings for typical and atypical outcomes). For our purposes, it also provides a strategy for utilizing historical events for interpreting twenty-first-century findings about developmental outcomes for minority youth (i.e., both expected outcomes and more atypical ones). The use of historical sources supports the centrality of particular opportunities and challenges regularly confronted by youth of color. At the same time, the historical backdrop provided and critical race perspective, collectively considered, afford explanations for the particular types of opportunities and challenges confronted by Black youth. Additionally and of relevance to resiliency findings, critical race considerations provide useful ways of thinking about salient constructs for consideration in programs of research but too frequently remain conspicuously absent. The conceptual deficiency disguises and complicates authentic comparisons between the daily reality of minority group youth versus those of nonminority youth, who customarily enjoy or benefit from what has been referred to as "Whiteness as property" (Harris, 1995). In this case, the term *property* suggests experiences including opportunities that are governed by social rules; relatedly, the North American brand of slavery had unusually horrific social rules. In fact, and consistent with this perspective, D. B. Davis (1966) described the continuity of slavery as a concept as well as a social and legal category. Operational Whiteness traditions separated Blacks and Whites relative to slavery. However, Whiteness itself became associated with sets of social rules and traditions in the mode of property, as described by Harris (1995); from this lens, Blacks became objects of property (i.e., Whiteness). Davis suggested that slavery in the modern Americas was remarkably dissimilar from other forms of slavery; its uniqueness had to do with its importance as an economic commodity in the plantation economies. Thus, that importance was a key reason for its distinctness. Perhaps its uniqueness and continuation into the twenty-first century is due to its continuing economic impact. More specifically, failing to confront the view of Whiteness as property suggests that the dire outcomes for Blacks functions as an economic system (i.e., job creation, which sustains the contemporary form of an earlier tradition). Careers can be devoted to "fixing others" or the design and implementation of policies and practices misconceived and inadequate as supports for guaranteeing opportunities for self-determination among Blacks.

The social rules that were altered with Lincoln's signing of the Emancipation Proclamation represented a change in a legal tradition. However, it might be argued that the social rules governing everyday access to power and the control of power over nonmaterial resources (e.g., access and opportunity) did not change; the persistency may explain the current design of research, the queries posed, and the interpretation of everyday experiences had and required of youth of Black families and communities. Further, given the lack of change regarding perceptions of and representations of Whiteness as property, James et al.'s (1992) epidemiological relevant observation of "John Henryism" is not unexpected. That is, the Whiteness-as-property social dilemma, in fact, would make the resources and supports actually required for offsetting the level of effort expended virtually unobtainable in accomplishing "ordinary developmental tasks" as described by Havighurst (1953). Considered collectively, the critical race perspective (e.g., see Harris, 1995) evoked and the continuing residual problem of (social and psychological) slavery as described by D. B. Davis (1966) afford new insights concerning human vulnerability and resiliency when applied to the experiences of contemporary African American youth.

As suggested and from a developmental science perspective, there continues to be a tradition to ignore the normative knapsack of White privilege (McIntosh, 1989) and general salience of the Whiteness-as-property thesis (Harris, 1995), a tradition that communicates a litany of intergenerational privileges. The socially constructed supports and rules—unacknowledged but operational—automatically provide White youth and families with unacknowledged social and personal supports; they virtually guarantee positive "typical" outcomes; further, their utility operates to decrease the obvious sources of high vulnerability (i.e., especially economic sensitive indicators). From a critical race perspective, a legally supported Whiteness-as-property tradition has dire consequences for minority resiliency, self-determination, and beliefs about the American Creed. This "silent" although

operational tradition contributes to persistently low human vulnerability for nonminority citizens independent of social class.

As cited by Harris (1995) and specifically analyzed by Roediger (1991), there are wages (such as having consistent benefits and unacknowledged assets) associated with Whiteness. Importantly, and given the obvious consequences and benefits of *not* acknowledging the benefits of Whiteness, bringing attention to the different contributors to and consequences of it for human vulnerability matters. Roediger's perspective also assists in explaining the differences among poor White, Black, and Brown individuals; that is, poor Whites may persist no matter their situation since being White still "pays wages."

In similar terms as Roediger and as McIntosh, Harris suggests that economic challenges may be experienced differently by poor Whites even during conditions of economic downturns. Harris noted that "Whiteness retains its value as a 'consolation prize': it does not mean that all whites will win, but simply that they will not lose, if losing is defined as being on the bottom of the social and economic hierarchy—the position to which Blacks have been consigned" (p. 286). Long-term and consistent stereotypes are associated with the position and have important significance for performance (see Aronson, Lustina, Good, Keough, Steele, & Brown, 1999; Aronson, Fried, & Good, 2002). No matter the effort expended, unless having and opting for the "opportunity" of "passing," the Black vulnerability level is never made less severe by such reassurances as described by Harris—that is, of never being at the bottom. That fact, in and of itself—and independent of one's point in the life course—promotes a very different level of stress and risk and approach to everyday challenge.

Maturation-based social cognition makes the awareness of dominant race-as-caste messages evident beginning in the early years. Such messages have been recorded as young children's race awareness, racial attitudes, and racial preference literatures (e.g., see Spencer, 1985; Spencer & Dornbusch, 1990; Spencer & Markstom-Adams, 1990). Identity-relevant accommodations by middle childhood and adaptations at adolescence and young adulthood have also been reported (e.g., see Harpalani & Spencer, 2009; Harpalani et al., 2013; McGee & Spencer, 2013; Swanson & Spencer, 1999; Swanson, Spencer, Dell'Angelo, Harpalani, & Spencer, 2002; Swanson, Spencer, & Petersen, 1998). The cognition-based awareness of African American youth of Whiteness-as-property themes require that they cope with extra-challenging—albeit generally "invisible"—identity-relevant developmental tasks. Although frequently understated in the literature, youth and families of color require more complex cognitive and emotional adaptations and context-relevant accommodations and supports (e.g., home, school) (e.g., see Brittian & Spencer 2012; Cross, 1991, 2003; McGee & Spencer, 2013; McGee, Hall, & Spencer, 2015; O'Connor, Hill, & Robinson, 2009; Spencer, 1990b). The knowledge base and resource needs for parents who must serve as effective socializing agents are different from those of parents who enjoy the social privilege of Whiteness as property. As described by Harris (1995), a fundamental and core valued aspect of privilege is "its exclusivity; but exclusivity is predicated not on any intrinsic characteristic, but on the existence of the symbolic Other" (p. 290). Harris explained that this symbolic character also communicates an "illusion of unity" among Whites. Identity accommodations are not required by White youth as adolescents (i.e., coping with stereotypes about group membership); that is, in general, White youth can pursue traditional developmental tasks of salience used for assessing stage-specific competencies and general resiliency outcomes (see Havighurst, 1953). The experiential differences between Whites and Blacks—based solely on skin color—matter for coping as well as adaptations required, including identity formation processes, which have implications for level of vulnerability.

Consistent with the opening quote by Einstein, at the least, the findings of too many studies about minority children and families create highly troubling literatures. More specifically, as contributed to by "experts" in the disciplines and fields of sociology, psychology, education, public health, social welfare, criminality, and criminal justice, a tax dollar–funded "research industry" is frequently overly simplistic and represents decontextualized approaches. Considered collectively, the shortcomings create or contribute to a virtual "culture of poverty" literature. It provides problematic interpretations of developmental processes and outcomes for children of color as well as entire communities. The lack of understanding into developmental mechanisms and their linkages with long-term context considerations and historical traditions result in the dilemma implied by the Einstein quote, which has obvious implications for competency assessments and stereotypes about them (see Aronson et al., 2002; Steele, 1997). In fact, as suggested from a critical race perspective, such conceptual shortcomings reify and illustrate "the valorization of Whiteness as treasured property in a society structured on racial caste" (Harris, 1995, p. 277). One may infer that not knowing about or failing to acknowledge the character and heterogeneity linked to the unique

racial caste system of diverse groups and their children's everyday experiences introduces a pattern of conceptual shortsightedness, at best.

The situation influences ultimate questions posed that impact the nature and delivery of social policy, everyday cultural practices delivered in schools and similar settings (e.g., see Lee, Spencer, & Harpalani, 2003), and while navigating neighborhoods "protected" by individuals purporting to "protect and serve" but in fact frequently suggest historically different interactions with particular socializing agents (see Cross, 2003). Considered together, the implicit messages of the two quotes are consistent with the culture of poverty critique and analysis described by Small et al. (2010).

The depression-like economic conditions of the last several years have impacted the United States and the globe. Accordingly, given the extreme competition for limited resources, the unacknowledged problem of unequal access serves to make worse the problem of inequality, thus increasing high levels of human vulnerability. That is, people of color who lack the property commodity benefits of "Whiteness," as posited by critical race theorists, experience the economic situation differently from their privileged counterparts. For African Americans, in fact, it may be less clear whether further adverse economic impact is due to continuing biases that contribute to greater inequality or whether the "national recovery" lacks levels of support actually needed for communities of color (and its child development outcomes) to experience actual economic supports for offsetting resource or asset insufficiency. These themes potentially impact and compromise youth resiliency, levels of human vulnerability, and interpretation of both. But they are not alone. In fact, particularly given the historical framing provided, the role and impact of race, ethnicity, skin color, identifiability, and ego processes are critical constructs. They represent a level of atypicality and conceptual uncomfortableness in the traditional approaches taken to social science research involving youth of color and particularly African Americans.

The opening quotes suggest particular coping needs required by individuals and communities, given unavoidable inferred messages about group membership, particularly for minorities of African descent. The conceptual strategy is necessary both for establishing and maintaining a healthy "sense of self" and for determining and supporting—as effective policies and practices—positive adaptations to typical and atypical human development needs and issues. Bronfenbrenner's (1992) framework and the historical framing provided explains the problem of unnecessary coping requirements as a function of status difference associated with skin color variations. The situation indicates a normative state of lack of fit or unacknowledged privileges experienced as children prepare for, navigate across, and interact with determinative environments. The character of the interactions has consequences for challenges and/or opportunity. The research questions pursued and methodologies considered in the conduct of twenty-first-century programs of research, evaluation, practices, and subsequent policies must represent youth placement and subsequent experiences.

The next two sections highlight and review some of the research on youth of color, given the themes noted, and present for analysis methodological issues of importance for research that aims to be salient for the developmental tasks, and interpretation of experiences and outcomes for African Americans. By integrating and framing the historical and privilege-acknowledging perspectives presented, the final section concludes with a discussion of methodological concerns necessary to frame future research and theorizing about African American children.

Salient Perspectives Required to Appreciate Challenges to Resiliency

Given universal developmental needs and tasks, one quandary created by ignoring historical circumstances and treatment is not acknowledging that everyone has sets of developmental tasks to master. These tasks are associated with the individual's stage of development (Havighurst,1953) and are influenced by the chrono-level of the ecology; accordingly, the character of the social challenges faced by a society at a particular psychological moment in history has implications for outcomes achieved (e.g., the recent and—virtually—globally experienced economic anguish). Although citizens overall confront economic challenges, the nature of the experience for some may be decidedly different and thus exacerbating of risk level in many cases. Moreover, the fact of differential experience by race, ethnicity, and class (and interactions among factors including gender considerations for Hispanics and African Americans) is infrequently acknowledged and factored into the conduct of science and its interpretation and utilization as policy and practice in the design of culturally authentic supports. These are, in contrast, considered as control variables in studies that negate the breadth of challenges experienced as a function of the interaction among the noted attributes. While appropriate as control variables in research designs exploring outcomes believed related to these factors, nonetheless, there remains less

attention to the experiences that contribute to specified outcomes.

The introduction suggested that different historical relationships between groups and untoward experiences borne by particular individuals have unexpected (and typical) effects on the character of the life course experienced. A basic feature such as the maturation status of cognitive and social development may, in fact, represent a significant dynamic and serve as a protective factor (e.g., the cognitive egocentrism of preschoolers) (see Elkind, 1966; Spencer 1982a, 1982b, 1985, 2008b; Spencer & Markstrom-Adams, 1990); however, during adolescence, maturational status of the noted domains may exacerbate relational experiences and may impact well-being of youth (see Elkind, 1967; Spencer, 2006, 2008b; Spencer, Harpalani, Cassidy, et al., 2006). That is, on one hand, young children's developmentally appropriate self-centered thought processes limit the internalization of risk and threat due to negative group membership stigma and general stereotyping. However, the interpretations and inferences made are more complex during middle childhood (e.g., Spencer, Cole, Dupree, Glymph, & Pierre, 1993) and adolescence (e.g., see Fegley et al., 2008; Spencer, 2006, 2008b; Spencer, Harpalani, Cassidy, et al., 2006; Spencer, Dupree, Cunningham, Harpalani, & Munoz-Milleret al., 2003; Stevenson, 1997). As noted in several papers, socialization strategies, beliefs, and assumptions matter as a protective factor as well (Spencer, 1982b, 1985). These themes, occurring at all levels of the ecology, have special salience across the life course (even within a lower-income caste [e.g., see MacLeod, 1995]) for African Americans and other frequently stereotyped individuals of color.

We suggest that on a daily basis and in light of the historical and long-term conditions described, persistently occurring and uniquely patterned challenges characterize the everyday experiences of America's communities of color and should be included as part of the context for everyday functioning (see Szalacha et al., 2003). The challenges need not be necessarily framed as deficits and deficiencies but acknowledged as part of the context of everyday life. At the same time, for nonminority group members, representative constructs acknowledging privilege also requires recognition and inclusion in the conduct of research, particularly when between group comparisons are part of the methodological strategy.

The dilemma of "invisibility" of contextual differences between groups matters. There are consequences for the conduct of and interpretation of findings; moreover, the research enterprise omits the recognition that the psychological and physical contextual differences have profound implications for individuals' basic meaning making, coping processes, and level of vulnerability; and, of course, there are varied experiences among ethnicities (see Szalacha et al., 2003). For example, the honorary White status accorded some Asian American ethnicities is generally not protested but is accepted as an underacknowledged protective factor (myriad privileges); of course, the situation introduces other types of within- and between-group tensions (e.g., see Diemer, Kauffman, Koenig, Trahan, & Hsieh et al., 2006). Consistent with global colonial historical traditions and practices, contemporary citizenship claims as well as immigration apprehensions—particularly in regard to individuals of color—introduce group-level sources of stress, entitlement beliefs, and protective factors that remain ambiguous, anonymous, and, more generally—with a few exceptions—virtually absent from rigorous scholarly efforts in the social sciences. In fact, perhaps reflecting the nearly century and a half of silenced and unremorseful practices following the signing of the Emancipation Proclamation and the passing of the Thirteenth Amendment to the Constitution, traditions and beliefs became solidified (as well as "silenced" from consideration). Accordingly, robust behavioral and social science careers may represent successful constructions due too frequently to practices designed for reaffirming a priori assumptions of group inferiority (i.e., a pattern of scholarship that affords a virtual colonialist representation of others' lives). The possibility of intergenerationally transmitted attitudes and assumptions is important, given an articulated social science "objectivity goal" and training criteria that assume values-free strategies. However, practiced objectivity is less possible and requires more coping, given unacknowledged and unchallenged views about others' identities and placement within American culture, views that include long-term practices and particularly "colored and coded" definitions of humanity.

This situation is exemplified and generally viewed as "typical" as structured approaches to topics such as student discipline problems in school contexts: that is, where punishment is viewed as a way to restore justice and deter future offenses (Wenzel, Okimoto, Feather, & Platow, 2008).The historically retributive approach strives to maintain objectivity and consistency but is unsuccessful in deterring undesired behavior. More relevant, however, to the issue of vulnerability is that the approach holds youth accountable for responding to socially constructed and underacknowledged contextual conditions. The character of outcomes is framed as implying incompetence and undesirability when, in fact, youth efforts and supports

could never be an even match or represent a formula for success.

Restorative practices are frequently used in educational contexts and are interpreted and examined as an alternative to systems of retributive justice (Amstutz & Mullet, 2005). As a prevention and intervention approach, the practices are based on the principles of restorative justice that involve accountability for all members of a relational community (Morrison & Vaandering, 2012; Parsons, 2005; Swain & Noblit, 2011). Schools' codes of conduct often require that students who break rules be subjected to punishments that often have little to do with their inappropriate behaviors or with those whom they have harmed by their actions (Kohn, 2006). Restorative principles are based on the premise that harming others damages interpersonal and communal relationships and that justice is best achieved by seeking to repair relationships through restitution, resolution, and reconciliation (Braithwaite, 2002; Morrison & Vaandering, 2012). Instead of delegating the resolution of rule violations to an impartial third party (i.e., a court, judge or jury, or in the case of a school, a dean or an assistant principal), offenders, victims, and the communities that have been affected (i.e., friends of the offender and victim, and community members) come together in an attempt to understand what happened, how it has affected everyone, and what can be done to ensure a supportive outcome (Braithwaite, 2002; McCluskey, Stead, Kane, Riddell, & Weedon, 2008; Morrison & Vaandering, 2012; Popa, 2012). Instead of expelling a student from the community (or suspending from school), the community seeks to reintegrate the student in a manner that also holds members of the community accountable for supporting the student. This strategy is more consistent with the perspective proffered; atypically, the approach requires adults to examine conjectures regarding their personal assumptions and systemic practices to which youth utilize specific coping efforts to respond.

Differences in the character of coping efforts needed as adaptations to everyday life course developmental tasks required for achieving competence and sustaining health and well-being for members of the human species are significant contributors to vulnerability level. Acknowledgment of the differences may serve as a national embarrassment and thus source of conceptual resistance for some individuals; however, at the same time, it represents an ever-present inconvenient hurdle for others. The fact is especially cogent for America's diverse citizenry, given the nation's reluctance to acknowledge the continuing salience of slavery, Jim Crow practices, and skin color salience in twenty-first-century life despite how long it has been since Lincoln signed the Emancipation Proclamation. As indicated, we suggest that the dissimilarity of experience and actual effort required has to do primarily with epidermal melanin level variation (skin color hue). Einstein's view of "human genius status" as the norm, in fact, is an enacted value of relevance primarily ascribed to Caucasian Americans. Although generally the bias is inadequately acknowledged in the social sciences, more often than not, it represents a consistent theoretical dilemma and frequent conceptual orientation of research efforts. The fact contributes to the character of social policy, educational pedagogy, and a "backpack of life course experiences" wherein Whiteness functions differently for groups and their members (i.e., as a burden, given its absence as representative sets of unacknowledged privileges is the dilemma); how to represent the problem of Whiteness as a knapsack of privilege as inequality in rigorous research continues to be the unaddressed task. Highlighting its determinative influence contributing to structural conditions, Whiteness status conveys high status and support for some citizens; and, at the same time, for those of a darker hue, the unacknowledged power of Whiteness solidifies nothing less than an institutionalizing of risk and challenge. Across the life course both for children and those intending to protect, support, socialize and train, an individual's particular Whiteness status makes a difference. It serves either to contribute to psychological consonance (i.e., affording a best-fit status between individual and context experiences) or facilitates the experience of dissonance, which requires extra consciousness, responsive energy, and time for obtaining resiliency. It also supports the achievement of positive youth outcomes in the face of significant and persistent challenge. The typical research approach is to assume that social address variables (e.g., social class and race categorization) adequately differentiate the complex experiences suggested.

Accordingly, as conceptualized by Anthony (1987) and other scholars, vulnerability is a shared human condition. It communicates a level of balance or imbalance between individuals' degree of risk versus the level of protective factors either present or accessible. Accordingly, all humans represent a level of vulnerability, although the character and level of risks and protective factors may vary by type and level of significance. In fact and as suggested, a characteristic such as Whiteness may function as a source of privilege and support for some individuals (e.g., Caucasian Americans) and as a source of significant risk and challenge for others. However, as suggested, in the case of within-species melanin variation and societal experiences, the fact of difference as daily practices

experienced represents a set of atypical and unique events that parallel those alluded to in the Einstein quote. Further, particularly for the North American experience, the fact has always been responded to at the national level as a dilemma of everyday traditions and unexpected social policy outcomes, but never one of social justice. As historically evidenced, the failure as a nation to acknowledge and to accept responsibility for long-standing, intergenerationally impactful forces—both personal and group—at the individual and collective levels, chronic injury has consequences. Supports can come from sources infrequently acknowledged as constructs in research (e.g., see Brittian & Spencer, 2013; Dupree, Spencer, & Spencer, 2015; McGee et al., 2015; McGee & Spencer, 2013; Spencer & Swanson, 2015). Of course, like the failure of individuals to acknowledge the fact of the Holocaust or that the nation's first Black president is an American citizen—albeit with the name Barack Obama—as both a historic and contemporary fact, there have always been pockets of individuals comfortable with distorting history as a way of accepting dehumanizing practices for overall economic and individual-level gains. Everyday behavior, collective practices, and stigma-linked determinative policies based on flawed perspectives concerning individual responsibility continue to enjoy contemporary manifestations in research studies as constructs assessed and questions posed.

The predicament described communicates and demonstrates the continuing advantages enjoyed by non-Brown individuals (i.e., described by Roediger as the "wages of Whiteness" [1991]). The conundrum significantly adds to the persistent situation of unacknowledged privilege and, accordingly, a significant source of psychological support for those of a lighter hue, which is evident both within-group and between-group experiences and social practices. Specifically, curriculum based social studies lessons are taught from the perspective of "the victor"; as such, privileged students occupy a position of never having to explain or having dissonance about: (a) a group's enslavement (and often mortal destruction during the Middle Voyage) and the implications for perceptions about "the self" and one's community; (b) individual and group-level inhumane treatment, including the separation of families, raping of women, rulings against indigenous language use, and proscriptions concerning the teaching of literacy skills; (c) the creation and use of policies and practices determined by the dominant majority solely on the basis of either being of African descent or having one drop of Black blood; and, additionally, (d) as formally or informally communicated, White status situating a privileged self to never having to concede personal culpability in the heinous enslavement of a group, destruction of family systems of identification and support, murder, and—collectively as a nation—never having to confront or bear individual-level responsibility for the heinous institution of slavery itself. To reiterate, in many ways, the "free pass" set of conditions described and framed in American textbooks as historical representations of the nation's past represents what Roediger refers to the unquestioned "wages of Whiteness."

Considered overall, these themes are not included in the formulation of publicly and privately funded social science research. An excellent illustration is provided in the recent "thriving literature."

New Concepts and "Traditional" Assumptions: Thriving and Development

Thriving originally appeared in the literature as a set of positive "vital signs" (Benson, 1990). Subsequent research has aimed at identifying these signs and developing measures as indicators of thriving in adolescence, most notably the 5C's (Competence, Confidence, Connection, Character, and Caring). All of this work attempts to draw a distinction between thriving and happiness (Scales, Benson, & Roehlkepartain, 2011). However, for the most part, it does not acknowledge the themes concerning Whiteness status and privilege nor minority group membership—given the unique histories of each—in the construct's conceptualization.

In fact, some scholars conceptualize thriving as the high point on a curve overtaking resilience, surviving, and succumbing (Carver, 1998; O'Leary & Ickovics, 1995). These writers connect adversity to the positive benefits that can come after a negative experience. Of course, the long-term and unacknowledged impact of slavery and unresolved between-group status issues do not represent the level of adversity considered. The work distinguishes between threats and challenges with the former producing harm and the latter often leading to improvements. Under this model, resilience represents a return to the status quo following the particular experience whereas thriving refers to the improved state that follows. These scholars address specific forms of thriving, including desensitization to the stressor, enhanced recovery potential from the situation, and heightened level of functioning. Although infrequently addressed under the rubric of unequal accessibility to supports that sustain recovery, as a recent construct, the perspective assumes an equally experienced American Creed and equity in individuals' access to and exposure to resources and supports.

The ability to measure these abstract changes, however, is challenging, although some objective developments can be assessed. Concrete benefits, more easily measured, can include improved or newly acquired skills, greater confidence, and strengthened personal relations (Carver, 1998); all imply accessible assets and supports. Research has shown that the higher the number of positive developmental factors that a young person is exposed to, the more likely he or she will be to also report thriving outcomes (Scales et al., 2000). Generally and as suggested earlier, thriving may be applied to all youth, although accessibility is decidedly different by race, ethnicity, historical circumstance, and unacknowledged privilege.

Lerner, Lerner, von Eye, Bowers, & Lewin-Bizan (2011) discuss the adaptive developmental regulations and bidirectionality of the individual and context that, if fostered properly, can contribute to an adolescent's thriving, something the authors define as manifesting "healthy, positive developmental changes" (p. 1107). What is not considered and included in the various analyses are the historical and contemporary experiences linked with group membership. In fact, the literature on thriving has been framed as the successor to the at-risk and pathologically focused studies of the past (Scales et al., 2011) with renewed attention on personal strengths and resiliency. However, the challenges and continuing risk factors are underexamined by race, ethnicity, and national origin. Historical contributions to the stability of inequality and sustainability of privileging status for Whites are never considered.

Those affiliated with the Search Institute link thriving to "sparks," which they characterize as passions or interests that provide direction to one's life (Benson & Scales, 2009; Scales et al., 2011); however, in general, it is not mentioned that "sparks" may be conceptualized as opportunities that are unequally accessible. Fifteen indicators of thriving have been identified that assess qualities such as school success, social life, and emotional outlook. This work expanded on previous work that was connected to status-related indicators (Scales, Benson, Leffert, & Blyth, 2000; Theokas et al., 2005).

Overall, these perspectives seem to indicate the importance of moving forward (Carver, 1998) through time as a critical factor in conceptions of thriving. Much of the literature suggests that thriving is less a state of being or trait but rather a process of change (Theokas et al., 2005) reflecting an active individual functioning across time and place who is able to exert flexibility and adapt to changing contexts. One difficulty, of course, is the difference between conceptualizing thriving as a process but measuring it at a moment in time (Benson & Scales, 2009). As suggested, unaddressed are the traditions and behavioral residuals of a nation with significant unresolved issues having to do with a history of slavery and a continuing contemporary condition of structured inequality and variously masked privilege associated with skin color.

Growth is also implied in this framework, which poses a conceptual challenge in that it remains uncertain to what extent thriving can be distinguished from other forms of development (Carver, 1998). Carver (1998) concluded that thriving represents an "extreme" form of growth that operates similarly to other forms of growth, such as physical exercise, with the exception that the growth that drives from threats is unexpected.

As presented in the literature, individual variables linked to thriving include those coming from both personal and social psychology. Specifically, this research is related to whether an individual can actually thrive in the face of any given adversity; however, as suggested by the chapter epigraphs, the conceptual orientation does not consider the persistency of beliefs, attitudes, and long-term unequal conditions that paint a very different picture of adversity as experienced by youth of color and African American youth (and males) specifically. Individual factors can include optimism/pessimism, hope/hopelessness, and self-mastery and efficacy. Contextual factors can include the availability/lack of social supports and the extent to which an environment encourages self-determination (Carver, 1998).

Criticism of the thriving literature has focused on the inability for many scholars to come to an agreement about what constitutes a developmental asset and what contributes to and indicates thriving. Central to this dilemma has been the context and domain-specific nature of thriving (Benson & Scales, 2009). Without question, a conundrum is why investigators lack interest in collaborating in order to obtain the perspectives of individuals themselves. Of course, whether thriving should be treated globally inevitably depends on the nature of the indicators utilized; some (i.e., assuming leadership roles) clearly are culturally specific. Some have challenged the limitations of this literature on thriving and instead have sought to incorporate a racial, gender, and socioeconomic component into their work (Blankenship, 1998). Responses to this criticism have emphasized the importance of how many developmental strengths (i.e., sparks, relational opportunities, and empowerment) youth are exposed to and how these are far better predictors of thriving outcomes than gender, race, and socioeconomic status (Scales et al., 2011). Scales and colleagues (2011) showed that adolescents who have sparks and supportive

individuals in their lives are more likely to have other commitments and values that connect them to their communities. From a national sample of 1,817 (56% White, 17% Black, 17% Hispanic, 0.5% Asian) 15-year-olds, they found this was the case across demographic variables. However and unfortunately, the final study (Spencer & Spencer, 2015) could not explore the questions either between or within groups because of the inadequate number of minority participants. Similarly, self processes have been studied for at least 75 years, there are few conceptual and methodological constructs more misconstrued in the case of African American youth (for reviews, see Hare, 1985; Spencer, 1985, 2008a; Spencer, Harpalani, Cassidy, et al., 2006; Spencer & Horowitz, 1973; Spencer & Markstrom-Adams, 1990).

Black Identity and Self-Esteem

Research into the association between racial/ethnic identity and self-esteem has tended to produce mixed results (Rowley, Sellers, Chavous, & Smith, 1998). Variations in ethnicity, geography, and age contributed to differences in these findings. Within the realm of Black identity, results have been more consistent with racial identity affirmation positively predicting levels of self-esteem in African American adolescents and college students (Resnicow, Soler, Braithwaite, Selassie, & Smith, 1999; Rowley et al., 1998; Toomey & Umana-Taylor, 2012). This has been particularly true in recent years as models have become increasingly more nuanced in assessing the degree and quality of racial identity (Rowley et al., 1998).

In the first decades following school integration, research on self-esteem and race showed that in contrast to some widely held conceptions, Black children generally displayed higher levels of self-esteem than White children and that they did not suffer from the presumed self-esteem deficit (Hare, 1985; Simmons, Brown, Bush, & Blyth, 1978). Observations obtained by Simmons et al. (1978) drew from the results of multiple-choice tests administered to 798 students in the sixth and seventh grade across 18 schools in a large midwestern city. Subsequent work continues to support these findings (M. Hughes & Demo, 1989; Porter & Washington, 1989). Absent from this research, however, was how racial identity might predict or influence self-esteem levels in African American adolescents.

Toomey and Umana-Taylor (2012) conceptualized two different ways in which racial/ethnic identity is linked to self-esteem. They drew on a risk and resilience framework in which racial identity can either promote self-esteem via pride in one's self/collective or protect by minimizing the negative effects of stressors via racial discrimination (Rutter, 1987).

Phinney, Cantu, and Kurtz (1997) conducted a survey of 669 American high school students in order to assess the predictive functions of ethnic identity, defined as "a broad construct including sense of belonging, positive attitudes, commitment, and involvement with one's own group" (p. 170), on minority self-esteem. A series of regression analyses found that neither gender nor socioeconomic status were a strong predicator of self-esteem in African American youth but that ethnic identity was a significant predictor of self-esteem across racial groups.

Within the "protective" model, Yasui, Dorham, and Dishion (2004) found that self-esteem was associated with adolescent adjustment for both White and Black youth. They examined 77 White and 82 Black adolescents (67 male and 92 female) who had an average age of 12.2. They focused on students who were considered both successful and at risk and employed the Multigroup Ethnic Identity Measure (MEIM) to assess the strength of ethnic identity, and the Children's Depression Inventory (CDI), and the Child Behavior Checklist (CBCL) to assess adjustment. Conversely, lower levels of ethnic identity predicted lower levels of social and emotional adjustment.

Employing the Adolescent Discrimination Distress Index (ADDI), Racial Socialization Scale (RSS), and the Rosenberg Self-Esteem Scale (RSES), Harris-Britt, Valrie, Kurtz-Costes, and Rowley (2007) examined how racial socialization messages can protect African American adolescents from perceived racial discrimination. In their study of 128 African American eighth-grade students (68 girls and 60 boys) from two public schools in the southeastern United States, they found that although racial pride did not predict self-esteem, other forms of racial socialization (i.e., understanding of cultural history, expectations of possible bias/discrimination) could positively predict higher levels of self-esteem.

One area of recent interest is the mediating/moderating influences of racial identity on self-esteem. Eccles, Wong, and Peck (2006) examined how ethnic identity could mediate the effects of racial discrimination in African American adolescents. They drew their results from the 1990s-era Maryland Adolescent Development in Context Study (MADICS), which examined a middle-class community with 51% African American and 43% European American households that have relatively equal income/political influence in the community. They focused on 1,480 middle-school-age adolescents over a 2-year period (seventh and eighth grade). The researchers measured the self-reported experiences of discrimination at

school as well as students' future expectations of discrimination and how these experiences influenced their views of and performance in school. Also measured were the students' self-reported feelings of "positive connections with their ethnic group" (their way of assessing ethnic identity). Regression analysis revealed that a positive connection to ethnic group predicted grade point average during the eighth-grade year. Indeed, the measured effect was approximately equal to the negative effect of experiencing racial discrimination, suggesting that a positive relationship to ethnic identity can counter, protect, or minimize the effects of perceived racial discrimination on academic motivation and achievement in African American adolescents.

Gaylord-Harden, Ragsdale, Mandara, Richards, and Petersen (2007) explored how ethnic identity and self-esteem function as mediators between social support and internalizing symptoms such as anxiety and depression. A sample of 277 (85 males, 142 females) African American middle-school students from high-crime rate neighborhoods in Chicago was used. The researchers utilized the MEIM, Survey of Children's Social Support (SOCSS), Experience Sampling Method, and the State-Trait Anxiety Inventory for Children (STAIC) to gather results about the sample's ethnic identity, perceived social support, self-esteem, and anxiety. They found that the strongest predictor of depressive symptoms and anxiety was perceived social support. Ethnic identity and self-esteem seemed to account for males' perceived support and females' self-esteem respectively. The gender finding is important and should suggest research questions that further differentiate the experiences of Black boys and girls.

Oney, Cole, and Sellers (2011) explored how racial identity and gender moderated self-esteem and body image for African American men and women. They drew on a sample of 425 college students (109 male and 316 female) from three regions of the country (East Coast, Southeast, Midwest). Utilizing several subsets of the Multidimensional Inventory of Black Identity (MIBI), they found that for those whose race was less central to their identities, body dissatisfaction was related to lower self-esteem. For those subjects who had high private regard (of their identities) and low body dissatisfaction tended to have higher self-esteem. Those who had low public regard and high body dissatisfaction displayed lower levels of self-esteem. The researchers also looked at assimilation ideology (i.e., emphasis on similarities between African Americans and Western society) on self-esteem; however, no significant relationship was found. Not unexpectedly, the connection between body image and self-esteem was higher for females than for males. The researchers also looked at assimilation ideology (i.e., emphasis on similarities between African Americans and Western society) on self-esteem; however, no significant relationship was found. Not surprisingly, given the higher salience of body image particularly for females, the connection between body image and self-esteem was higher for females than for males.

Some research has shown that the differences in self-esteem among Whites and Blacks can be attributed to the design of self-esteem reporting methods (Bachman & O'Malley, 1984). Bachman and O'Malley (1984) showed that Black adolescents were more likely to report more extreme levels of self-esteem than Whites when using incremental-based (1–5) methods. When these differences were accounted for, the gap between levels of self-esteem were not as acute. Some have explored the relationship between parental influence and social/personal self-esteem in Black adolescents (Constantine & Blackmon, 2002). The work illustrates the more complex parental tasks required of Black socializing agents and contributes an understanding of the John Henryism well-being challenge referenced previously. In fact, Constantine and Blackmon (2002) found that parental messages that reinforced pride and value in African American culture were positively associated with self-esteem among Blacks and their peers. However, those who emphasized the preference of White/majority institutions and culture were negatively associated with school self-esteem in Black adolescents. Research has shown that for U.S. high school students, self-esteem is comparatively high, with Blacks scoring the highest, followed by Whites, Hispanics, and then Asians (Bachman, O'Malley, Freedman-Doan, Trzesniewski, & Donnellan, 2011). Slightly higher levels of self-esteem were reported by males compared to females.

Tynes, Umaña-Taylor, Rose, Lin, & Anderson (2012) explored the moderating influences of racial identity and self-esteem on the negative effects of online racial discrimination (i.e., depression and anxiety). They surveyed 125 African Americans ages 14 to 19 (55% female) from three urban high schools in the Midwest and compiled composite scores measuring online racial discrimination, ethnic identity, depressive symptoms, anxiety, and self-esteem. The researchers found that the negative effects were significantly minimized for those who reported higher levels of racial identification and self-esteem and observed that males experienced significantly less discrimination than females.

Researchers operating within a PYD perspective have tended to criticize the approaches of the risk and

resiliency models, given their emphasis on assets mediating/protecting at-risk youth from negative outcomes rather than an emphasis on the importance of positive assets (Evans et al., 2012). They point toward work that better measures the association between racial socialization messages such as preparation for bias with positive racial identity. They believe that this approach is more conducive to PYD concepts such as confidence, competence, and connection (Murry et al., 2009).

Lusk, Taylor, Nanney, and Austin (2010) explored the relationship between racial identity and self-esteem for Black/White biracial individuals. The average age of the sample in this study was higher than the age in other works cited in this review (23.62 years), but this study has been included to provide a wider perspective and because of the dearth of work on biracial identity and self-esteem in adolescents. Lusk et al. focused on 74 self-identified biracial individuals drawn from online multicultural websites as well as university campuses, which clearly limits the generalizability of their findings to more affluent/privileged populations. They utilized Rockquemore and Brunsma's racial self-identity measure (2002), MEIM and RSES and the Center for Epidemiological Studies Depression Scale (CES-D) to determine levels of emotional well-being. They found that the individuals in their study self-identified first as biracial ("border identity") and then a singular one (i.e., White/Black). This was in keeping with Rockquemore and Brunsma's (2002) original work on biracial identity. Lusk et al. did note, however, that more participants identify differently depending on context/circumstance. The overall results of the study confirmed previous findings regarding the positive relationship between racial identity and self-esteem as well as the negative correlation between identity and depression. Additionally, they found that those who identified with border identities exhibited higher levels of self-esteem than those who identified with singular or "transcendent" options.

The literature seems to point toward a generally positive association between racial identity and self-esteem, at least in regard to African American youth. Disagreements between researchers focus on conceptual differences relating to how to measure racial identity (i.e., pride of the group or affirmation of self) and whether this identity promotes/protects minority youth from stressors or whether that identity serves as a positive asset in and of itself. However, certainly the problem of colorism plays a very important role in the lives of youth of color. The research suggests that group membership is salient and, is particularly evident, when associated with contextual experiences. Given historical, underacknowledged, and generally ignored historical events and evolved social traditions, color matters.

Research Acknowledging Colorism

To address the recent literature surrounding the phenomenon known as colorism, a definition of the term is critical. Burke (2008) describes it as "the allocation of privilege and disadvantage according to the lightness or darkness of one's skin" (p. 17). The literature on colorism is vast, beginning with the classic Clark Doll Studies (Clark & Clark, 1940), which showed that Black and White children demonstrated a consistent preference for a White doll over a Black one (reviews are available that include at least 50 years; see Cross, 1991, 2003; Spencer, 1982a, 1976; Spencer & Markstrom-Adams, 1990). For a good overview of some of the principal contributions from the expansive literature on doll studies, see Fegley, Spencer, Goss, Harpalani, and Charles (2008).

More recent treatments have expanded, revised, and altered aspects of Clark's original work with some exploring how such preference (i.e., given skin color) might be altered through incentives (Jordan & Hernandez-Reif, 2009). Researchers explored this bias for other racial groups with Hispanic children also demonstrating a bias toward lighter skin (Kaufman & Wiese, 2012), although some have been skeptical of the reliability of traditional doll studies (Stokes-Guinan, 2011). Studies have also shown that Black children are more likely to remember narratives that depict darker-skinned African Americans in a negative or stereotypical light (Averhart & Bigler, 1997). Overall, these studies have tended to reinforce the original results of the Clark study with incentives and technological changes having limited impact on changing child and adolescent attitudes toward skin color (Fegley et al., 2008).

Despite these challenges, research into the effects of colorism on children and adolescents continues to be a dominant area of inquiry with particular emphasis on the negative impact of privilege on their development and life experiences. Scholars often depict colorism as a social ideology bound up with the institutions of public life, such as school and the workplace. The family, it would seem, serves as a place of refuge from which its members might contest dominant racial narratives. Some research has shown, however, that Black families often reinforce colorism by privileging lighter-skinned members (McDonald, 2006; Russell, Wilson, & Hall, 1993; Wilder & Cain, 2011). Russell et al. (1993) suggested that a family's preoccupation with skin color begins at the time of the child's birth.

McDonald (2006) explored a case study where a woman born with darker skin than her mother and siblings was abused and neglected as a result of her mother believing that she had "lowered" the family's status. Wilder and Cain (2011) showed that among Black women, maternal figures often play a central role in shaping Black children's attitudes about skin tone. Many of these women claim that they learned at a young age to associate darker skin with ugliness and lighter skin with beauty.

One area of research that remains particularly voluminous is in the impact of colorism on the social mobility of African Americans in United States. Many investigators examined the relationship between skin color and educational attainment and economic success in both contemporary and historical contexts (Bodenhorn, 2006; Bodenhorn & Ruebeck, 2005; Goldsmith, Hamilton, & Darity, 2006; Hannon, DeFina, & Bruch, 2013; M. Hughes & Hertel, 1990; Keith & Herring, 1991; Ryabov, 2013). These studies have found that even when accounting for parental variables, lighter-skinned Blacks are more likely to obtain higher levels of education and pursue more prestigious and lucrative professions than those who have darker skin.

In addition to professional and education success, some researchers have focused on more subjective evaluations, such as personal attractiveness (M. Hill, 2002; Wade & Bielitz, 2005). Drawing from the National Survey of Black Americans, Hill found that skin color had a greater impact on the perceived attractiveness of women than on men with lighter skin being seen as a more attractive quality. Wade and Bielitz (2005) examined perceptions across gender and race and found that African American women with lighter skin were rated higher than lighter-skinned African American men on intelligence and parenting. Women generally rated dark-skinned individuals higher than men did on intelligence. Self-esteem and self-efficacy have been important topics within the literature of colorism with some exploration of the differences affecting male and females (M. Hill, 2002; Thompson & Keith, 2001). Thompson and Keith (2001) demonstrated that skin color remains an important indicator for self-esteem in women but not in men and for self-efficacy in men but not in women. They also maintained that, for women, the power of colorism was strongly associated with the individual's social class with working-class darker-skinned women having lower self-esteem than dark-skinned women in higher social classes. Elmore (2009) explored the relationship between self-perceptions of skin tone and the processes of identity formation in adolescents. Other scholars have shown that young women who embrace an African American standard of beauty (reflecting a higher level of self-esteem) exhibit lower levels of substance use than those who embrace White standards of beauty (Wallace, Townsend, Glasgow, & Ojie, 2011).

As suggested previously, in light of Barack Obama's election as the first African American President of the United States, some scholars have examined the impact of colorism on political behavior (Weaver, 2012). Weaver (2012) demonstrated the limitations of traditional discussions of race and politics and argued that skin tone and hue play a far more pivotal, however subtle, role in shaping electoral outcomes in the United States.

The implications of colorism for immigrants and workplace discrimination are examined in Hersch (2011). In accounting for length of residency, English-language competency, and education, Hersch found that lighter-skinned immigrants earn 16% to 23% more on average than darker-skinned persons. The findings are important, given the role of socioeconomic status as a source of support and protection for families and children.

This phenomena is not unique to the United States. There have been a number of efforts to explore the implications of colorism around the world. (For Japan, see Wagatsuma, 1968; for India, see Beteille, 1968; for dark-skinned Puerto Ricans, see Hall & Julian Samora Research Institute, 1987; for Latin America, see Russell, Wilson, & Hall, 1993.) Ferguson and Cramer (2007) showed that rural Jamaican children who self-identify and idealize skin type as White exhibited higher levels of self-esteem. Some scholars have taken up the idea of "economies of color" in examining the pigmentocracy underlying racial liberalism globally (Glenn, 2009). Charles (2011) studied how Jamaicans have historically practiced skin bleaching in order to enhance sexual attractiveness. In a survey of self-reported health and racial categories in selected Canadian cities, Veenstra (2011) found that darker-skinned Blacks were more likely than lighter-skinned ones to report poorer health outcomes.

The findings of this research point toward a tendency to demonstrate preference for lighter-skinned and White phenotypes. However, some research has shown a more complex dynamic where Whiteness alone is not treated as a privileged category (Quiros & Dawson, 2013). Quiros and Dawson (2013) demonstrated how among Latino populations, although lighter skin is seen as being a more positive feature, being perceived as White does not carry the same level of prestige. The complexities of colorism therefore do not appear to be as uniformly internalized as previously believed. Other examples of research within this "revisionist" camp have shown that skin color does

not necessarily exacerbate racial discrimination outside of the family but that there is a correlation between skin tone and family dynamics (Landor et al., 2013). This research maintains that parents will demonstrate preferential treatment to their children based on skin tone. Specific gender variations were noted, with dark-skinned males and light-skinned females receiving "higher-quality parenting" and "racial socialization" within the family.

Colorism and Achievement

Dupree, Spencer, and Fegley (2007) tackled stereotypical assumptions about (relatively) low intellectual ability among African Americans and Hispanics. They reported research findings which suggest that many high-achieving male and female adolescents of color have self-schema that include positive racial identities. At the same time there are also high-achieving adolescents of color who do not. Their study investigated skin color preference of high-achieving Asian, Black, and Hispanic adolescents and was framed to indicate cognitive coping outcomes in response to skin color stereotypes and Eurocentric standards of beauty. In addition, relationships among different dimensions of youth self-schema (i.e., skin color preference, academic and social self-esteem, and body esteem) were explored. Place of origin and race-ethnicity were used as proxies for the different culturally based skin color connotations to which youth are exposed. Results suggest that, in interaction with race-ethnicity or place of origin, preference for lighter skin predicts academic and social self-esteem for high-achieving adolescent females; however, this was not the finding for high-achieving adolescent males. In interaction with place of origin, preference for lighter skin was a predictor of body esteem for both high-achieving males and females. These gender differences suggest gender-specific self-schema for high-achieving youth of color.

Skin Color and Well-Being

High academically performing adolescents of color negotiate multiple identities (e.g., gender, race, ethnicity, academic, etc.) (Bonner, Lewis, Bowman-Perrott, Hill-Jackson, & James, 2009; A. Graham & Anderson, 2008). The very idea that youth "negotiate" multiple identities suggests that there can be a variety of combinations of identity outcomes. These processes can differ in how central gender, race, ethnicity, and academics are to their identities. Research targeting high-achieving African American students provides many examples of such youth who are both high achieving and maintain positive racial identities (Bonner et al., 2009; D. J. Carter, 2007; Carter Andrews, 2009; A. Graham & Anderson, 2008; Harper, 2006; Spencer, Noll, Stoltzfus, & Harpalani, 2001). Some of these same studies demonstrate that these high-achieving youth not only hold race central to their identities but (a) they also have a critical understanding of the structural or systemic forces that work against the positive development and achievement of racial and ethnic minorities, and (b) they seek to actively resist these forces (Bonner et al., 2009; D. J. Carter, 2007; Carter Andrews, 2009; A. Graham & Anderson, 2008). Salient about the findings is that *youth are not resisting or opposing a culture of achievement. They are resisting stereotypical conceptions of their racial or ethnic group*. Specifically, they resist assumptions that they are underachievers and assumptions about the superiority of members of the majority culture. *Yet,* also critical to acknowledge is that *these data do not preclude the possibility that there are high-achieving youth who do have negative racial identities*.

It is more likely that there are many different identity profiles that reflect individual responses to proximal experiences of race and ethnicity. In the United States, a critical aspect of our individual experiences of race is visibility (i.e., what we look like, who we appear to be). Skin color influences visibility as it is one critical characteristic used to determine race, along with facial features, hair texture, and body type (e.g., Stepanova & Strube, 2009). Carter Andrews (2009) focuses on the skin color dissonance of high-achieving youth of color as one indication of how these youth are negotiating their racial identities. It represents another step forward by operationalizing racial identity in terms of actual physical status—the consonance-dissonance between one's actual skin color and one's preferred skin color. The study also explores how the skin color dissonance of high-achieving youth of color—as representative of cognitive coping outcomes in response to skin color stereotypes and Eurocentric standards of beauty—relate to other dimensions of their self-schema (i.e., academic and social self-esteem and body esteem).

Culturally Based Color Connotations and Skin Color Consonance-Dissonance

In many places, there exist skin color connotations that are qualitatively different from those in the mainland United States (Benson, 2006). Group differences may exist but not necessarily along the lines of White versus non-White. For instance, in the commonwealth of Puerto Rico, ethnic identity takes precedence over racial identity, and the caste system is a function of the culturally determined meanings given to SES, facial features, and hair texture in addition to skin color (Alarcon, Szalacha, Erkut, Fields, &

García Coll, 2000; Benson, 2006; López, 2008; Montalvo, 2004). Under such conditions, culture may have qualitatively different influences on skin color preference. Yet cross-cultural experiences, such as immigration from one country to another or regular travel between one country and another, can make the symbolic, culturally determined role of skin color much more explicit. That is, if one recognizes that the same skin color is perceived and responded to differently depending on the cultural context in which one resides, it becomes much more obvious that skin color connotations are culturally determined and not necessarily the norm for all.

However, as it relates to skin color, many places share culturally based color connotations that are similar to those of the mainland United States. There are places where—as in the United States—lighter or White skin is more valued (R. Frank, Akresh, & Lu, 2010; Uhlmann, Dasgupta, Elgueta, Greenwald, & Swanson, 2002; Ullrich, 2010). Accordingly, there would not necessarily be dissonance-creating immigration experiences that would raise awareness of the arbitrary and symbolic character of skin color connotations.

Individual experiences of skin color can raise awareness of the complex relationships among race, culture, and class for immigrants to the United States when, based on skin color, immigrants can be mistaken for nonimmigrants. For instance, in the United States, darker-skinned Hispanics with relatively coarse hair or Caribbeans of African descent may be treated like African Americans based solely on their physical appearance. Although they may originate from different cultural backgrounds, their mutual experiences of prejudice and discrimination in the United States work to acculturate these immigrants to the disfavored or stigmatized minority status of U.S.-born African Americans (Benson, 2006; R. Frank et al., 2010). Immigrant status can complicate self-perceptions based on skin color. Telzer and Vazquez-Garcia (2009) found that, in their study, U.S.-born Latinas with darker skin did not want to change their skin color, did not feel less attractive, and did not have low self-esteem. In contrast, the immigrant Latinas in their study wanted their skin color to be lighter, felt less attractive, and had lower self-esteem. These findings suggest that place of origin must be taken into account when conducting research examining skin color.

As it relates to European standards of beauty (e.g., a preference for lighter or White skin), research by Sahay and Piran (1997) suggested that the farther away from the European ideal individuals are (e.g., darker-complexioned South Asian Canadian females), the less likely they are to endorse a European ideal (i.e., less likely to prefer lighter skin). Likewise, the closer individuals are to the European ideal (e.g., lighter- or medium-complexioned South Asian Canadian females), the more likely they are to be influenced by this ideal (i.e., more likely to prefer lighter skin). In fact, Fegley, Spencer, Goss, Harpalani, and Charles (2008) reported, in their study of adolescents of color in the northeastern United States, that light-skinned adolescents were just as likely to prefer their own skin color as they were to prefer another skin color. In contrast, medium-complexioned adolescents were more likely than their light- and dark-skinned peers to prefer a skin color other than their own. Likewise, dark-skinned adolescents were more likely than their light- and medium-complexioned peers to prefer their own skin color (Fegley et al., 2008).

Skin Color as a Signifier of Attractiveness: The Complex Relationships between Skin Color and Body Esteem

Greater satisfaction with one's skin color in later stages of development (i.e., adolescence and young adulthood) is associated with higher self-esteem and body esteem (Falconer & Neville, 2000; Telzer & Vazquez-Garcia, 2009). In her study of ethnicity and body image, Altabe (1998) found that, in general, Asian Americans and African Americans held similar perceptions of the cultural ideal for skin color (i.e., lighter skin color is believed to be desired by other men and women). Relatively speaking, Asian Americans had the highest desire for lighter skin followed by African Americans. Hispanic Americans had the least dissatisfaction with skin color and valued darker skin or wanted darker skin color. However, Hispanic Americans showed more body dissatisfaction than Asians or African Americans. Interestingly, African Americans had higher self-ratings of attractiveness than Hispanic Americans. Likewise, Hispanics had higher self-ratings of attractiveness than both Caucasian Americans and Asian Americans. But, when asked to rate the importance of appearance to their self-esteem, all groups scored higher than the Asian Americans. In a study based in Canada, Sahay and Piran (1997) found that South Asian Canadians showed the least skin color satisfaction compared to European Canadian females and that light- and medium-complexioned South Asian Canadian females reported the lowest body satisfaction. Thus, a desire for lighter skin color likely reflects a devaluing of one's own skin color and a desire to identify with individuals who have lighter skin color. These findings reflect the complexity of identity negotiations even as they relate to physical appearance and perceived attractiveness.

Adolescents' Negotiation of Skin Color Consonance-Dissonance as a Coping Response

Given the topic's long-term silencing in the social science literature except for inferred assumptions about its psychopathological character for Blacks (for a review, see Guthrie, 1976), attentiveness to the proactive coping of youth with dissonance-producing contexts has been ignored. It might be that in the United States, wanting their skin to be lighter or darker is psychologically important for adolescents of color. Specifically, in race-based societies like the United States, such cognitions can represent attempts to adapt to the perceived cultural standards. The cognitions represent coping responses. As suggested by the theoretical grounding provided by the phenomenological variant of ecological systems theory (PVEST), identity processes are coping processes (Spencer, 2006; Spencer, Fegley, & Harpalani, 2003). More specifically, identity outcomes emerge from consistent coping behaviors (i.e., particularly patterned responses). Consequently, resulting *identities serve an organizing function as they influence one's thoughts and behaviors* (i.e., determining which *thoughts and behaviors that do* and *do not fit with my identity*). Spencer (2006) made a distinction between reactive coping and stable coping. Whereas reactive coping represents responses to specific and immediate challenges, stable coping represents general responsive strategies that are engaged consistently without significant regard for the specific character or nature of challenges encountered (e.g., having health consciousness as a significant aspect of one's identity, the automatic response to "pass" on the offer of a cigarette does not require conscious consideration). Particular challenges may be encountered quite regularly; accordingly, as a response, specific coping strategies are responsively and consistently employed (i.e., thus representing stable coping strategies); the patterned response contributes to and aids in maintaining an emergent identity status. The resulting identity serves as a filter for day-to-day (potentially and ideally healthy) functioning. There will be certain thoughts and behaviors that are in keeping with one's identity and, at the same time, other thoughts and behaviors that are not. A PVEST interpretation would suggest that skin color preference represents (a) a coping response to pervasive and consistent exposure to culture-specific color connotations and racial or ethnic stereotypes and (b) an identity outcome to the extent that it suggests the degree of acceptance of one's own skin color. For instance, when an individual does not fit the skin color ideal within a particular cultural context, skin color preference signifies his or her racial ideology (i.e., one's acceptance or rejection of a culture's overarching color connotations). A preference for lighter skin reflects a desire to be perceived as more similar to the other individuals who have light or White skin and to benefit from all the advantages and privileges afforded to those with light or White skin (i.e., perceived and treated as more attractive, smarter, morally upright, etc). For instance, research supports the notion that people who are perceived as more attractive (based on skin color or otherwise) are also perceived as smarter and more likely to be successful. In some instances, lighter skin is associated with more successful life outcomes, while darker skin is associated with less successful life outcomes (i.e., personal earnings) (R. Frank et al., 2010; Harrison & Thomas, 2009; Hunter, 2002; Kiang & Takeuchi, 2009; Townsend, Thomas, Neilands, & Jackson, 2010).

Gendered Differences in How High-Achieving Adolescents Negotiate Multiple Identities

As suggested by data, there are gender differences in the relationships between skin color and other dimensions of self-schema. For instance, as skin tone relates to self-perceptions, Thompson and Keith (2001) found that, for both men and women, the lighter the skin tone, the higher the sense of self-efficacy. However, the effect was more pronounced for men in the study. (Of course, these findings may be somewhat different for youth, given the study's focus on adult participants. Other research suggests that females are more likely to desire lighter skin color than males (e.g., Fegley et al., 2008; M. Hill, 2002; Wade & Bielitz, 2005). In relation to perceptions by others, Wade and Bielitz (2005) found that light-skinned African American females are perceived as higher in intelligence, a relationship that does not necessarily hold for light-skinned African American men. Together, these findings suggest that gendered experiences may influence the role of skin color for the identities of adolescents of color. Specifically, gender differences in their experiences may lead male and female African American adolescents to think about skin color—as a signifier of race—very differently. Overall, findings from African American youth suggest complex relationship and individual differences—including gender patterns—that index complex relationships among self, context, and identity as coping processes. In particular, the skin color findings suggest very interesting, nuanced, and overall complex color-associated patterns. More informed, theory-based, and rigorous research is needed for testing and integrating (1) the historical analyses by D. B. Davis (1966); (2) the critical perspective by Harris (1995), which hypothesizes the representation of "Whiteness as property"; (3) critical race viewpoints of Roediger (1991) alluding

to the "wages of Whiteness" (i.e., as affirming and supporting myriad benefits); and (4) the knapsack of supports and privileges suggested by McIntosh (1989). Along with others viewpoints, these are not typically woven into the constructs considered in social science research or reflected in the research methodologies and designs embraced. Most important, for African American youth, their self-identity formation generally does not represent developmental processes linked with their identifiability—skin color—in light of their progressively complex meaning-making capacity (i.e., given cognitive maturation irrespective of its expression in achievement-assessing contexts).

The final sections of this chapter describe in more detail both the methodological challenges and the opportunities possible. They also consider the conclusions and inferences possible from a social science perspective that acknowledges the impact of a 150-year historical backdrop in which color continues to matter.

METHODOLOGICAL CONSIDERATIONS

In theorizing about individuals' ability to resist and overcome risks, Prilleltensky (2008) asserted that power is always reflected in political processes which create conditions impacting psychological processes. We have framed the historical influences and research on vulnerability and resilience within this orientation. These factors provide not only the context in which development occurs but also the one in which research is conducted. The sociopolitical nature of most scholarship on African Americans requires significant consideration of issues involved in conducting research. "Central to a discussion of procedural issues in minority research is the awareness that research on minority issues often has perpetuated stereotypes, reflected prevailing biases, and assumed that personal characteristics of research participants reflect causal connections to specific outcomes" (Schwartz et al., 2014, p. 62). With that assertion, the next review presents conceptual and procedural issues related to research on resilience among African American youth.

Conceptual Issues

The study of resilience, with a focus on processes through which it develops, requires conceptual framing that offers criteria for defining and examining the processes. The framing defines the scope of risk in understanding intrapersonal, interpersonal, and contextual factors contributing to unexpected trajectories, given the magnitude of vulnerability. Risks are generally well defined, given their explicit associations with adverse outcomes, which include issues that are *school related* (i.e., academic failure and school dropout), health related (i.e., obesity and sexual behaviors), *justice system related* (i.e., various forms of delinquency), and *mental health focused* (i.e., anxiety, depression). Understanding mechanisms by which protective factors mitigate these risks has been a primary focus of resilience research.

The Scope of Risk

Resilience research evolved from examining trajectories associated with youth experiencing positive outcomes despite numerous compromising risks. This shift expanded historical research from a pathologizing orientation to including considerations for strength-based studies (Zimmerman et al., 2013). Over the past two decades, complex research designs have examined varying forms of vulnerability and risk in exploring differences in developmental trajectories and levels of need to be mitigated (Jung & Wickrama, 2008; Sohoni & Soporito, 2009). Consistent with the methodological and conceptual challenges associated with late twentieth-century and early twenty-first-century social science research traditions alluded to, importantly and unfortunately, *few focus on African American youth*.

Arrington and Wilson (2000) have suggested differentiating "risk" from "vulnerability." They asserted that the latter represents individual factors, in contrast to the former reflecting group experiences. Resilience theorizing, however, continues to broadly conceptualize risks as contributing to significant vulnerability for youth individually and collectively. Resilience, in essence, represents the individual experience of risk and the individual impact of vulnerability. Arrington and Wilson, however, introduced a consideration for explicitly acknowledging group vulnerabilities as a condition of individual risks.

Based on the dual-axis model of vulnerability (Spencer, 2006; Spencer, Harpalani, Cassidy, et al., 2006), all youth experience varying risks and levels of support. Many studies explore factors associated with the most vulnerable youth: high risk, low supports. The scope of risk frequently considers poverty as a contextual condition indicative of restricted resource accessibility, but poverty is also recognized as an inaccurate assessment for determining youth success. As a protective or support mechanism in mitigating risks associated with poverty, numerous studies confirm the impact of a trusting and caring adult as a significant, contributing factor toward youth resilience (see Zimmerman et al., 2013). The consistency of this

finding became the basis for mentoring programs and a central component of youth-focused intervention projects more generally (DuBois & Karcher, 2005; Herrera, Grossman, Kauh, Feldman, & McMaken, 2007). This body of research highlights the effects of caring adults throughout adolescence and into emerging adulthood, where many colleges and universities have incorporated mentoring urban youth into components of their service learning offerings. To understand attributes of particularly effective relationships, some studies have examined the individual histories and experiences of significant adults to capture their moderating impact on youth outcomes. These include discrimination experiences, racial socialization, earlier school experiences, substance abuse, and personal traumatic experiences. Acknowledging the direct and indirect impact of significant adults' histories is comparable to accounting for the impact of cultural trauma or sociohistorical influences (discussed later) in creating conditions of risk for contemporary youth.

Collaboration among families, schools, and community-based organizations are critical to building supports for the future trajectory of youth (Broussard, Mosely-Howard, & Roychoudhury, 2006). The greater the social support, the more competent and motivated students are in their educational abilities. As such, the guidance and care demonstrated through mentorship heightens willingness for school engagement as a basis for academic achievement and in deterring decisions to leave school (Darensbourg & Blake, 2013). Although research documents the positive impact of mentoring relationships, little research has been done on the nature of these relationships and the youth targeted to receive mentorship. For example, Monroe (2013) found that colorism impacts both youth opportunities for educational opportunities and also *selection as a mentee in nonschool programs*. Although there is a clear trend favoring lighter youth (and females over males), research regarding criteria for selecting youth participants remain unclear.

These approaches on interpersonal dynamics also draw from research on the impact of close peer relationships associated with resilience during adolescence (Masten et al., 1999; Morrissey & Werner-Wilson, 2005). Youth without trusting and stable relationships can experience difficulties navigating contextual risks that strain their limited coping abilities. There may, however, be critical or sensitive periods during which experiences influence the subsequent interpretation and response to future events of youth (see Swanson, 2010). A youth's history of unstable relationships, for example, has implications for social and emotional development and identity formation throughout the life course (e.g., ability to get along and work well with peers in school).

Phenomenological research has shown the value of accounting for the youth perspective in designing empirical studies but also for interpreting findings within a developmental orientation. This is particularly relevant given the shift in cognitive abilities experienced during adolescence related to self-appraisals and the abstract processing related to the assessment of risks and supports perceived as available. Work acknowledging the impact of poverty, for example, consistently indicates the limited opportunities available for exploration that support competence formation, self-appraisals, and identity development. It is misleading, however, to suggest that youth interpret their impoverished conditions as a risk or limitation (i.e., reports of low aspirations, or a narrow perspective of the future, by youth living in poverty is not indicative of them interpreting their future based on their family's income status). Similarly, it is misleading to suggest that mentoring relationships are supportive without also acknowledging the relevance of the relationship to the youth. The scope of risk is subsequently related to a clear conceptualization regarding the form of risk and also the historical nature of supports (i.e., stability) relevant to interpretation of experiences and supports by youth.

Attributes of Resilience

Other factors associated with resilience include individual attributes: an area of emerging or demonstrated competence, a positive reference group–oriented identity, and a future orientation (Masten et al., 1999; Mello & Swanson, 2007). As noted in the introduction, normalization of Whiteness remains a major problem in research agendas targeting or including African American youth and may be one of the major impediments to gaining a full understanding of development among diverse youth. White middle-class youth continue to represent the standard for normative outcomes (i.e., competence) with minimal reference to their sociohistorical status or their status as a racialized group (e.g., enjoying the "wages of Whiteness" (see Roediger, 1991). Helms' (1990) and McIntoch's (1989) work prompted examination of White racial identity and White privilege, respectively. The expansion of Whiteness and White identity studies was a major theme in research for a few years preceding conceptual considerations regarding White privileging status. Although studies have examined the impact of White identity on stereotype beliefs (R. T. Carter, Helms, & Juby, 2004), very few studies have examined White identity or privilege as a source of vulnerability (i.e., the intersection of available supports

and risks) on the mental health of White youth when they are challenged and on their developmental trajectories. Among the few that approximate these issues is a study that examines the "psychosocial costs" of racial attitudes for Whites. Although it examines the within-group impact of attitudes, it does not assess the influence of identity or unexamined privilege (Spanierman, Poteat, Beer, & Armstrong, 2006).

Although years have passed since frameworks exploring White privilege were presented, little empirical work has examined Whites as one of many diverse groups; rather Whites continue to represent a standard by which others are judged. Sociohistorical analyses regarding these issues remain empirically unaddressed. Much research documents the impact of experiencing discrimination, but significantly less research focuses on being a person of privilege. As an attribute of resilience, significant effort has been expended raising and integrating cultural competence into activities where adults have direct interaction with youth and impact their experiences. Assessments of cultural awareness and cultural knowledge suggest the significance of others' understanding (and subsequent acceptance) of cultural differences as normative rather than pathological. This orientation, while relevant in attempting to broaden perspectives on differences and mitigate stereotypes, has not resulted in improved outcomes associated with resilience; in fact, it reinforced an "othering" perspective (see Harris, 1995).

Training on cultural competence highlights the values different groups possess and generally introduces the implications of group history on the cultural strengths and sources of collective coping that influences current experiences. Professional training, however, seldom addresses the inherent biases of those being trained; nor does it provide sufficient time for the long-term engagement necessary to examine, challenge, and create new perspectives (Fouad et al., 2009; Hatcher et al., 2013; Rogers, 2006). For example, on average, a degree program requires one semester focusing on cultural influences relevant to individuals' development and lived experiences; only 1 to 4 hours per year are required through continuing education postgraduate training and licensing in select disciplines. Although culturally based training is seldom an explicit requirement in research-focused graduate programs, it is relevant in conceptualizing and assessing how empirically examined proximal relationships are studied. Even less frequently considered is the limited cultural perspective (i.e., ethnocentric) behind the development of youth-based policies intended to address issues related to African American youth and their families.

Although there remains substantial work to understand the influence of privilege as a source of significant support for youth with few known risks, there has been tremendous effort to understand how various groups live culturally. García Coll and Magnuson (1999) suggested the need to acknowledge cultural factors as

> an active part of the changes and influences on developmental processes. . . . This new treatment of culture reflects the need to "unpackage" culture, that is, to consider culture as a multidimensional evolving source of influence on developmental processes within any culture rather than as a monolithic nominal variable. The unpacking of culture also requires researchers to operationalize culture in concrete variables. (p. 3)

This focus in research on exploring and understanding cultural factors impacting development has been particularly true for many immigrant families and youth, although the degree of within-group diversity continues to be minimally acknowledged even for them (see Nakamura, Tummala-Narra, & Zárate, 2013; special issue on immigration status and within-group assessment considerations). Even so, less attention has been paid to cultural and historical factors shaping experiences and outcomes for African Americans that also considers their developmental needs.

Universal versus Group Dynamics

Tensions exist when conceptualizing intervention programs regarding the extent to which research studies exploring resilience from a developmental orientation are focused on universal versus group-specific factors. The perception that factors contributing to resilience are universally constant ignores the sociohistorical conditions that influenced the presence and type of vulnerabilities youth must navigate. As resilience research expands to better understand the broad factors related to positive outcomes for youth experiencing multiple risks, it is important to continue examining unique group differences as well. It is interesting to note that significant research has been conducted on within-group processes, outcomes, and trajectories, especially for African American and Latino youth (Cedeno, Elias, Kelly, & Chu, 2010; Edwards, & Romero, 2008; Gonzalez, Stein, Kiang, & Cupito, 2014; Pina-Watson, Ojeda, Castellon, & Dornhecker, 2013; Stevenson & Arrington, 2009; Travis & Leech, 2014). Findings from such studies, however, are utilized infrequently in studies involving diverse racial and ethnic groups. In searching empirical studies on research databases (i.e., PsycInfo) from 2000 to 2010, frequently cited literature reviews do not often reference group-specific studies. Although this is understandable, given a focus on universal attributes, a general

orientation toward excluding group-relevant research contributes to designs and interpretations of results reflecting a status quo orientation. Much of the multigroup research on resilience acknowledges group variability in reviewing the implications and generalizability of findings, but often it is limited to interpretations of findings within a universal orientation. Exploring similarities in parallel processes offers explanations and possible confirmation of universal trajectories potentially associated with developmental trajectories; considering implications associated with different processes and outcomes, however—both individual cultural factors and positionality of the group within broader societal experiences—contributes to greater interpretive understanding of group-differentiated experiences.

Examining within-group variability also receives attention as investigators increasingly attempt to differentiate experiences of native and immigrant African Americans. Due to different sociohistorical conditions, immigrant youth have a cultural reference that extends beyond American borders. Ogbu (1978; Ogbu & Simons, 1998) identified these groups as voluntary (immigrant) and involuntary (nonimmigrant) minorities to acknowledge the influence of their cultural histories within the United States. This classification was based on reasons for the different groups of African descent being in the United States and the involvement of White Americans in defining their status. Although identifying with an immigrant history can provide a specific source of support (i.e., cultural identity associated with country of origin), immigrants share the stigmatizing experiences associated with being identified phenotypically with native-born African Americans (Caldwell, Guthrie, & Jackson, 2006; Seaton, Caldwell, Sellers, & Jackson, 2008). Although not all studies will have sample sizes sufficient for within-group analyses, it is relevant to consider the implication of the diverse experiences within groups that could result in different findings or trajectories. The situation is relevant even in cases of PYD research that aims to be inclusive (see Spencer & Spencer, 2015).

SES is another area acknowledged in research relevant to within-group variability. African American youth in low-SES families experience risks directly associated with limited resource opportunities that continue to be the focus of much resilience research. Youth in middle- to high-income-status families experience risks associated with racial discrimination, for example, but the scope and impact of their vulnerability is less well understood (McNeil, Harris-McKoy, Brantley, Fincham, & Beach, 2014; Wood, Kurtz-Costes, & Copping, 2011). Lindsay (2011) confirmed persistent racial differences in academic performance when examining White and African American youth from middle-class families with similar resource capital. Similarly, McNeil et al. (2014) asserted the need for further examination of contextual risks and related demographic factors influencing of the nature and impact of discrimination among middle-class youth.

Developmental Trajectories and Transitions

Although many resilience models are developmental in that they focus on adolescence as a period in the life course, they vary in terms of the periods studied (e.g., early, middle, or late) and the age ranges in longitudinal designs. Research has focused on specific areas of impact influenced by vulnerability during adolescence, however, with far less attention to late childhood, the transition into adolescence, and late adolescence as an emerging shift into adulthood. Interpretational information is compromised when accounting for ages as a study condition without a concomitant acknowledgment of developmental factors associated with the ages as well. As suggested by the historical framing provided, a history of vulnerabilities and risks that is both cumulative and multiplicative suggests the presence of developmentally comprising issues that often exist long before pubertal development begins. Most research, therefore, does not focus on late adolescence within a resilience framing as the needs associated with a history of academic and psychosocial risks, and therefore sustainable intervention factors that influence resilience, are numerous and complex. Exceptions to this are studies examining the success of African American youth who attend college with attention to their mental health and college retention (see Hunn, 2014; McGee & Spencer, 2013; McGee, Hall, & Spencer, 2015; Solorzano, Ceja, & Yosso, 2000). More work is emerging around middle to late childhood as precursors to adolescent experiences (see Swanson, 2010).

Early childhood research provides a basis for understanding the impact of developmental processes in cultural awareness and self-processes as indicators of resilience. The relevance in particular of meaning making and the implications for children understanding and internalizing contextual supports was linked to their developing social cognition. A developmental pattern in the understanding of color connotations, for example, is a consequence of increases in social experiences and social cognition (Spencer, 1982b, 1985; Swanson, Cunningham, Youngblood, & Spencer, 2009). Three-year-old children of all race/ethnic backgrounds are generally Eurocentric in terms of racial attitudes, racial preferences, color concepts, and connotations. However, for Black children, an Afrocentric pattern of attitudes and preferences begins to appear at age 5 and continues through age 9. Different

developmental patterns emerge when SES is taken into account. Middle-income Black children are generally Eurocentric in terms of racial attitudes, racial preferences, color concepts, and connotations at age 3, while low-income children were neutral on the same dimensions at the same age. After age 3, both low- and middle-income children showed a clear Eurocentric orientation for color concepts. However, middle-income children became progressively more Afrocentric through age 9, while low-income subjects showed a pattern of neutrality.

This work by Spencer and colleagues, among others, became the basis of exploring the role of racial identity processes and the impact of discrimination experiences through adolescence as predictive of resilience. A broader, developmental perspective of youth experiences and outcomes necessitates the assessment of processes that are precursors to identity formation: cognitive development and opportunities for "industry." Findings on racial identity and discrimination experiences, for example, are broad in their exploration of mediating and moderating variables and assessments of discrimination (Eccles et al., 2006; Harris-Britt et al., 2007). Empirical reports should include information on the population criteria (i.e., middle school age versus high school age), measurement validity (i.e., assessing types of discrimination), and context of experience (i.e., racial demographics). Given differences in early opportunities received, cognitive shifts that occur during adolescence, and the general developmental needs and areas of vulnerability between early and late adolescence, aspects of resilience are unique at different periods. Research examining the middle school and high school periods often focus on academic outcomes, identity development, and relationships with adults and peers. Post–high school research (i.e., emerging adult years) explores issues largely related to academic experiences in college and university settings. Approaches that focus on the individual experiences and issues contributing to resilience have been necessary in understanding the impact of contextual factors on youth; they have also provided sufficient data demonstrating the extent to which unaddressed contextual factors can undermine long-term outcomes. Examinations of resilience therefore extend from the conceptual to the procedural.

Procedural Issues

As others have noted, the scope and quality of methodological procedures have implications for the value of research findings (see Schwartz et al., 2014; Veale, 2006). Two major areas of consideration are briefly highlighted here: (a) recruitment and sample characteristics influencing generalizability of findings and (b) psychometrics (e.g., assessment reliabilities and normed criteria).

Recruitment Considerations

Research participants provide data that inform the interpretation of findings relative to the questions being examined. Characteristics of the sample also affect attrition and generalizability of the findings. Inclusion and exclusion criteria are important to note in reporting studies. Recruiting in urban schools with high free-lunch participation or community mental health facilities to address issues relevant for a broader group is exclusionary by default; students in schools with diverse SES populations are excluded, as are youth receiving mental health services paid or supplemented through private insurance. Such inclusion and exclusion approaches are based on a priori decisions but can also reflect limited time or effort to establish relationships with individuals in locations that facilitate accessibility to diverse populations. *The impact, regardless of the reason, is suggestive of skewed results with limited generalizability. This issue is often addressed in discussing the implication of findings, but it is not frequently raised in considering future research strategies*. It can be difficult to gain access to youth identified as low risk because they are more likely to be protected, whether having high or low supports, from research efforts perceived as exploitive (Hatchett, Holmes, Duran, & Davis, 2000). Research briefs on effective recruitment approaches in conducting developmental research with African American youth or their families are generally not available but could broaden existing approaches used by investigators.

Psychometric Considerations

It is common, and often expected, for psychometric properties of new instruments to be investigated and documented. It is particularly critical to do so with instruments adapted for a developmental period or used with a population not previously tested. It is useful, although uncommon, for investigators to report the reliability of measures for each group being studied if there is limited documentation of the measure's prior use with each group. The assumption, and therefore the interpretation of results, is that all groups will interpret items (i.e., on self-reported measures) representing a construct similarly and consistently. This level of planning and reporting will enhance the likelihood of measurement strategies representing the constructs investigated.

Research with diverse groups may occasionally require alternative interpretations for established constructs. The

constructs of racial awareness and identity, for example, may be conceptualized as risk variables in exploring the impact of discrimination. However, youth have varying experiences of race as a risk factor related to their skin tone. African American toddlers and young children, for example, have not developed a racial identity but demonstrate awareness of color connotations, or concepts, as early as age 3. This early awareness of race and color connotation is related to the child's social cognitive ability to take the perspective or point of view of another, which becomes more differentiated in self-appraisal processes with maturation (Spencer, 1982b; Swanson et al., 2009). In essence, perceptions and stereotypes related to skin color can influence self-appraisal in conjunction with racial identity. Skin color biases pose a risk for youth of color, particularly African American youth, as skin color is the most visible and salient phenotypic feature associated with racial categorization and related biases.

There is a need to examine "norms," both in terms of attributes associated with typical development—emotional, cognitive, social—and in terms of data typically collected to assess specific constructs (e.g., connectedness, individuation, etc.). For example, in the absence of examined criteria that defines norms, there is potential for misinterpretation of developmental processes that underlie constructs in diverse groups. In using family structure as a construct of normed family patterns, Murry, Smith, and Hill (2001) reiterated the need for research to redefine family composition and family structure to more accurately capture the family supports available to African American families not represented in traditional assessments using two-parent and single-parent criteria. They noted that this construct maintains a consistent definition of single parents as representing both composition (i.e., the individuals in families) and structure (i.e., single, two-parent, intergenerational). Given the significant reporting and inclusion of family structure as a factor associated with vulnerability, greater differentiation can enhance empirical reports and account for the impact of extended family on the development of African American youth.

An understanding of racial attitudes in the context of social cognitive development suggests that some explanatory power can be lost when race (used as a categorical variable) is considered as a risk factor without additional variables that captures the experience of race (i.e., the youth's understanding of color connotations, racial attitudes, and preferences). In essence, identity development may also reflect processes by which a youth copes with her or his experiences of race (Swanson, Cunningham, & Spencer, 2003). For instance, research suggests that there is a difference between children's ability to perceive color connotations and their acceptance or internalization of those color connotations (Spencer, Harpalani, Cassidy, et al., 2006). A similar pattern is found among youth when exploring the impact of their experiences with discrimination and factors contributing to depression (Caldwell et al., 2006; Lambert, Herman, Bynum, and Ialongo, 2009; Seaton et al., 2008). Depending on the phenomena being studied, the internalization of negative stereotypes associated with being a member of a particular racial group may be a more important risk factor than belonging to the specific racial group. Social cognition among adolescents is seldom explored, yet it is a critical construct for exploring the meaning-making processes associated with self-appraisal processes and subsequent behavioral coping patterns.

Contextualizing Norms

Research with diverse groups also necessitates establishing new norms or reassessing the applicability of current conceptualizations. Often norms serve as benchmarks for determining whether behaviors and abilities are within the expected range versus below or above it. Without an understanding of norms for diverse groups, children from different groups may be mistakenly identified or overlooked for intervention when their behaviors or abilities are based on the degree to which expected norms are expressed. For example, there are standard criteria for classifying a child as anxious, yet there are group differences in the expression of anxiety (Morrissey & Werner-Wilson, 2005; Wiese, 2010). The limited degree to which cultural differences exist in coping expressions is a challenge. This is particularly relevant when examining a developmental period noted for heightened anxiety in addition to the criteria used for observer-rated assessment procedures to evaluate behavior problems. Clinical standards for assessing behavior problems would appear sufficient for identifying needs and subsequent treatment plans if there were not continuing concerns regarding overdiagnosing African American males for behavioral plans within schools (see Noguera, 2008).

As DiBartolo and Rendon (2012) found in their review of literature examining cultural factors influencing mental health outcomes, sociocultural factors significantly affected the expression of symptoms with implications for treatment. A child exposed to neighborhood violence may, over the course of time, exhibit behavioral impulsivity more consistent with hyperactivity or conduct disorder than with anxiety. National organizations approach

violence as a health risk (i.e., Centers for Disease Control) and a psychological risk (i.e., National Institute of Mental Health). The implications, however, of exposure to violence on youth resiliency has not been systematic or conclusive; the association between violence and trauma is defined quite broadly across various studies. Nevertheless, as noted, there is evidence of somatic complaints among youth who exhibit behavioral problems who have also, for example, witnessed violence. For African American youth, little research explores behaviors identified as a problem but interpreted as a normed response to the contextual experiences (see Swanson, 2010). As such, intervention efforts address the behavior, not the contextual conditionsor the emotional impact (without a primary focus on behavior). Among the sources of trauma for African Americans recently being reintroduced into social science research is cultural trauma. The intergenerational impact of cultural trauma, shaped by the historical experiences discussed earlier, draws on critical race theory and extends challenges regarding inferences based on reactive behavior.

According to Stamm, Stamm, Hudnall, and Higson-Smith (2004), cultural trauma is nonspecific and tends to help explain human interchange across cultures with differences in economic, social, and technological organization. Sociocultural trauma exists because of certain conditions either inherited or forced on people by dominating forces. Over the last few decades, cultural trauma has been examined for many groups worldwide. Alexander, Eyerman, Giesen, Smelser, and Sztompka (2004) defined its impact as "members of a collectivity [who] have been subjected to a horrendous event that leaves indelible marks upon their group consciousness, marking their memories forever and changing their future identity in fundamental and irrevocable ways" (p. 1).

Eyerman (2001) argued that "[t]here is a difference between trauma as it affects individuals and as a cultural process. As a cultural process trauma is linked to the formation of collective identity and the construction of collective memory" (p. 1). During the last 20 to 25 years, American media has consistently projected an expectation for citizens to be their own individuals, independently creating the life they envision, and take their piece of the "American Dream." The literature suggests that this type of socialization does not work well with an ethnic group whose highest value lies in relationships between people (Akbar, 1996; Degruy, 2005).

Alexander et al. (2004) suggested that an understanding of cultural trauma is relevant in exploring how it contributes to, or affects, everyday life. This framework implies that social-cultural traumas are fused into the collective identity and collective memory via generational transmission influencing the individual development and self-worth of those impacted. Although it is implied in relation to impacting socialization practices and youth outcomes, limited research connects parenting patterns and cultural socialization or practices used to raise children.

Training New Scholars

The 30 years of research on vulnerability and resilience created a shift from pathologically based studies to greater emphasis on developmental and contextual framing. In essence, earlier research involving African American children and adolescents was based on comparisons to Whites, was atheoretical, lacked developmental considerations, and was based on a priori assumptions regarding deviance (see Spencer 1985, 1990a). A shift toward exploring PYD offered hope in addressing these earlier issues: Studies explore within-group development, are theoretically conceptualized, and began to consider developmental processes. Since a priori assumptions remained unchallenged, the research continues to replicate biased assumptions. There is significant research on within-group processes for African American youth; a wealth of research also is available using multi-ethnic samples in which African American youth are compared to other youth. Limited developmental understanding is applied to exploring the social-cognitive and culturally based, meaning-making processes necessary to interpret contextual influences impacting youth outcomes. These trends have not only influenced the focus and nature of research but have also shaped the training of emerging scholars who will continue in this "tradition" of conceptualization.

The American Psychological Association (2008) task force guidelines for multicultural training and research recommend that consideration is given to the *impact of researcher perceptions on implementing a research plan*. These include the need to recognize:

(a) that psychologists are cultural beings that "may hold attitudes and beliefs that can detrimentally influence their perceptions of and interactions with individuals who are ethnically and racially different from themselves";
(b) "the importance of multicultural sensitivity/responsiveness, knowledge, and understanding about ethnically and racially different individuals"; and
(c) the importance of "conducting culture-centered and ethical psychological research among people from ethnic, linguistic, and racial minority backgrounds." (pp. 3–18)

The guidelines are to encourage an awareness of ethical research in conducting studies with diverse groups, but they fail to highlight the need for researchers to examine personal biases and perspectives of the groups being examined from the conception of a study through analysis and interpretation. As such, subsequent emerging scholars will not have an awareness of how positions of privilege and perceptions of others impact their research that can inform policies and practices for youth of color generally and African American youth specifically. Without such insights, researchers themselves are at risk for using publicly funded and federal research dollars to foster successful careers while perpetrating perspectives that compromise the potential effectiveness of policies and programs for youth and families most in needed of authentic supports.

As the examples offered suggest, integrating a developmental perspective into research on diverse groups requires an articulated understanding of the processes by which development takes place. In addition to the collective impact of historical experiences and cognitive maturation as relevant, these constructs are seldom explicitly examined in studies of vulnerability and resilience. They are also minimally addressed as an interpretational consideration that is particularly relevant when examining the meaning-making processes involved in negotiating experiences of stress.

TRANSLATIONAL PRACTICES

Since the mid-1990s, federal and foundation funding agencies have increasingly required accountability for the dissemination of results obtained from supported studies. These agencies have been linked to policies requiring explicit collaborations between researchers and providers along with a public expectation for research to inform services being provided or obtained. During President Johnson's administration, policies meant to address poverty were framed to provide opportunities for youth and families (see Swanson & Spencer, 1991). These practices, viewed by a later administration as an economic drain, were eliminated. Subsequent policies since the 1990s have focused on addressing families and youth as problems to be fixed or managed, resulting in significant attention on individual characteristics and significantly less on societal practices contributing to the noted problems. Consistent with research patterns historically, the developmental field has responded to these policy and societal shifts *without shifting the underlying individualistically oriented paradigms*. Support for identifying practices that meet the criteria for generalizability (i.e., wide dissemination) while identifying factors relevant for mitigating individual problems are the focus of recent research on resilience. These practices are identified as evidence-based.

Evidence-based practices (EBPs) offer best practices for facilitating positive outcomes for youth in various settings drawn from randomized control studies. They have been particularly relevant in addressing targeted mental and physical health risks, but they also are relevant in identifying effective universal strategies as noted earlier with regard to mentoring practices. Numerous standardized programs exist for addressing universal and targeted youth concerns across various institutional systems (J. L. Frank, Jennings, & Greenberg, 2013; Kusche & Greenberg, 2012). Dissemination and extension of these practices has, however, been limited for small-scale prevention and intervention practices, particularly for those needing to ensure cultural relevance. Community-based organizations and faith-based institutions are two areas that provide significant support for youth in which dissemination of findings has been slow. Research has been relatively effective in addressing individual issues, particularly in school and family contexts. Yet even within this framing, there is limited consideration of the developmental needs and cultural factors influencing sustainability of positive outcomes. Specifically, in providing culturally relevant universal interventions, there is no current mandate to adopt a developmental framework in guiding practice-related decisions; a "lack of knowledge and guiding framework can significantly impair [practitioners'] abilities to address the complexities [youth] experience that may call for tailoring or adapting treatment models" (DeRosa, Amaya-Jackson, & Layne, 2013, p. 199). Given the framework of the dual-axis model of vulnerability suggesting that, at some level, all youth are vulnerable (see Spencer, Harpalani, Cassidy, Jacobs, et al., 2006), programs should address youth needs by facilitating coping strategies and competence formation relevant in early adulthood. DeRosa et al. (2013) proposed that an essential approach is one that cultivates both lifelong learning and critical thinking in the knowledge obtained through emerging research and the utilization of evidence-based, trauma-informed assessments. With this knowledge of emgering science and evidence-based practices, programs are better equipped to critically appraise their approaches as they formulate conceptualizations and treatment recommendations for vulnerable youth. Concurrently, however, there is a need to address factors that contribute to youth vulnerability or that continue to exacerbate the concerns. Framing adolescence as a culture in itself, Nelson and Nelson (2010)

suggested that EBPs address the multiple components of adolescents' experiences (e.g., technology, peer relationships, identity processes) in developing and implementing intervention practices. They contended that "Whether modifying existing evidence-based protocols or designing new interventions to be evaluated, thoughtful attention to adolescent culture will help enhance adolescent engagement and promote improved treatment effectiveness" (p. 310). The increase understanding of assets associated with PYD contributes to explicit programmatic considerations of risks and supports.

Allison, Edmonds, Wilson, Pope, and Farrell (2011) further suggested that even when prevention or youth development programs are available, community residents may not know about nor access these resources. Community infrastructure (e.g., availability, quality) is important, but resource awareness is also necessary. If we build it and they do not use it, dissemination efforts that just target organizations may not result in ultimate benefits to youth and communities. Support for the prevention delivery system may need to explicitly address those organizational capacities that also engage and link community residents to prevention opportunities and resources. Intentional linkages at each step may be necessary.

Next we present two programs that utilize research on vulnerability and resilience in their design and implementation to mitigate challenges and enhance future trajectories of youth. Each program has a specific focus, but both provide a comprehensive approach that includes addressing racial disparities and societal incongruence through developmentally appropriate practices for African American youth. Numerous other programs are based on best practices from the research. We present these two to highlight how program practices can draw from resilience research and to explicitly illustrate the multilevel focus (i.e., individual developmental needs, contextual conditions) required of programs in which research can ensure knowledge of supportive strategies are available. These provide a novel conceptualization in translating research for practice that addresses youth as in need of support (rather than a problem to fix) the developmental tasks relevant for youth, and the contextual supports necessary for a sustainable positive trajectory.

Work Connections

Hillside Work-Scholarship Connection (HWSC) is a youth development program designed to help youth (most likely to leave school) to stay in school, graduate, and be prepared for the transition into work or postsecondary education. With several sites nationwide, HWSC assists youth with acknowledging, and achieving their potential to mitigate chronic, negative contextual influences surrounding them. HWSC also endeavors to change the negative educational trajectories of youth by connecting them with resources to become successful. As a secondary intervention, the focus is on youth already showing signs indicative of negative outcomes. Youth are identified based on having at least two risks associated with school dropout: failing a core subject, multiple school suspensions, overage for grade level, high rates of absenteeism, and a family that meets poverty guidelines (Swanson & Spencer, 2011; see Zimmerman et al., 2003, regarding resilience-compromising factors).

HWSC defines resilience as students' success in overcoming aversive barriers, created by poverty, as expressed through completing high school and obtaining some post–high school training. To accomplish this, HWSC serves as a bridge that connects its students to opportunities and resources often blocked or denied by their impoverished contexts. Recognizing its limits in changing students' aversive circumstances, the program positively impacts students' access to profitable skills and knowledge. HWSC offers the traditional resources associated with successful programs addressing academic vulnerabilities of youth: mentoring and academic supports. HWSC's work in translating research to practice, extends into providing work opportunities for youth (i.e., identity-enhancing opportunities), ongoing cultural and developmental training for the staff (i.e., to address perceptions of privilege, personal expectations, and assumptions about development), and training for partner organizations that offer employment (i.e., to address inherent biases in policies or expectations that compromise youth opportunities to learn and grow).

Youth are provided and connected to individualized resources to enhance their educational trajectories and the social-emotional development needed to succeed: long-term mentoring, academic support, life and social skills, employment, and postgraduation planning and support. Each component is designed to guide students toward academic achievement by directly addressing contextual barriers and risks (see Bauermeister, Zimmerman, Barnett, & Caldwell, 2007).

Long-term mentoring is a critical component to HWSC's overall functioning, and mission. This service is executed by Youth Advocates, who each serves as a mentor to an average caseload of 30 students. To best support and guide students toward the goal of graduation, Youth Advocates (i.e., mentors) build rapport with not only the student but also relevant stakeholders in the student's

life, such as family members, teachers, and employers. Through establishing meaningful connections, the Youth Advocate is able to best identify and address each student's specific needs.

As part of the life and social skill building service, HWSC staff members conduct weekly enrichments that follow the evidence-based curriculum included within the Teen Outreach Program (TOP; Allen, Spencer, & Brookins, 1985). During these sessions, students are provided opportunities to evaluate current and future life options. These are growth-promoting experiences that exist outside of potential challenges in their homes or neighboring communities. Since many of the students potentially become first-generation college students, they are also provided postsecondary planning and support (e.g., free SAT/ACT prep courses, Free Application for Federal Student Aid [FAFSA] workshops, resume/cover letter building, and organized college tours) to help them manage unfavorable contextual obstacles.

Offering students employment is an aspect of the program that encourages focus and a trajectory toward graduation. The skills prepare youth for the transition into future work roles. HWSC has established meaningful relationships with prominent local employers to support job placements. Students must initially meet the program's pre-employment criteria for "Triple-A Standard" (Academics, Attitude, and Attendance), which hold students accountable for average or better grades on recent report cards, good attitude (as denoted by school/program staff), and school attendance above 85%. Once youth are employed, Youth Advocates assist them with time management skills and in balancing obligations at school, work, and home. Employment opportunities through this program instill students with a greater sense of purpose and drive to succeed. HWSC students who are employed by an employment partner often experience greater access to opportunities and resources, which expands their social, cultural, and financial capital. Factors identified as enhancing youth resilience that are incorporated into this program include mentoring by adults who have shared experiences similar to the youth participants, academic supports, positive peer relationships, and an opportunity for financial autonomy. These factors, identified as particularly relevant for urban African American youth, have been integrated with TOPS as an EBP, to explicitly address the youth needs. An additional component not explicitly explored in developmental research but acknowledged as significant in this chapter is addressing the potential for biases: addressing stereotyped perceptions of the youth and positions of privilege among those who will hire and supervise them.

In complementary roles, the Youth Advocate supervisors maintain regular meetings and provide ongoing training for employee supervisors around unintentional biases and youth areas of strengths to utilize and enhance. This component of the program extends the use of existing research into practices addressing systemic biases and discriminatory practices that impact the nature of feedback and work opportunities youth receive consistent with research on youth employment. There is variability in the extent to which these employer meetings occur. However, while a process for establishing fidelity is needed, the initial piloting provides a novel orientation to programmatically maximizing supports for vulnerable youth. The current programmatic and practice guidelines are being refined and will offer potential for exploring translational approaches in the future.

Restorative Practices and Principles

Restorative practices, as previously noted, is an approach to addressing behavior problems in schools where the behavior is understood in social context. "Individuals are recognized as being part of a social web of relations, and building, maintaining and repairing relationships become priorities" (Morrison & Vaandering, 2012, p. 138). Restorative principles are based on the premise that harming others damages interpersonal and communal relationships and that justice is best achieved by seeking to repair relationships through reconciliation. Restorative practices, however, evolved from a philosophy of restorative justice that is essentially reactive in response to a disciplinary issue. However, a restorative approach within the context of education moves beyond reactive responses to wrongdoing to include proactive strategies that address the needs of students and staff members to work together in positive relationships as members of a community (Morrison & Vaandering, 2012; Wachtel, 2012): It is a universal intervention approach where behavior is understood in social context in supporting individual development.

The school-to-prison pipeline has recently received substantial acknowledgment in various fields but was identified as an emerging issue warranting immediate attention over two decades ago (Mulligan, 2009). This trajectory is traced to progressively harsher penalties for mild to moderate infractions that became linked to juvenile justice proceedings and is associated with discriminatory treatment of minority and marginalized students in many U.S. schools (Caton, 2012; Evans & Lester, 2012; Molsbee, 2008). In an

effort to reverse this process, restorative practice strengthen relationships responsible for the social context or climate. It involves creating an environment where (1) everyone is viewed and treated as valuable and (2) a process for examining the impact of one's behavior on another, beginning with restorative questions [e.g., what did you want (from the disruptive behavior?)], that encourages individual and collective responsibility consistent with cultural values of mutual cooperation and sharing (Murry et al., 2005. It is also conducive for adolescents who have the capacity to reflect and discuss their needs. Loosely drawn from nonviolence principles, questions are framed, and expected to be asked, in a manner supportive of youth development and their relationship with others.

Although restorative practices have been used in schools since the 1990s, little research has been done evaluating the effects of these programs using experimental or quasi-experimental methods (Stinchcomb, Bazemore, & Riestenberg, 2006). One exception to this is Wong, Cheng, Ngan, and Ma's research (2011). These authors conducted a quasi-experimental study of a restorative whole-school approach, which found that intervention group participants, as opposed to the partial intervention group and the comparison group that received no intervention, experienced a significant reduction in bullying, higher empathic attitudes, and higher self-esteem.

Other studies, examining components of the restorative practice process, suggest that when restorative practices are implemented, behavioral infractions are reduced, suspensions and expulsions decrease, academic achievement improves, school climate and school safety improve, student engagement and connectedness increase, and absenteeism declines (Drewery & Winslade, 2005; International Institute for Restorative Practices, 2009; Karp & Breslin, 2001; McCluskey et al., 2011; Mirsky & Wachtel, 2007; Rideout, Roland, Salinitri, & Frey, 2010; Stinchcomb et al., 2006). Importantly, school connectedness and engagement has been shown for minority students previously identified as having either struggling or as having discipline concerns.

Evaluations of discipline approaches in schools show the benefit of collective responsibility in establishing caring relationships and nonpunitive approaches to discipline. Freiberg and Lapointe (2006) evaluated 40 school-based programs that included evaluations of interventions in schools that specifically sought to reduce behavior problems. Of these 40 programs, 29 were implemented in schools with high minority and low-income student demographics. The authors found several commonalities among the successful programs: The programs moved beyond discipline, emphasizing student learning and self-regulation, not simply procedures for addressing rule infractions. They encouraged "school connectedness" and "caring and trusting relationships" between teachers and students (p. 65). Overall, the programs tried to increase students' positive experience of schooling by building mutually respecting relationships for all school staff and students and by moving away from a reliance on punitive reactions to misbehavior.

Restorative practices in education offer an approach that manifests itself in a variety of strategies. These practices take a universal approach and systems-based orientation toward creating and sustaining a climate conducive for positive relationships and academic engagement. It does, however, require substantive shifts in existing practices and policies that can exceed a district's or school's capacity for implementation and sustainability. In addition, the focus on establishing and restoring relationships is based on the premise of mutual respect. There is an expectation that individual differences are minimized in the process, which has been reported as a concern in some contexts. As respect and the nature of relationships are contextually defined, studies are currently exploring the impact of explicitly incorporating training to ensure personal and historical biases are mitigated in the implementation of the practices. Restorative practices do not negate the benefits of EBPs to understanding effective, theoretically framed strategies, yet substantial work is needed to understand and implement these into translational practices that consider contextual and cultural influences on effectiveness.

Restorative practice programs are shaped by available research on resilience relevant to their mission and the desired outcomes for their target populations. They acknowledge developmental needs and seek to explicitly integrate cultural influences in their attention to how relationships influence on youth outcomes. Particularly important is attention to providing accepting and caring relationships consistent with research regarding safe and impactful adults in the lives of youth. To varying degrees, restorative practice programs also address individual biases that contribute to youth trajectories and outcomes of concern. Sociohistorical factors related to untoward conditions are generally unknown and therefore unacknowledged. Efforts to explore individual biases and their bases (often from a position of privilege, regardless of race) are ways to better understand programs and their limitations in facilitating resilience among African American youth.

System-wide or comprehensive efforts such as HWSC and restorative practices are challenging to implement with

the type of fidelity required by EBPs. These types of programs draw from the research to identify what practices to consider as central and where flexibility might be allowed. Smaller programs that exist within community-based organizations and faith-based institutions often lack the resources needed to create conditions that are inclusive of developmental, cultural, and relational factors in order to retrofit them for their mission and youth population. Collectively, small, community level programs reach substantial numbers of youth, and invest significant time, effort, and resources in meeting youth needs with little knowledge of how and why their efforts should work. Translating research into action should involve mechanisms and networks that can explicitly inform those directly involved in meeting youth needs.

CONCLUSION: REFRAMING THE FUTURE

As developmental science is a data-based field that informs decisions within a data-driven society, there is a prevailing assumption that data and data sources represent reality. A primary proposition of this chapter is an acknowledgment that data alone are not always enough. Part of the challenge for research scholars is not only ensuring that their research accurately represents the populations investigated (and the unique historical experiences of each) but, additionally, disseminating the findings to those who can implement the work in a relevant manner. Acknowledging one's position of privilege and recognizing the need for accurately understanding others' experiences without automatically pathologizing differences is always a necessary first step in the conduct of science. Without that critical consideration, there is the risk of misrepresenting youth and their families due to preconceived and unchallenged assumptions about the meaning and impact of historical and contemporary experiences. Without question, consequent translational work is more complex than developing a treatment plan for problem behaviors. Sufficient data on culturally informed (and thus, historically embedded), contextually based, and developmentally explored phenomena are needed to support research and the implementation of practices. As important, however, is the necessity of examining the influence of investigator privilege and the "wages" of social science status quo adherence on these processes (e.g., the ease of procuring research funds and the securing of journal publishing, given adherence to "traditional perspectives" in the conduct of social science).

Multicultural training should be explicitly integrated into research training as a core component of professional ethics. As an extension of the traditional approach to exploring others, a core component of the training must integrate positions of privilege that shape how others are viewed, evaluated, and supported (i.e., resources provided, treatments recommended). Although multicultural training is a course requirement in clinical, counseling, and education programs, there is substantial variation in the extent to which this training is integrated into other core courses and subsequently extended into practice. In addition, multicultural training is not a course or practice requirement in other areas of psychology; frequently it is addressed only within studies exploring research ethics and some justifications associated with the human subjects review process. These approaches to understanding cultural practices suggest they are sufficiently important to be acknowledged but minimally relevant in clinical and research practices. More disconcerting, however, is the perspective that historical and cultural influences are focused on merely to be politically correct. Such an attitude removes personal responsibility to examine and address individual biases from the equation.

The need for cultural awareness grew out of grassroot efforts to impact federal policies and professional standards, such as those by the American Psychological Association. Federal policies have focused on nondiscriminatory practices in an effort to facilitate inclusion (e.g., affirmative action) but negated the sociohistorial factors rooted in the attitudes and behaviors that compromised equitable opportunities. Since the mid-1980s, policies influencing African American youth directly focused on addressing observable problems in contrast to the preceding two decades, which focused on providing opportunities: welfare reform did not provide support for the working poor; zero tolerance as a reform for school-based discipline did not mitigate referral biases or create safe environments conducive for learning. As research often follows trends highlighted in national and educational policies, a focus on problems without consideration for the contributing historical or contextual influences has remained in research.

There is considerable research regarding factors influencing resilience for African American youth; there is less acknowledgment of practices that continue to constrain their opportunities. Given what is known from basic and applied research, those within the field are positioned to better facilitate resilience by consciously acknowledging societal and professional culpability, in this way removing systemic barriers that compromise the opportunities and outcomes for African American youth. Until the noted changes occur, the Einstein quote at the beginning of

the chapter still holds sway, and virtually guarantees the misrepresentation of African American youth sources of high vulnerability and resilience.

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CHAPTER 8

Social Inequalities and the Road to Allostatic Load: From Vulnerability to Resilience

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INTRODUCTION

The developmental trajectories that render individuals vulnerable toward or resilient against diseases of the mind and body are major themes in stress theory, research, and practice. As the field of developmental psychopathology expands our understanding of the multicausal mechanisms involved, vulnerability and resilience are increasingly conceptualized not as static states but rather as probabilistic processes that vary according to the contexts and the consequences investigated (Cicchetti & Toth, 2009; Rutter, 1985; Rutter & Sroufe, 2000). *Resilience* is therefore defined as a dynamic process that promotes positive adaptation among individuals exposed to severe forms of adversity, stress, and/or trauma (Cicchetti & Garmezy, 1993; Luthar, Cicchetti, & Becker, 2000; Masten, Best & Garmezy, 1990; Rutter, 2012). In order to further identify the intertwined risk factors and protective factors associated with diverse developmental pathways that promote resilience, scientists require multilevel analyses and refined measures of biopsychosocial stress among disadvantaged populations.

The social determinants of health literature focusing on stress pathophysiology apply increasingly integrative mind-body perspectives to understand how social inequalities influence disease susceptibilities. In this spirit, the neurobiologist Sterling and the epidemiologist Eyer coined the term *allostasis* to describe dynamic, multifaceted biological processes that maintain physiological stability by recalibrating homeostatic parameters and matching them appropriately to meet environmental demands (Sterling & Eyer, 1988). Analogous to our understanding of resilient systems that have the capacity to dynamically adjust and stabilize systems to adapt to perturbations (Cicchetti, 2013), allostatic processes likewise alter metabolic functioning via compensatory and anticipatory mechanisms for which the brain is the commander in chief. In formulating the concept of allostasis that has since revolutionized our

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[1]Color versions of Figure 8.1 are available at http://onlinelibrary.wiley.com/book/10.1002/9781119125556

views of what constitutes adaptive and maladaptive stress physiology, Sterling and Eyer (1988) proposed that age and socioeconomic differentials in cardiovascular hyperarousal represented physiological recalibrations to the needs of adversity.

Allostatic Load Model

Over the last quarter century, stress researchers have assimilated the concept of allostasis into understanding how biopsychosocial stress gets under our skin and skull (McEwen, 1998a). At a biological level, a stress response exemplifies an allostatic mechanism that integrates mind and body via the brain's perception of environmental stressors (for an earlier review, see Lupien et al., 2006). Under stressful situations, real or interpreted threats to homeostasis initiate a cascade of biological activities that leads to the sympathetic-adrenal-medullary (SAM) axis release of catecholamines such as adrenaline within seconds, followed by the hypothalamic-pituitary-adrenal (HPA) axis production of glucocorticoids such as cortisol within minutes (Sapolsky, Romero, & Munck, 2000). These activities ultimately serve to adaptively mobilize energy necessary for "fight-or-flight" behaviors (or female-specific "tend-and-befriend" behaviors (S. E. Taylor et al., 2000) that will be discussed in a later section on sex and gender diversity) that ensure survival, but at the cost of recalibrating many other biological functions in turn (McEwen & Wingfield, 2003). For instance, compensatory alterations during acute stress include decreased digestion, bodily growth/repair, and reproductive functions counterbalanced to accommodate increased neurological, cardiovascular, respiratory, and immune activities.

Although stress responses are adaptive in the short-term, long-term activations can result in the gradual dysregulation of allostatic mechanisms. Shonkoff, Boyce, and McEwen (2009) differentiated stress physiology using a useful taxonomy: (1) *positive stress* refers to moderate stress responses that are normal, short-lived, and appropriately deactivated; (2) *tolerable stress* refers to potentially damaging stress responses that get buffered and can even promote protection against future stressors; and (3) *toxic stress* refers to damaging stress responses occurring under conditions of severe adversity, stress, and/or trauma where there is a lack of internal and/or external resources to cope. In addition, such environmental perturbations can be exacerbated by genetic and epigenetic influences that render brain circuitry inadequate to promote emotional regulation. Under toxic stress, stress hormones become misbalanced and induce an interconnected domino effect on interdependent biological systems that collectively collapse as individual biomarkers topple and trail toward disease.

This multisystemic strain attributable to toxic stress is referred to as allostatic load (McEwen & Stellar, 1993). *Allostatic load* (AL) is defined as the multisystemic wear and tear the brain and body experience when repeated allostatic responses exact their noxious toll under conditions of chronic stress. Over time, chronic stress and AL can perpetuate unhealthy behaviors (e.g., poor sleep, diet, smoking, drinking, physical inactivity) that eventually lead to allostatic overload that in turn culminates in disordered, diseased, and deceased endpoints. In an evolutionary biology framework (McEwen & Wingfield, 2003), *allostatic overload* comes in two varieties. Type 1 allostatic overload occurs when energy demands exceed energy supply (negative energy balance), for example, when starving or migrating. By contrast, Type 2 allostatic overload occurs when energy supplies exceed energy demand (positive energy balance), for example, when overeating or hibernating. This conceptual distinction is important when we consider the multifaceted interactions between chronic stress and lifestyle choices exercised by people of diverse social strata. Ultimately, allostatic responses necessitate a biological balance that can shift over time in response to adversity that contributes to AL and allostatic overload.

Because vulnerability and resilience fall along a continuum (Cicchetti, 2013), applying triangulated methods represents a very powerful means to investigate biopsychosocial stress and AL using transdisciplinary perspectives that transcend disciplinary boundaries (Juster et al., 2011). For example, combining biometrics, psychometrics, and sociometrics together promotes triangulation amenable to both research designs and clinical approaches. The essence of the transdisciplinary tradition is illustrated in Figure 8.1, whereby the antecedents and consequences of AL thus far identified in the literature are holistically represented to exemplify the importance of comprehensive measurement approaches that collectively assess interconnected domains using multiple disciplinary tools. Beginning with operational definitions and the development of AL algorithms that have proven reliable in identifying developmental trajectories associated with stress-related disease vulnerabilities, the AL model has rapidly evolved and more recently has begun to be applied to detect pathways that promote resilience.

Operationalizing Allostatic Load

The AL model postulates that stress-related pathophysiology can be detected and objectively measured by assessing a battery of subclinically relevant biomarkers

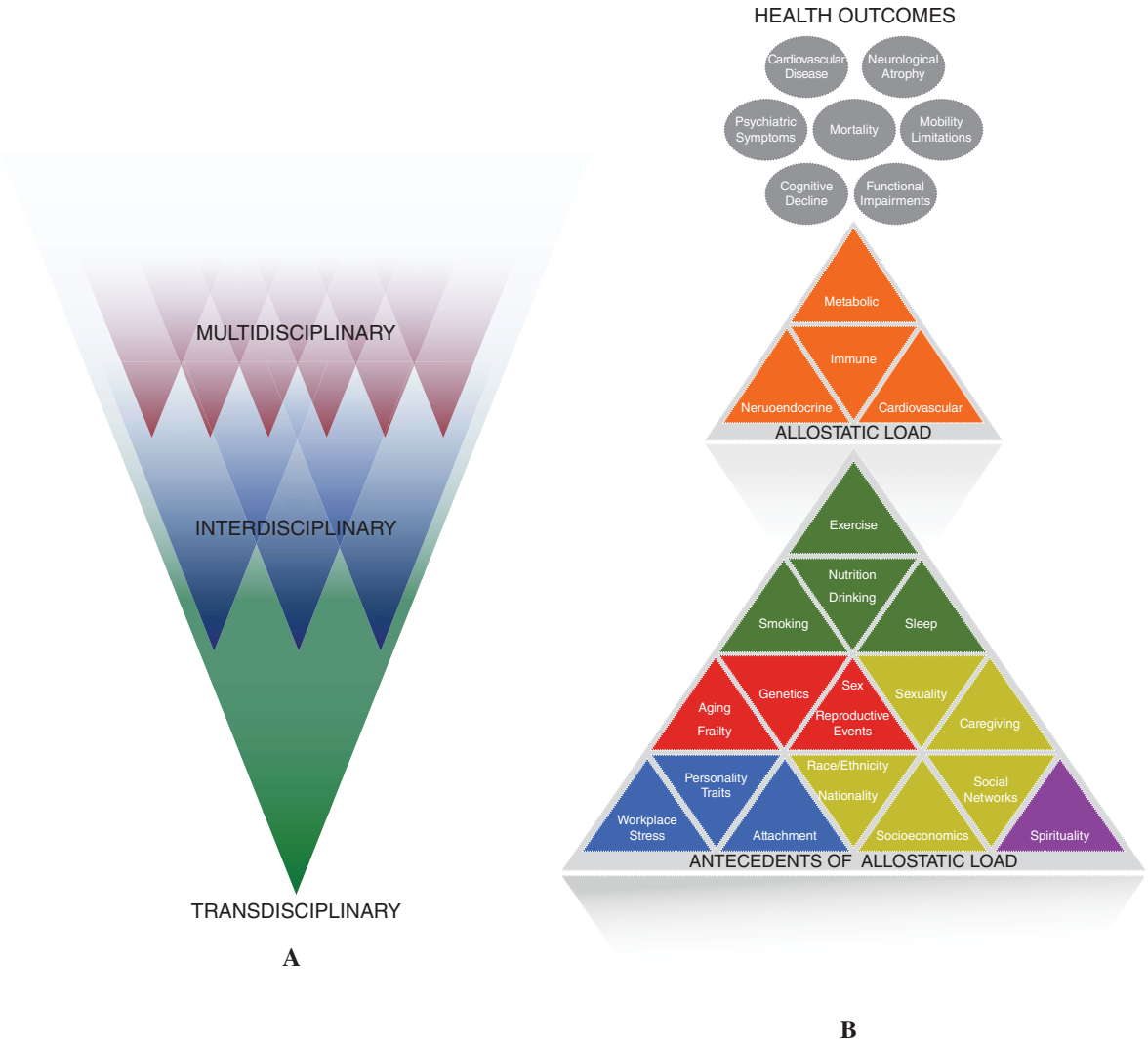


Figure 8.1 (A) A transdisciplinary framework in relation to other research frameworks (adapted from Juster et al., 2011). Multidisciplinarity approaches combine knowledge from different disciplines additively. Interdisciplinary approaches involve the appreciation of disciplinary overlap and the integration of discipline-based constructs into higher-order concepts encompassing several disciplines. Transdisciplinarity emerges as a higher-order framework that integrates all knowledge into new concepts and perspectives that encompass complex interactions reaching across disciplinary boundaries. This approach is consistent with perspectives espoused in the field of developmental psychopathology and is best measured by triangulating methods. Adapted from "A transdisciplinary perspective of chronic stress in relation to psychopathology throughout life span development," Development and Psychopathology, 2011, Volume 23, Issue 3, p. 761, Cambridge University Press. (B) Allostatic load is an exemplar of trandisciplinarism (Juster et al., 2011). Aspects of AL are illustrated here as topic triangles forming a holistic triangle according to diverse disciplines; namely, biological, psychological, sociological, behavioral, and spiritual. As reviewed in Juster, McEwen, and Lupien (2010), each of these life domains has been empirically substantiated in relation to multisystemic biomarkers representing AL that are consequently associated with clinical outcomes. In relation to Figure 8.A, AL is best understood from a transdisciplinary perspective whereby complex interactions among risk factors and protective factors can be identified. See footnote 1.

from multiple nonlinear and interconnected biological systems (McEwen & Seeman, 1999). When chronically stressed, the biphasic effects of numerous biomarkers eventually lead to AL and disease in a theoretical sequence embodied in our domino effect analogy: (1) overactivation of primary mediators such as stress hormones and pro- and anti-inflammatory cytokines induce primary effects on cellular activities, leading to secondary outcomes (2), whereby metabolic, cardiovascular, and second-order immune biomarkers become dysregulated and (3) culminate as tertiary outcomes or clinical endpoints (McEwen & Seeman, 1999).

The AL model proposes that by measuring the multisystemic, reciprocal interactions among primary mediators, primary effects, and secondary outcomes, individuals at high risk of tertiary outcomes can be identified (Juster, McEwen, & Lupien, 2010; McEwen, 1998a). This cascade has important implications not only in terms of research but potentially also clinically in detection and prevention of elevated AL; for example, patients with severe mental disorders are prone to developing comorbidities that could be proactively prevented (Bizik et al., 2013). Specifically, physicians routinely incorporate many related biomarkers in typical blood tests; however, attention is largely placed on values reaching clinically significant levels. By including additional biomarkers, identifying preclinical values, establishing clinical norms, and triangulating methods using combined transdisciplinary approaches (e.g., genetic assessment, neuropsychological testing, clinical interviews, psychometrics, sociodemographics), advances in diagnostics, treatment, and prevention can be improved using the AL framework (Juster et al., 2011; Lupien et al., 2006).

Pioneering epidemiological work by Seeman and colleagues has led to the development of AL algorithms predictive of numerous tertiary/clinical outcomes and predicted by diverse psychosocial factors. Validation using longitudinal data from the MacArthur Studies on Successful Aging cohort led to a count-based AL index representing the next 10 biomarkers (Seeman, Singer, Rowe, Horwitz, & McEwen, 1997): 12-hour urinary cortisol, adrenaline, and noradrenaline output; serum dehydroepiandrosterone-sulphate (DHEA-S), high-density lipoprotein (HDL), and HDL to total cholesterol ratio; plasma glycosylated hemoglobin; aggregate systolic and diastolic blood pressures (BP); and waist-to-hip-ratio. Participants' values falling within high-risk quartiles (clinical and preclinical ranges based on percentiles) with respect to the sample's biomarker distributions are dichotomized as "1" and those within normal ranges as "0." Once tabulated, these are summed to yield an AL index ranging from a possible 0 to 10, which can then be used to predict health outcomes. Beyond these traditional biomarkers, many others have been incorporated into numerous analyses worldwide using similar formulations and/or more sophisticated statistical analyses (e.g., multivariate reduction techniques) that continually refine AL measurement.

By using simple or complex AL algorithms, researchers are ever expanding our understanding of the psychosocial antecedents and health consequences of AL. To summarize (see Figure 8.1), increased AL indices are associated with a plethora of antecedents (e.g., socioeconomic disadvantage, poor social networks, workplace stress, maladaptive personality traits, lifestyle behaviors, genetic polymorphisms, etc.) and consequences using cross-sectional and longitudinal study designs (e.g., mortality, cardiovascular disease, psychiatric symptoms, cognitive decline, physical/mobility limitations, neurological atrophy, etc.) (Juster et al., 2010). There are five thematic advantages of applying an elevated-risk-zone system when scoring AL as AL algorithms represent: (1) early-warning signals, since thresholds are anchored at subclinical thresholds; (2) multi-finality, in that similar AL algorithms predict different tertiary outcomes; (3) flexibility, since calculations are based on different biomarker combinations; (4) synergism capturing the cumulative interaction of numerous biomarkers; and finally, most important for this chapter, (5) antecedent adversities predicting individual variation (Singer, Ryff, & Seeman, 2004). In sum, AL algorithms are objective reflections of biological functioning that are intricately interconnected with genetic, neurological, developmental, behavioral, cognitive, and social factors.

Modern societies face numerous challenges that are particularly pronounced among those from marginalized strata. In this chapter, we explore how AL disproportionably burdens public health in the developed and developing world. By taking a transdisciplinary perspective of life span development, the first sections of this chapter explore literature focusing on early adversity, socioeconomic status (SES) and health gradients, race/ethnicity and discrimination, shifting economic contexts using Brazil as a case study, the struggles of Indigenous peoples of North America and Australia, and finally the importance of biological sex differences and sociocultural gender diversity in understanding AL. Although the majority of studies focus on risk factors that propagate vulnerability toward AL and pathologies, emerging studies are increasingly identifying protective factors and trajectories that promote resilience, which we believe represents a new frontier.

SOCIAL INEQUALITIES INFLUENCING ALLOSTATIC LOAD

Many psychosocial stressors that contribute to AL are mirrored throughout the animal kingdom. Allostatic responses are conserved among species and help orchestrate adaptive metabolic changes, for instance, during hibernation or long-distance migration (Gotmann & Wingfield, 2004; Goymann & Wingfield, 2004; Korte, Koolhaas, Wingfield, & McEwen, 2005; McEwen & Wingfield, 2003). Among nonhuman primates and other social species,

social hierarchies are also important as dominant and subordinate members experience compromised health depending on the stability of rival competition for higher status (Sapolsky, 2005). Social inequalities therefore exert pernicious effects on health gradients across species.

Viewed from allostatic and AL perspectives, social inequalities are associated with specific physiological phenomena rooted in psychosocial determinants that often have origins in early life experiences. Although dozens of AL studies have linked socioeconomic differences to the prevalence of disease and even death, most reports initially focused on middle-aged and older adults (for reviews, see Beckie, 2012; Dowd, Simanek, & Aiello, 2009; Juster et al., 2011). In the last decade or so, an emerging body of literature has also successfully applied this framework to detect AL levels among disadvantaged children and adolescents exposed to adversity. Many of these have followed in the footsteps of Evans and colleagues (e.g., Evans et al., 1998) by assessing cumulative risk factors, a term that refers to a summary index of early adversities, such as crowding, noise, housing problems, family separation/turmoil, violence, low income-to-needs ratio, single parenthood, and low maternal education.

Early Adversity

Individuals exposed to greater social inequalities, such as socioeconomic deprivation, fare worst in terms of physical and mental health (Shonkoff et al., 2009). Nevertheless, our capacity to build on this knowledge to help prevent these negative outcomes is limited. One reason may be that the mechanisms whereby social inequalities underlie long-term vulnerability toward disease remain enigmatic. Specifically, how social inequalities during distinct periods of development shape allostatic systems—especially in early life—are not explicitly encompassed in existing theoretical models. Accordingly, we explore whether allostatic mechanisms are more sensitive to early environmental influences in a manner that affects long-lasting changes.

Shonkoff and colleagues (2009) proposed that health disparities are rooted in childhood and represent either latent or active sources of vulnerability found at multiple levels of analysis, including physiological systems sensitive to social environments. Akin to the allostasis concept and AL model, these authors postulate that accumulating exposures to adversity—both in terms of quantity or duration—overwhelm the physiological systems designed to support adaptation to stress and induce changes in their physiological set points. This could in turn increase vulnerability to disease in later life stages. In addition, a more profound impact of social inequalities is to be expected, provided they occur during sensitive developmental periods (Shonkoff et al., 2009). The general assumption here is that the earlier the adversity, the greater and more resistant these changes become due to the brain's immaturity and sensitivity to environmental tuning (A. B. Fries, Ziegler, Kurian, Jacoris, & Pollak, 2005).

Several lines of research highlight the importance of considering early adversity. This approach may prompt a better understanding of individual differences in later health, which could eventually be further integrated into the AL model. Through the invaluable use of longitudinal studies, epidemiology and developmental sciences have played a major role in substantiating this possibility (Anda et al., 2006; Felitti et al., 1998; Gilbert et al., 2009; Widom, DuMont, & Czaja, 2007). For example, adverse experiences in childhood—but not necessarily in adulthood—predict later psychopathology (Weber et al., 2008). The presumed causal effect of early adversity on later mental health is also supported by rare natural experiments (Costello, Compton, Keeler, & Angold, 2003) as well as experimental designs controlling for genetic and familial confounds (Arseneault et al., 2008). Thus, robust associations between early adversity and pathology are a starting point to uncovering physiological mechanisms bearing theoretical and potential clinical utility.

A second line of research stemming from developmental neurosciences and psychoneuroendocrinology also suggests that early adversity induces persistent differences in primary familial systems. For instance, maternal care in the first weeks of life, but not necessarily afterward, is associated with stable differences in the adult rodents' neuroendocrine and behavioral reactivity to stress (Meaney, 2001). Only indirect evidence suggests that such a period of increased sensitivity to cortisol surges exists in humans, for which the beginning is hypothesized to take place in the first year and persist until puberty (Gunnar & Vazquez, 2006; Neigh, Gillespie, & Nemeroff, 2009). Despite no clear delimitations established among humans (Gunnar & Vazquez, 2006), several brain structures involved in stress regulation are known to remain immature in childhood, adolescence, and early adulthood only to then undergo age-related changes in later life (Lupien, McEwen, Gunnar, & Heim, 2009). As we explore next, the maturity of these structures is particularly vulnerable to the timing and severity of environmental stressors.

Life Cycle Model of Stress

The brain is the central regulator of allostatic mechanisms that are continuously shaped by the environment. Stress

hormones bypass the blood-brain barrier to bind to three key receptor-dense regions; namely, the prefrontal cortex (PFC), the amygdala, and the hippocampus. Morphological and functional changes in these brain regions occur as adaptations to environmental demands that are essential to understanding pathways toward resilience or vulnerability (Cicchetti, 2013; McEwen, 2009, 2012). Chronic production of glucocorticoids is believed to contribute to frontal lobe malfunctioning, amygdaloidal hypertrophy, and hippocampal atrophy (Lupien et al., 2009). In addition to these neurological processes, individual differences in constitutional (genetics, period of development, environmentally mediated traits and experiences), behavioral (coping strategies and lifestyles), and historical (trauma/abuse, major life events, and stressful environments) factors interactively determine one's sensitivity to chronic stress and AL. Of critical importance is the timing and duration of perturbations, as this profoundly affects neurological development.

Lupien and colleagues (2009) have proposed that the consequences of chronic stress and trauma at different life stages depend on which brain regions are developing or declining at the time of exposure. Stress in the prenatal period affects development of the hippocampus, PFC, and amygdala, leading to well-substantiated programming effects. From the prenatal period onward, all developing brain areas are sensitive to the effects of stress hormones; however, some areas undergo rapid growth during key critical windows. For example, from birth to 2 years of age, the developing hippocampus is extremely vulnerable to glucocorticoid surges. By contrast, in late childhood (10 years old), the amygdala appears to be more vulnerable to hypertrophy in the context of lifelong exposure to maternal depression (Lupien, King, Meaney, & McEwen, 2001). During adolescence, the amygdala continues to develop until young adulthood, and finally the frontal lobe undergoes important maturation. Consequently, stress exposure during this transition into adulthood can have major effects on the PFC. Studies show that adolescents are highly vulnerable to stress because of pubertal changes in gonadal hormones and sensitivities of the HPA axis that can persist into adulthood as potentiation/incubation effects. In middle and older adulthood, the brain regions that undergo the most rapid decline as a result of senescence are once again highly vulnerable to the effects of stress hormones. This period leads to the manifestation of incubated effects from earlier life on the brain referred to as maintenance effects (Lupien et al., 2009).

Lifelong brain perturbations can diminish an individual's ability to adapt, leading to subtle recalibrations in stress responsivity that could be used to detect disease trajectories (McEwen, 1998a). According to the life cycle model of stress, regional volumes of these neurological structures in conjunction to biological signatures (e.g., hypercortisolism or hypocortisolism) can be used to predict differential risk profiles for specific psychopathologies (e.g., depressive or posttraumatic stress disorder) in adulthood as well as inform when certain traumas might have occurred in early life (Lupien et al., 2009). This hypothesis complements the AL model. Given that direct measurement of central nervous system substrates are costly and potentially invasive, indirect assessment using peripheral biomarkers routinely collected in blood draws could be used to measure AL algorithms (Juster & Lupien, 2012a). By this same logic, developmental trajectories that promote resilience at a neurological level could also be identified.

Neuroendocrine responses triggered by early adversity are thought to play a pivotal role in the life cycle model of stress and the AL model. The concentration of glucocorticoid receptors (GR) in the PFC, amygdala, and hippocampus (Sapolsky, 2000) are consistent with the proposed mediating pathways translating exposure to early adversity into lasting changes in perceiving, responding, and coping with stressors (e.g., health behaviors such as sleep, diet, and exercise) as well as nonrandom exposures (e.g., distinct living environments, such as crowded, unattractive, dangerous, noisy, and polluted spaces). The next three subsections provide brief overviews of how changes in cortisol, immune, and epigenetic mechanisms following early adversity may become biologically embedded (Hertzman, 1999) to render individuals vulnerable to future pathologies. Consistent with the life cycle model of stress, such processes can affect the long-term transaction between individuals' (mal)adaptation to their environment.

Hypothalamic-Pituitary-Adrenal Axis

Evidence from animal and human studies demonstrate that the HPA axis is integral to the physiological and behavioral adaptation required to face stressors (Sanchez, 2006; Tarullo & Gunnar, 2006). However, significant associations have been documented between a wide range of adverse life circumstances and distinct cortisol profiles (e.g., cortisol awakening response; Engert, Efanov, Dedovic, Dagher, & Pruessner, 2011) and disrupted diurnal rhythms (Bruce, Fisher, Pears, & Levine, 2009; Cicchetti & Rogosch, 2001; Cicchetti, Rogosch, Gunnar, & Toth, 2010; Lupien et al., 2001; Neigh et al., 2009); for review, including conflicting findings, see Dowd et al. (2009) and Tarullo and Gunnar (2006). Early adversity is also linked to disrupted patterns of cortisol reactivity to stress, manifested in higher (Heim

et al., 2000) and lower responsivity (Carpenter et al., 2007; Lovallo, Farag, Sorocco, Cohoon, & Vincent, 2012).

More recently, early life stress has also been linked to higher cortisol levels in hair. Hair cortisol is an increasingly validated matrix to monitor cumulative cortisol secretion retrospectively (Kirschbaum, Tietze, Skoluda & Dettenborn, 2009). For example, reports of higher hair cortisol have been shown among hospitalized newborns (Yamada et al., 2007), preschoolers growing up with less educated parents (Vaghri et al., 2013), as well as young adults reporting major stressors (e.g., death of a relative) or psychological problems (Karlen, Ludvigsson, Frostell, Theodorsson, & Faresjo, 2011). Similar to findings in regard to salivary cortisol (J. H. Fries, Hellhammer, & Hellhammer, 2005), prolonged stress has also been associated with lower hair cortisol in young adults (Stalder et al., 2012), not just with higher levels. Concurrent mental health as well as the nature, timing, and prolonged adversity have been hypothesized to explain these seemingly opposite patterns of cortisol secretory patterns (Gunnar & Vazquez, 2001; Miller, Chen, & Zhou, 2007). Direct tests of these hypotheses are unfortunately scarce in humans (Trickett, Noll, Susman, Shenk, & Putnam, 2010) and should be the focus of continued transdisciplinary research.

Timing of stressor exposure is essential to understanding the heterogeneity of future HPA axis functioning. Preliminary evidence suggests that adversity taking place before age 11 (including pre-/postnatal) is associated with higher cortisol responsivity during psychosocial stress whereas adversity experienced after age 11 is linked to lower levels (Bosch et al., 2012). Future studies with repeated measures of adversity collected prospectively, beginning at birth and persisting into adolescence, could further our understanding of these time-sensitive trajectories hypothesized to differentially affect HPA axis functioning. Such studies could include, but are not restricted to: the timing when adversity occurs; stress-sensitization effects of pre-/postnatal adversity when adversity is again experienced at later time points (Bosch et al., 2012); the length of time since the adversity ended (Miller et al., 2007; Trickett et al., 2010); differential maturational processes of brain structures regulating reactivity to stress (Lupien et al., 2009); and age- and puberty-related changes in HPA axis functioning (Dahl & Gunnar, 2009; Shirtcliff et al., 2011; Stroud et al., 2009; Trepanier et al., 2013).

Several considerations should be noted to guide future directions. Studies that link early adversity to HPA axis functioning are often constrained by a limited number of cortisol samples or other biomarkers during restricted periods of development. Moreover, study designs are generally correlational in nature and only partially address confounders. Intervention studies (often quasi-experimental) have shown that improvement (or alleviation) of detrimental proximal environmental influences help to normalize HPA axis functioning (Fisher, Gunnar, Dozier, Bruce, & Pears, 2006). Yet it remains unclear whether the same mechanisms are at play in the context of early adversity and whether these pervasively exert a causal effect on AL primary mediators. For ethical reasons, studies involving manipulations of these variables are not possible to conduct among humans. Nevertheless, complementary designs could be used (Rutter, 2007), including the investigation of teratogenic prenatal influences in the context of in vitro fertilization and discordant monozygotic (MZ) twin designs.

In the context of peer victimization, distinct patterns of cortisol reactivity to stress in a subsample of identical twins discordant for bullying victimization from the Environmental Risk Longitudinal Twin Study is consistent with a causal impact of early adversity on cortisol reactivity to stress (Ouellet-Morin et al., 2011). Specifically, nonbullied twins showed increases in cortisol following social stress whereas bullied cotwins did not exhibit this increase. Because of the study design, the difference in neuroendocrine response to stress cannot be explained by the genetic background, shared familial influences, or other individual experiences or characteristics. Since these factors cannot be disassociated, this suggests that bullying victimization exerts an environmentally mediated effect on the HPA axis. More generally, inadequate HPA axis responsivity in the context of adversity may indicate that these experiences have become biologically embedded and thus more resistant to positive changes of interventions.

Finally, few studies have examined prospectively whether neuroendocrine changes triggered by early adversity persist beyond adolescence. Preliminary evidence of a flattened pattern of morning cortisol secretion found in middle-age adults with a history of childhood maltreatment ascertained prospectively suggests that early adversity indeed biologically embeds future biological functioning (Power, Thomas, Li, & Hertzman, 2012). Future studies including repeated measures of adversity and HPA axis functioning collected prospectively across the life span will contribute to better understanding of the roots of health disparities.

Immune Functioning

In addition to investigations of HPA axis functioning, research indicates that inflammation is associated with an increased risk of pathology, including cardiovascular

diseases, autoimmune diseases, obesity, and affective disorders (Buckley, Fu, Freeman, Rogers, & Helfand, 2009; Howren, Lamkin, & Suls, 2009). Although acute stress enhances adaptive immune functions via cortisol and catecholamines, chronic stress and poor health behaviors ultimately suppress adaptive immunity and further lead to a chronic inflammatory state as immune mediators cease to promote innate immune defenses and adaptive immunity (Dhabhar, Malarkey, Neri, & McEwen, 2012). Interest in the early origins of individual differences in inflammation and its hypothesized consequences on health has recently grown and could constitute another pathway linking early adversity to later pathology (Felitti et al., 1998; Green et al., 2010).

In a series of studies, Danese and his team (2009) reported persistent changes in the innate immune system of children exposed to early adversity. They reported higher levels of inflammation in 32-year-old adults who were maltreated or socially isolated as children in comparison to controls. Such experiences accounted for approximately 13% of the cohort with elevated inflammation (high sensitivity c-reactive protein [CRP] > 3 mg/L). Other longitudinal studies corroborate the hypothesized impact of early adversity persisting into adulthood, as associated with CRP (S. E. Taylor, Lehman, Kiefe, & Seeman, 2006), interleukin-6 (IL-6), and fibrinogen (Slopen et al., 2010). Likewise, among older adults these associations persist, as suggested by higher levels of proinflammatory cytokines IL-6 and tumor necrosis factor-α (TNF-α) in caregivers and noncaregivers with a history of childhood abuse (Kiecolt-Glaser et al., 2011). Interestingly, these patterns of inflammation were also detected in the context of acute stress in both a standardized protocol and a natural setting (Carpenter et al., 2010; Gouin, Glaser, Malarkey, Beversdorf, & Kiecolt-Glaser, 2012).

Additional studies also suggest that the impact of early adversity on inflammation, including socioeconomic factors, may already be detectable in late childhood (Danese et al., 2011) and adolescence (Miller & Chen, 2010). Higher CRP levels were reported in children living in Indigenous Canadian communities; this finding represents a higher risk of impending cardiovascular problems and further supports the idea that the early roots of adult diseases implicate inflammatory mediators (for an extended review, see (Danese & McEwen, 2012; Fagundes, Glaser, & Kiecolt-Glaser, 2013). Beyond primary mediators representing neuroendocrine and immune parameters, increasing attention has focused on genetic propensities in interaction with environmental triggers. In the same spirit as recent studies of the HPA axis, future studies should explore whether individual (genetic background) and stress-related factors that affect stress responsivity, AL, and disease trajectories.

Deoxyribonucleic Acid Methylation

In the last decade, innovative experiments using animal models of early-life stress have shown that the genome is not as immutable as previously thought. Rather, it responds dynamically to the environment through the regulating influence of epigenetic processes (Bagot & Meaney, 2010). *Epigenetics* refers to a series of modifications in the chemistry of deoxyribonucleic acid (DNA) and its associated proteins (collectively termed *chromatin*) that have the potential to alter expression without changing its sequence. The epigenome is conceptualized as an interface between the environment and the genome. In addition to the intrauterine environment, recent evidence suggests that postnatal social environments can also alter epigenetic signals (Szyf, McGowan, & Meaney, 2008), which represent another biological mechanism by which childhood adversity could have long-lasting influences on health (Jirtle & Skinner, 2007; Shonkoff et al., 2009; Tsankova, Renthal, Kumar, & Nestler, 2007).

To date, most empirical findings supporting the epigenome construct come from animal models of early-life stress. Specifically, maternal care received by rat pups during the first week of life changes DNA methylation of the GR gene promoter in the hippocampus, GR expression, and stress reactivity in adulthood (Meaney & Szyf, 2005). DNA methylation is one of several epigenetic mechanisms but is often regarded as the most stable and representative (Talens et al., 2010). Additional studies have since extended these findings to other genes regulating stress and neurodevelopment, such as the arginine vasopressin (AVP) and brain-derived neurotrophic factor (BDNF) genes (Murgatroyd et al., 2009; Roth, Lubin, Funk, & Sweatt, 2009). The impact of early stress on DNA methylation has also been documented in nonhuman primates (Kinnally et al., 2010; Provencal et al., 2012).

Comparatively less research has investigated the epigenetic remodeling following early adversity in humans. Preliminary reports of higher methylation of the GR gene and the serotonin transporter (SERT) gene in adults with a history of childhood abuse or low SES (ascertained retrospectively) are consistent with animal data supporting the epigenome (Beach, Brody, Todorov, Gunter, & Philibert, 2010; Labonte et al., 2012). Similarly, differential clustering patterns of DNA methylation have been reported across the genome in children raised in institutional care (Naumova et al., 2011). Birth cohorts with prospective measures

of adversity have recently contributed to clarifying the temporal sequence of these associations and reported distinct DNA methylation profiles in adults exposed to different levels of socioeconomic adversity during childhood (Borghol et al., 2012).

To the best of our knowledge, only two longitudinal studies have explored the associations between early adversity and DNA methylation patterns with diverse measures of adversity (not only SES) collected prospectively throughout childhood (Essex et al., 2011; Ouellet-Morin et al., 2013). The first study comprises 109 adolescents exposed to maternal stress during their first year who showed elevated DNA methylation in 139 sites located across the genome (Essex et al., 2011). The second study showed that bullied twins had higher SERT DNA methylation compared to their nonbullied MZ cotwins, again supporting an environmentally mediated effect of childhood adversity (Ouellet-Morin et al., 2013).

Childhood adversity is theorized to differently affect DNA methylation depending on the developmental periods when these experiences occur (Roth & Sweatt, 2011). Preliminary findings in humans tend to support this hypothesis. For instance, early adversity affects DNA methylation around the time of conception but not in late gestation for famine exposure; in the first year of life but not during the preschool years for maternal stress; and in the second but not the third trimester for maternal depressed mood (Devlin, Brain, Austin, & Oberlander, 2010). By and large, the understanding of the role of DNA methylation is constrained by the few studies conducted in humans and the lack of repeated measures of adversity and DNA methylation across development. This makes it difficult to establish clear-cut temporality and thus to evaluate whether the time when adversity is experienced should be a concerted focus in integrated revisions of the AL model. Moreover, the role of DNA methylation within the GR promoter (or other genes directly or indirectly affecting stress regulation) and the underlying biological pathways by which these changes affect GR expression remains poorly understood in humans. The studies reviewed are nevertheless crucial to our continued understanding of how DNA methylation could eventually be integrated in the allostasis and AL framework, as GR plays a key role in adaptive functions as well as pathophysiology (namely by turning on and turning off the HPA axis). Future research in this promising area also will contribute to existing frameworks delineating the mechanisms by which early adversity exerts long-lasting influences on physical and mental health.

Akin to emerging epigenetic studies in humans, AL studies have also revealed intergenerational associations of lower SES. For example, non-Hispanic Caucasian and African American children with less educated parents have higher AL levels, driven heavily by insulin dysregulation (Goodman, McEwen, Huang, Dolan, & Adler, 2005). Within an allostatic framework, insulin dysregulation is part of a broader network of disrupted allostasis related to cortisol, inflammation, and a myriad of processes that differ markedly as a function of social inequalities. In the next section, we explore literature linking AL indices to SES mostly in adulthood but also increasingly at earlier life stages.

Socioeconomic Status and Health Gradients

SES represents education, income, neighborhood, and occupational features that interact strongly with AL throughout life (Szanton, Gill, & Allen, 2005). The MacArthur Study of Successful Aging used to validate the AL model consistently found that higher AL predicts incidences of cardiovascular disease, physical declines, cognitive impairments, and all-cause mortality (Seeman et al., 1997; Seeman et al., 2004a; Seeman, McEwen, Rowe, & Singer, 2001b). Interestingly, even in this representative group of successful agers from diverse race/ethnicity and SES, lower education was a powerful contributor to higher AL levels (Seeman et al., 2004a). This patterning provides evidence of health gradients found not only between but also within socioeconomic strata (Adler & Snibbe, 2003).

Likewise, a cross-cultural study of Taiwanese elders from the Social Environment and Biomarkers of Aging Study (SEBAS) revealed that higher AL as well as lower education and income were independently associated with health status (P. Hu, Wagle, Goldman, Weinstein, & Seeman, 2007). By combining the Taiwanese and MacArthur cohorts, lower SES (lower education, occupational status, and finances) together with greater social challenges (e.g., recent widowhood, high family demands) related to higher AL (Weinstein, Goldman, Hedley, Yu-Hsuan, & Seeman, 2003). This finding suggests that SES and adversity might synergize among different older adults from North America and Asia.

Some of the most compelling epidemiological evidence in support of the AL index has come from the large-scale American National Health and Nutrition Examination Survey (NHANES). Findings show that AL mitigates the effects of education and income gradients predictive of ischemic heart disease and periodonal disease (Sabbah, Watt, Sheiham & Tsakos, 2008). Tracking about 15,000

participants from the same cohort over 6 years, it was shown that those living in poverty show sharper increases in AL up until middle age and then plateau around ages 70 and above (Crimmins, Johnston, Hayward, & Seeman, 2003). Strikingly, those with high AL have a life expectancy that is 6 years shorter than those with low AL but with similar poverty status and matched for sex (Crimmins, Kim, & Seeman, 2009).

Beyond individuals and households, AL studies on SES have also begun assessing neighborhood characteristics. A cross-sectional analysis of 12- to 20-year-olds from NHANES assessing multiple levels nested at the levels of individuals, families/households, and census tracts elegantly demonstrated gradients in AL levels that increased incrementally among adolescents living under low-, medium-, to high-cumulative-risk neighborhoods (Theall, Drury & Shirtcliff, 2012). Likewise, a large-scale multiethnic analysis revealed that Detroit-area neighborhood poverty was positively associated with AL independent of household income and covariates and was furthermore mediated by perceived environmental stress within one's neighborhood (Schulz et al., 2012).

Socioeconomic factors may affect AL differently according to one's sex and age. A recent study of 199 healthy Montreal workers revealed that higher occupational status (classified using a pure-type scaling system based on median education and income in a given occupation) was associated with higher AL in men, whereas the reverse occurred for women (Juster, Moskowitz, Lavoie, & D'Antono, 2013a). As has been substantiated in primate research that parallels socioeconomic inequalities in humans (Sapolsky, 2005), males at the top of the hierarchy might be challenged by unique sets of adversity that exacerbate rather than attenuate physiological functioning. Specifically, socially dominant male primates experience the highest physiological dysregulations when reigning in unstable hierarchies in which subordinates continuously challenge their authority (Sapolsky, 2005). This finding has been confirmed in a comparative study of social status, AL, and glucocorticoid profiles among free-ranging animals (Goymann & Wingfield, 2004). When translated to humans, it is plausible that this pattern also exists among men occupying higher occupational status at the price of higher AL. Given the worldwide changes in wealth and health as a function of women further occupying the workplace, it will be important for future studies to also understand the experiences and health of women in higher occupational statuses who have so often faced unique challenges, unknown to men, to reach the top.

Resilient "Shift-and-Persisting" and Life Histories

AL studies identifying pathways toward resilience among low-SES individuals are emerging. Among women of different socioeconomic strata, workplace stress moderates AL levels: Those with lower occupational status, but who have higher decision latitude or job control at work, experience lower AL levels (Juster, Moskowitz, Lavoie, & D'Antono, 2013a). In the Biomarker Sub-Study of the Study of Midlife in the United States (MIDUS) cohort, it has been proposed that individuals of either sex who are able to "shift-and-persist" out from low childhood SES might be more resilient to AL. This survival strategy is of particular importance to individuals faced with social adversity, as it combines shifting one's cognitive appraisals and emotional regulation positively to adapt to stressors while persisting by maintaining hopes for the future (Chen & Miller, 2012; Chen, Miller, Lachman, Gruenewald & Seeman, 2012). In addition, increased job control may be another way in which positive working conditions can moderate the otherwise negative effects of lower SES. Within the framework of the shift-and-persist hypothesis, we propose that protective workplace characteristics represent one avenue whereby individuals can promote their health even when unable to shift into higher SES boulevards.

Life histories in socioeconomic mobility and social and family relationships are increasingly explored in the AL literature. Using the Wisconsin Longitudinal Study, Singer and Ryff (1999) have applied such pathways and demonstrated that childhood parental bonding and household income categories are associated with AL. Contrasting childhood context with adult finances and relations revealed that increased downward mobility—that is, a depreciation in one's SES over time—was related to increased AL, as was low parental income coupled with negative social relationships. Most important, this approach can be used to identify resilient pathways whereby, for example, economically disadvantaged individuals can compensate by developing positive social relationships that buffer against AL (Singer & Ryff, 1999).

This approach can also be used to track the pervasive effects of adversity that accumulate throughout life. Concordantly using the MIDUS cohort, individuals who grew up in low-SES contexts (low parental education, income, and welfare status) and who remained in disadvantaged circumstances in middle and later adulthood (indexed according to educational attainment, household income, difficulty paying bills, availability of money to meet basic needs, and current financial situation) showed the highest AL levels, followed by individuals classified as downwardly

mobile, upwardly mobile, and individuals who always had high SES (Gruenewald et al., 2012). Although these results may be related to elusive critical thresholds in developmental processes, the authors stated that their findings supported the cumulative risk hypothesis that accumulated SES adversity accelerates biological damage. As we explore next, cumulative risk and differences in SES are more pronounced among marginalized groups within society.

Race/Ethnicity and Discrimination

Gradients in AL related to SES are compounded by race/ethnic disparities. For instance, African Americans with peripheral arterial disease in the NHANES had the highest AL levels compared to other race/ethnicities (Nelson, Reiber, Kohler, & Boyko, 2007). In another multi-ethnic analysis of NHANES, African Americans of both sexes had higher AL levels than matched Caucasians, partially explaining a greater overall risk for cardiovascular and diabetes-related mortality after adjusting for education, poverty status, and health insurance status (Duru, Harawa, Kermah, & Norris, 2012). It has been proposed that African American women are particularly vulnerable as they show the most consistently elevated levels of AL across age groups. Moreover, neighborhood characteristics and race/ethnic segregation were found to be particularly damaging to African American women in terms of their increased rates of obesity (Chang, Hillier & Mehta, 2009).

The "weathering hypothesis" states that the health of non-Caucasian women deteriorates in early adulthood as the physical consequences of cumulative socioeconomic deprivation manifest themselves (Geronimus, Hicken, Keene, & Bound, 2006). This chronic strain in turn contributes to intergenerational effects that complicate reproductive activities and lead to decrements in health at greater rates than among other more privileged societal groups. In this vein, another NHANES analysis of women between the ages of 17 and 30 revealed that those with high AL levels were two times more likely to have experienced early menarche (10 years old or earlier); early menarche was in turn more common among women who were African American, less educated, currently poorer, smoked, and/or had a history of depression (Allsworth, Weitzen, & Boardman, 2005). Consistent with this sex-specific vulnerability, data from the Jackson Heart Study found that AL indices and constituent biomarker clusters are more consistently dysregulated among African American women, but less so among African American men (Hickson et al., 2012). Adding insult to injury, African American women who have had breast cancer also experience higher AL levels; however, in the NHANES cohort, Caucasian women do not (Parente, Hale & Palermo, 2013).

Beyond the weathering hypothesis, the deleterious interaction effects of race/ethnicity and SES factors can be amplified by psychosocial adversities, such as discrimination or acculturation (Chapman et al., 2009; Friedman, Williams, Singer, & Ryff, 2009; Kendall & Hatton, 2002; Mays, Cochran, & Barnes, 2007; Myers, 2009). For instance, social isolation, single motherhood, early parenthood, and numerous other factors must be further identified as effect modulators of sex and race/ethnicity specific associations. Moreover, although the influence of discrimination is difficult to quantify, a report suggests that in adolescence, the association between poverty and elevated AL is mediated by perceived discrimination (Fuller-Rowell, Evans, & Ong, 2012). Notably, impoverished Caucasians are less likely than nonimpoverished African Americans to have higher AL. For individuals of lower neighborhood SES in the NHANES cohort, the risk of having the highest AL levels is 200% for African Americans, 70% for urban Mexican Americans, and 30% for Caucasians (Merkin et al., 2009). Beyond objective sociometrics, it is possible that many of these findings are driven by interaction effects with subjective factors like discrimination that are experienced in distinct ways.

For instance, U.S.-born Mexican Americans and African Americans show higher levels of AL than foreign-born Hispanics and Caucasians, suggesting that migration interacts with SES effects in compromising immigrants' health and well-being (Seeman et al., 2008). Regardless of racial/ethnic stratifications, however, lower education and income are consistently associated to AL. A recent cross-sectional analysis of NHANES confirmed that low-SES adolescents and African American adolescents experience elevated AL levels; however, the relative advantage of Caucasians and Mexican Americans in comparison to African American adolescents diminishes around age 15, at which point metabolic markers increase specifically among Mexican American (Rainisch & Upchurch, 2013).

Resilient "John Henryism" and Familal Support

In terms of potential resilient pathways, a fascinating research program developed by Brody and colleagues (2013b) has investigated the John Henryism theory among African American youth. Legend says that John Henry was an industrious African American railroad worker in the late 1800s who challenged and defeated a steam-powered mechanical drill in a steel-driving contest, but died thereafter of exhaustion. The John Henryism theory (James,

1994) therefore refers to behaviors that involve high-effort coping and hyperarousal that fuel single-minded mental concentration and drive physical energy needed to succeed when faced with overwhelming odds (Brody et al., 2013b). Resilience may thus be seen in key life domains (e.g., overt behaviors, academic performance), but it comes at a physiological price.

This proposition was tested among a cohort of rural African American youth from the southern United States who had cumulative risk factors (higher scores indicating lower SES) and teacher-reported issues wih self-control and competence measured from ages 11 to 13. At follow-up when 19 years old, depressive symptoms, externalizing behaviors, and AL levels (overnight urinary cortisol, adrenaline, and noradrenaline; resting diastolic and systolic BP; and body mass index [BMI]) were measured. Results revealed that preadolescents from low-SES environments with high competence displayed low levels of teacher-reported adjustment problems, but at the cost of higher AL at age 19. These findings support the John Henryism theory and sadly suggest that resilience may be skin deep (Brody et al., 2013b). Said otherwise, adaptation in domain-specific areas may come at a physiological cost. This finding highlights the notion that resilience is not a status or a generalized state of global "resiliency" but rather a constellation of adaptations to life's challenges in terms of both positive and negative domains.

In a separate investigation of genetic and contextual associations using the same cohort, a three-way interaction effect was found for environmental adversity (low family support) with genetic susceptibilities (e.g., short allele of serotonin transporter-linked polymorphic region genotype) predicted AL levels in early adulthood (Brody et al., 2013c). In the hopes of identifying different developmental trajectories, another analysis also using genetic information as well as psychological adjustment between ages 14 and 18 applied latent profile analysis to demarcate two developmental profiles: (1) a physical health vulnerability profile characterized by high cumulative SES risk/high AL/low adjustment problems; and (2) a resilient profile characterized by high cumulative SES risk/low AL/low adjustment problems (Brody et al., 2013a). While carrying the s allelle for the 5-HTTLPR genotype (diathesis) and receiving less peer support (stress) predicted membership in either profile, so did protective parenting and emotional regulation. Brody and colleagues argued that while resilience may be skin deep, the positive influence of family support can help "thicken" skin regardless of color and render protection against genetic susceptibilities and adverse SES conditions.

More broadly, parental support appears to be a powerful pathway toward long-standing protection against elevated AL. An analysis of the 27-year longitudinal northern Swedish cohort showed that high parental involvement in children's academic studies (measured by teacher and pupil ratings) at age 16 was associated with low AL (16 biomarkers) at age 43 while accounting for an array of life course sociodemographics (Westerlund, Gustafsson, Theorell, Janlert, & Hammarstrom, 2013). Taken together, this impressive body of work is consistent with findings on resilience in the field of developmental psychopathology more broadly. This fact attests to the vast heterogeneity and multifinality manifested by differential configurations of genetic processes and contextual challenges (Cicchetti et al., 2010). Moreover, these findings also speak to the importance of race/ethnic, life experiences, and genetic interactions in explaining pathways toward vulnerability or resilience that can be modulated by modifiable behaviors as simple as parental involvement in scholastics.

Shifting Major Economies: Brazilian Context

Contextual factors beyond SES and race/ethnicity influence health outcomes internationally. It is important to highlight that the majority of studies linking SES to stress pathophysiology (Cohen et al., 2006; Hajat et al., 2010; Lupien et al., 2001) are based on samples from the developed world. Despite such adversity, low-SES individuals from the developed world are generally living in better conditions than those of comparative SES living in the developing world. This fact presents an important interpretive issue when we consider that 80% of Earth's population lives in developing countries, where the majority of chronic disease burden for conditions like hypertension and depression occur (Ibrahim & Damasceno, 2012; World Health Organization [WHO], 2012). In this section, we substantiate the importance of context in relation to stress-related diseases using Brazil's shifting socioeconomic conditions as a case study and as a cross-cultural contrast to the Canadian context.

Social inequalities related to unemployment, deprivation, and income disparities are pronounced in countries with emerging economies that further widen gaps between social classes (WHO, 2012). As elsewhere, those at the bottom of the social hierarchy consistently demonstrate poorer health than those at the top (Demakakos, Nazroo, Breeze, & Marmot, 2008; Kawachi & Kennedy, 2002). In particular, subjective feelings related to unfavorable social comparisons—in other words, *feeling* poor (subjective

SES)—may further explain why low SES predicts poorer health (Adler, Epel, Castellazzo & Ickovics, 2000; Sapolsky, 2005; Wilkinson, 1996). Ultimately, the large gap between social positions strongly promotes discrimination (Jackman, 1994), which intensifies the consequences of poverty.

Perceived discrimination—racial or otherwise—is associated with stressful life experiences and adverse health outcomes (Clark, Anderson, Clark, & Williams, 1999; Dion, 2001; Harrell, Hall, & Taliaferro, 2003; Harrell, Merrit, & Kalu, 1998). For example, perceived unfairness, racial discrimination, and nonracial discrimination are positively associated with coronary calcification (Lewis et al., 2006), and are independent predictors of coronary events (De Vogli, Ferrie, Chandola, Kivimaki, & Marmot, 2007). Although these findings are based on minority groups living in developed countries, discrimination is an especially important contextual factor in countries with emerging economies. Indeed, discrimination generates social inequalities that transcend group membership(s) as part of minority or majority groups. For example, native Africans living in South Africa exhibit higher levels of psychological distress than the Caucasian minority, with perceived chronic discrimination positively associated with distress (Williams et al., 2008).

In contrast, social support and social integration are protective factors that are each mitigated by different mechanisms (Cohen, 2004). Although social support attenuates stress through psychological and material resources provided by social relationships, social integration influences health based on the participation of the individual in the social relationships and the sense of belonging this creates (Brissette, Cohen, & Seeman, 2000; Cohen, 2004). Social supports are coping strategies that dampen stress by (a) altering the appraisal or perception of a potential threat and (b) modulating reappraisals of the potential threat after exposure (Cohen & Wills, 1985). First, stress reactivity might not be activated as intensely among individuals who feel supported. Indeed, social support seems to benefit health only for individuals under adverse circumstances since there is no effect in the absence of highly stressful demands (Cohen, 2004; Cohen, Gottilieb & Underwood, 2000). Second, after perceiving an event as threatening, individuals with greater social support show enhanced emotional regulation and reduced physiological responsivity. Several studies demonstrate that high social support corresponds to lower cortisol levels in comparison to those with low social support (Eisenberger, Taylor, Gable, Hilmert, & Lieberman, 2007; Rosal, King, Ma, & Reed, 2004; Uchino, Cacioppo, & Kiecolt-Glaser, 1996).

In the context of countries with emerging economies, we know of only one study showing that individuals with higher social support display lower BP as well as self-report less perceived stress and depressive symptoms compared to those with limited or no access to social support networks (Dressler, Balieiro, & Dos Santos, 1997). Regarding social integration, one's active engagement within social networks can promote positive psychological health and can facilitate health-promoting behaviors. In contrast to social support, the benefits of social integration on health are independent of whether an individual experiences adversity or not (Cohen, 2004). Interestingly, greater social integration is associated with lower rates of mortality (Berkman & Glass, 2000) as well as lowered risk of cancer recurrence, psychopathology, and cognitive decline with aging (Cohen et al., 2000).

In sum, these findings suggest that psychosocial factors, such as negative feelings related to unfavorable conditions, perceived discrimination, social support, and social integration, represent significant risk factors or protective factors associated with stress and health. Within the frame of advancing the AL model at an international level, these findings in turn raise questions: for example, do contextual differences explain discrepancies in perceived stress and physiological functioning between nations with developed and developing economies?

Psychosocial Stress: Canadians versus Brazilians

A recent cross-national collaborative study conducted between our Canadian and Brazilian research groups revealed significant differences in self-reported psychosocial stressors as well as differential patterns of basal and stress-reactive cortisol profiles. A rich literature on the psychosocial determinants of neuroendocrine responses reveals that situations that are novel, unpredictable, threatening to the self, and uncontrollable additively contribute to stress hormone responses (Dickerson & Kemeny, 2004; Lupien et al., 2006; Mason, 1968). With this in mind, 1,156 healthy youngsters, adults, and elderly participants from Canada and Brazil—developed and emerging economies, respectively—were asked to indicate among a list of nine different factors (novelty, unpredictability, low sense of control, social evaluation, time pressure, work overload, conflict, unbalance and children) which factors elicited the greatest distress.

For Canadians, "children," "novelty," and "unpredictability" were the major stressors; Brazilians indicated "time pressure," "work overload," and "conflict" as

their major stressors. Differences regarding education level, SES, work organization, and experiences may synergistically influence these perceptions and in part explain the discrepancies between Canadian and Brazilian contexts. In particular, Brazilians experience long workdays (between approximately 40 to 44 hours a week on average), work overload (43.6% of Brazilians work overtime), informal sector or under-the-table employment (10.7% of Brazilians work without the coverage of labor laws and employment insurance), and low payments associated with low purchasing power (Institute for Applied Economic Research, 2009). In addition, Brazilian inhabitants must routinely face such challenges as unequal access to public health services, education, and transportation as well as frequent exposure to violence, overcrowding, and traffic. These contextual factors explain the differences in stressor sensitivities between Canadians and Brazilians.

Beyond the geographical and contextual factors that influence perceived distress, people from different environments may present different patterns of physiological stress responsivity. To the best of our knowledge, only a handful of studies have investigated cortisol profiles among nondeveloped nations living in disadvantaged conditions (Decker, 2000; Flinn & England, 1997; Nyberg, 2012; Pike & Williams, 2006) and demonstrated both hyper- and hypocortisolemic profiles; therefore, any conclusions at this time are limited. None of these studies, however, compared stress response profiles between countries, each with its own distinct cultural, economic, political, and social realities. Continued cross-cultural investigations will help the scientific community and health organizations better understand pathways toward vulnerability or resilience in diverse and ever-changing contexts.

In delineating cross-cultural patterns linking stress to disease, factors related to migration, immigration, and nativity are important to consider. To date, two cross-cultural studies have shown that difficulty verbalizing (Kim, 2008) and race/ethnicity (Hajat et al., 2010) represent factors associated with both low and high cortisol levels among adult immigrants in contrast to native inhabitants. This finding may, however, be due to acculturation biases that may underestimate the differences observed. For example, higher basal cortisol levels were also observed in Australian Aboriginal communities compared to British inhabitants from Oxford (Harrison, 2001). Conversely, mean basal cortisol levels of Tsimane Amazonian adult foragers were lower compared to American participants from the Coronary Artery Risk Development in Young Adults (CARDIA) study (Cohen et al., 2006; Nyberg, 2012). In addition to these findings among different international communities, Kim (2008) demonstrated an influence of culture on cortisol response to a speech task comparing European Americans with Asian Americans. In sum, nationality and inherent sociocultural factors related to race/ethnicity and acculturation influence stress.

Although Canadians and Brazilians share Western cultural roots, they differ vastly with respect to urban conditions, physical conditions (e.g., climate/light exposure, noise, pollution, crowding), history, sociocultural views, and organizational values that may ultimately modulate their respective sensitivities and HPA axis adaptation to daily stressors with important health disparities. For instance, a WHO report showed 39.4% prevalence of raised BP among male adults aged $\geq$ 25 years among Brazilian inhabitants (WHO, 2012). Similarly, higher rates of diabetes (421 cases per 100,000 population by case) and unipolar depressive disorders (1,410 cases per 100,000 population by case) were reported among Brazilian inhabitants. These findings collectively suggest that chronic stress exposure, cortisol dysregulation, and AL are heightened among inhabitants of countries with emerging economies, such as Brazil, in addition to differences attributable to SES.

The importance of cross-cultural studies has been well represented in several AL studies. A recent study scrutinizing the association between perceived stress and AL among Russians, Americans, and Taiwanese revealed important nation-specific sex differences in magnitudes and directions: strongest positive association for Russians of both sexes, weaker association among American women, and an unexpected negative association among Taiwanese men (Glei et al., 2013). The importance of urban and rural locations is also an important consideration, given a recent finding among Polish men who had lower AL levels if they were more educated, married, and residing in an urban area (Lipowicz, Szklarska, & Malina, 2013). In summary, it is imperative to expand international investigations among individuals living in different sociocultural contexts in order to understand unique vulnerabilities and culture-specific protective factors that propel pathways toward potential resilience.

Resilient Hispanic Effects in Emerging Economies

There is a paucity of research on resilience among inhabitants from emerging-economy countries. Nevertheless, a burgeoning literature and several AL studies (for a review, see Beckie, 2012) report positive health outcomes among Hispanic populations, due perhaps to unique sociocultural contexts and value systems that might promote resilience (Gallo, Penedo, Espinosa de los Monteros, & Arguelles, 2009). Despite substantial adversities (e.g., immigration,

discrimination, low incomes, less education, unequal opportunities, limited health care access), Hispanic populations living in the United States have at times shown equal and sometimes even better health outcomes in comparison to Caucasian populations (Gallo et al., 2009). Similarly, Hispanic individuals with non-American nativity exhibit better health than those born in the United States. Features of Hispanic culture (e.g., allocentrism, family-oriented values) represent attitudes and behaviors that might exert a protective influence on health outcomes (Gallo et al., 2009).

The sociocultural dimensions of Brazilians exhibit similarities to those of Hispanics. Interestingly, Brazilian inhabitants score equally with populations from the developed world on psychometrics of resilience (Ferreira, Santos, & Maia, 2012; Fortes, Portugues, & Argimon, 2009; Gaiolli, Furegato, & Santos, 2012; Rodrigues, Barbosa, & Chiavone, 2013; Tavares, Barreto, Lodetti, Silva, & Lessmann, 2011) that actually increase with age (Gaiolli et al., 2012; Tavares et al., 2011). Among Brazilian children living under adverse conditions, a father's ability to adequately respond to his child's needs, ability to promote expression of the child's potential, and engagement in gratifying familial activities have been identified as key protective factors (Silva, Lacharité, Silva, Lunardi, & Lunardi-Filho, 2009).

Similarly among young Brazilians from low-SES backgrounds, the cultivation of interpersonal relationships (e.g., family, friends, teachers) and personal resources (e.g., personality traits, optimism motivation, spirituality) promote resilience in the face of future life challenges (Silva et al., 2009). It is interesting to note that different studies reveal that resilience is independent of SES among adult and elder Brazilians (Gaiolli et al., 2012; Tavares et al., 2011). These protective factors include personality characteristics such as self-confidence, self-control, self-esteem, empathy, optimism, and sense of meaning (Rodrigues et al., 2013). Future cross-cultural research could investigate these cultural distinctions by delineating important differences between the sexes around the world. As presented next, biological sex and sociocultural gender factors influence physical health and well-being.

Sex Differences and Gender Diversity

Every cell is sexed, every person gendered, and every organism stressed (Juster & Lupien, 2012c). Whereas the term *sex* refers to a multidimensional construct that includes genes, anatomy, gonads, and hormones that collectively define us as male or female, *gender* refers to the implicit and explicit dissimilarities in an array of socioculturally constructed roles, orientations, and identities that generally predominate in one sex or the other (Juster et al., 2011). Relatedly, gender roles represent the social norms and stereotypes we assimilate and endorse through the enactment of masculine traits (e.g., independence, assertiveness, competitiveness, instrumentality) and feminine traits (e.g., empathy, compassion, helpfulness, expressivity (O. Evans & Steptoe, 2002; Johnson & Repta, 2011). One's sexuality also comprises its own constituent sexual behaviors, identities, and orientations that correspond with health inequalities (Institute of Medicine [IOM], 2011). In the next sections, we summarize an ongoing research program on the effects of sex, gender roles, and sexual orientation on AL.

Biological Sex and Aging

Sex differences in AL depend on sample-based and age-related factors (Juster et al., 2010). For example, successive analyses of the MacArthur cohort provide evidence for age-specific sex differences in the biological signatures linking AL to tertiary outcomes, such as all-cause mortality. An early analysis found that cardiovascular biomarkers were more often dysregulated for men, whereas neuroendocrine biomarkers were more often dysregulated for women (Seeman, Singer, Ryff, Dienberg Love, & Levy-Storms, 2002). In a 12-year follow-up that used recursive partitioning, high-risk pathways of AL biomarker clustering for men included adrenaline, noradrenaline, IL-6, CRP, and fibrinogen, while women included IL-6, CRP, glycosylated hemoglobin, and systolic BP (Gruenewald, Seeman, Ryff, Karlamangla, & Singer, 2006). Interestingly, elevated systolic BP occurred in 100% of high-risk pathways for women but only 17% for high-risk pathways among men, principally driven by elevated fibrinogen, noradrenaline, and adrenaline levels otherwise absent for women. These findings from the MacArthur cohort measured at different time points reveal that sex differences in AL pathways might emerge only with advanced age. This is consistent with numerous studies demonstrating links between chronic stress and advanced aging at molecular, social, and environmental levels (Epel, 2009; Epel et al., 2004; Tomiyama et al., 2012).

Identification of sex-specific thresholds in individual biomarkers and systemic clustering of AL at different ages should be a priority, given increasing older populations worldwide (Singer et al., 2004). In a first attempt, a 15-year follow-up of CARDIA participants in their 40s found no differences between sexes or by race/ethnicity. Nevertheless, it must be noted that aggregate metafactors including

heart rate variability, BP, and inflammatory, metabolic, catecholaminergic, and glucocorcoticoid biomarkers captured 84% of the statistical variance, suggesting that AL biomarkers indeed form a constellation of shared interrelations consistent with theory (Seeman et al., 2010). Yet subtle physiological dysregulations of intertwined systems may not be easily detected or differ between the sexes when assessing younger adults. Consequentially, determining meaningful subclinical biomarkers cutoffs between sexes at different ages is essential.

In this regard, sociocultural differences also must be considered cross-culturally. For example, a pilot study of Japanese elders measuring AL based on 33 parameters revealed that they were leaner with slightly more elevated BP than Europeans and Americans, in addition to having higher total HDL cholesterol (Crews et al., 2012). Despite a lack of age differences, sex differences were also found for dopamine, uric acid, glutamic-pyruvic transaminase (liver enzyme), and white blood cells. Although preliminary and requiring continued cross-cultural comparisons, we propose that delineation of sex- and age-specific differences will require gender-based perspectives that appreciate differential socialization patterns (e.g., social networks, diet and alcohol consumption, leisure activities) and the consequent risk and protection this engenders. In addition, do gender effects interact with sociocultural factors to modulate AL in an international context? For instance and as discussed next, one could imagine the stressful circumstances of, say, a feminine Japanese American woman with conflicting traditions of collectivism versus individualism or perhaps a masculine male nurse, since each may embody mismatches to societal and occupational expectations of them.

Sociocultural Gender

Our understanding of sex differences can be complemented by incorporating gender perspectives when interpreting the AL literature (Juster & Lupien, 2012a). Sex differences in biological constitution, in concert with individual differences in elusive gender-based factors, are known to influence patterns of physiological stress responsivity (Dedovic, Wadiwalla, Engert, & Pruessner, 2009). For example, women generally self-report more environmental stressors and psychosocial distress, while men are generally more biologically stress responsive compared to women in the follicular phase of their menstrual cycle or on oral contraceptives. These sex differences stem from lifelong exposure to sex steroids, anthropometry, and sociocultural factors that construct one's gender that collectively drive diverse patterns of threat processing and coping mechanisms. It has been argued that sociocultural factors may be more important than biological factors in explaining mysterious sex differences in stress responsivity (Lundberg, 2005). For instance, it would seem that women demonstrate increased cortisol levels when facing social rejection (Stroud, Salovey, & Epel, 2002), whereas men tend to be more reactive when confronted with achievement-based stressors in laboratory paradigms (Dickerson & Kemeny, 2004).

A complementary evolutionary hypothesis put forth by S. E. Taylor and colleagues (2000) states that men and women generally cope differently under stressful situations. Accordingly, the primary stress response pattern for men are fight-or-flight responses, whereas women might be more prone to engage in tend-and-befriend responses, such as nurturing and affiliation-based behaviors that protect against the demands of pregnancy, nursing, and child care (S. E. Taylor et al., 2000). The central tenet of Taylor et al.'s proposal is that instead of utilizing physical retaliation when faced with threats, women focus on behaviors that protect vulnerable offspring and maintain social bonds. Compelling animal and human studies have substantiated this theory; however, it is not clear whether these responses are due to sex, gender, or both—or perhaps even influenced by how our own gendered assumptions factor into our research designs (Juster & Lupien, 2012c). For instance, S. E. Taylor et al. underlined that prior to 1995, women represented a mere 17% of participants in human studies of stress due to the alleged complications of female reproductive functions.

Importantly for the present discussion, the tend-and-befriend hypothesis sheds some light on sex and age differences found throughout the stress and AL literature vis-à-vis social networks and relational factors that likely also differ internationally according to socialization and gender stereotyping. For instance, AL levels were lower only for Taiwanese elderly men with a spouse, while both sexes benefit from ties with close friends and neighbors in a SEBAS analysis (Seeman et al., 2004b). Interestingly, the perceived quality of these social relationships was not consistently linked to AL, suggesting that cross-cultural differences to between Eastern and Western societies may be influenced by sociocultural factors (e.g., virtues of collectivism/interdependence, social obligation, and the absence of "self") that are inherently influenced by gender-based constructs related to societal patriarchy and/or matriarchy.

In this spirit, one's sex and gender role might divergently influence biopsychosocial stress. In particular, extremely traditional or hegemonic masculine gender roles

(e.g., hostile, dictatorial, impatient) are strongly linked to coronary-prone behaviors (e.g., inhibited emotional expression, lack of empathy, homophobia) that overlap with hostile personality traits shown to mediate the association between low SES with increased AL levels (Kubzansky, Kawachi, & Sparrow, 1999; J. Sun, Wang, Zhang, & Li, 2007). As women increasingly occupy non-traditional professions around the world (WHO, 2006), changing gender roles might incur both health-promoting and health-damaging consequences (Lundberg & Frankenhaeuser, 1999). It follows that individual differences in unique configurations of AL psychosocial antecedents might differ according to gender and related behaviors that might ultimately contribute to AL health consequences (Juster et al., 2011; Lupien et al., 2006).

Our group recently investigated whether age, sex, and gender roles were associated with AL levels and physical complaints among Montreal workers from diverse occupations (Juster & Lupien, 2012b). Preliminary results revealed that: (1) increased masculinity (e.g., independent, assertive) and age predicted high AL levels, while sex did not; (2) increased masculinity and being female together predicted increased physical complaints; and finally, (3) high AL corresponded to increased physical complaints. That higher masculinity was related to increased objective physiological dysregulation and subjective physical complaints (e.g., nausea, dizziness, and pain) suggests an overall increased vulnerability to hyperarousal pathologies such as cardiovascular disease among masculine-typed individuals. These triangulated findings are clinically important. In particular, atypical prodromal symptoms of acute coronary syndrome for women include physical complaints (Pilote et al., 2007). This fact provides preliminary support for the inclusion of gender roles in studies investigating AL with differences otherwise attributable solely to sex or age.

Interpreting sex differences in pathophysiology and AL levels involves consideration of gender-based factors that need to merge qualitative and quantitative approaches. For example, widespread assumptions that men are vascular reactors and women that are cardiac reactors do not address intra-individual differences between, as well as within, the sexes (Legato, 2010). Many of the antecedents of AL, such as social support, personality traits, occupational characteristics, and lifestyle behaviors (see Figure 8.1), are influenced by sociocultural factors for which gender perspectives can be applied. In synthesizing existing literature with future directions in mind, we postulate that the synergism or interactions among sex- and gender-based factors modulate biological signatures (diurnal cortisol, reactive cortisol, AL) more strongly than the main effects of either set of factors alone (Juster et al., 2013a). In addition to sex and gender roles, one's sexual orientation has received limited attention in the biopsychosocial stress and AL literature, an area to which we turn to next.

Sexual Orientation

Lesbian, gay, and bisexual (LGB) individuals, as a result of their minority sexual identities, frequently experience stress resulting from living in a society that negates or denigrates their identity. Specifically, LGB individuals face heterosexism on a regular basis. Herek (1992) defined heterosexism as an ideological system that denies, denigrates, and stigmatizes any non-heterosexual form of behavior, identity, relationship or community. Heterosexism encompasses homophobia, an irrational fear or hatred of nonheterosexual individuals, as well as bias against LGB individuals. Manifestations of heterosexism can be subtle, such as assuming someone is heterosexual, or overt, such as using anti-LGB epithets, engaging in violence against LGB individuals, or discriminating against LGB people in hiring or housing.

Experiences of heterosexism are common in the lives of LGB individuals. For example, Mays and Cochran (2001) found that LGB individuals were twice as likely as heterosexuals to have experienced prejudice. Likewise, Herek, Gillis, and Cogan (1999) found that up to 25% of their LGB participants had experienced physical violence or property crimes because of their sexual orientation. Recent national data from the Canadian Centre for Justice Statistics show that hate crimes based on sexual orientation are the third most prevalent type of hate crime after race/ethnicity and religion. Moreover, hate crimes based on sexual orientation are characterized by violence more often than other types of hate crimes. For example, 56% of hate crimes based on sexual orientation in 2006 were violent, whereas 38% and 26% of hate crimes based on race/ethnicity and religion, respectively, were violent (Dauvergne, Scrim, & Brennan, 2008). Both overt and subtle heterosexism increase stress for LGB individuals. This increased stress can lead to AL and negative health outcomes.

This form of sociocultural stress has been termed *minority stress* (Meyer, 1995; Meyer, 2003), which refers to the stress of living in an environment that is stigmatizing of nonheterosexual sexual orientations. Meyer (2007) identified three overarching characteristics of minority stress:

1. Minority stress is *unique*. The stress of living in an environment that stigmatizes nonheterosexual sexual orientation is unique to LGB individuals and different

from mundane stressors encountered by all people and moreover is additive to the stress caused by normal everyday stressors.

2. Minority stress is *chronic*. LGB individuals experience this form of stress on a daily basis from events ranging from mundane offenses to extreme instances of harassment and violence.
3. Minority stress is *socially based*. Minority stress is caused by factors outside the individual by other people, institutions, and social-political processes.

Meyer (1995, 2003) divided minority stress into five separate components: (1) internalized homophobia, (2) perceived stigma, (3) prejudice events, (4) sexual orientation concealment, and (5) subsequent coping strategies. *Internalized homophobia* refers to negative views of homosexuality/bisexuality that have been internalized by the LGB individual. *Perceived stigma* relates to the view that a person will be treated unfairly because of her/his sexual orientation. *Prejudice events* are the actions of others toward a LGB individual that are discriminatory, biased, or violent; these can vary in intensity from overt physical or verbal attacks to more subtle instances of bias. *Sexual orientation concealment* refers to attempts to hide one's sexual orientation or "pass" as heterosexual. These components of minority stress require individuals to engage in compensatory coping strategies in an attempt to ameliorate negative effects.

Minority stress is linked to negative health outcomes. Indeed, a recent review of the literature by the Institute of Medicine (2011) highlighted that LGB individuals tend to have elevated levels of psychological distress, increased incidence of suicidal ideation and attempts, and increased substance use relative to their heterosexual peers. Early studies noted the high incidence of minority stressors and their relationship to health outcomes. For example, Ross (1990) found that the majority of his sample of gay men had heard antigay jokes, had to associate with someone who was homophobic, and had been harassed or threatened. In addition, 25% of his sample had been the victim of antigay physical assault. Moreover, these experiences of discrimination were positively related to somatic symptoms, anxiety, and insomnia.

Other studies have continued to demonstrate links between minority stress and a variety of negative mental, physical, and behavioral health outcomes. As reported by the Institute of Medicine (2011), the negative outcomes of minority stress include psychological distress, anxiety, depression, suicidal behaviors, insomnia, physical symptoms, health complaints, substance abuse, prostitution, increased number of sexual partners, and unprotected anal intercourse to name but a few. In particular, behavioral outcomes associated with minority stress include substance use and unprotected sexual intercourse that are important risk factors for the transmission of the human immunodeficiency virus (HIV) among gay and bisexual men in particular. The high incidence of HIV among gay and bisexual men—and the role of minority stress as a risk factor for HIV transmission—has been explained by the concept of syndemics.

A *syndemic* is defined as "a set of closely intertwined and mutual enhancing health problems that significantly affect the overall health status of a population within the context of a perpetuating configuration of noxious social conditions" (Singer, 1996, p. 99).With regard to gay and bisexual men, psychosocial health problems, including depression, substance use, and antigay victimization, are related to HIV risk. When these psychosocial variables combine, the resulting impact on HIV risk is greater than the sum of their individual effects (Safren, Reisner, Herrick, Mimiaga, & Stall, 2010; Stall, Friedman, & Catania, 2008; Stall et al., 2003). For example, Mustanski, Garofalo, Herrick, and Donenberg (2007) found that gay and bisexual men who engaged in binge drinking were over five times more likely to use street drugs; those who used street drugs were almost four times as likely to engage in unprotected anal intercourse. Moreover, they found that for each additional psychosocial health problem (e.g., alcohol use, drug use, psychological distress, violence), the odds of engaging in unprotected anal intercourse increased by 42%. Research on syndemics suggests gay and bisexual men's increased HIV risk can be understood in the context of living in a stigmatizing environment that results in victimization, mental health problems, and substance use. From a transdisciplinary perspective, these sociocultural outcomes interact with each other syndemically to increase risk for HIV.

The accumulated findings over the past several decades suggest that minority stress plays an important role in the psychological, physical, and behavioral health of LGB individuals. However, this rich body of psychological research is matched by a paucity of biopsychosocial research. Research examining biological data among LGB individuals has been sparse, with earlier research examining biological outcomes among HIV-positive gay and bisexual men (and sometimes matched HIV-negative controls), and research focusing on healthy LGB populations only emerging later. Most of the research that includes a focus on biological data has examined the relationship between psychological distress and physical

health, often in HIV-positive gay and bisexual men. For instance, Leserman and colleagues (2000) found that faster progression to AIDS among HIV-positive gay and bisexual men was associated with more stressful life events, use of denial coping strategies, lower satisfaction with received social support, and lower serum cortisol levels. Greeson et al. (2008) found that the relationship between HIV disease progression and psychological distress was mediated by decreased natural killer cell immunity (fewer cells and less cytotoxic function) and increased cytotoxic T-cell function. In a study of both HIV-positive and HIV-negative gay men, Kertzner Goetz, Todak, and Cooper (1993) found that urinary free cortisol was related to depressed and anxious moods.

Resilience When "Coming Out of the Closet"

Early research on the minority stress factor of sexual orientation concealment revealed that both HIV-positive and HIV-negative gay men evidenced worse health outcomes when they concealed their sexual orientation. Cole and colleagues (1996b) found that HIV-negative gay men who were closeted had significantly higher incidence of cancer and infectious diseases than those who were out. In addition, HIV-positive gay men who were closeted reached a critically low CD4 cell count, received an AIDS diagnosis, and died significantly faster than those who were out (Cole, Kemeny, Taylor, Visscher, & Fahey, 1996a).

Likewise, among healthy LGB, disclosure represents an important source of distress. Indeed, "coming out of the closet" (Riley, 2010) to family, friends, and coworkers is considered one of the most significant stressors in the lives of LGBs (Hershberger, Pilkington & D'Augelli, 1997). To date, only one study of healthy sexual minority men showed that disclosure at work was unexpectedly associated with higher cortisol levels and negative affect in comparison to nondisclosed workers (Huebner & Davis, 2005). Shedding light on this unintuitive finding are those from a qualitative study showing that gay men who disclosed their sexual orientation to supervisors reported significantly more hostility in their work environment, significantly fewer perceived promotion opportunities, and significantly higher turnover intentions (Tejeda, 2006). Disclosure of one's sexual orientation is a complex phenomenon that has been purported to involuntarily incite harassment and discrimination among work colleagues (Waldo, 1999) and in the community more broadly (Huebner, Rebchook, & Kegeles, 2004). As noted, however, disclosure can eventually promote positive health and well-being, as evidenced by less distress reported than with nondisclosure (Greene, Derlega, & Matthews, 2006; Morris, Waldo & Rothblum, 2001).

A recent study by our group assessed psychiatric symptoms, diurnal cortisol, and AL levels as a function of sexual orientation as well as disclosure status. The results revealed that sexual minorities did not manifest more stress-related problems than heterosexuals (Juster, Smith, Ouellet, Sindi, & Lupien, 2013b). Quite to the contrary, gay/bisexual men had lower depressive symptoms and AL levels than heterosexual men, which is inconsistent with a sexual minority stress model. Differences in AL levels were driven by lower levels of triglycerides, body mass indices, and TNF-α levels among the gay/bisexual men that could be explained behaviorally by their increased focus on thinness and muscularity by means of diet and exercise compared to heterosexual men (Juster et al., 2013b). Alternatively, the differences may be due to sample-based features or potentially even be influenced by resilient pathways related to the rites of passage associated with sexual minority status and coming out. Given that two-thirds of LGB participants had completely disclosed their sexual orientation, we ascertained whether disclosure might explain these surprising reversals. Accordingly, those who had completely come out to friends and family had less symptoms of anxiety, depression, and burnout as well as lower levels of morning cortisol than those who remained closeted (Juster et al., 2013b).

In a secondary analysis by our group, retrospective coping strategies used during disclosure (problem-focused, seeking social support, wishful thinking, blaming self, and avoidance) were assessed in relation to current indices of environmental, psychological, and biological stress. This period of sexual identity formation represents the elapsed time since first recognizing same-sex attraction or disclosing to family and friends. The increased use of avoidance coping behaviors was associated with increased self-reports of daily hassles and perceived stress, as well as increased AL levels. Interestingly, coping that involved seeking social support buffered against current perceived stress. Could prosocial behaviors and disclosure represent respective coping strategies and life transitions that promote resilience among sexual minorities? Stigma-related stress can promote individual differences in adaptive behavioral responses among stigmatized individuals that can render them more resilient and effective at managing future stressors, especially if they are well supported socially and are able to develop adaptive coping strategies (Hatzenbuehler, 2009).

Although these novel findings link sexual orientation, life transitions, and coping strategies to psychological

outcomes, cortisol, and/or AL levels, we cannot assume that our results generalize to all LGB communities. Specifically, participants were all recruited from the liberal city of Montreal, and Canadian social policies are progressive vis-à-vis sexual minority rights. As such, our findings might not generalize to more conservative locations in particular. Moreover, differences among specific LGB groups *intersect* according to age cohorts, race/ethnicity, SES, culture, and geographic location (IOM, 2011). For instance, younger generations of LGBs are 16 times more likely to have disclosed than older generations (Gates, 2010), and African American gay/bisexual men experience higher levels of internalized homophobia and are therefore less likely to disclose than other racial/ethnic groups (Peterson & Jones, 2009).

Intersectionality is an inductive research framework that appreciates the reality that individuals are members of multiple social groups and identities that will contextually determine their experiences, chances, opportunities, and ultimately health (Johnson, Repta & Kaylan, 2011). Moreover, there are many environments where disclosure may be a dangerous option. At a societal level, however, these findings have social implications: If individuals are to garner any benefits from disclosing, there must be established social policies that reduce stigma and intolerance (Chaudoir & Fisher, 2010).

Institutionalized stigma and heterosexism includes, for example, the denial of marriage rights, disadvantaged treatment in schools and workplaces, and disenfranchisement of sociocultural resources like religion and spirituality that often dehumanize LGBs and contribute to psychosocial distress (Herek & Garnets, 2007; IOM, 2011). These social inequalities have health consequences that can be reversed when policy changes are made (Hatzenbuehler, 2010). Compelling research shows that American LGBs living in states without policies that protect them from hate crimes and employment discrimination experience significantly higher rates of psychopathology than LGBs living in states with protective policies (Hatzenbuehler, Keyes & Hasin, 2009). Likewise, LGBs living in states with constitutional amendments banning same-sex marriages experience increased rates of generalized anxiety disorder, depressive disorders, and alcohol abuse. By contrast, those living in states that recognize same-sex marriages show no increased development of these conditions (Hatzenbuehler, McLaughlin, Keyes, & Hasin, 2010).

A recent study showed that following the Massachusetts legalization of same-sex marriage, there were significant decreases in general medical and mental health care visits and costs 12 months afterward among gay men (Hatzenbuehler, O'Cleirigh, Mayer, Safren & Bradford, 2012). This body of research demonstrates how changes in distal policies can progressively eliminate institutionalized stigma and promote public health benefits (Hatzenbuehler et al., 2012). In a pioneering study, Hatzenbuehler and McLaughlin (2013) examined stress-reactive HPA axis functioning emphasizing discrimination among sexual minorities exposed to varying degrees of stigma. Results indicated that LGB young adults who lived in states with high structural stigma (e.g., states without policies that protect sexual minorities from hate crimes, ensure employment nondiscrimination, and support same-sex marriage) as adolescents showed blunted cortisol responses following the Trier Social Stress Test (TSST) compared to those from low-stigma states. This finding suggests that the stress of growing up in environments that target sexual minorities for social exclusion may result in HPA axis dysfunction (Hatzenbuehler et al., 2014). Given ongoing debate in the United States and worldwide concerning same-sex marriage, assessing AL levels in states with and without protective policies over time would contribute further to our understanding of the relation between social policy and biology.

Beyond sex and gender diversity, the plight of Indigenous peoples within our national borders must not be ignored or forgotten. Especially troubling is the fact that few biopsychosocial studies have been conducted among Indigenous peoples, especially for studies quantifying chronic stress. In the next section, we discuss the American Samoans, Nunavik Inuit, and Australian Aborigines as Indigeneous populations at risk of higher AL.

Indigenous Peoples of North America and Australia

American Samoans

American Samoa is a group of five volcanic islands and two coral atolls located in the South Pacific that is an unincorporated U.S. territory (Central Intelligence Agency, 2012). As early as 1000 B.C., proto-Polynesians settled the islands. Today, native American Samoans are descendants of the Lapita culture and are one of the few remaining Polynesian societies (Bellwood, 1987). In 2012, the native American Samoan population was estimated at 49,782 individuals (Central Intelligence Agency, 2012). American Samoan women have a life expectancy of 75.9 years in comparison to 69.3 years for men (WHO, 2011), which is about 5 to 7 years lower than that of the general American population as of 2009 (80.9 years for women in comparison to 76.0 for men [WHO, 2012]). Migration of many Samoans to Hawaii and the American mainland has led to

a number of communities with widely varying sociocultural characteristics. Investigations on the challenges of changing social contexts and acculturation on health have been undertaken (Baker, Hanna, & Baker, 1986).

Public health reports reveal that American Samoans have alarming rates of metabolic disorders. American Samoans have the highest prevalence of adulthood obesity in the world: 74.6% of the adult population classify as obese, according to their BMI (WHO, 2011). Additionally, diabetes mellitus cases have doubled and are a leading cause of death for American Samoans (WHO, 2011). Metabolic diseases are strongly associated with chronic stress (Kyrou & Tsigos, 2007, 2009; Mattei, Noel, & Tucker, 2011; Stumvoll, Tataranni, & Bogardus, 2004; Tamashiro, Sakai, Shively, Karatsoreos, & Reagan, 2011) that can synergize with acculturated dietary factors to increase AL and therefore increase vulnerability to diabetes mellitus. In a landmark study, it was shown that Pima Indians living traditionally in rural Mexico were in better health than those living in Arizona for whom diabetes incidence was much higher (Ravussin, Valencia, Esparza, Bennett, & Schulz, 1994). Studies that can assess such adverse acculturation and consequent AL could provide powerful evidence to inform policymakers.

In a first study, Crews (2007) investigated the association between AL and diabetes mellitus among American Samoans. AL was significantly associated with diabetes mellitus (Crews, 2007), consistent with higher prevalence among American Samoans. While Samoan inhabitants are well integrated into a cosmopolitan way of life, recent acculturation has led to increasingly overlapping sociocultural risk factors for metabolic diseases common to the larger American population. As a consequence, clusters of "new" risk factors (e.g., industrial food production) are generally lower in the oldest portion of the population (Bindon, Knight, Dressler, & Crews, 1997) who grew up and developed before these massive changes in their lifestyle. Interestingly, AL was negatively associated with age in men but was more strongly positively associated with age in women. In sum, the oldest Samoans are those who grew and developed before massive sociocultural changes, the middle-age Samoans experienced many of these changes, and the youngest generation are the now the most obese Samoans (Crews, 2007).

These differences may be driven by interactions among age, biological sex, and sociocultural gender-based differences like those discussed in the previous section. It is important to highlight that gender issues are of high importance in Samoan society, with active promotion and protection of women's rights and equalities in addition to equality with men with respect to participation in the paid labor force, educational attainment, and occupation of several senior positions in the public sector (WHO, 2011). Yet sociocultural changes may have caused greater disruption of women's traditional way of life that may have contributed to their higher levels of AL. Although the exact mechanism is unclear, obesity, hypertension, and diabetes are more common among older Samoan women in contrast to men (Baker et al., 1986; Crews, 1989). This suggests that AL might reflect sociocultural changes in the life style of Indigenous populations and might be useful to predict future health vulnerabilities to metabolic disorders among others.

Nunavik Inuit

The Inuit are a group of native inhabitants of the Arctic regions of Russia, the United States, Canada, and Greenland that share similar culture and ancestors as the descendants of the Thule culture that migrated from eastern Asia to Alaska by crossing the Bering land bridge around 1000 BC. By the thirteenth century, the Inuit had settled across the continent toward eastern Arctic territories of Canada, such as Nunavik (McGhee, 1978). Nunavik is a vast territory (larger than California) north of the fifty-fifth parallel in the province of Quebec, Canada. In 2006, the Nunavik Inuit population comprised 10,950 people living in 14 coastal communities (Statistics Canada, 2006a). With a median age of 20.8 years, they have the lowest mean age in Canada (Statistics Canada, 2006a).

Nunavik Inuit are the most vulnerable Canadian Inuit population to health problems (Statistics Canada, 2006b, 2006c, 2008). Since 2004 to 2008, they have had the lowest life expectancy at birth in Canada and the lowest overall life expectancy, at 66.5 years (68.5 years for females and 64.5 years for males) in comparison to 80.6 years for the Canadian average (82.9 years for females and 78.2 years for males (Statistics Canada, 2008). Moreover, life expectancy is 5.6 years lower than the average of any other Canadian Inuit (Statistics Canada, 2008). The AL model could be applied to further understand the social determinants of these disturbing demographics.

In particular, housing conditions are a major source of distress (G. W. Evans, Lepore, Shejwal, & Palsane, 1998) and a potential determinant of compromised Indigenous health (Gracey & King, 2009). Approximately half of Nunavik Inuit live in overcrowded houses, defined as more than one person per room, compared with 33% for the average of any other Canadian Inuit and 3% for non-Indigenous Canadian households (Statistics Canada, 2006c). This situation is explained in part by high birth

rate, housing shortage, and high cost of construction (Rochette, St-Laurent, & Plaziac, 2007). The association between household crowding and AL was recently assessed by our group using data from the Nunavik Inuit Health Survey (Blanchet & Rochette, 2008; DeWailly et al., 2007a, 2007b; Kirmayer & Paul, 2007; Rochette et al., 2007) that calculated AL by incorporating 14 biomarkers from on a cross-section of 839 Inuit between the ages of 18 and 79. Results show that higher household crowding was significantly associated with elevated AL levels while controlling for the effects of age, sex, income, diet, and involvement in traditional activities (Riva et al., 2014)

Another major risk factor for the Nunavik Inuit that overlaps with household conditions is low SES. In particular, educational level is very low in Nunavik: Only 25% of Nunavik Inuit over 15 years old have a high school diploma or above (Statistics Canada, 2006b). Unemployment is also an important issue for the Inuit from Nunavik with only 56.1% over 15 years of age employed (Statistics Canada, 2006b). The proportion of this population with stable and well-paying employment is also relatively limited in Nunavik: income is exceedingly low (42.6% earning less than $20,000/year) and only 32.2% have full-time employment (Statistics Canada, 2006b). This low income in turn leads to food scarcity reported by 25% Nunavik Inuit (Blanchet & Rochette, 2008).

Finally, exposure to environmental contaminants is a well-known problem in the Canadian Arctic. Members of our group have previously proposed that environmental toxins might modulate AL and exacerbate health outcomes (Juster et al., 2011; Loucks, Juster, & Pruessner, 2008; McEwen & Tucker, 2011). Accordingly, a recent cross-sectional analysis of the NHANES cohort demonstrated that high AL levels amplify the damaging effects of exposure to lead in terms of elevated BP (Zota, Shenassa, & Morello-Frosch, 2013). This is likely much more problematic for Nunavik Inuit inhabitants who are exposed to a plethora of environmental contaminants that are carried from southern to northern latitudes by atmospheric and oceanic currents that are then bioaccumulated in the Arctic food chain. Specifically, the traditional Inuit diet contains high levels of fish (Arctic char) as well as land (caribou) and marine mammals (beluga, seal, and walrus) that are at the top of the food chain (Blanchet & Rochette, 2008). Consequently, the Nunavik Inuit are more exposed to environmental contaminants than the average population from southern Quebec (Muckle, Ayotte, Dewailly, Jacobson & Jacobson, 2001). This exposure includes exposure to traditional legacy contaminants (heavy metals like lead, methylmercury, and cadmium) and persistent organic pollutants (mainly polychlorinated biphenyls [PCBs]) and chlorinated pesticides (DeWailly et al., 2007a, 2007b).

Environmental contaminants can exert endocrine-disrupting effects that modulate allostatic processes (Juster et al., 2011). For example, among wildlife, impaired ability to mobilize glucocorticoids in response to an acute stress is related to heavy metal exposure and environmental organic contaminants (e.g., PCBs, solvents, pesticides) in fish (Benguira, Leblond, Weber, & Hontela, 2002; Hontela, Dumont, Duclos, & Fortin, 1995; Hontela, Rasmussen, Audet, & Chevalier, 1992), amphibians (Gendron, Bishop, Fortin & Hontela, 1997), birds (Love et al., 2003), and large mammals (Oskam et al., 2004). In rodents, altered HPA axis functioning has been reported following early exposure to PCBs (Meserve, Murray, & Landis, 1992) and heavy metals (Vyskocil, Fiala, Ettlerova, & Tenjnorova, 1990). Human studies demonstrate that some PCBs even act as antagonists of glucocorticoid receptors (Johansson, Nilsson, & Lund, 1998) and alter glucocorticoid biosynthesis in human adrenocortical cells (L. A. Li & Wang, 2005). This finding has also been shown at low levels of lead exposure: Exposure to lead increases glucocorticoid responses to acute stress in 9- to 10-year-old children (Gump et al., 2008). Likewise, a recent study reported an association between lead exposure and higher cortisol levels in occupationally exposed workers (Fortin et al., 2012). Beyond the HPA axis, environmental toxins influence cardiovascular functioning. For example, elevated exposure to methylmercury is pathophysiological and increases heart rate, BP, and coronary heart disease (Ayotte et al., 2011; Valera, Dewailly, & Poirier, 2008, 2009, 2013; Valera et al., 2012). Finally, prenatal exposure to PCBs has been related to incidence of acute respiratory infections in Inuit children (Dallaire et al., 2006).

Numerous environmental contaminants are related to adverse mental health outcomes. For Inuit infants, postnatal lead exposure is linked to increased inattention, impulsivity, and irritability (Plusquellec et al., 2007, 2010), while pre- and postnatal PCB exposure is linked to increased unhappiness, anxiety, and inattention (Plusquellec et al., 2010; Verner et al., 2010). This finding is clinically important as postnatal lead exposure increases the risk of hyperactivity and attention-deficit disorder in Inuit children (Boucher et al., 2012), while prenatal methylmercury exposure increases inattention in Inuit infants (Verner et al., 2010). Thus, environmental contaminant exposure may alter stress physiology and influence developmental psychopathology.

In summary, comprehensive biopsychosocial studies of Indigenous people in North America are needed. As reviewed, American Samoans and Inuit from Nunavik are

both at high risk of chronic stress through socioeconomic factors, health behaviors, and environmental contaminants. There is therefore a strong need for continued research using the AL model to understand the health disparities of Indigenous peoples and to inform public health policies. Turning now to Oceania, we explore how the AL model can be further cross-culturally tailored to the challenges of Australian Indigenous peoples.

Australian Aborigines

Aboriginal people have lived in Australia for at least 60,000 years. Today, there are two main groups of Indigenous Australians: those from the Australian continent and the island state of Tasmania and those from the Torres Strait. With an estimated population of 575,552 and projected annual growth rate of 2.2%, the Aboriginal and Torres Strait Islander population of Australia represent 2.5% of the total Australian population. The Australian Aboriginal population is relatively young, with a median age of 21 years compared to 37 years for the non-Indigenous population as of 2006 (Australian Bureau of Statistics, 2007). Prior to the arrival of European settlers in the late eighteenth century, Indigenous Australians were healthier than most Europeans (Webb, 2009). As elsewhere around the world (e.g., among Native American communities), European settlers arrived with diseases that subjected Indigenous people to widespread changes that included loss of land and livelihood, as well as restricted civil rights and forced familial breakdown by religious missions that removed Indigenous children from their families (Chesterman & Galligan, 1997). These dramatic changes have destroyed their traditional way of life and have had abysmal effects on their health and well-being.

Mortality rates are much higher among the Australian Indigenous population when compared to the general Australian population. Causes of morbidity and mortality include cardiovascular disease, diabetes, and tobacco-related conditions that collectively account for half of health disparities in comparison to non-Indigenous Australians (T. Vos, Barker, Begg, Stanley, & Lopez, 2009). Life expectancy is 67.2 years for men (11.5 years lower than for non-Indigenous men) and 72.9 years for women (9.7 years lower than for non-Indigenous women). Roughly 87% of all Australians reach age 65; this is reduced to 24% and 35% of Australian Aboriginal men and women, respectively. These statistics are lower than in Nigeria, Bangladesh, and several other developing countries (UN, 2003).

Cardiovascular diseases and diabetes are much more common for Indigenous people than for non-Indigenous people (Australian Bureau of Statistics, 2006) and have a much younger incidence. Young and middle-aged Indigenous adults surprisingly drive these differences: the death rates for the 35 to 44 age groups and 45 to 54 year age groups are 8 to 12 times higher than corresponding non-Indigenous rates by age (Australian Institute of Health and Welfare, 2008). Although the prevalence of diabetes increases with age, here too the pattern of onset is much earlier: prevalence for Indigenous people aged 25 to 34 years old was almost seven times that of non-Indigenous people, while the prevalences reported by Indigenous people aged 35 to 44 as well as 45 to 54 years are more than five times those reported by age-matched non-Indigenous people (Australian Bureau of Statistics, 2006). This rate represents a strain on the health care system, as hospitalization rates for diabetes among Indigenous men and women are 3.4 and 5 times, respectively, the rates of non-Aboriginals after adjusting for age (Australian Institute of Health and Welfare, 2011).

Chronic stress and AL likely mediate associations among social inequalities and health disparities among Australia's Indigenous population. Like previous cross-cultural AL studies (e.g., Taiwanese SEBAS cohort), psychosocial stressors—such as death of a family member or closed friend, serious injury or disability—are major contributors of cardiovascular and metabolic problems among Australian Indigenous people (Australian Institute of Health and Welfare, 2008). In a large community sample of Australian Aboriginal and Torres Strait Islanders, glycosolated hemoglobin was measured and interpreted as a biological indicator of social environmental stress (Daniel, O'Dea, Rowley, McDermott, & Kelly, 1999). As an important biomarker of diabetes, mean glycosylated hemoglobin concentrations were 18.2% higher for both Indigenous groups in comparison to Caucasian Australians and for Greek migrants who experience unique distress due to acculturation.

Despite recent major efforts to study the social determinants of disease that disproportionately affect Indigenous Australians, relatively few studies have investigated AL biomarkers in community samples to serve as contrasts. Schmitt and colleagues (1995) studied urinary cortisol and adrenaline excretion rates in three Aboriginal communities in the Kimberley region of northwest Australia and compared them to samples from Oxford in the United Kingdom. They found that both cortisol and adrenaline secretion was significantly higher in the Aboriginal communities than in the Oxford sample, which was already quite high by international standards.

Mental health burden is similarly much higher among Indigenous people. Psychiatry-related hospitalizations

have also increased: schizophrenia, schizotypal personality disorder, and delusional disorders are 4 times higher, substance use disorder is 3.8 times higher, and suicide attempts are 2.7 times higher among Indigenous people. High rates of psychosis and alcohol and cannabis use have also been reported among the Indigenous populations of Cape York and the Torres Strait, who experience heightened distress (Hunter, 2013; Hunter et al., 2012). Large-scale surveys reveal that prevalence for symptoms of depression and anxiety are 3 times higher than for non-Indigenous adults (Jorm, Bourchier, Cvetkovski, & Stewart, 2012). Qualitative research among Aboriginal men in central Australia reveals that depressive symptoms are mostly attributable to a sense of loss and connection with the social and cultural fabric of Aboriginal life as well as with the cumulative stress of marginalization (Brown et al., 2012). Low SES (Cunningham & Paradies, 2012) and other social inequalities, including transgenerational trauma, discrimination, and racism, may underlie these health inequalities among Indigenous Australians (Marmot, 2011). Research that can further assesses intersections within marginalized groups (e.g., sexual minority Indigenous peoples) are needed. These statistics demonstrate pernicious effects of social marginalization among Indigenous populations that ultimately exacerbate trajectories toward mental and physical morbidity. Utilizing the AL model to demonstrate this conclusively would provide an important platform by which to assess the needs of marginalized groups and in turn inform policymakers of intervention efficacy that address these needs.

In conclusion to this first part dedicated to social inequalities, we have reviewed an impressive breadth of research linking AL to mental and physical health. Studies clearly demonstrate that lower SES is associated with greater risk of increased AL, concomitant with important inequalities in Indigenous status, race/ethnicity, geography, as well as differences related to sex, gender, and sexual orientation throughout life that ought to be addressed in the evolution of public policies. Fundamental conclusions surface from this analysis of AL. AL represents a reliable measure of physiological dysregulations underlying illnesses that are influenced by social inequalities, such as with socioeconomic gradients, discrimination, homophobia, and adverse environments. In the interest of promoting continued advances in the measurement of AL in relation to biological, neurological, and cognitive indices of vulnerability and resilience to pathologies, we turn next to innovative approaches that should be incorporated into future research endeavors.

INNOVATIVE BIOCHEMICAL, NEUROLOGICAL, AND COGNTIVE PERSPECTIVES

In the first part of this chapter, we explored the psychosocial aspects of social inequalities influencing vulnerability toward, and resilience against, AL. Elevated AL hastens the development of age-related disease outcomes, such as cognitive and functional decline, cardiovascular disease, and mortality. However, the cellular mechanisms by which social inequalities and adverse experiences promote disease remain elusive. More specifically, the "primary effects" of allostatic mediators in the AL model (e.g., specific alterations in cellular functioning) have received limited empirical substantiation. The reader is reminded that primary mediators (glucocorticoids, catecholamines, cytokines) exact a domino effect on secondary outcomes (e.g., glycol-lipid profiles, cardiovascular functioning) via primary effects—that is, cellular changes in tissue and organ functioning.

Allostatic mechanisms like the stress response are diverse and span the spectrum of adaptive and maladaptive response patterns. In considering stress and resilience at a biological level—or what is referred to herein as *biological resilience*—we wish to first define three key interconnected concepts outlined by Karatsoreos and McEwen (2011) regarding resilience, resistance, and recovery. First and consistent with previous sections, *resilience* is defined as an organism's ability to rebound from adversity when its ability to physiologically function has been tampered with in some negative way; however, the organism is able to adapt by activating allostatic mechanisms that can promote resistance. Second, *resistance* is defined as an organism's ability to withstand adversity and face future stressors with little or no stress response. Resistance is conceptually akin to vaccination or stress inoculation that helps bolster immunity to future stressors. Third, *recovery* is defined as an organism's ability to shut down the stress response and other related biological activities back to baseline levels (Karatsoreos & McEwen, 2011). All three of these constructs are related to adaptation at a biological level and are central to our understanding of biological processes that promote resilience. Although the AL framework is embedded within such processes, we present diverse research areas to provide food for thought to help guide future research.

In this section, we focus on biological pathways that might mediate the adverse effects of chronic stress on health and ultimately modify vulnerability and resilience across the life span. We begin this discussion at a cellular level central to energy metabolism and the aging

process—namely, the mitochondrion (Picard, 2011). Next, we present advances in hippocampal neurogenesis to underline an important development in neurosciences that has redefined our understanding of neural plasticity of the hippocampus. Finally, we explore the concept of cognitive reserve among the elderly to highlight continued research on AL and cognitive functioning. In the next three sections, we highlight the importance of assimilating new techniques and perspectives to refine our understanding of social inequalities in AL and navigating potential routes toward resilience.

Mitochondria

Each of the approximately 10 trillion cells of the human body contains hundreds of mitochondria within their cytoplasm. *Mitochondria* are cellular organelles that arose 2.2 to 2.5 billion years ago when the ancestor of the mammalian cell fused or engulfed an aerobic bacteria capable of utilizing oxygen for energy production (Sagan, 1967). The bacteria thereafter remained and evolved into today's mitochondria. Through this endosymbiotic fusion, the mammalian cell *de novo* acquired from the ancient bacterium—now mitochondria—the capacity to produce large amounts of energy by oxidative phosphorylation (OXPHOS), which allowed the evolution of complex genomes and multicellular life-forms (Lane & Martin, 2010; Wallace, 2010). Cells of the human brain, muscles, vasculature, heart, and other organs, therefore, rely heavily on mitochondria for energy production and other cellular functions that sustain life (Scheffler, 1999). For this reason, mitochondria that do not function normally can cause death in infancy or severe multisystemic diseases in childhood and adulthood (Koopman, Willems & Smeitink, 2012). Beyond regulating life and death at the cellular level, mitochondria also produce signals within cells (Liu & Butow, 2006), between cells (Taivassalo, Ayyad, & Haller, 2012), and across organ systems (Taivassalo et al., 2003) that shape the body's allostatic mechanisms and thus the capacity to adapt to environmental challenges.

As reviewed in previous sections, environmental and perceived stress initiates allostatic mechanisms and cellular processes. These adaptive physiological processes involve metabolically expensive neuronal activities, increases in heart rate and BP, secretion of neurochemicals, and hormone synthesis. At a more fundamental level, they require changes in gene expression regulated in part by epigenetic writers and modifiers that ultimately regulate protein synthesis. All of these adaptive processes are energy dependent and thus increase cellular energy demand. Given that mitochondrial function provides the necessary energy reserve to fuel these adaptive processes, mitochondria have been regarded as a key component of the stress response (Manoli et al., 2007). These organelles also contain receptors for glucocorticoids (S. R. Lee et al., 2013) as well as other steroid hormones (Psarra & Sekeris, 2009; Yang et al., 2004) that regulate mitochondrial function in the brain and throughout the body (Rettberg et al.,2014). Taken together, this evidence attests to the importance of conceptually linking the biological stress response to mitochondrial function.

Differences in mitochondrial content and function that determine cellular energy capacity could therefore contribute to vulnerability or resilience to stress-related diseases (Morava & Kozicz, 2013). For example, following acute stress, the combination of a rapid rise in cellular energy demand with insufficient endogenous energy capacity to sustain this demand could cause a bioenergetic mismatch. Because cellular energy is a rate-limiting step for many protective cellular processes, a transient mismatch causing energy deficiency would generate cell stress, damage, and possibly elevated AL over time. Applied to stress physiology, inadequate capacity for mitochondrial energy production may thus be a source of cellular AL. Conversely, fostering a reserve capacity for mitochondrial energy production, such that capacity exceeds stress-induced energy demand, could permit rapid and effective adaptation to stressors and promote timely recovery from stressors. This adaptation might prove particularly critical in situations of prolonged and repeated stressors known to cause AL (McEwen, 1998b). The following section considers factors that influence mitochondrial content and function, including behavioral and genetic factors, in the context of social inequality. We conclude by considering conditions wherein mitochondrial energetic capacity may be exceeded, leading to mitochondrial stress, mitochondrial AL, and downstream allostatic consequences such as cellular senescence (Picard, Juster, & McEwen, 2014).

Behaviors Influencing Mitochondrial Function

The effects of physical activity and other protective behaviors that foster biological resilience may lie in improved mitochondrial energy production. The amount of energy cells can use and produce is in large part dictated by the quality and quantity of mitochondria they contain (Schwerzmann, Hoppeler, Kayar, & Weibel, 1989). For instance, cells with more healthy mitochondria can perform more work than those with fewer mitochondria. Equally important, high mitochondrial content enables

cells to sustain function at a given workload for longer periods before fatigue onset. For instance, individuals with mitochondrial diseases (where mitochondria cannot normally produce energy for muscles to contract) can exercise only at low intensities and can maintain given workloads only for limited periods of time (Taivassalo et al., 2003).

In response to increased energy demand, cells adapt by increasing the number of energy-producing mitochondria in their cytoplasm via a process called mitochondrial biogenesis (Handschin & Spiegelman, 2008). Physical activity, which increases the energy required and consumed by the contracting muscles and the working brain, triggers mitochondrial biogenesis. Resulting rises in energy demand initiate cellular signaling cascades that consequentially increase mitochondrial content in muscles (Hood, 2009), in different brain regions (Steiner, Murphy, McClellan, Carmichael, & Davis, 2011) and systemically in other organs (Little, Safdar, Benton, & Wright, 2011). Changes in mitochondrial content and morphological shape as well as other concomitant antioxidant, quality control, and anti-inflammatory processes are thought to underlie the beneficial effects of health behaviors that transiently increase energy demand, such as exercise (Handschin & Spiegelman, 2008; Picard & Turnbull, 2013).

Health behaviors that increase cellular energy capacity can promote successful adaptation. Equipped with a healthy pool of well-functioning mitochondria, cells can more easily meet the energy cost of stress and thus minimize AL. In the long run, this reserve would contribute to biological resilience. In line with this, regular exercise may prevent the deleterious effects of chronic psychosocial stresses on cellular senescence as measured with telomere length (Puterman et al., 2010). It is important to recall that lifestyle factors are integral behavioral components of AL. For instance, caloric overload and excessive dietary sugar generates free radicals and inflammation. Similarly, physical activity can also contribute significantly to the association between stress/depression and cardiovascular disease, with physically active and fitter individuals appearing to be more resilient to stressors (Hamer, 2012). Likewise, aging is associated with a decline in mitochondrial content and function (Short et al., 2005), which is partially normalized by physical activity (Lanza et al., 2008). Physical activity, which stimulates mitochondrial biogenesis and affects other cellular processes that improve mitochondrial function, is therefore a potential source of cellular resilience.

Conversely, factors that reduce cells' energy-producing capacity are associated with adverse health outcomes, including cardiometabolic diseases and cognitive decline (F. B. Hu et al., 2004; Mattson, 2012). Behaviors leading to reduced mitochondrial content and function include physical inactivity and excess calorie intake (overeating) or type 2 allostatic overload. Because organs require less glucose and lipids when they are inactive, food substrates accumulate systemically. This accumulation leads to the oversupply of energetic substrates (glucose and lipids) relative to demand, also known as a state of metabolic oversupply (Picard & Turnbull, 2013). Metabolic oversupply can compromise mitochondrial health in three major ways: (1) by suppressing mitochondrial biogenesis, thereby reducing the synthesis of new mitochondria and lowering of mitochondrial content within cells of the body (Petersen, Dufour, Befroy, Garcia, & Shulman, 2004); (2) by inhibiting the removal of damaged and dysfunctional mitochondrial, which normally occurs on a continuous basis and contributes to normal mitochondrial function (Liesa & Shirihai, 2013); and (3) by causing prolonged mitochondrial fragmentation (Picard & Turnbull, 2013), which leads to the accumulation of mitochondrial DNA damage (Fukagawa et al., 1999), oxidative stress, and molecules that trigger cell death (Yu, Robotham, & Yoon, 2006). Thus, behaviors that promote metabolic oversupply and reduce mitochondrial energy-producing capacity can lead to AL.

Environmental and social factors inherent to social inequalities can significantly shape one's behavior and mitochondria, at least in part via physical activity and diet. Neighborhoods and social environments that encourage the regular practice of physical activity (e.g., access to facilities, safe walking or biking paths, social engagement) or promote sedentary lifestyles (e.g., urbanized neighborhoods, unsafe environments, social desirability, stigmatization, self-perceptions, and discrimination (Sabiston & Crocker, 2008)) may exert strong indirect influences on metabolic state and thus affect biological resilience. Altered behaviors (physical activity and diet) and primary AL mediators (cortisol, cytokines) might synergistically influence mitochondrial function. Thus, psychosocial and behavioral factors linked to social inequalities may influence AL and vulnerability/resilience to disease by contributing to mitochondrial health and the organism's adaptive capacity. In addition and as is explored next, factors intrinsic to mitochondria could influence how cells adapt to stress.

Mitochondrial Genome, Haplogroups, and Telomeres

Essential to mitochondrial energy production is mtDNA, a circular genome residing within mitochondria that encodes only 37 genes and is inherited from the mother

only (R. W. Taylor & Turnbull, 2005). Although this genome is approximately 200,000 times smaller than the nuclear genome, 98% of the mtDNA encodes essential components of energy production. Pathogenic mutations in the mtDNA therefore have severe health consequences (DiMauro & Schon, 2003). However, other "milder" genetic variations in the form of single nucleotide polymorphisms (SNPs) exist in the mtDNA and appear to have subtle effects on the function of mitochondria (Gomez-Duran et al., 2010). mtDNA SNPs have historically segregated as groups—called haplogroups—during human evolution and migration (Wallace, 2005). To date, several studies have linked mtDNA variants to disease susceptibility (Wallace, 2013), such that specific haplogroups appear to predispose to specific illnesses, such as schizophrenia and bipolar disorder (Rollins et al., 2009; Sequeira et al., 2012), AIDS progression (Hendrickson et al., 2008), and diabetes (Crispim et al., 2006). By contrast, specific mtDNA haplogroups have also been associated with athletic performance (Niemi & Majamaa, 2005) and longevity (De Benedictis et al., 1999), indicating that subtle changes in mtDNA can confer susceptibility or resistance to age-related disease.

It is informative to consider the origin of human mtDNA haplogroups. mtDNA haplogroups arising 50,000 to 200,000 years ago are thought to have permitted the migration of humans out of Africa, from warmer to colder climates based on differences in mitochondrial function (Wallace, 2005). According to this theory, individuals with a certain mtDNA haplogroup would have mitochondria that are well coupled electrochemically, which makes them ideally suited to warm climates and possibly certain types of food; whereas other individuals with certain mtDNA haplogroups would be better suited to tolerate colder climates and thus could migrate out of Africa (Wallace, 2005). As a result, race/ethnic groups with ancestry originating from geographically distinct regions (e.g., Africa, Asia, North Europe, Siberia) characterized by warmer or colder climates harbor divergent mtDNA haplogroups. In other words, in addition to the sociocultural variables typically associated with race/ethnicity (e.g., cultural differences, diet, family structures, value sets, visible minority features that are often sources of discrimination), different "types" of mitochondria could further modulate disease susceptibilities.

In particular, different mtDNA haplogroups may generate mitochondria that respond differently to environmental factors, behaviors, and psychosocial factors influencing energy metabolism (Liou et al., 2007). This alteration might contribute to shape an individual's responses to chronic stress and thus AL. For instance, a specific mtDNA haplogroup or SNP may exert little or no effect under normal circumstances but can become deleterious in the presence of chronic metabolic stress (type II allostatic overload) when mitochondria are challenged (Liou et al., 2007). Studies are needed to disentangle the biological effect of mtDNA haplogroups from those of other sociocultural factors that frequently correlate with race/ethnicity. It may be that inherited mtDNA haplogroups differentially alter disease susceptibility in conjunction with social inequalities, particularly in the context of racially and culturally diverse study samples.

A related biomarker related to aging is the length of telomeres, the protective DNA-protein complexes at the end of chromosomes that shorten as cells age. Telomere shortening is therefore a marker of cellular senescence (Chan & Blackburn, 2004). Interestingly, individuals exposed to chronic psychological stress (Epel et al., 2004) or with low SES (Needham, Fernandez, Lin, Epel, & Blackburn, 2012; Needham et al., 2013) have shorter telomeres in blood cells, and A mtDNA haplogroups are associated with blood cell telomere length (Fernandez-Moreno et al., 2011). This finding substantiates the notion that cellular senescence and the aging process are characterized by telomere shortening, which is also interconnected with mitochondrial dysfunction (Sahin & Depinho, 2010). Despite its popularity as a biomarker of senescence, telomere erosion can occur early in life: A recent study demonstrated that 5-year-old children exposed to heightened domestic violence displayed significantly more telomere erosion than counterparts when adjusting for sex, SES, and BMI (Shalev et al., 2013). In summary, mitochondria, mtDNA haplogroups, and telomeres are biomarkers that should be assessed in AL research on vulnerability and resilience. However, other neurobiological factors also mediate the effects of stress on AL and psychiatrically relevant phenotypes, including hippocampal neuroplasticity involved in regulating HPA activity and stress response.

Hippocampal Neurogenesis

The central organ of stress physiology and AL is the brain because it determines what is threatening and then orchestrates the appropriate physiological and behavioral responses needed to cope. The brain is also a plastic and vulnerable organ and changes in the architecture of key brain regions, such as the hippocampus, PFC, amygdala, and nucleus accumbens, alter how these brain regions respond. In determining susceptibility to

negative outcomes following chronic stress, it is important to consider the neurobiological underpinnings of neuroplastic responses to stress in the brain.

In this respect and consistent with the life cycle model of stress, the hippocampus is particularly important as it modulates HPA axis activity through its inhibition of the hypothalamus (Herman, Ostrander, Mueller, & Figueiredo, 2005; Pruessner et al., 2005, 2008, 2010). The hippocampus is also relatively unique among brain structures in that it undergoes substantial neurogenesis (the creation and integration of new neurons) throughout life (Knoth et al., 2010). This process has particular significance to stress (Schloesser, Manji, & Martinowich, 2009; Snyder, Soumier, Brewer, Pickel, & Cameron, 2011), affective modulation (Mahar et al., 2011; Perera et al., 2011; Santarelli et al., 2003; Snyder et al., 2011; J. W. Wang, David, Monckton, Battaglia, & Hen, 2008), and psychiatric phenotypes (Boldrini et al., 2013; Perera et al., 2011; Reif et al., 2006). It may also play an important role in the mechanism by which social inequality affects AL.

Hippocampal neurogenesis results in the continual addition of new granule cell neurons to the dentate gyrus (DG) of the hippocampus (see Kempermann, 2011, for review). These neurons originate from local neural stem cells, which produce rapidly amplifying neuronal precursors. Following several weeks of development, during which these cells differentiate into neurons and extend neurites, these immature neurons functionally integrate into existing DG circuits, contributing to hippocampal plasticity. In addition to constantly shaping the organization of DG circuitry, these cells also individually show increased plasticity in their firing activity relative to mature neurons (Ge, Yang, Hsu, Ming, & Song, 2007). Neurogenesis is modulated by a wide variety of factors, including exercise (Kiuchi, Lee & Mikami, 2012; Kronenberg et al., 2006; Trejo, Carro, & Torres-Aleman, 2001), sleep (Meerlo, Mistlberger, Jacobs, Heller, & McGinty, 2009; Mirescu, Peters, Noiman, & Gould, 2006; Mueller, Mear, & Mistlberger, 2011; Mueller et al., 2008), age (Knoth et al., 2010; Kronenberg et al., 2006; Kuhn, Dickinson-Anson, & Gage, 1996), diet (J. Lee, Duan, Long, Ingram, & Mattson, 2000; J. Lee, Duan, & Mattson, 2002; Lindqvist et al., 2006), neurotrophic factors (Aberg, Aberg, Hedbacker, Oscarsson, & Eriksson, 2000; Jin et al., 2002; J. Lee et al., 2002; Mahar et al., 2011; Schmidt & Duman, 2010), biological sex (Boldrini et al., 2009; Chow, Epp, Lieblich, Barha, & Galea, 2012; Perfilieva, Risedal, Nyberg, Johansson, & Eriksson, 2001), antidepressant medication (Boldrini et al., 2009, 2012; Malberg, Eisch, Nestler, & Duman, 2000; Perera et al., 2011), and (of particular relevance) stress (Dagyte et al., 2011; Elizalde et al., 2010; Jayatissa, Henningsen, West, & Wiborg, 2009; Mineur, Belzung, & Crusio, 2007; Perera et al., 2011).

In animal models, chronic stress induces depressive-like behavior and decreased hippocampal volume and hippocampal neurogenesis (Brummelte & Galea, 2010; Dagyte et al., 2011; Elizalde et al., 2010; Jayatissa et al., 2009; Mineur et al., 2007; Perera et al., 2011; Schmidt & Duman, 2010; Valente et al., 2012; Veena et al., 2009; Wong & Herbert, 2004). The latter is thought to result from the stimulation of GR receptors on neurogenic cells by cortisol, leading to decreased transforming growth factor-β-SMAD2/3 and hedgehog signaling and subsequent decreases in cell proliferation, neuronal differentiation, and survival (Anacker et al., 2012; Dagyte et al., 2011; Elizalde et al., 2010; Jayatissa et al., 2009; Mineur et al., 2007).

Neurotrophic factors, including insulin-like growth factor (IGF; Aberg et al., 2000), vascular endothelial growth factor (VEGF; Jin et al., 2002), and neuregulin-1 (NRG1; Mahar et al., 2011), also regulate adult hippocampal neurogenesis and affective behavior. They may also govern biological resilience or susceptibility to HPA axis dysfunction and psychopathology in the context of adverse life circumstances. Notably, brain-derived neurotrophic factor (BDNF) is thought to mediate the interaction between neurogenesis and stress (Suri & Vaidya, 2012). Indeed, hippocampal (including DG) BDNF levels: decrease following chronic stress (Shi, Shao, Yuan, Pan, & Li, 2010; Smith, Makino, Kim, & Kvetnansky, 1995a; Smith, Makino, Kvetnansky, & Post, 1995b); increase following antidepressant treatment (Altar, Whitehead, Chen, Wortwein, & Madsen, 2003; Czubak et al., 2009; Gersner, Toth, Isserles, & Zangen, 2010; Hanson, Owens, & Nemeroff, 2011; Musazzi et al., 2009; Nibuya, Morinobu, & Duman, 1995), and indirect modulate hippocampal neurogenesis and affect.

Specifically, higher BDNF levels are associated with increases in neurogenesis and antidepressant effects (Scharfman et al., 2005; Schmidt & Duman, 2010; Shirayama, Chen, Nakagawa, Russell, & Duman, 2002), whereas lower levels have been associated with decreased neurogenesis, depressivelike behavior, and behavioral insensitivity to antidepressants (Adachi, Barrot, Autry, Theobald, & Monteggia, 2008; Rossi et al., 2006; Sairanen, Lucas, Ernfors, Castren, & Castren, 2005; Taliaz, Stall, Dar, & Zangen, 2010). In addition, expression of Tropomysoin receptor kinase b or *TrkB*, the gene encoding the BDNF receptor, is required in hippocampal neuronal precursors (but not mature granule cells) for neurogenic

and behavioral responses to antidepressants (Y. Li et al., 2008). Finally, genetic alterations of BDNF or *TrkB* in humans have been associated with depression and altered antidepressant response as well as suicidal behavior and other psychopathology (Ernst et al., 2011, 2012; Licinio, Dong, & Wong, 2009; Perlis, Ruderfer, Hamilton, & Ernst, 2012). Thus, reduction of hippocampal BDNF levels and signaling represent an alternative putative mechanism by which increased stress reduces hippocampal neurogenesis.

Underlining the complex nonlinear network of interconnected allostatic mechanisms, an emerging body of research has revealed that mitochondria can function as neuromodulators (Picard & McEwen, 2014). Indeed, the very process of synaptic transmission that constitutes the foundation of current theories for brain function and cognition is modulated by the presence of mitochondria in presynaptic terminals (Ivannikov, Sugimori, & Llinas, 2013; T. Sun, Qiao, Pan, Chen, & Sheng, 2013; M. Vos, Lauwers, & Verstreken, 2010). A recent study further found that the morphology of PFC presynaptic mitochondria—which is contingent on their function and oxidative stress—correlated with synapse morphology and memory performance in living monkeys (Hara et al., 2014). Likewise, the genetic mixing of different types of mtDNA in mice resulted in severely impaired spatial learning and memory retention capacity, indicating that subtle bioenergetic changes have significant functional consequences on brain function and cognition (Sharpley et al., 2012). It is also noteworthy that several widely used drugs to treat affective spectrum disorder affect mitochondrial function (Gardner & Boles, 2011), and new-generation antidepressive agents also have preferential action on mitochondrial energy metabolism (Nasca et al., 2013). Mitochondrial remodeling of brain function is an emerging additional mechanism of great interest whereby environmental and biological factors can impact neuroplasticity.

Septotemporal Axis and Stress Response

As with the life cycle model of stress described earlier, the hippocampus has been extensively implicated in stress reactivity and HPA axis function (Herman et al., 2005; Pruessner et al., 2005, 2008; Schloesser et al., 2009), and hippocampal neurogenesis in particular has also been implicated in these functions (Schloesser et al., 2009; Snyder et al., 2011). The involvement of hippocampal neurogenesis in HPA axis function and stress response is likely related to its anatomy and functional connectivity. Specifically, the posterior hippocampus in humans (analogous to the dorsal hippocampus in rodents) is associated with learning and memory, and projects to the lateral septum (O'Keefe & Nadel, 1978), whereas the anterior hippocampus (ventral in rodents) is more involved with affective functions, and connects to the PFC, amygdala, and, most relevantly, the paraventricular nucleus of the hypothalamus via the bed nucleus of the stria terminalis (Bannerman et al., 2004; Fanselow & Dong, 2010). Notably, long-term plasticity in the ventral hippocampus in animals is selectively affected by stress and glucocorticoids (Maggio & Segal, 2007), and lesions to areas of this subregion specifically projecting to the hypothalamus induce changes in stress regulation (Nettles, Pesold, & Goldman, 2000).

Hippocampal neurogenesis has been extensively implicated in stress modulation. More specifically, chronic stress has been demonstrated to decrease neurogenesis in the ventral hippocampus (Elizalde et al., 2010; Jayatissa, Bisgaard, Tingstrom, Papp, & Wiborg, 2006; Jayatissa, Bisgaard, West, & Wiborg, 2008; Tanti, Rainer, Minier, Surget, & Belzung, 2012), whereas increases in neurogenesis restricted to the same subregion have been associated with antidepressantlike effects as well as normalization of hippocampal GR expression following stress (Mahar et al., 2011; Paizanis et al., 2010). Conversely, the ablation of neurogenesis disrupts HPA response to stress (Schloesser et al., 2009; Snyder et al., 2011) and prevents antidepressants from normalizing hippocampal HPA axis regulation in response to chronic stress (Surget et al., 2011). Taken together, these studies support the role of ventral (anterior in humans) hippocampal neurogenesis in regulating HPA axis activity via its connections to the paraventricular nucleus of the hypothalamus. This finding suggests that chronic stress-induced decreases in neurogenesis decrease hippocampal suppression of the HPA axis, leading to increased GC secretion in response to stress, further suppressing neurogenesis, causing HPA dysregulation and ancillary deleterious effects.

By extension, an initial deficit in neurogenesis could predispose individuals to HPA axis dysregulation following chronic stress, and proneurogenic factors could act as prophylaxis against neurogenesis-related HPA axis dysregulation following stress. If individuals experiencing social inequality are indeed vulnerable to HPA axis dysregulation, as discussed, they in particular might benefit from proneurogenic interventions, such as antidepressant medication or exercise, in order to prevent or reverse neurogenesis deficit–related HPA axis dysregulation. Thus, prestress levels of hippocampal neurogenesis may serve as a vulnerability/resiliency factor to the stress-related effects of social inequalities and other diverse stressors.

Social Inequalities and Neurogenesis

To the extent that social inequality affects HPA axis activity, the effects of social inequality on AL are likely exacerbated through the suppression of hippocampal neurogenesis and resulting HPA axis dysregulation. As such, it is critical to determine the extent to which social inequality increases glucocorticoid secretion and HPA axis dysregulation. Animal models of social stress have revealed that social defeat decreases hippocampal neurogenesis (see Schoenfeld & Gould, 2012 for review) and induces submissive behavior (Vivian & Miczek, 1999). In addition, environmental enrichment facilitates recovery from social stress–induced submissive behavior through a neurogenesis-dependent mechanism (Schloesser, Lehmann, Martinowich, Manji, & Herkenham, 2010).

Although it remains to be demonstrated in human studies that social inequality itself is directly associated with decreased hippocampal neurogenesis, human social inequality and societal disadvantage have been shown to provoke abnormal physiological stress responses and HPA axis dysregulation. These social adverities have included, for example, low childhood SES (Lupien et al., 2001), childhood abuse (Cicchetti & Rogosch, 2001; Cicchetti et al., 2010), low maternal care (Pruessner, Champagne, Meaney, & Dagher, 2004), psychiatric illness (Staufenbiel, Penninx, Spijker, Elzinga, & van Rossum, 2012), low self-esteem (Pruessner, Hellhammer, & Kirschbaum, 1999; Pruessner et al., 2005), caregiver burden (Davis et al., 2004; de Vugt et al., 2005), minority sexual orientation (Huebner & Davis, 2005; Juster et al., 2013b), and perceived racial discrimination (Fuller-Rowell, Doan, & Eccles, 2012; Zeiders, Doane, & Roosa, 2012). One mechanism by which social inequality may affect AL is by decreasing hippocampal neurogenesis (particularly in the anterior hippocampus). This would ultimately lead to decreased inhibition of the HPA axis (specifically via the *paraventricular nucleus* of the hypothalamus), resulting in increased glucocorticoid release and further HPA axis dysregulation through neurogenic and nonneurogenic mechanisms.

In conclusion, human hippocampal neurogenesis in the specific context of social inequalities has yet to be examined. This is due in part to the difficulty of assessing neurogenesis in vivo as well as a paucity of postmortem samples from individuals characterized by their stressful exposure to chronic social inequality. However, as techniques for measuring neurogenesis advance and as large-scale longitudinal cohorts potentially lead to the collection of more thoroughly characterized postmortem brain samples, future studies should be well positioned to confirm or revise the hypothesis that the effects of social inequality on subsequent HPA axis dysregulation are exacerbated or mediated by decreases in hippocampal neurogenesis. Further research into hippocampal neurogenesis may also contribute to our understanding of the effects of glucocorticoid neurotoxicity on hippocampal volume and cognitive functioning in elders (Lupien et al., 1998) as well as the factors driving morphological hippocampal changes throughout life (Lupien et al., 2007; Lupien et al., 2009). Along these lines, our next and final section of this part of the chapter explores the concept of cognitive reserve as a form of cognitive resilience in old age and is of importance for future AL research.

Cognitive Reserve

Aging is often associated with cognitive impairment and worsening health that is consistently associated with increasing AL. Yet a considerable degree of variability in cognitive performance as well as health status exists among older adults (Mattson, Chan, & Duan, 2002; Rowe & Kahn, 1997; Wilson et al., 2002a). Epidemiological studies have consistently shown that life experiences are associated with risk for cognitive impairments (Fratiglioni, Paillard-Borg, & Winblad, 2004; Scarmeas, Levy, Tang, Manly, & Stern, 2001; Stern, 2012). To address this probabalistic process the notion of cognitive reserve helps account for interindividual differences in the risk for dementia in the presence of brain pathology and the various factors that may allow one's brain to respond appropriately to pathology and postpone the onset of symptoms (Stern, 2002; Whalley, Deary, Appleton, & Starr, 2004). It is believed that individuals with more cognitive reserve are able to tolerate more pathology prior to the appearance of symptoms, representing an important form of cognitive resilience in the face of aging and AL. This adaptation may occur through the use of neuronal compensatory mechanisms and the use of existing cognitive processes established by the individual (Stern, 2002), which we explore in this section before concluding with clinical and social implications.

Various factors throughout life span development contribute to enhanced cognitive reserve that buffers the adverse biological effects of senescence. First, higher educational attainment consistently plays a protective role in epidemiological studies, whereas low educational attainment increases the risk for dementia and Alzheimer's disease (Karp et al., 2004; Launer et al., 1999; Ngandu et al., 2007; Ott et al., 1995; Qiu, Backman, Winblad, Aguero-Torres, & Fratiglioni, 2001). Similarly, benefits are

observed among healthy older adults, such that those with higher educational attainment show a slower rate of cognitive decline compared to those with fewer years of formal education (Chodosh, Reuben, Albert, & Seeman, 2002; Cullum et al., 2000). As described earlier, this finding is consistent with a large body of research linking lower SES to higher AL among different social groups throughout the life span.

An important factor that contributes to cognitive reserve is occupational attainment and skill sets exercised during working adulthood. Specifically, job complexity is an extremely important factor in light of the extensive amount of time people engage in work and work-related activities throughout adulthood. Some studies show that jobs consisting of manual work increase the risk for dementia in comparison to nonmanual jobs (Bonaiuto et al., 1995; Mortel, Meyer, Herod, & Thornby, 1995). The nature of job demands may also protect against dementia and Alzheimer's disease; those requiring the use of extensive vocational training, academic skills, and complex work are protective due to their high mental demands (Andel et al., 2005; Kroger et al., 2008; Potter, Helms, Burke, Steffens, & Plassman, 2007), while results are mixed when it comes to job complexity (Andel et al., 2005; Kroger et al., 2008; Potter et al., 2007). Moreover, the risk for cognitive decline is higher among individuals with both low educational and occupational attainment (Stern et al., 1994). In line with this finding, a recent study revealed that older women with low psychological demands at work experience elevated levels of AL (Juster et al., 2013a). Taken together, demanding jobs may function as a form of mental exercise, consistent with the use-it-or-lose-it principle (Katzman, 1995).

Although educational and occupational attainment are factors that occur earlier during working adulthood, experiences later in life can also play a marked role in decreasing the risk for dementia (Stern, 2009). For example, participating in leisure activities—especially those that are cognitively stimulating—can promote cognitive capacities and reduce the risk for dementia (Crowe, Andel, Pedersen, Johansson, & Gatz, 2003; Scarmeas et al., 2001; Wilson et al., 2002b). Benefits are also observed among patients with Alzheimer's disease (Friedland et al., 2001; Kondo, Niino, & Shido, 1994). A systematic review demonstrates that the protective effects of leisure activities are observed even after controlling for factors such as age, health status, education, and occupation (Valenzuela & Sachdev, 2006). Importantly, engaging in leisure activities postpones cognitive impairment and slows the rate of decline among individuals who eventually develop dementia (Crowe et al., 2003; Scarmeas, Albert, Manly, & Stern, 2006; Stern, Albert, Tang, & Tsai, 1999; Wilson et al., 2002b).

Despite the strong evidence for the benefits of higher cognitive reserve, it is noteworthy that patients with Alzheimer's disease who have higher cognitive reserve show accelerated progression of symptoms and more rapid cognitive decline (Scarmeas et al., 2001, 2006; Stern et al., 1999). This finding suggests that cognitive reserve might play an important role in "masking" existing pathology while postponing the appearance of clinical symptoms until the underlying pathology becomes more severe (Stern, 2006). Future research could investigate this paradox further by assessing how cognitive reserve manifests among diverse social strata and whether this mechanism corresponds with specific biological signatures of AL and thresholds of severity linked to neuropathology and clinical symptoms.

Neuroimaging Cognitive Reserve

Imaging studies using various techniques support the protective role of cognitive reserve. The first studies investigated cerebral blood flow, which decreases among patients with Alzheimer's disease (Hirao et al., 2005; Kogure et al., 2000). Findings showed that patients with higher cognitive reserve (based on educational attainment) showed dampened overall cerebral blood flow compared to patients matched for clinical severity (Stern, Alexander, Prohovnik, & Mayeux, 1992). Similar findings have been shown as a function of occupational attainment and leisure activities (Alexander et al., 1997; Perneczky et al., 2006; Scarmeas et al., 2003; Stern et al., 1995). Collectively, these studies indicate that those with higher cognitive reserve are able to resist senescence while showing similar clinical symptoms (Alexander et al., 1997; Bennett et al., 2003; Perneczky et al., 2006; Stern, 2009). Education, occupational attainment, and leisure activities may also interact with each other to enhance the protective role they each play individually.

Functional magnetic resonance imaging (fMRI) studies investigating neural compensatory mechanisms have found two separate networks used when performing a working memory task. The more efficient structure, the left precentral gyrus, is used by both young and older adults, whereas the less optimal structure, in the left precentral region of the supplementary motor area, is used only by older adults and is predictive of poorer performance (Steffener, Brickman, Rakitin, Gazes, & Stern, 2009). This finding is hypothesized to be due to the fact that the first network no longer functions as effectively during aging, and this fact is partially compensated for through the increased use of

the second network; however, it does not necessarily result in comparable memory performance (Stern, 2012). It also appears that individuals with higher cognitive reserve can withstand more atrophy in the first network and maintain cognitive performance, avoiding or delaying the need to resort to the second network (Steffener, Reuben, Rakitin & Stern, 2011). Among users of the second network, those with higher cognitive reserve show better cognitive performance than those with low cognitive reserve (Steffener et al., 2011). Whereas higher cognitive reserve is associated with less activation when performing a memory task in healthy older adults, more activation was observed among individuals with mild cognitive impairment and Alzheimer's disease (Sole-Padulles et al., 2009). In sum, more effective neural mechanisms are present among those with higher cognitive reserve (Stern, 2012).

Structural MRI studies also tend to support that notion of cognitive reserve. Importantly, atrophy of the hippocampus is a marker for dementia and Alzheimer's disease (Barnes et al., 2009). In one longitudinal study, more frequent lifelong engagement in complex activities was associated with a lower magnitude of hippocampal atrophy measured 3 years later (Valenzuela, Sachdev, Wen, Chen, & Brodaty, 2008). In one longitudinal study, more frequent lifelong engagement in complex activities in working adulthood was associated with a lower magnitude of hippocampal atrophy over time (Valenzuela et al., 2008). Such activities were related to education, occupation, reading and writing, creative arts, socializing, and daily habits during young adulthood (13–30 years of age), middle age (30–65 years), and older adulthood (65 years and above). Similarly, hippocampal-dependent neuroplasticity is found among London, UK, taxi drivers who undergo intensive training in order to navigate through complex routes (Maguire et al., 2000). In a landmark study, their posterior hippocampi were found to be larger than those of age-matched controls. These studies provide parallel evidence for the beneficial role of experience-dependent hippocampal plasticity that may potentiate cognitive reserve.

Cognitive reserve has also been examined in relation to beta-amyloid, a protein that appears to accumulate in Alzheimer's disease (Ghiso & Frangione, 2002). Patients with higher educational attainment perform better than expected on cognitive tasks than would be otherwise expected considering their elevated beta-amyloid levels (Roe et al., 2008), highlighting a protective pathway against dementia-related pathophysiology (Kemppainen et al., 2008). This is an excellent example of biological and cognitive resilience as promoted by higher educational attainment that could be explored further in future AL research on geriatric neurobiology. Further identifying protective factors against AL and disease will illuminate our understanding of trajectories toward resilience to age-related diseases.

Another important recurring protective factor in this chapter that may prevent or delay dementia onset is physical exercise. The performance of aerobic activities among healthy older adults can prevent cognitive impairment (Kramer & Erickson, 2007) and may therefore represent a factor that promotes cognitive reserve and biological resilience. Whereas epidemiological studies demonstrate that inactivity increases the risk for cognitive impairment and Alzheimer's disease (Andel et al., 2008; Larson et al., 2006), evidence from clinical randomized trials shows that aerobic activities can reverse cognitive decline prior to the development of dementia (Colcombe et al., 2006; Kramer et al., 1999). Consistently, meta-analyses and reviews on exercise find that it improves cognitive performance among individuals with mild cognitive impairment and Alzheimer's disease. Specific cognitive benefits have been observed for memory performance, attention, executive functioning, and processing speed (Heyn, Abreu, & Ottenbacher, 2004; P. J. Smith et al., 2010).

Neuroimaging studies likewise reveal that aerobic fitness is associated with larger hippocampal volume and better memory performance among older adults (Erickson et al., 2009). In one study, exercise training increased hippocampal volume over the course of a year, whereas in the control group, a decrease in hippocampal volume was observed (Erickson et al., 2011). Interestingly, the augmentation in hippocampal volume was associated with higher levels of BDNF (a marker that tends to be reduced among Alzheimer's patients; Peng, Wuu, Mufson, & Fahnestock, 2005). Aerobic exercise also increases gray and white matter volume in the PFC and improves executive functioning (Colcombe et al., 2004, 2006; Rosano et al., 2010) as well as whole-brain volume among Alzheimer's patients (Burns et al., 2008). These studies demonstrate that aerobic exercise has important benefits for cognitive aging. In the broader context of resilience, it would be very interesting for future research to assess whether these associations are observed in older adults exposed to adverse life conditions.

Another important factor recurring throughout this chapter is social support, which consists of a quantitative component (the number of individuals in one's social network) and a qualitative component (the quality of relationships, frequency of socialization, and the perception of available social and emotional support). Both dimensions of one's social network protect against

cognitive impairment in senescence (Seeman, Lusignolo, Albert, & Berkman, 2001a). Large community-based studies show that having few social contacts and, in particular, being unsatisfied with the quality of contacts is associated with increased risk for dementia (Fratiglioni, Wang, Ericsson, Maytan, & Winblad, 2000), whereas more frequent participation in social and mental activities decreases risk for dementia (H. X.Wang, Karp, Winblad, & Fratiglioni, 2002). Additional support for this association has been provided by various longitudinal studies (Bassuk, Glass, & Berkman, 1999; Fratiglioni et al., 2004; Seeman et al., 2001a).

In conclusion, higher cognitive reserve decreases the risk for dementia (by up to 50%; Valenzuela & Sachdev, 2006). Importantly, while formal education and occupational attainment may be relatively fixed by older adulthood, findings demonstrate that engagement in stimulating cognitive and social activities in older adulthood can independently play protective roles (Valenzuela & Sachdev, 2006). Collectively, evidence suggests that engagement in social, mental, and physical activities, in addition to having adequate social support, can protect against dementia in late life, and this finding provides an important avenue for prevention efforts (Fratiglioni et al., 2004; Stern, 2012). The concept of cognitive reserve represents an important construct in our discussion of resilience that we believe future AL studies could help progress by further assessing specific biological processes involved.

CONCLUSIONS

Clinical Implications

The AL model has the potential to become a powerful tool in clinical contexts. Perhaps the most promising approach would involve tracking changes over time in AL to examine the efficacy of clinical interventions using transdisciplinary perspectives informed by triangulated combinations of biometrics, psychometrics, and sociometrics. As future studies further our understanding of which configurations of risk factors and protective factors potentiate pathways toward resilience, it will be imperative to design prospective studies tailored to reduce AL. To date, however, no treatment options aimed at lowering AL levels exist. Nevertheless, many therapeutic options could be implemented based on the antecedents associated with AL and its clinical repercussions (see Figure 8.1). The vast array of identified risk factors and protective factors associated with vulnerability toward or resilience against AL provide scientist-practitioners with a wealth of information to help guide targeted interventions in the future.

Notwithstanding, interventions attempting to reverse developmental trajectories from vulnerability toward resilient pathways may be much more complicated than simply switching risk factors into protective factors at micro- to macro-levels (e.g., hypercortisolism to hypocortisolism, physical inactivity to activity, low to high SES, etc.). Although it cannot be denied that an accumulation of protective factors promotes health and well-being, resilience as defined from a developmental psychopathology perspective implicates some history of risk factors related to adversity, stress, and/or trauma that have been modulated to allow individuals to thrive and survive, even if specific adaptations can come at a cost in other domains (e.g., academic performance and AL in John Henryism). This reality highlights the importance of trandisciplinary approaches to interventions orchestrated by teams of professionals (e.g., nurses, psychologists, psychiatrists, social workers, nutritionists, educators, etc.).

A key question outlined by McEwen (2007, 2012) is whether approaches to reducing AL levels are best tailored in relation to top-down modifications versus conventional biomedical remediation. At an individual level, brain-centered programs that encourage improved sleep quality and quantity, social support, sense of purpose, self-esteem, healthy diet, substance avoidance, and physical activity would be undoubtedly beneficial. Interventions at social levels might include policies that create incentives for beneficial or best practices in the workplace, cleaner and safer neighborhoods, and encouraging advanced education. Specifically for the elderly, well-being therapy emphasizing autonomy, purpose in life, personal growth, positive relations with others, environmental mastery, social activities, and self-acceptance could be coupled with more traditional cognitive and physical interventions. Assessing changes in AL provides a powerful, multisystemic means to assess salubrious processes in a comprehensive manner amenable to clinical investigation (McEwen, 2012).

To the best of our knowledge, no studies have assessed intervention effects on AL. Notably in an analysis of unaccountable changes in AL levels in the MacArthur cohort over the span of 2 to 5 years, deceases in AL were significantly related to reductions in all-cause mortality regardless of one's sex (Karlamangla, Singer, & Seeman, 2006). An important consideration is whether any decrease in AL is random, or whether could there be distinct neuroendocrine, immune, metabolic, or cardiovascular

system(s) driving downward and/or upward shifts. It will be important for future studies to determine what combinations of health-promoting and damaging factors correspond to AL and systemic clustering at different ages and among different social groups that cope with stress in diverse ways. As described in this chapter, the direction of these interacting risk and protective factors is complex and at times contradictory. For instance, one report found that African Americans—but not Caucasians—who self-reported increased environmental stressors and engaged in more unhealthy behaviors (e.g., overeating) had lower levels of depression but an overall greater risk of chronic physical conditions (Jackson, Knight, & Rafferty, 2010). Thus, it is possible that unhealthy behaviors have different modulatory effects depending on sociocultural factors. Identifying salubrious pathways could help guide health care approaches that are recognizing of the fact that one glove does not fit all.

Throughout life span development, behavioral modification is complex and multifaceted but ultimately essential for reducing AL. In the context of the obesity epidemic, for example, interacting factors such as poor sleep hygiene, sedentary behaviors, and pollution are ubiquitous in modern societies and can compromise the efficacy of dieting among obese individuals (Tremblay & Chaput, 2012). Such unhealthy behaviors can also exacerbate interacting genetic and behavioral vulnerabilities. For instance, a novel study of Puerto Rican adults living in the United States showed that genetic polymorphisms related to lipid metabolism were only related to AL in interaction with unhealthy dietary intake (Mattei, Bhupathiraju, & Tucker, 2013). This finding has important implications for advancing our understanding of acculturation effects among different groups that can be compounded by intersecting social pressures. By the same logic, identifying and informing individuals with genetic vulnerabilities that specific diets are especially dangerous based on their constitution and circumstances is an important preventive approach that must be considered in the evolution of person-centered health care and consultation. Given cultural differences in dietary intake, and given the links among genetics, metabolism, and diet to name a few, future studies could assess associations among stress, diets, and AL in various social groups and between the sexes over life span development.

Another important health behavior is sleep-related behaviors that regulate allostatic mechanisms (e.g., circadian clocks) and AL levels (Karatsoreos & McEwen, 2011; McEwen, 2006). Following sleep restriction, elevations in AL biomarkers occur (decreased glucose tolerance, increased evening cortisol, increased sympathetic activity); however, these allostatic processes are particularly pronounced for low-SES individuals who consequently experience increased risk of sleep problems, obesity, diabetes, and hypertension (Van Cauter & Spiegel, 1999). More broadly, researchers studying stress-related phenomena should account for sleep, given its important bidirectional association to psychiatric symptomatologies. Measuring AL in such investigations would provide important information for stress and sleep researchers alike who are studying overlapping mechanisms.

Advances in neuroscience are also providing compelling insights into complex pathways of biological resilience wherein brain plasticity is modulated by behavior and environment (McEwen & Gianaros, 2011). For example, French stroke patients treated early with antidepressant medication in conjunction with physiotherapy experience better recovery of motor deficits over time (Chollet et al., 2011). In the spirit of "stress inoculation," short periods of food restriction in rats predictably increases stress hormone levels, but in a positive manner that can help cure amblyopia (lazy eye) otherwise considered irreversible (Chollet et al., 2011). Whereas the mechanisms involved require further elucidation, the concept of *hormesis*, that is, evolutionarily conserved biological patterns wherein mild stressors can buffer against noxious effects of subsequent stressors (Pijl, 2012), provides some insights. Studying how hormesis might function vis-à-vis mitochondrial sustainability, neurogenesis proliferation, or cognitive reserve and other biopsychosocial processes that ultimately foster resilience is a fascinating frontier for future AL research.

As AL represents multisystemic, subclinical physiological dysregulations often predating the emergence of clinical outcomes, treatment options targeting psychological, behavioral, cognitive, and social domains discussed in this chapter could be alternatives or complements to biomedical approaches (Juster & Lupien, 2012b). These clinical approaches could perhaps even improve compliance and facilitate proactive prevention instead of reactive prescription. Indeed, we strongly believe that implementing person-centered approaches to diminishing AL collectively represents viable alternatives or complementary approaches to pharmacological strategies. For instance, the effects of chronic stress can be improved via pharmaceutical agents such as sleep medications, anxiolytics, antidepressants, and beta-blockers as well as by drugs that reduce oxidative stress and inflammation such as statins, insulin resistance treatments, and painkillers (McEwen, 2007). Yet there are counterarguments against pharmaceutical remediation, especially as polypharmacy

relates to the widespread systemic dysregulations inherent in AL. In Sterling and Eyer's (1988) original formulation of the allostasis concept, they argued that medical practices based on homeostatic models were in danger of potentially damaging side effects and polypharmacy, as treatment problems can arise when correcting one parameter causes other systems to become dysregulated (Sterling, 2004).

Allostatic regulatory systems interact in a hierarchical, dynamic, and nonlinear manner in response to stressors that prompt compensatory behaviors. From this perspective, lifestyle choices can be considered as "higher-order" allostatic mechanisms activated in reaction to external and internal cues. As such, maladaptive behaviors have the propensity of increasing AL levels even further. Taken together, unhealthy lifestyle behaviors may often represent behavioral compensatory mechanisms used to counteract negative affective states related to inherent neurobiological predispositions. From this perspective, these coping behaviors are allostatic mechanisms because they compensate for dysfunction, but ultimately at the expense of long-term health. With this in mind, therapeutic interventions targeting either specific neural pathways or the substitution of damaging behaviors for less or nondamaging ones (e.g., physical exercise, dietary restriction) would be beneficial.

In addition, several psychotropic agents seem to interact with illness-related predispositions to synergistically worsen some unhealthy lifestyle behaviors and ultimately induce a type of "pharmacological" AL. As first described by our group (Juster et al., 2011), *pharmacologicalcal AL* (PAL) refers to the adverse effects medications can exert that then inadvertently prompt individuals to remediate the biological system(s) affected by unhealthy means . For example, smoking is often used to dampen adverse side effects of antipsychotic medications among those with severe mental illnesses, such as schizophrenia or bipolar disorder, but this compensatory behavior further amplifies AL levels (Bizik et al., 2013). Such behavioral side effects represent maladaptive allostatic mechanisms whereby individuals strive to reregulate medicinally altered neurotransmitter functions linked, for instance, to cognition and motivation. We propose that using AL indices could provide insights into PAL in the context of psychiatric remediation (Bizik et al., 2013). To quote Jackson and colleagues (2010): "[S]uccessful interventions to reduce the use of unhealthy coping behaviors over the life course among populations living under chronically stressful conditions depend upon the recognition that such behaviors may have adaptive, neurological effects that alleviate negative psychological and physiological states." (p. 7).

The PAL concept goes beyond the known side effects of psychopharmacology; it endeavors to understand how interventions meant to treat primary diagnoses inadvertently prompt physiological dysregulations and comorbidities via patients' behavioral compensations. We propose that applying the AL model to the interpretation of the results from standard laboratory reports can provide medical professionals with a sensitive tool to monitor patients' global response to treatment (Bizik et al., 2013; Juster & Lupien, 2012b). The PAL concept also constitutes an advantage compared to focusing solely on numerous known side effects because it provides a global measure that subsumes the direct effects of the primary pathology, treatment, the effects of maladaptive compensatory behaviors, as well as other as-yet unidentified contributors to AL. Given that many of the biomarkers collected in routine blood work are the same as those used in constructing AL indices, applying simple calculations could be easily integrated into a typical clinical follow-up (Juster & Lupien, 2012b).

AL indices can also serve as a starting point for a discussion between the patient and the health practitioner regarding adaptive behaviors and prevention of the development of negative sequelae related to the illness and its treatment (Bizik et al., 2013). Moreover, from an empirical standpoint, it is not yet known what constitutes critical levels of AL and how such thresholds could be used to predict specific stress-related conditions. For example, does an AL score greater than 5 represent a critical threshold for developing cardiovascular disease, and which biomarkers are more important? Because the AL index is an objective reflection of biological functioning that is intricately interconnected with genetic, neurological, developmental, behavioral, cognitive, and social factors, AL captures complex interactions that cannot be easily deduced until clinical research is conducted. Ideally, the richness of data collected in clinical practice by various professionals could be compiled and explored in relation to AL levels.

All individuals have the capacity for considerable resilience in the face of adversity via beneficial processes and the appropriation of protective factors. In identifying salubrious pathways, greater appreciation must be exercised in our search for the biological mechanisms that drive resilience and how these can be harnessed to improve health (McEwen, 2003). The stress of inequality may manifest at a cellular or subcellular level, and understanding this relationship may drive further efforts in preventing and treating the pernicious effects of inequality on AL and its clinically relevant phenotypes. As explored next at a societal level, reducing social inequalities should

also minimize conditions that elevate AL, thus preventing disease onset or progression.

Social Policy Implications

The AL model could be used at a macro-level to inform public health and the implementation of social policies. Daniels, Kennedy, and Kawachi (2000) have argued that reducing socioeconomic gradients and providing equal opportunities to all members of society will produce dramatic health benefits. Using AL algorithms to assess the efficacy of an intervention or policy could be a powerful way to substantiate this proposal. AL increases the risk of developing morbidities that currently burden population health worldwide to a disproportionate degree. The array of mediators and moderators constituting AL represents a physiological mechanism at the heart of socially determined health inequalities. We propose that knowledge derived from the AL model can provide policymakers with tools to help prioritize and substantiate tentative public health interventions aimed at reducing social inequalities in population health. By quantifying changes in AL over time, policymakers can also determine the efficacy of such policies. In so doing, public health officials may curb growing inequalities and monitor progress in programs that promote health. Ultimately, the biological sciences need to provide policymakers with the much-sought-after causal links for these effects and with the tools necessary to effectively evaluate health and well-being (McEwen, 2001). Our overview on social inequalities influencing AL provides a biological bridge linking social injustice to health inequalities.

Although social contexts are generally measured using aggregates of individuals, diseases occur at the level of the individual, making it very difficult to assess the impact of social policy implementation (Thisted, 2003). Advances in biological sciences should therefore be applied to tease apart the factors that contribute to the paradox that while we generally live longer, health and wealth are shared so unequally. Policies often fail to attend adequately to determinants of health upstream from the provision of medical interventions (Daniels, Kennedy, & Kawachi, 2000) like those discussed in our previous section on clinical implications. Furthermore, there is growing recognition within numerous disciplines that significant risk factors associated with developing numerous pathologies are socially determined (Marmot, 2005).

Likewise, Daniels, Kennedy, and Kawachi (2000) proposed that suboptimal aggregate health measures result from unnecessary differentials in the distribution of resources among social classes. The current means by which societies allocate resources within their populations is therefore a key contributor to socioeconomic gradients in disease (Daniels et al., 2000). As social inequalities are bad for our health and are socially constructed, differentials in health measures would undoubtedly lessen through a more equal reorganization of society. Knowledge generated by the AL model at theoretical and empirical levels expands epidemiological evidence of population health inequalities. Complementarily, social justice focuses on the premise of equality of opportunity. Social and political institutions should mitigate the effects of social inequalities that prevent less fortunate members of society from obtaining equal health opportunities and chances to flourish in life.

Importantly, there are potential critical periods to identify and prevent individuals from developing elevated AL. Indeed, findings from the large-scale NHANES reveal that AL steadily increases with age up through the 20s to 60s and then plateaus throughout the 60s to 90s, during the period of greatest mortality risk (Crimmins et al., 2003). From life course perspectives, these trajectories represent decades-long windows of opportunity to intervene before individuals succumb to disease and death. Could there be windows of opportunity for best periods in life to develop resilience in specific life domains that could minimize AL? Despite sensitive periods that occur early on in life during critical windows of development, positive health can be achieved at any age (Cicchetti, 2013).

The best way to assess the real impact of interventions on AL would be to measure their potential for changes at different ages, different sexes, different SES, and different cultures internationally. It is also important to recognize the potential to improve health and well-being at every life stage. For example, a fMRI study of African American older women of lower SES who were at risk of cognitive deterioration showed improvements in left PFC and anterior cingulate cortex functioning matched by behavioral improvements in executive functioning 6 months after volunteering in the social service Experience Corp. program compared to wait-list controls (Carlson et al., 2009). This finding has important implications for the implementation of interventions that can target social inequalities and age-related cognitive deterioration even in late life.

To summarize the implications for the field of developmental psychopathology, the AL model has proven powerful in explaining the pervasive and long-lasting consequences of social inequalities on physical and mental health. In many ways, the AL model adopts numerous principles guiding developmental psychopathology. For example, it focuses on bidirectional transactions

occurring between the individual and the environment, and it proposes progressive rather than discrete transitions between normal/adaptive responses (allostasis) and pathological states (AL and allostatic overload). Moreover, it emphasizes the cumulative and synergic impacts of changes occurring at multiple levels of analysis, including vertical- and horizontal-level interactions. Furthermore, the AL model follows transdisciplinary perspectives (Juster et al., 2011) and process-oriented approaches that provide explanations for underlying differences between individuals exposed to similar life circumstances (multifinality). All of these constructs are considered conceptual landmarks in developmental psychopathology (Cicchetti, 2013).

In conclusion, the AL model originated with the study of vulnerabilities to stress-related disease and has recently evolved to include approaches toward greater understanding of resilience. This paradigm shift is important for three key reasons. First, AL studies of resilience are consistent with a central tenet in developmental psychopathology over and above those just mentioned; that is, that probabilistic pathways toward vulnerability or resilience fall along a continuum over life span development. Second, a focus on resilience to AL allows researchers to further identity protective factors integral to biological integrity despite preexisting risk factors associated with life histories of stress, strain, and stigma. And third and most broadly, scientific investigations that can reveal success stories among socially marginalized groups represent an important platform from which to change social perspectives. If the majority of individuals can learn of the remarkable resilience exemplified by hardy individuals exposed to social inequalities, a connectedness between social groups is fostered. This connection is otherwise more difficult to achieve with doom-and-gloom perspectives focused solely on vulnerabilities to AL since it overlooks the inspiring potential among all people to change their destiny.

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CHAPTER 9

Competence and Psychopathology in Development

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A core theoretical feature of developmental psychopathology is the simultaneous consideration of normal and abnormal development; this is historically prominent and ongoing to the present day, shaping research agendas for the future (Cicchetti, 1984, 2013; Rutter & Sroufe, 2000; Sroufe & Rutter, 1984). The developmental psychopathology perspective comprises several tenets that guide investigation, including a focus on processes that unfold over time, a consideration of interactions across multiple levels of analysis, and an appreciation for diverse developmental pathways through concepts of equifinality and multifinality (Cicchetti, 2006, 2013; Cicchetti & Rogosch, 1996; Masten, 2006; Pickles & Hill, 2006). Based on these foundational tenets, in this chapter we review the interrelations of adaptive and maladaptive functioning, broadly considered. Rather than focus on one specific mental disorder or diagnostic category, we detail theory and evidence on associations among prominent domains of competence (e.g., academics, social relationships) and broad dimensions of psychopathology (e.g., internalizing and externalizing symptoms) in youth. Several specific diagnostic categories of psychopathology are considered in the process. Overall, we aim to provide a review of empirical work detailing the nature of these associations as well as theoretical and methodological discussion of how one might interpret the empirical findings.

The chapter is divided into three main sections. First, we briefly review historical and theoretical discussions of the concept of competence, particularly from a developmental tasks framework. Second, in the central part of the chapter, we discuss empirical reports on the links between competence and psychopathology, working from two main traditions: (1) classification systems for mental illness, in which competence can be considered the opposite of functional impairment, and (2) statistical models relating competence and psychopathology, with attention to details of analytic methodology as well as common substantive findings. The latter section focuses particularly on a class of longitudinal mediation models termed cascade models (Masten & Cicchetti, 2010). Finally, we consider the literature on competence-promoting prevention and intervention programs, with a prominent focus on results from randomized controlled trials, which has the potential

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to provide both crucial practical benefits to youth as well as rigorous testing of causal claims.

DEFINING COMPETENCE AND PSYCHOPATHOLOGY: HISTORICAL LEGACIES AND THEORETICAL WORK

Here we briefly recapitulate selected key developments in the evolution of thinking on competence and psychopathology; for more detailed discussions, please see the two prior editions of this chapter (Masten, Burt, & Coatsworth, 2006; Masten & Coatsworth, 1995). Definitions of psychopathology have evolved considerably since the mid-twentieth-century advent of the *Diagnostic and Statistical Manual* of the American Psychiatric Association (the *DSM* system), but debates continue on the nature of mental disorder, in particular to what extent mental illness can be conceptualized as categorically versus continuously distributed in the population (Coghill & Sonuga-Barke, 2012; Pickles & Angold, 2003) and how best to assess the core features of disorder, especially for some youth whose problems may be more distressing to family members or school personnel than to themselves. We consider definitional issues of mental disorder further later.

We have previously presented a working definition of competence as "a family of constructs related to the capacity or motivation for, process of, or outcomes of effective adaptation in the environment, often inferred from a track record of effectiveness in age-salient developmental tasks, and always embedded in developmental, cultural, and historical context" (Masten et al., 2006, p. 704). This definition is indebted to historical work on developmental tasks: the adaptive, age-related criteria by which cultures, families, and individuals judge how well development is proceeding (see McCormick et al., 2011). The concept of developmental tasks was advanced significantly by educational theorist Robert Havighurst's (1972) work on the idea of a progression of achievements that children, adolescents, and adults are expected to accomplish by members of the broader society. Developmental task theories are in turn based partly on (a) earlier psychoanalytic work on the resolution or persistence of psychosocial crises in an individual progression through specific stages (Erikson, 1968); and (b) work on ego psychology and personality development that focused on the integration of cognition, affect, and behavior (Loevinger, 1966) and constructs of ego control and ego resiliency (Block & Block, 1980). The latter two constructs describe not only the effective modulation of impulses but also the flexible control of that modulation.

In addition, the history of developmental tasks research owes a substantial debt to work on intellectual functioning in youth, which has had a strong focus on assessing the ability of children to act effectively in their particular environmental context (Binet & Simon, 1905; Charlesworth, 1979; Sternberg, 1985; Wechsler, 1958). Although intelligence (the inferred ability) and "intelligent behavior" have been closely linked to other domains of competence in theory and research, they often are distinguished from other competence domains in assessment and diagnosis. For example, in diagnosis of intellectual disability, the psychometric assessment of intellect is joined with a judgment of adaptive behavior, which often includes practical or social skills from a formal assessment, such as the Vineland Adaptive Behavior Scales (VABS; Sparrow, Cicchetti, & Balla, 2005).

Finally, researchers interested in the development of self-concept and mastery motivation have developed theories on the intrinsic motivation of humans to master their environment (White, 1959), building on evolutionary and biological foundations to integrate cognitive and behavioral constructs such as self-perception, locus of control, and self-efficacy (Bandura, 1997; Harter, 1978). This work has advanced definitions of competence by focusing attention on the interrelations between internal judgments of effectiveness across domains as well as judgments made by others.

Each of these areas has informed the study of developmental tasks. Havighurst (1972) proposed that specific age-salient tasks form the basis by which members of society judge whether or not an individual's developmental trajectory has been successful. His initial series of specific tasks was grounded in middle-class mid-twentieth-century American values. For example, at earlier ages in development, these tasks included learning to communicate and distinguishing right from wrong; at older ages, developmental tasks included academic success, forming close relationships, and civic responsibility. Other writers have proposed organized sequences of developmental challenges and tasks, in which successful achievement of prior tasks set the stage for those coming later (Greenspan, 1981; Sroufe, 1979; Waters & Sroufe, 1983). More recent examples of developmental tasks in contemporary industrialized societies organized by developmental period can be found in several of our collaborative publications (Masten & Coatsworth, 1998; Masten et al., 2006; McCormick et al., 2011). In similar historical and cultural contexts, independent investigators often identify similar developmental tasks. Nonetheless, developmental task theorists have posited that there also would be some tasks unique to

a particular context of development, reflecting the values and requirements for success in different cultures, ecologies, or periods of history (Masten et al., 2006; McCormick et al., 2011).

Over the decades, there also have been significant debates about the definition and assessment of competence. Salient points of debate include whether to include internal adaptation (e.g., subjective well-being) as well as external adaptation (relationship-based or otherwise) in criteria for competent functioning; to what extent processes versus individual attributes are highlighted; and, crucially, how broad or narrow each domain of competence should be (see Masten et al., 2006; McCormick et al., 2011). For example, some theories about developmental tasks view identity as a key task (e.g., Erikson, 1968) or sequence of tasks (see Motti-Stefanidi, 2015) whereas others focus on meeting criteria for expected behavior in the environment (such as schoolwork or work achievement, friendship, or law-abiding conduct).

Finally, we emphasize that the study of positive development and the nature and measurement of developmental tasks is an active area of research. For example, international work to develop a core set of child well-being indicators is ongoing. One such effort is UNICEF's *Innocenti Report Card 7*, derived from the United Nations Convention on the Rights of the Child and including domains of material well-being, health and safety, education, peer and family relationships, subjective well-being, and behavior and risk (United Nations Children's Fund, 2007). More generally, Mahoney and Bergman (2002) have discussed conceptual and statistical aspects of positive development work from a holistic and person-centered perspective. Much of their discussion dovetails with the work described earlier, although they provide a helpful reminder that both developmental tasks themselves and the processes by which youth may attain (or fail to attain) them often vary by context (e.g., high- versus low-risk youth). Mahoney and Bergman write from the vantage point of positive psychology and thus provide connections from this work to other (largely adult-based) research on challenging but crucial constructs such as optimism, wisdom, and agency.

RELATIONS BETWEEN COMPETENCE AND PSYCHOPATHOLOGY

There are several reasons to expect consistent associations between measures of competence and measures of psychopathology. Unfortunately, there is a continuing and persistent risk of misinterpreting associations, in part because of the conceptual and methodological overlaps in the definitions and operationalization of these concepts. First, the concepts themselves may overlap, as when certain diagnostic categories (e.g., conduct disorder in the *DSM* system) share defining criteria with certain developmental tasks (rule-abiding conduct), a problem relevant to debates on impairment and mental disorder discussed later. Although not of great interest theoretically, this permeable boundary between constructs has the potential to mislead research if one is not extremely careful about operational definitions. In addition, even constructs that are nominally discrete may share overlapping assessment criteria, a problem that is well known in research on associations between temperament and psychopathology and has led to calls for revised assessed instruments in that area (Lahey, 2004). As noted in our prior work (Masten et al., 2006), many common measures of functional impairment contain content closely related to content of competence measurements, albeit with a focus on a more negative range of functioning. Thus, to the extent that impairment might be considered the purview of mental disorder, these concepts will be confounded.

If overlapping definitions and shared assessment content can be convincingly ruled out or minimized, research focus shifts to three non-mutually exclusive categories well-known for explaining an association between two constructs A and B: Either A causes B, B causes A, or one or more additional constructs cause both A and B. This presentation of competence-psychopathology relations is somewhat reductionistic, in that processes underlying these directional, causal effects likely operate simultaneously and continuously, consistent with the nature of dynamic systems (Gottlieb, 2007; R. M. Lerner, 2002; Overton, 2013). Nonetheless, we feel that the delineation of these competing explanations is of value, as it can help identify areas for further conceptual and methodological/statistical work.

For the constructs considered here, this logic means that successes or failures in competence cause changes in psychopathological symptoms (improvements or exacerbations), that symptoms (or their immediate effects) alter subsequent competence, or that one or more of a series of third variables operate to cause changes both in competence and behavioral or emotional problems. Importantly, in this chapter, we usually discuss the directional causal hypotheses in terms of failures in competence contributing to psychopathology or psychopathology undermining adaptive competence. This is because the majority of theory and research in this area is conceptualized in terms of failure. However, it should be kept in mind throughout

that associations of the continuous, dimensional variables that index levels of competence or psychopathology are also consistent with the possibility that competence successes prevent the development or exacerbation of future symptoms or that improvement in symptoms leads to greater subsequent competence (Masten, 2001; Masten et al., 2006).

Potential third-variable explanations between competence and symptoms can take several forms. Masten and colleagues (2006) detail a number of examples that show how individual difference variables (e.g., intelligence and personality traits such as impulsivity, introversion, and conscientiousness) and other contextual variables (e.g., received parenting and child maltreatment) might serve as common causes of both psychopathology and competence. Central to this discussion is the idea of cumulative risk and risk gradients: the well-documented finding of an increased likelihood of problems across multiple domains with increased aggregate number of risk factors (Masten, Morison, Pelligrini, & Tellegen, 1990; Rutter, 1979; Sameroff, 2000; see also Obradović, Shaffer, & Masten, 2012).

Although delineation of common-cause variables is clearly of importance, there are also ambiguities in interpretation of the statistical finding when a third variable accounts for the association between two others. As a simple but likely fairly common example, there may be situations in which the third variable serves as a proxy for a prior assessment of one of the two focal variables, complicating inferences about direction of effects (see also Card & Barnett, 2015). Even in situations where such ambiguity is clearly implausible, a larger (and near-ubiquitous) concern is that it is in practice impossible to include all relevant common-cause variables in a given analysis. This fact makes the theory-driven selection of key covariates of primary importance, as well as the integration of results across studies and the replication of key results with experimental evidence (from either randomized prevention/intervention studies or natural experiments) wherever possible. Helena Kraemer and her colleagues (1997) have attempted to clarify this picture with reference to risk factors by generating a taxonomy that distinguishes causal risk factors from fixed or variable markers (noncausal factors) as well as a more differentiated system describing how risk factors might work together as mediators, moderators, or proxies to affect an outcome of interest (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001).

Of course, these three primary explanations for competence-symptom associations can operate in tandem, which makes testing of unique predictions that convincingly elevate one or more of the potential reasons for competence-psychopathology co-occurrence extremely difficult. Developmental theorists have strengths in recognizing the complexity of forces at work in this arena: In particular, as noted, writers in this area have specified broader theoretical orientations that explicitly acknowledge the bidirectional nature of the relation between competence and psychopathology and the importance of context, at multiple levels, in moderating that association (e.g., Mahoney & Bergman, 2002; Overton, 2013; Sameroff, 2010). But a continuing challenge for the field is the translation of such theories into testable and falsifiable predictions that can begin to rule out one or more possible explanations for observed associations, despite explicit acknowledgment of the interplay between complex theories and relatively new statistical methods (Jelicic, Theokas, Phelps, & Lerner, 2007). In general, some of the theories that have been most influential in guiding competence-psychopathology work have been more specific, aiming to lay out in detail the processes by which a specific failure of competence is connected with a specific aspect of psychopathology.

One example of a well-developed framework for competence failures contributing to subsequent psychopathology is the dual failure model proposed by Patterson, Capaldi, and colleagues, which posits that failures in the key developmental tasks of academics and social relationships/peer acceptance lead to increased depressive symptoms (Capaldi, 1992; Patterson & Stoolmiller, 1991). This model, supported by well-controlled longitudinal evidence, suggests that early behavior problems and family conflict can lead to disrupted school achievement and spreading of negative interaction patterns to peers, which in turn appear to result in increased dysphoric mood. Cole and colleagues have proposed a similar direction of effect between social failure and increased depressive symptoms, one that is mediated by perceived competence (Cole, Martin, Powers, & Truglio, 1997; Tram & Cole, 2000). Cascade modeling work from each of these research teams is reviewed in more detail in a subsequent section. Importantly, these theories have proved generative for diverse other work: for example, data from the male Developmental Trends Study informed by the failure model has suggested that oppositional defiant disorder (ODD) predicted both later conduct disorder (CD) and also later affective disorder, while CD was related to later affective disorder indirectly via functional impairment (Burke, Loeber, Lahey, & Rathouz, 2005).

The second edition of this chapter presented several additional examples of possible competence failures

contributing to increases in symptoms of psychopathology as well as the reverse—scenarios in which clearly defined mental illness leads directly or indirectly to problems in age-salient developmental tasks (Masten et al., 2006). As a group, these examples represent a wide array of disorders, tasks, and problems, with ample initial evidence for effects in both directions. It is important to recognize that a search for a single, universal mechanism of action for these effects might be misguided. Indeed, the cascade work reviewed later in the chapter has dealt with this complexity of constructs by limiting primary focus to the key competence domains of academics and social competence—the latter itself a complex construct containing facets of self-concept, peer acceptance and reputation, victimization and bullying, and close friendship—and the broad problem domains of internalizing and externalizing. However, selected papers have expanded the methodology to other constructs, as detailed further later.

We now turn to a more detailed consideration of work linking competence and psychopathology through the broad areas of impairment in mental disorder classification systems and longitudinal cascade models. Although mutually informing, these two bodies of work have been conducted by separate research teams working from somewhat different theoretical perspectives and using different samples and methods. We focus primarily on work published since the prior edition of this chapter in 2006.

IMPAIRMENT AND MENTAL DISORDER: SYSTEMS, MEASURES, AND RESEARCH SUPPORT

In the second edition of this chapter, we highlighted how competence has been incorporated into the major diagnostic systems for psychiatry and psychology, which is primarily through the opposite of competence, namely functional impairment (Masten et al., 2006). We also discussed Jerome Wakefield's (1997) harmful dysfunction analysis of the concept of mental disorder, which has been influential in some of the philosophical work underpinning prior revision cycles of the *DSM*. Although the revision process leading to the current version, the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*) (American Psychiatric Association, 2013), included discussion of the nature and definition of mental disorder itself, the issue of impairment in defining mental disorder has been relatively uncontroversial. For example, minor wording changes to the global definition of mental disorder were added to explicitly describe distress and/or impairment as a consequence of disorder, which was implicitly assumed to be the case in prior editions (First & Wakefield, 2010).

At the same time, the topic of impairment was raised as an important issue for working groups to consider when revising disorder criteria (C. Lord, personal communication, February 2013). Partly to align the system more closely with the *International Classification of Diseases* (*ICD*) system in use throughout much of the rest of world, *DSM* working groups were charged with considering the implications of separating out functional impairment from the criteria sets themselves. However, it appears that this task was extremely difficult, as many criteria sets are difficult to measure without some reference to impairment, especially those related to social functioning (e.g., multiple criteria for autism spectrum disorder), and *DSM-5* has retained the clinical significance criterion while acknowledging international efforts to separate symptoms from impairment (American Psychiatric Association, 2013).

Despite this situation, concerns have continued to be raised regarding the confounding of symptoms and impairment across multiple aspects of *DSM*, including some criteria sets (especially in the externalizing domain). The collapsing of symptom severity and functional impairment into a single numeric score for Axis V, the Global Assessment of Functioning (GAF), received particular criticism—so much so that *DSM-5* revamped the entire multiaxial system, in the process replacing the GAF with the World Health Organization (WHO) Disability Assessment Schedule—Second Edition (WHODAS 2.0, detailed later). However, some researchers continue to explore the SOFAS (Social and Occupational Functioning Assessment Scale) and GARF (Global Assessment of Relational Functioning) scales from prior editions, which are the closest cousins to the GAF. For example, Smith and colleagues (2011) showed in a sample of psychotic patients that symptom severity ratings contributed to substantially more of the variance in GAF scores than did impairment, largely due to rating conventions that set a ceiling for functioning scores in the presence of psychosis. However, database searches indicate that SOFAS research continues to consist primarily of relatively modest-size intervention studies that employ the scale to track patient progress. Although valuable, this work does not provide data for critical evaluation of competing theoretical frameworks for impairment.

Turning specifically to youth disorders, a review by Rapee, Bögels, van der Sluis, Craske, and Ollendick (2012) gave careful consideration to a number of important conceptual issues related to impairment. To begin with,

the authors noted that aspects of context, culture, gender, and developmental stage will influence the nature and extent of functional impairment. For example, parents or other family members may consciously or unconsciously "accommodate" child behavioral or emotional problems in such a manner that the current functional impact is limited, with either adaptive or maladaptive consequences for later development. In addition, Rapee and colleagues detailed the myriad ways in which impairment has been assessed, from single-score global measures to highly differentiated tools. The latter are used mainly in research settings or in specialty clinics, and a subset of these measures was reviewed in the second edition of this chapter (for additional reviews, see Kutash, Lynn, & Burns, 2008; Winters, Collett, & Myers, 2005). This topic is highly relevant for our broader discussion of competence and psychopathology, because it highlights how researchers and theorists working from a mental disorder classification standpoint have measured impairment. There is reasonable agreement that, for youth, areas of social functioning (including family relationships), academics (and work for adolescents in some contexts), and self-care/leisure activities are primary measurement domains for impairment. For example, Bird and colleagues (2005) developed the 23-item Brief Impairment Scale (BIS) as an impairment measure that maintains not only the reliability and fast administration of scales such as the GAF or Children's Global Assessment Scale (CGAS; Shaffer et al., 1983) but also the breakdown of impairment across core domains that is characteristic of more differentiated scales; the items are grouped into interpersonal relations, school/work functioning, and self-fulfillment, which includes hobbies and other activities.

Rapee and colleagues (2012) also detail the challenges inherent in impairment research in youth as compared with adult populations. The issue of multiple informants arises in a related fashion as it does for symptom assessment: It is sometimes unclear who is the most reliable or valid informant on impairment and, when information gathered from multiple informants is discrepant, how to best aggregate it (Sanford, Offord, Boyle, Peace, & Racine, 1992). This issue is of particular concern given evidence that, in adults, the diagnostically reported "clinically significant impairment" criterion does not always map onto objective measures of impairment, such as work days lost (Breslau & Alvarado, 2007). Additionally, for youth who are assigned more than one mental disorder diagnosis, it is often extremely difficult to disentangle which aspects of impairment are consequences of which disorder, independent of broader concerns regarding the validity of specific pairs of comorbid diagnoses (Angold, Costello, & Erkanli, 1999a; Sroufe, 1997). Thus, issues of impairment connect with broader critiques of *DSM* and proposals to move the field toward mixed categorical-dimensional systems of taxonomy (Drabick, 2009; Yates, Burt, & Troy, 2011), which may require different systems across different classes of disorders (see Coghill & Sonuga-Barke, 2012, for relevant evidence and discussion, as well as the Research Domain Criteria initiative discussed later).

Despite thoughtful reviews such as that by Rapee and colleagues (2012), research on impairment continues to be fragmented, due in part to the diverse stakeholders in classification systems and the significant implications for "caseness" represented by different uses of impairment. For example, Leclair, Leclair, and Brigham (2009) detailed the complications of recent changes to the American Medical Association's process for rating medical impairment for determination of Social Security disability status in the United States and the difficulties of how to reliably and validly apply these standards to mental illness. In addition, distinctions between symptoms and disability have implications for community care, since disability-related care is often provided by organizations other than traditional mental health services (Whiteford, 2009). To help advance this discussion, we consider some specific taxonomic systems of impairment and new dimensional approaches for mental disorder research in more detail as well as recent work on the association of disorder symptoms with impairment.

Formal Systems and Instruments for Assessing and Classifying Impairment

The study of impairment has been complicated by the existence of several closely related classification systems that have arisen for specific purposes. One of the most influential is the *International Classification of Functioning, Disability, and Health* (*ICF*; WHO, 2001). The *ICF* is a wide-ranging classification system designed to categorize the various ways in which both physical and mental illness can impact an individual's life: major groupings of this system are (1) bodily functions and structures, (2) activities, and (3) participation, with allowance for coding of external environmental factors and an overarching biopsychosocial conceptual model of disability (Kostanjsek, 2011). The domains of impairment most relevant for this chapter fall into the *ICF*'s activities and participation categories, which contain some entries similar to widely studied competence domains as well as others that are less often discussed. For example, detailed aspects of interpersonal relationships

can be coded, as well as learning and educational skills, various modes of communication, civic engagement, formal education and employment. Consistent with a dual focus on physical and mental health, the *ICF* also contains detailed codes related to mobility and self-care.

A measurement tool referenced earlier, the WHO's Disability Assessment Schedule—Second Edition (WHODAS 2.0) has been developed to assess key domains from the *ICF* (Üstün et al., 2010). The WHODAS 2.0 was refined via factor analysis and extensively field-tested globally and has been translated into 27 languages. Although items load on a common disability factor, content is also divided into six categories: cognition, mobility, self-care, getting along with others, life activities (e.g., school, work, and household tasks), and community participation. Overall, the WHODAS 2.0 is an impressive undertaking, albeit one developed and validated solely on adult samples; study of its potential application to diverse child samples is more recent (e.g., Scorza et al., 2013). As described earlier, it has replaced the GAF for assessment of impairment in *DSM-5*.

Although the *ICF* has been an impressive attempt to provide a universal categorization of impairment applicable across all types of health/illness, in many respects it is not developmental in nature, with implicit adult norms and frames of reference. Therefore, it is promising to see the development of the *International Classification of Functioning, Disability, and Health–Children and Youth Version* (*ICF-CY*), a closely related classification system of impairment and disability focused on children and adolescents (WHO, 2007). The *ICF-CY* adds codes for items such as babbling, accepting novelty and adapting one's activity level that may be more applicable to youth; however, most items remain identical to the adult *ICF*, and developmental norms are not discussed. Although discrete assessment measures directly based on the *ICF-CY* have to our knowledge not yet been developed, recent research has linked existing measures of adaptive behavior to *ICF-CY* codes. For example, a content analysis of one widely used scale of adaptive behavior in youth suggests that most scale items were reasonably well captured by the codes (Gleason & Coster, 2012). In addition, work attempting to link assessment measures to the *ICF-CY* is ongoing (e.g., Castro, Ferreira, Dababnah, & Pinto, 2013; Gan, Tung, Yeh, & Wang, 2013), as is work building consensus on the subsets of *ICF-CY* elements most relevant to ADHD (Bölte et al., 2014a; de Schipper et al., 2015) and autism spectrum disorder (Bölte et al., 2014b).

Others have also attempted to link adaptive behavior to impairment and disability within narrower domains of disorder. Writing mainly from a background in intellectual disability and autism spectrum disorder research, Ditterline and Oakland (2009) provided a comprehensive review of relations between the constructs of adaptive behavior and impairment, as experts in these domains have been grappling with effective ways of classifying impairment for some time. As detailed by Ditterline and Oakland, the American Association on Intellectual and Developmental Disabilities (AAIDD) groups adaptive skills into ten narrowband domains: communication, community use, functional academics, home/school living, health and safety, leisure, self-care, self-direction, social (skills), work (skills), and motor skills (AAIDD/AAMR, 2002). These 10 areas are grouped in turn into three broad categories: conceptual skills, social skills, and practical skills. Ditterline and Oakland also briefly reviewed well-validated measures of adaptive functioning, such as the Scales of Independent Behavior-Revised (SIB-R; Bruininks, Woodcock, Weatherman, & Hill, 1996) and the VABS (Sparrow et al., 2005), designed to tap into some or all of the above-mentioned areas. The clear overlap among the constructs and domains highlighted by the AAIDD and by the WHO in their respective systems is evident from comparing these lists.

Some investigators have tried to capture a middle ground between extremely brief impairment measures, such as the GAF, and more extensive measures, such as the SIB-R or VABS. Whiteside (2009) described a youth adaptation of the widely used Sheehan Disability Scale designed to tap child and parent social, educational/occupational, and family functioning. Initial validation results showed that this measure contributed unique predictive power beyond symptom severity for the outcome of presentation for treatment. In addition, a promising report by van der Knaap and colleagues (2009) described the development of the Adolescents' Tasks and Skills Questionnaire (TASQ), designed to assess impairment in youth living in residential facilities. This measure is noteworthy for its rare focus on positive outcomes in a clinical setting with seriously disturbed youth. The broad dimensions of the TASQ include peer relations, autonomy and self-management, school competence, job competence, romantic competence, and self-care. Initial validation shows expected negative associations between competence domains and behavioral and emotional problems; further validity evidence, including incremental validity for future outcomes, is needed.

Finally, recent work by Russell Barkley, focused primarily on impairment resulting from attention disorders, has argued strongly for a statistical-normative conceptualization of impairment. Thus, for both youth and

adults, individuals are compared to age- and gender-based norms on a series of impairment areas. Barkley has developed impairment scales for adults (the Barkley Functional Impairment Scale [BFIS]; Barkley, 2012a) and youth (Barkley Functional Impairment Scale for Children and Adolescents [BFIS-CA]; Barkley, 2012b) that show promise as a middle ground between GAF ratings and more time-consuming instruments. For adults, the BFIS includes domains such as home and work responsibilities, social relationships, finances, sexual relationships, and self-care. For youth, the BFIS-CA includes many domains already discussed, including friendships, schoolwork, chores, and family relationships. These measures have already proven useful in differentiating attention-deficit/hyperactivity disorders (ADHD) from other putative disorders, such as Sluggish Cognitive Tempo (SCT), in a large-scale adult sample (Barkley, 2012).

Overall, the measures just cited are promising developments for the field, although careful analysis of item content is also needed, as ostensibly overlapping domains may nonetheless mask divergent association with other variables. For example, Weissman (2009) noted how three "work impairment" scales all differentiated healthy from mentally ill adults but were only modestly intercorrelated themselves because they assessed different aspects of the work experience (e.g., workdays lost versus performance/problems at work versus interest/motivation).

Separating Impairment from Definitions of Mental Disorder

Paralleling the struggle to develop comprehensive and valid systems of impairment, theorists and diagnosticians have grappled with the role of impairment in taxonomic systems for mental health. In 2009, a special section of the journal *World Psychiatry* was dedicated to discussion of a forceful proposal by Üstün and Kennedy (2009) for the *DSM* system to separate judgment of disability or impairment from the diagnosis of mental disorder, in a manner similar to the *ICD* and *ICF* systems. The authors noted that the *DSM*'s inclusion of the "clinically significant impairment" criterion creates several inconsistencies with diagnosis in physical medicine, in addition to inconsistencies with the international systems used by the WHO. Reactions to this proposal were broadly supportive of this ideal: For example, Lehman (2009) noted that the current system of requiring clinical significance for a *DSM* diagnosis is analogous to leaving primary hypertension, absent other complications, untreated in physical medicine. However, respondents also raised various implementation concerns. More specifically, Narrow, Kuhl, and Regier (2009) noted that the *ICF* domains contain content very closely related to symptom criteria for several *DSM* disorders, making the separation of impairment and disorder difficult in practice.

In commenting on the above-mentioned proposal, Wakefield (2009) pointed out that *DSM* implicitly allows the presence or absence of impairment to distinguish between disorder and nondisorder via not otherwise specified (NOS) categories (changed to other specified and unspecified disorders in *DSM-5*): that is, individuals can be diagnosed if impaired but not meeting full symptom criteria. Although this is desirable from the standpoint of maximizing access to diagnosis-dependent services, it potentially undermines the scientific basis of the *DSM* system. There is no simple solution to this problem, and Wakefield noted that even the *ICD* system contains many criteria that are impairment-related, despite the overarching goal to separate out impairment into the *ICF*. Ultimately, Wakefield argued for a close concept analysis of each disorder to determine how best to assess underlying biological/evolutionary dysfunction, as well as impairment.

Associations Between Psychopathology and Functional Impairment: Empirical Evidence

Several recent reports have focused on the relations among symptoms of mental illness (both categorical *DSM*/*ICD* as well as broad dimensional problems) and measures of functional impairment. In general, these studies either demonstrate significant impairment from subthreshold conditions, replicating the seminal report by Angold, Costello, Farmer, Burns, and Erkanli (1999b), or else investigate what type or class of problems may result in more or less impairment. As an example of the former, Balázs and colleagues (2013) reported data from the large-scale Saving and Empowering Young Lives in Europe (SEYLE) study on subthreshold depression and anxiety and functional impairment (assessed via the extended form of the Strengths and Difficulties Questionnaire). The authors found that both subthreshold anxiety and subthreshold depression were associated with increased risk of functional impairment controlling for the association across the two illness domains as well as demographic variables. Other work has demonstrated significant functional impairment even at the first visit for early-intervention services for affective disorders (Hamilton, Naismith, Scott, Purcell, & Hickie, 2011). In addition, the large-scale international Global Burden of Disease study began

inclusion of CD and ADHD impacts in 2010, showing (despite various assessment and methodological challenges) that both conditions result in significant disability and quality-of-life impairments in youth, particularly males (Erskine et al., 2014).

Other investigators have explored how the association of symptoms and impairment may differ across disorder categories. Often this work is motivated by relatively low to moderate associations between disorder symptoms and impairment, which can result in dramatic lowering of prevalence rates, depending on whether clinically significant impairment is included as part of the diagnostic criteria. For example, Lewandowski, Lovett, and Gordon (2009) gave a detailed discussion of impairment in ADHD, documenting that correlations between symptoms and impairment measures are generally no higher than .5 (i.e., 25% of shared variance) and are often substantially lower in this domain. Depending on how cutoffs for impairment are used, dramatic differences in ADHD rates will be seen (Gathje, Lewandowski, & Gordon, 2008). Low associations between symptoms and impairment have also been documented in the domain of separation anxiety disorder, with minimal incremental validity of impairment for future symptoms; the authors argued that distress, rather than impairment, may be a more focal predictor for this particular disorder (Foley et al., 2008). Relations among distress and impairment have been broadly studied by Ezpeleta, Reic, and Graner (2009), with results suggesting demographic differences in distress levels (with females and adolescents displaying greater distress overall) and disorder differences in impairment: broadly, externalizing disorders such as ADHD, ODD, CD, and substance use problems were associated with more significant impairment than most anxiety disorders but not more than major affective illness. In fact, the negative impact of ODD and CD (independently) on functional impairment across multiple domains has been corroborated longitudinally into young adulthood by Burke and colleagues (2014) using data from the Developmental Trends Study.

Further complicating matters, associations among problem domain and impairment may vary depending on the specific measure of impairment used and the informant assessed. For example, Francis, Ebesutani, and Chorpita (2010) analyzed scores from the highly detailed Child and Adolescent Functional Assessment Scale (CAFAS) and the GAF in a diverse sample of youth ages 5 to 17 years living in Hawaii and referred for mental health evaluation. The study compared the proportion of youth meeting standard cutoffs for serious emotional disturbance on each measure for both broad externalizing and internalizing disorders. Of note, Francis and colleagues reported that the CAFAS identified more youth with externalizing disorders as meeting serious emotional disturbance criteria compared with internalizing disorders, whereas the GAF showed more equivalent rates across broad disorder categories. Unfortunately, absent both additional information and a gold standard for serious disturbance, it is difficult to ascertain whether this result represents an oversensitivity of the CAFAS to externalizing problems versus an undersensitivity of the GAF to the same domain. Regarding multiple informants, research suggests that the informant specificity characterizing symptom ratings may also generally apply to impairment ratings, making for complex patterns of associations when both symptoms and impairment are assessed across multiple settings (Gadow, Kaat, & Lecavalier, 2013).

Although work on impairment and symptoms to date has been largely cross-sectional, Cleverley, Bennett, and Duku (2013) reported a longitudinal study of functional impairment and internalizing symptoms through early adolescence (ages 10–15) in a large-scale, nationally representative and nonreferred Canadian sample. Measures of internalizing were available each year whereas impairment assessment was more limited (a single item for each of three domains: academics, peer relationships, and organized activities, with significant problems in any domain at any time resulting in classification of "impairment"). However, impairment status was associated with baseline internalizing symptoms, controlling for change in internalizing over time. Thus, there was consistent evidence for a main effect of impairment on internalizing (but not growth in internalizing) in this study. Other work examining associations between symptoms and impairment using epidemiological sampling has been conducted by Stringaris and Goodman (2013) in the United Kingdom, finding modest associations between symptoms and "impact" (impairment + distress) as well as incremental prediction of impact to future disorder status above symptom counts.

Relatively little work has centered on either cultural variation in impairment or racial and ethnic differences in the relation between symptoms and impairment. When such efforts have been made, results suggest the importance of taking into account cultural context when discussing impairment. As a brief example, Jayawickreme, Jayawickreme, Atanasov, Goonasekera, and Foa (2012) demonstrated incremental validity in predicting WHO-DAS 2.0 functional impairment by using local idioms of distress in addition to Western-based symptom measures in an adult Sri Lankan sample. Additionally, data from an evaluation study of community mental health services

for children and families in the United States suggested that relations between behavioral/emotional strengths and functional impairment may vary by ethnicity (Barksdale, Azur, & Daniels, 2010). There is evidence that youth social withdrawal may be less impairing in Asian cultures as compared to Western cultures and that parents' likelihood of seeking professional help for their children's symptoms (a potential indicator of impairment) may vary cross-culturally (Rapee et al., 2012). However, not all investigations show evidence for cross-cultural differences related to impairment, as Zwirs et al. (2011) found evidence for similar relations between symptoms and impairment (though mean differences of each) across ethnic Dutch and immigrant Moroccan, Turkish, and Surinamese children living in the Netherlands.

NIMH Research Domain Criteria Project

Although it is distinct from the *DSM* and *ICD* systems, there has been a high-profile effort to link mental disorder research with a system of constructs developed to emphasize multiple levels of analysis and, in particular, neurobiological substrates of disorder. The National Institute of Mental Health (NIMH) Research Domain Criteria (RDoC) project is a collaborative effort among researchers from basic science, clinical, and translational backgrounds to move diagnostic efforts closer toward identifying the pathophysiological mechanisms underlying disorder (Insel et al., 2010; Sanislow et al., 2010). This work is grounded in the long-known study of endophenotypes: well-specified physiological or behavioral indices that act as intermediaries between genetic influence and clinical disorder (Gottesman & Gould, 2003). The RDoC initiative aims to define dimensional constructs relevant to disorder at multiple levels of analysis, making the endophenotype concept more explicit and potentially more useful (Insel & Cuthbert, 2009). Levels of analysis as defined in the RDoC include genes, molecules, cells, circuits, physiology, behavior, self-reports, and paradigms: Each is crossed with multiple constructs within each broad domain to generate matrices of information to guide further research, construct validation, and ultimately new diagnostic classification systems (Cuthbert & Kozak, 2013).

There are promising connections between the RDoC constructs chosen for initial study and constructs central to this chapter. The initial RDoC domains/systems include positive affect, negative affect, cognition, social processes, and regulatory systems (Sanislow et al., 2010). Several narrower constructs within these broad domains have clear connections to competence in our framework of success in developmental tasks. In particular, the RDoC domain of social processes, which includes affiliation and attachment, reception and production of facial and nonfacial communication, and perception and understanding of self and others (NIMH, 2014), contains multiple connections to our focus on social competence. However, the RDoC's emphasis on constructs closely linked to biology and neuroscience has tended to focus attention on narrower, behaviorally assessed traits/abilities such as behavioral inhibition and the recognition of facial expressions (see Lilienfeld, 2014, for related discussion of the limitations of RDoC's biological focus). Although the RDoC project is a sweeping and ambitious step toward increased validity of clinical syndromes, to date it has been approached in a largely nondevelopmental manner, and its ultimate utility may be gauged in part by how well it can be integrated with a comprehensive science of developmental psychopathology. Early steps in such integration have been taken by Franklin, Jamieson, Glenn, and Nock (2015), who highlight, among other points, the importance of multiple methods and integration of findings across levels of analysis.

Impairment: Conclusions

As discussed in the second edition of this chapter (Masten et al., 2006), some of the debates surrounding the role of impairment in psychiatric diagnostic systems parallel those in the realm of competence. Issues of construct validation, choice of specific assessment measure, and aggregation of data from multiple informants are crucial factors in both areas. Certainly the field remains far from a consensus on any of these issues with regard to impairment. Indeed, discussions such as the debate over inclusion versus exclusion of impairment in *DSM-5* diagnostic criteria suggest that research and theory on impairment remains in the fairly early stages. However, the presence of both widely cited empirical demonstrations of the importance of impairment (e.g., Angold et al., 1999b) and compelling recent conceptual reviews (e.g., Rapee et al., 2012) offer promise for the future.

More specifically, when one studies the actual domains and item content assessed in measures of functional impairment, the links with the developmental study of competence are obvious. Indeed, it is not much of an exaggeration to say that impairment is the negative pole of competence. However, we can go beyond this basic relation to compare and contrast the domains that are deemed salient by each broad research tradition. A complication

here is the relatively nondevelopmental nature of much impairment research, with the notable exception of careful work creating age-based normative data for measures of adaptive behavior such as the VABS (Sparrow et al., 2005) and the Scales of Independent Behavior-Revised (SIB-R; Bruininks et al., 1996). The broad developmental tasks of academic functioning and social relationships (broad peer acceptance and/or close friendship) have prominent placement in nearly all youth impairment instruments. In turn, many impairment measures focus on domains of youth's lives, such as self-care, leisure activities, and broader community engagement, that are less often seen as central in other developmental task work, with one exception being the positive youth development framework (e.g., R. M. Lerner, von Eye, Lerner, & Lewin-Bizan, 2009), discussed in more detail in the "Conceptual Models" section of this chapter.

Finally, impairment has clear relevance for interventions with disturbed youth, as it is conceptualized as the visible impact of underlying disorder, is often the reason for referral for services, and often is (or should be) the primary target for intervention (Barkley, 2009). In fact, a recent discussion of evidence-based interventions argues that the standards for what qualifies as evidence-based should include measurements of practically significant reductions in functional impairment in addition to clinically significant reductions in symptoms (Becker, Chorpita, & Daleiden, 2011). Of note, Becker and colleagues described the relative lack of an evidence base on reductions in impairment among classic randomized clinical trial (RCT) designs, which is due to both omissions of such measures from many study designs and greater challenges in influencing impairment for those studies that include such instruments. Others have noted that reducing impairment can be crucial for the "social validity" of an intervention (essentially, participant and family buy-in) and argue that measures of impairment should be included in RCT designs and should also be tailored in some degree to the particular aspects of functioning directly or indirectly targeted by the intervention (Fabiano & Pelham, 2009).

CASCADE MODELS

Conceptual and Statistical Background

Cascade models are both conceptual models and research designs that emphasize spreading effects across domains, generally through inclusion of three or more target constructs at three or more time points in a single study (Masten & Cicchetti, 2010). These models have roots in theoretical conceptualizations of cumulating problems or advantages across major adaptive domains (Cicchetti & Schneider-Rosen, 1986). As in many other domains, methodology in this area remains under close scrutiny and continued development: Conceptual and statistical discussions are prevalent and important for adequate communication and advancing theory. For example, Gonzalez (2009) has provided a thoughtful discussion of various methods for the analysis of transactional models: Like cascade models, transactional models emphasize interconnection of distinct constructs over time, although the two classes of models are not identical (Sameroff, 2009). In particular, Gonzalez highlighted the need to consider individual heterogeneity and nonlinearity in testing theories of development and change.

Cascade models are statistically similar to longitudinal mediation models, especially the subset of models in which the predictor variable, mediator, and outcome are all measured on at least three occasions. In a series of methodological papers, David Cole and Scott Maxwell have provided comprehensive discussions of the major analytic issues related to longitudinal mediation models, highlighting both their clear advantages over models using only cross-sectional data and the potential concerns and additional assumptions needed for accurate inference. To begin with, they noted that prior levels of the dependent variable represent an unmeasured confound in most cross-sectional analyses of mediation, which increases the challenge of assessing the magnitude of indirect effects in such designs (Cole & Maxwell, 2003). Subsequently, Maxwell and Cole (2007) demonstrated that estimates of the magnitude of the indirect effect from cross-sectional analyses can be either positively or negatively biased relative to the estimates from longitudinal data, depending on a number of factors, such as the stability of the predictor and the mediator. They also illustrated that the presence or absence of such bias can be substantial and difficult to predict in advance without making stringent assumptions.

Cole and Maxwell (2003) went on to emphasize several additional points relevant for our discussion. First, they noted the importance of timing in longitudinal assessments, including the obvious but rarely acknowledged point that timing of measurement does not always equate with timing of causal action for a construct (see R. M. Lerner, Schwartz, & Phelps, 2009, for related discussion). Thus, whenever possible, researchers should engage in pilot work to establish the minimum estimated lag time for both a predictor's effect on a mediator to emerge and

(separately) for the effect of the mediator on the outcome to emerge, and they should design longitudinal assessments to bridge those time intervals, which will not necessarily be equal. Longer and shorter intervals than these standards can bias estimates of indirect effects, related to the bias introduced by a cross-sectional design. We should point out that, in practice, statistically optimal lag times remain unclear in many areas of developmental psychopathology, a fact that parallels concerns about our lack of knowledge of causal structure and ambiguous constructs generally (e.g., Aalen, Røysland, Gran, & Ledergerber, 2012). Second, Cole and Maxwell also emphasize the importance of estimating and reporting *overall indirect effects* for studies designed with more than three time points, in which several mediating paths (i.e., unique tracings from the predictor to the outcome) are estimated; others have stressed the calculation of confidence intervals for total indirect effects in longitudinal designs (Little, Preacher, Selig, & Card, 2007). Third, they discuss the complex and unpredictable effects of measurement error, noting that mediators in particular should be assessed using multiple broad manifest indicators in a latent variable framework whenever possible and that informant variance should be noted as a possible biasing factor.

Building in part on this work, Selig and Preacher (2009) discussed the wider use of longitudinal mediation analysis in developmental research. In particular, they highlighted the fact that cross-lagged panel designs do not directly assess intraindividual change, for which latent growth curve models (Preacher, Wichman, MacCallum, & Briggs, 2008) are needed. Panel designs also do not allow change in one construct to serve as a predictor of another construct, for which growth curve models or latent difference score models (McArdle, 2009) are needed. Importantly, Selig and Preacher detailed how mediation models can be combined with either latent growth or latent difference models to answer developmental questions. Although we detail examples of some of these approaches in this chapter, these methods remain underused and may offer new windows for elucidating the nature of relations between competence and psychopathology from a perspective of individual differences in intraindividual change. Note that the relevant interpretive challenges do not simply go away with use of these methods, since each type of analysis allows for several different types of indirect effects (e.g., effects via slope versus intercept for growth curve models; effects via latent change scores versus initial values for latent difference models).

It is important to stress that the cascade models discussed in this chapter do not all follow a single, prescriptive analytic framework. However, the majority of studies conducted within this conceptual area have a longitudinal panel design structure with at least three constructs of interest assessed on at least three occasions of measurement. In addition, the estimation of indirect effects, through various paths, is of substantial interest for this area of work. In reviewing the work to be discussed, there is clearly a greater need to incorporate some of the tenets of Cole and Maxwell's (2003; Maxwell & Cole, 2007) methodological studies to obtain the most accurate estimates of effects in the future. For example, even modelers who are most interested in testing whether effects from one domain assessed early in a longitudinal study (e.g., externalizing behavior problems) eventually spread out to affect multiple later domains are implicitly testing for the presence of a nonzero longitudinal indirect effect. However, given the current state of the science, we also applaud the use of multiple analytic methods in this domain. For example, some work uses latent growth curve modeling to test whether effects in one domain "spill over" to affect the change in a separate domain (Klimes-Dougan et al., 2010). Other work makes use of intervention designs to test whether hypothesized cascades can be interrupted (McClain et al., 2010; Patterson, Forgatch, & DeGarmo, 2010).

Cole and Maxwell (2009) provided further elaboration of methodological issues related to studying longitudinal relations among constructs. Their work highlighted the sensitivity of results to variations in individual patterns of change and specified several additional potential analytic approaches (e.g., random coefficient modeling, latent state-trait modeling) that are of potential interest in this domain. Relatedly, Selig, Preacher, and Little (2012) emphasized the explicit modeling of varying time lags across individuals and potentially the random assignment of participants to different measurement lags, if one's focus is on elucidating the timing of a developmental process. The largely variable-focused nature of these methods can be complemented by person-oriented methods that aim to identify relatively homogeneous subgroups of a sample, either concurrently or via patterns of change over time (Masten, 2001; Nagin & Tremblay, 1999; Von Eye & Bergman, 2003).

Unfortunately, none of the statistical techniques just described eliminate well-known and fundamental causal inference problems for nonexperimental data. Social scientists have long been aware of the need for experimental, or quasi-experimental, manipulation of constructs for establishing causal inference, and new statistical and theoretical work has drawn closer attention to the conditions

under which causal inference can be justified (Foster, 2010). Recent advances suggest ways in which careful selection of exogenous predictors in a model can move the field closer to causal inference, given specific assumptions (Pearl, 2000, 2012). This work on *causal mediation analysis*, largely developed outside of psychology, is nonetheless having an impact on the field. In a key contribution, Imai, Keele, and Tingley (2010) detailed the assumptions required to make causal attributions from both experimental and nonexperimental data and provided routines to conduct sensitivity analyses for key assumptions and bootstrapping to estimate the magnitude of mediating effects through a psychological research example. Few of the studies to be reviewed have been directly informed by these approaches. However, prevention scientists have considered this body of work in efforts to clarify mechanisms of mediation and reduce selection bias (Coffman, 2011; Crowley, Coffman, Feinberg, Greenberg, & Spoth, 2014), and a highly accessible treatment of modeling confounds in resilience research has been presented by Card and Barnett (2015). This is clearly an area for further research and application; nevertheless, we caution researchers in this area to be conservative in their discussions of causality and to detail all attempts made to justify the necessary analytic assumptions.

Empirical Findings

Here we review findings from selected empirical investigations that are consistent with our understanding of testing developmental cascades. We highlight in particular the series of papers published in two special issues of *Development and Psychopathology* in 2010 (Masten & Cicchetti, 2010) as well as selected additional papers. Because these papers focus on a variety of constructs, samples, and age ranges, they are somewhat difficult to classify. However, given this chapter's focus on competence and psychopathology, we have organized this discussion by areas of competence that have been assessed. We first focus on studies including academic competence in patterns of relations with risk and psychopathology, followed by studies including social competence and studies testing both academic and social functioning. We then discuss other studies that have examined a wide range of target constructs. Where possible, we draw attention to convergent empirical evidence across age ranges as well as the implications of differences in statistical/data analytic methods. In most cases, research is focused on estimating cross-domain longitudinal paths between competence domains and either externalizing or internalizing problems.

Testing Cascade Effects through Academic Competence

Several investigations have examined the longitudinal links among behavioral/emotional problems and academic competence. Masten and colleagues (2005) reported results from the Project Competence longitudinal study, demonstrating that childhood externalizing problems were negatively associated with later academic achievement in late adolescence/emerging adulthood, and academic competence in turn was negatively associated with internalizing problems in young adulthood. Key cross-domain paths remained statistically reliable when adding a subset of potential common-cause variables, namely socioeconomic status (SES), intellectual ability, and quality of received parenting. In addition, the authors noted a negative longitudinal path from internalizing to externalizing, one possible interpretation of which was the personality construct of behavioral inhibition simultaneously acting as a protective factor for externalizing problems but as a risk factor for internalizing problems (Kerr, Tremblay, Pagani, & Vitaro, 1997).

Following Masten and colleagues (2005), in recent years the associations among externalizing, internalizing, and academic competence have continued to be studied across different samples and age ranges. A subset of these studies have extended this work by longitudinally testing the role of alcohol and substance use in cascade findings that relate to academic competence (or failure) and broader externalizing problems, given long-standing work on the associations across these domains. Other work has expanded the range of samples, age ranges, and assessment intervals that are employed. Finally, as discussed in subsection "studies including both academic and social competence," some work has examined reciprocal and joint paths among academic competence, social competence, and behavioral and emotional problems.

An investigation by Moilanen, Shaw, and Maxwell (2010) tested longitudinal links among externalizing problems, internalizing problems, and academic competence in a sample of low-income boys and their families, with rich multi-informant assessments of each construct spanning ages 6 to 12. In the best-fitting structural equation model for their data, Moilanen and colleagues reported consistently high rank-order stability of each of their primary constructs across this developmental period. Above and beyond stability and concurrent association, the authors reported negative cross-domain paths from externalizing problems to academic competence (from ages 6–10) and from academic competence to internalizing problems (from ages 8–11), as well as "feedback" negative paths from academic competence back to later externalizing.

Contrary to Masten and colleagues (2005), positive externalizing-to-internalizing paths were observed at the start and end of the study. However, consistent with Masten and colleagues' (2005) results, primary cross-domain paths were largely unchanged when including additional early constructs of neighborhood advantage, IQ, and parenting in the model. Moilanen and colleagues (2010) interpreted their results in terms of "adjustment erosion," positing that early externalizing problems in particular could have both direct and indirect effects on functioning in the classroom, especially during the transition to formal schooling and the transition to middle school, transitions that bookended their assessments.

Starting at a similar age range as Moilanen and colleagues (2010) but extending farther into adolescence, Englund and Siebenbruner (2012) reported cascade model results from the Minnesota Longitudinal Study of Risk and Adaptation, an intensive long-term study of youth at developmental risk due to poverty. Findings were again broadly consistent with prior work, especially in terms of academic failure (here, at age 9) predicting longitudinally to future externalizing and internalizing problems as well as a negative internalizing-externalizing link consistent with results of Masten and colleagues (2005); covariates included SES, minority status, and age of mother at participant's birth. However, in the Englund and Siebenbruner (2012) study, longitudinal links from externalizing to academic competence were not observed, although the two constructs were associated at the first time point in their model (age 7; standardized path estimate of –.22). Importantly, and consistent with much prior work, Englund and Siebenbruner reported that prediction of substance use in adolescence was mediated through earlier (and concurrent) externalizing problems, although they also noted an unexpected positive association from academic competence to use versus nonuse of alcohol, suggesting that presence of alcohol use, distinct from amount of drinking, may have been quasi-normative for this at-risk sample. Other work examining links between academic achievement and substance use, although not conducted from a full cascade framework, has supported a consistent longitudinal association between marijuana use and academic underperformance throughout high school in an affluent sample (Ansary & Luthar, 2009).

Other work in this area has focused more closely on the longitudinal associations among academic competence and either broad internalizing problems or key subsets of internalizing, such as depressive symptoms. For example, Hishinuma, Chang, McArdle, and Hamagami (2012) examined the longitudinal links between academic functioning and depressive symptoms in a large ($N > 7{,}000$) sample of Hawaiian youth across grades 9 to 12. In contrast to the traditional cross-lagged structural equation modeling (SEM) design, this study employed a sophisticated bivariate latent difference score model, although it should be stressed that this analytic approach does not fully remove the potential criticism of unobserved confounders preventing causal inference. Of interest, Hishinuma and colleagues (2012) found stronger evidence for depressive symptoms being associated with future changes in academics (with somewhat stronger effects for native Hawaiian youth), which contrasts with several of the cross-lagged studies already discussed. It is unclear whether this discrepancy in findings may be related to analytic differences or perhaps differences in the sample or assessment: For example, the Hishinuma et al. study relied primarily on self-report measures for both academics and depressive symptoms. In addition, latent difference scores were set up annually; as discussed by Cole and Maxwell (2003), lag time between assessments may have influenced the pattern of findings.

More frequent assessments entered into an extensive analysis of data from the Pittsburgh Youth Study (a longitudinal study of over 1,500 boys oversampled for antisocial behavior) from ages 11 to 15 (Defoe, Farrington, & Loeber, 2013). The authors tested a series of models linking SES, academic achievement, hyperactivity, delinquency, and depressive symptoms annually over this age period. Although due to complexity some constructs were split into separate models, the results showed impressive consistency in terms of direction of effects. Briefly, evidence was obtained for a longitudinal chain of effects starting with early joint influences of hyperactivity and low SES on academic achievement to delinquency and finally to depressive symptoms. Although cross-domain paths tended to be small in magnitude, they were obtained in excess of both single-year and 2-year lagged continuity estimates, which themselves were generally moderate in strength.

Other work has examined academic achievement itself as an outcome of cascading effects that cumulate from early childhood. Notable for its prediction from very early in childhood, a report by Bornstein, Hahn, and Wolke (2013) demonstrated indirect effects from habituation efficiency at age 4 months to cognitive testing at 18 months and 8 years (indirectly affecting and affected by 36-month behavior problems) to academic achievement at age 14. In this study, using data from the Avon Longitudinal Study of Parents and Children, behavior problems and maternal education had both direct and indirect effects

on later academic achievement. Early cognitive measures had small but reliable effects on childhood intelligence, which was the largest single predictor of academics in adolescence. Further work by this same research team has demonstrated two additional findings of interest. First, infants' early physical development and motor exploration (at 5 months of age) appear to act as catalysts for their later intellectual development, with cascading effects seen to IQ at ages 4 and 10 years and subsequently to academic achievement at age 14 (Bornstein, Hahn, & Suwalsky, 2013c). Second, language abilities in early childhood showed cross-domain paths to subsequent internalizing problems in two samples controlling for a series of potential common-cause variables (Bornstein, Hahn, & Suwalsky, 2013b). Although language facility has only rarely been studied from the cascade modeling perspective, it is a promising candidate for future research due to its status as a key developmental task of the early childhood years (McCormick et al., 2011) and is a clear foundational task for academic achievement. In addition, longitudinal evidence using bivariate growth curve models has shown stronger prediction from language skills—specifically, receptive vocabulary—to (reduced) growth of externalizing problems and inattention/hyperactivity from ages 7 to 13 (Petersen et al., 2013).

Summary of Academic Competence Cascade Evidence

To date, several independent data sets have shown evidence for cross-domain longitudinal prediction from externalizing behavior problems to lowered academic competence. In addition, there is generally consistent evidence for links from lowered academic competence to increased internalizing problems, although this association is less consistent than the former one. Effects appear to be stronger when indexed with somewhat longer time intervals, excepting very young childhood; indeed, in this body of work, the chosen time intervals are not always justified by developmental considerations, and an argument can be made to vary assessment intervals based on the expected pace of change in a given developmental period. Overall, however, this work affirms the role of adequate academic performance as a key developmental task in the overwhelmingly North American and Western European societies from which these data have been drawn. In the majority of cases where gender differences in cross-domain paths have been tested, evidence has not been found for differences. However, it should be emphasized that power analysis for SEM is evolving, and it is not entirely clear how large sample sizes need to be to convincingly rule out Type II error for tests of gender differences. Target sample size will depend on the predicted effect size of key model paths, which is an extension to this research that is still in early stages.

Not all investigations have found robust associations between early externalizing problems and academic achievement: Duncan and colleagues (2007) pooled results across six data sets and found negligible predictive power of early socioemotional variables (including internalizing and externalizing) to academic achievement later in elementary school when also controlling for early school readiness variables, attention, and a wide set of demographic control variables. Rather, preacademic skills and attention skills appeared to be stronger predictors. It is likely that choice of covariates and potentially the direct versus indirect assessment of socioemotional variables play a role in differences in findings in this domain, as discussed further later. Although not focused on broad internalizing problems, a separate meta-analysis by Huang (2015) showed evidence for a modest negative relation (mean $r = -.15$) between academic competence and subsequent depression, which was reduced when including prior depression in the analysis and not moderated by gender, ethnicity, birth cohort, or measurement strategy.

Testing Cascade Effects through Social Competence

Cascading relations among social competence and behavioral/emotional problems have been even more frequently studied than links with academics. Using the same sample and parallel analytic techniques to the Masten et al. (2005) study, subsequent Project Competence research examined the longitudinal links among externalizing, internalizing, and social competence (Burt, Obradović, Long, & Masten, 2008), finding evidence for moderate to strong negative longitudinal associations from social competence to internalizing problems, both from childhood to adolescence and from emerging adulthood to young adulthood. Although longitudinal links were not seen between externalizing problems and social competence in this study, the latter constructs were strongly negatively associated (standardized coefficient of –.48) in the initial middle-childhood assessment.

A limitation of the study by Burt and colleagues (2008) was reliance on relatively large time lags between assessments, on the order of several years. In addition, although constructs were assessed comprehensively through multi-informant and multimethod assessments, the study took a big-picture view of key constructs, treating social competence as a single measure (consistent with confirmatory factor analytic evidence for those data). However, other studies have examined related constructs, such as popularity and peer social preference, in more

detail and across narrower time ranges. Generally speaking, this work confirms that failures in social competence in both childhood and adolescence can have negative links to later internalizing (and sometimes externalizing) problems. In addition, multiple studies have found longitudinal links from early externalizing problems to subsequent problems with peers. In each case, peer rejection and/or victimization are likely to be key elements.

Following the core analytic strategy of Burt and colleagues (2008) but using annual assessments including family adversity exposure in the oldest cohort (ages 9–14) of the Pittsburgh Girls Study (a group oversampled for neighborhood disadvantage and followed annually), Obradović and Hipwell (2010) replicated an externalizing-social competence-internalizing cascading effect across ages 9 to 12. In addition, child behavior problems predicted later family adversity exposure (e.g., parental depression, harsh parenting, and perceived parental stress) in these models, consistent with a "child effects" framework and with work to be discussed suggesting that preventing child problems is associated with changes in parental and family functioning (Patterson et al., 2010). Finally, pubertal status had negative links with internalizing problems early in the study, but the direction of this effect shifted as the majority of the sample reached puberty, suggesting that pubertal effects may vary depending on the larger peer context. Similar to the Project Competence report, this study assessed a broad social competence construct made up of both peer and friendship social status and social self-worth, although competence assessment was solely self-report.

Other work from a cascades framework has found evidence for social competence as a key predictor in middle childhood and has extended this work to examine diverse samples and potential moderators. For example, Rogosch, Oshri, and Cicchetti (2010) tested social competence cascades in a sample of maltreated and nonmaltreated but demographically matched youth. They found robust main effects of maltreatment on all major constructs (externalizing, internalizing, and social competence) at the first time point (ages 7–9) and evidence for social competence at ages 10 to 12 as a negative predictor of later externalizing problems; earlier internalizing was a negative predictor of social competence. Rogosch and colleagues (2010) were interested in predicting cannabis abuse and dependence in late adolescence, and showed both direct and indirect (through internalizing and externalizing) links from maltreatment history. In a separate study, Bukowski, Laursen, and Hoza (2010) demonstrated that friendship status moderated the effect of peer rejection on growth curves of peer-reported sad affect across 3 years of middle childhood. That is, among youth with high initial scores of peer avoidance and peer exclusion, depressed affect increased over time for youth without close friends but decreased for youth with at least one close friend. Although the latter study used a different analytic strategy from most studies discussed in this section, the use of growth curve models may be of special importance for future study of developmental cascades, and we consider several additional examples of this analytic strategy later. Taken together, the previous studies show the importance of social competence as an organizing construct in middle childhood across diverse samples and methods.

Several investigations have pushed back the developmental time frame of cascade models, assessing social competence and peer relations earlier in childhood while sometimes still maintaining assessments through adolescence and into adulthood. This extensive time frame is particularly challenging since typical longitudinal structural equation models require similar measurement of constructs through the duration of the study, to avoid confounding change in measurement with true construct differences. In a study extending this broad work to the early childhood years (beginning at age 2), Blandon, Calkins, Grimm, Keane, and O'Brien (2010) examined links between early externalizing problems, developing emotion regulation and social skills (beginning at age 4), and later sociometric status. Consistent with greater fluidity of development and less differentiation in the early years, Blandon and colleagues found evidence for less stability of constructs than similar studies with older participants and noted very high associations between early emotion regulation and social skills measures, both of which serve to limit detection of any nonzero cross-domain effects. Nonetheless, negative cross-domain paths were noted from social skills to later externalizing problems at multiple time points, providing evidence for the importance of these emerging skills early in childhood.

Two additional studies have examined social competence and peer relations in early childhood and their associations with later behavioral/emotional problems. First, Bornstein, Hahn, and Haynes (2010) showed evidence for negative links from age 4 social competence to age 10 and 14 externalizing and internalizing problems, effects above the moderate stability in each domain and which were unchanged when including child intellectual functioning, maternal education, and maternal social desirability in the path model. The authors noted that their results reinforced the historical importance granted to early social competence by attachment researchers

(e.g., Sroufe, Egeland, & Kreutzer, 1990). The same research group demonstrated cascading effects from externalizing problems at age 4 to broad adaptive functioning (communication, socialization, motor and living skills on the VABS) at age 10, controlling for IQ (Bornstein, Hahn, & Suwalsky, 2013a). Second, Lansford, Malone, Dodge, Pettit, and Bates (2010) tested a series of paths connecting social information processing (SIP), peer rejection, and aggression over 12 assessment periods spanning kindergarten through third grade in the Child Development Project, building on earlier work from that sample and others examining SIP as a partial mediator of effects of early rejection on aggression (Dodge et al., 2003). In brief, Lansford and colleagues found evidence for a series of "snowballing" effects in which SIP deficits were associated with later rejection, which was associated with both aggression and further SIP changes, with aggression also providing a separate link to subsequent peer rejection. The authors noted that the lower stability of SIP relative to rejection and aggression implies that SIP should be a key target for prevention and intervention efforts.

As evidenced by Lansford and colleagues (2010), closer waves of assessment allow for the development of feedback loops over time among constructs. In this vein, two further studies specifically highlight the "vicious cycles" that can arise during multiple developmental periods when child behavior problems are first linked with peer problems and those further exacerbate children's problems over time. Focusing on the early school years, van Lier and Koot (2010) aimed to clarify how different aspects of broad social functioning (social preference, victimization, and friendedness) related to externalizing and internalizing in a Dutch sample. Results from this study supported transactional links between externalizing and poor social preference over time, with initial externalizing predicting all three social constructs in expected directions. Victimization also became "entangled" with poor social preference in this study, suggesting complex relations among social competence constructs that also mediated longitudinal links between externalizing and internalizing problems, with key results invariant by gender. Follow-up work with this sample has replicated the bidirectional links between peer rejection and externalizing problems when including best friend's externalizing in the model, which did not add to cross-domain prediction at this age range (Sturaro, van Lier, Cuijpers, & Koot, 2011). Additional work by this team in a separate sample using linked growth curve models has shown that kindergarten conduct problems are linked to early-elementary-school depressive symptoms via experiences of peer rejection (Gooren, van Lier, Stegge, Terwogt, & Koot, 2011). Relatedly, but moving into middle childhood and adolescence, an analysis of the Multimodal Treatment of ADHD (MTA) sample by Murray-Close and colleagues (2010) showed evidence for transactional effects between low social skills and aggressive behavior problems throughout the course of their study (ages 10–16). Aggression was also linked to antecedent inflated self-beliefs and prospectively to peer rejection in this sample, with paths invariant by gender and ADHD status.

Finally, we wish to draw particular attention to two studies conducted by Dodge and colleagues, using parallel analytic methods to test a long-ranging cascade of effects from early problem behavior to the development of serious violence and substance use problems in adolescence across two samples. This work is an example of how the cascade metaphor links to programmatic developmental work without necessarily prescribing a single analytic method. First, Dodge, Greenberg, Malone, and the Conduct Problems Prevention Group (2008) used this framework to examine a progression of effects from early contextual disadvantage to adolescent serious violence in the high-risk control sample of the well-known Fast Track intervention study. Key constructs spanned time periods from kindergarten through eleventh grade and were assessed via multiple informants and methods. Rather than traditional SEM, Dodge and colleagues chose a two-stage partial least squares (PLS) predictive modeling procedure, which seeks to maximize predictive power and has somewhat less restrictive assumptions as compared with other uses of confirmatory factor analysis and SEM. When matched with specific theory, PLS can provide important model testing, albeit with a different focus from typical SEM: one that emphasizes an aggregate index of items for prediction that is not hypothesized to be caused by a single latent variable. Results from this study suggested that each step of the hypothesized cascade—adverse context, early harsh parenting, poor school readiness, early school conduct problems, grade school academic failure, low parental monitoring in later grade school, affiliation with deviant peers in early adolescence, and violent behavior in adolescence—was related to the prior and subsequent steps. More specifically, each domain partially mediated the effects of the immediately preceding domain, and each added incrementally to the overall prediction of adolescent violence. Although most paths were invariant by gender, there was some evidence that social context and early parenting had greater prediction of later violence for females whereas early externalizing and school problems predicted for males. Among other contributions,

these results confirm previous work on the bidirectional relations between school failure and externalizing behavior problems and provide compelling evidence for the early contextual and familial difficulties that precede the rapidly developing school problems for some externalizing youth. As the authors noted, a detailed cascading chain of effects also points toward places and time points that may be ripe for preventive intervention efforts. In fact, subsequent mediation work using the Fast Track intervention sample has shown that over 25% of the impact of the intervention on reducing adolescent antisocial behavior could be accounted for via three earlier social-cognitive processes: reducing hostile attributions, increasing competent responses to social challenges, and reducing favorability of aggressive responses (Dodge, Godwin, & the Conduct Problems Prevention Research Group, 2013).

Second, a monograph by Dodge and colleagues (2009) employed parallel methods to study the development of illicit drug use in the previously mentioned Child Development Project sample, with associated commentary by Schulenberg and Maslowsky (2009). In this comprehensive study, Dodge and colleagues demonstrated how early child, family, and peer factors systematically build to predict the initiation of illicit substance use by the end of high school. Although effects at each time point were small to moderate in magnitude, the cumulative effect of these cascading influences is striking, with person-oriented analyses describing risk of substance use initiation that varied from 25% among youth following the lowest-risk sequence to 91% among youth following the highest-risk sequence. These analyses were complemented by variable-oriented tests of the full model (i.e., from parenting problems in early childhood to adolescent substance use initiation via early child behavior problems, early peer problems, adolescent parenting problems, and association with deviant peers) again using composite variates and PLS modeling. Above and beyond the key cascading path of effects, continuity was seen for parenting problems and peer problems from childhood to adolescence. Similar to several of the studies reported earlier, mean gender differences were observed on many constructs, but developmental progression did not vary by gender. Perhaps most important, each piece of the hypothesized progression mediated (either partially or fully) the prior step in the sequence. Commentary on this study emphasizes the strong theoretical basis of the proposed sequence of effects, the utility of a parsimonious model with a low risk of overfitting to a specific data set, and the need for close study of developmental transitions (Schulenberg & Maslowsky, 2009).

Summary of Social Competence Cascade Evidence

An impressive body of work has arisen in recent years testing cascading effects between social competence and both externalizing and internalizing problems, spanning childhood and adolescence and employing several different methodologies. It is clear that, like academics, social competence represents a core developmental task beginning in young childhood and continuing throughout development. Several studies show the pernicious effects of externalizing problems on social adjustment, and multiple investigations show paths consistent with failure model theories that predict increased internalizing, and sometimes externalizing, problems from lower social competence.

More specifically, findings from the social domain generally show somewhat less longitudinal stability in constructs but somewhat more cross-domain links as compared with academics. In addition, findings vary, albeit often in predictable ways, depending on the domain of social adjustment that is assessed (e.g., broad judgments of competence, peer rejection, social cognition). Of particular note are findings of "vicious cycle" links across time between peer relations and externalizing problems, and the programmatic work by Dishion, Dodge, and others that demonstrates how deviant peer association and constructs such as deviancy training and coercive joining of an antisocial peer group operate to reinforce and amplify aggression and antisocial behavior (Van Ryzin & Dishion, 2013).

It should also be noted that the broad social competence construct has been linked to adult psychopathology in different ways. For example, although not tied to social competence as measured by many of the studies already discussed, Lenzenweger (2010) has proposed a theoretical cascade that posits absence of parental "proximal process" (reciprocal interactions with a child that foster psychological functioning) impairing the broad affiliative system observable via child temperament and leading to the development of schizoid personality disorder in adulthood.

Studies Including Both Academic and Social Competence

There are multiple reasons to highlight longitudinal cascade studies that include both social and academic competence domains: Longitudinal SEM studies statistically control for other constructs in the model, thus providing more stringent tests of prior findings with single domains; relations between academics and social functioning themselves can be modeled in these studies; and key theories, such as the dual failure model for depressive symptoms, that rely on joint effects from failure in these

two broad domains are more fully tested. In general, this research has supported dual failure theories in which the combination of problems with academics and one's peers interact to elevate risk for future mental health problems (e.g., Capaldi, 1992).

Two reports from the Project Competence data set have explored the potential joint relations of academic and social competence with externalizing problems, internalizing problems, and the subsequent competence domain of effective work functioning. First, Obradović and colleagues (2010) demonstrated that earlier longitudinal cross-domain effects from academic and social competence in childhood and emerging adulthood to internalizing problems in young adulthood maintained when both domains were included in the statistical model, with academics also showing a positive longitudinal relationship to social competence. Second, subsequent work with this sample focused on the crucial young adult outcome of work functioning, demonstrating a longitudinal cross-domain path from childhood social competence to the domain of employment functioning (e.g., reliability, achievement) in emerging adulthood, which in turn was highly stable into young adulthood (Masten, Desjardins, McCormick, Kuo, & Long, 2010). Although academic competence did not show unique longitudinal prediction to the work domain, this may have been in part due to the high concurrent association (standardized path estimate of .59) in emerging adulthood.

Other work has extended the dual failure cascade modeling to independent samples, while also looking at the timing of effects at narrower intervals. Burt and Roisman (2010) tested similar effects in the National Institute of Child Health and Human Development (NICHD) Study of Child Care and Youth Development (SECCYD), using maternal reports of behavior problems and social skills and standardized academic achievement testing at five time points from age 54 months to 15 years. They found evidence for indirect effects of early externalizing problems through academic competence/failure to internalizing in early childhood as well as indirect effects through social competence later in childhood (feeding back to externalizing and academic problems in adolescence), consistent with other work emphasizing social relations in predicting trajectories of externalizing and internalizing problems in the same data set (Fanti & Henrich, 2010). However, effects seen by Burt and Roisman were generally of small magnitude. At first glance, these findings conflict with Duncan and colleagues' (2007) report that also included the NICHD SECCYD as part of six meta-analyzed data sets. However, closer inspection of the analytic plan from each report suggests that it is the presence of specific covariates that affected whether the externalizing-academics association is present: In the Duncan et al. (2007) paper, earlier externalizing behavior (age 3) was also controlled for when examining age 4.5 aggression to kindergarten academic skills in this data set. Consistent with this finding, the early externalizing to academics link reported by Burt and Roisman dropped to marginal significance when the covariates of maternal sensitivity, income/needs ratio, and early cognitive ability were also included in the model.

Related work from the Québec Longitudinal Study of Child Development, focused more narrowly on the early school years, showed evidence for cascading effects from externalizing problems at age 6 through both academic problems and peer victimization at age 7 to internalizing problems at age 8. Peer victimization also fed back to externalizing, and early school readiness measures predicted negatively to internalizing 1 year later; again, cross-domain effect sizes tended to be small in the face of strong continuity and contemporaneous associations among constructs (van Lier et al., 2012). Subsequent work by this research team provides evidence for a cascade from peer rejection through (low) social self-concept to internalizing problems across second grade into third grade (Spilt, van Lier, Leflot, Onghena, & Colpin, 2014). Extending this work to slightly older youth, Vaillancourt and colleagues (2013) presented cascade evidence through the middle school years for internalizing problems leading to increased future peer victimization and for academic problems predicting future externalizing, both cascade effects persisting when controlling for household income and parental education.

Finally, Chen and colleagues (Chen, Huang, Chang, Wang, & Li, 2010; Chen, Huang, Wang, & Chang, 2012) have presented two studies from a Chinese sample of elementary school students investigating these topics. Their first report supported paths from early aggressive behavior problems to lowered social and academic competence, and cross-domain longitudinal paths between social competence and academics, even in the context of high rank-order stability (Chen et al., 2010). A follow-up report supported a consistent link between aggression and poor peer relationships (seen at each annual window from grades 3–6) but also demonstrated that starting levels of aggression are associated with the growth of peer problems over the 4-year duration of data collection (Chen et al., 2012). For all of these studies, although mean gender differences were frequently observed for key constructs, the longitudinal cross-domain paths generally did not vary by gender, suggesting the operation of similar processes.

The authors highlighted the strict socialization away from externalizing problems in Asian culture (i.e., self-control and maintaining group harmony are highly valued) while noting their results were generally consistent with data from Western societies.

Given the increased salience of peer relationships in adolescence, several longitudinal studies have focused on the preteen, teenage, and young adult years in testing links among behavioral and emotional problems and academic and social competence, the latter broadly defined to include deviant peer affiliation and peer victimization. First, work from the University of Oregon has modeled the longitudinal development of violent behavior in late adolescence via early problem behavior and academic failure, leading to gang involvement and deviancy training—the highly stable mutual reinforcement of deviant talk in friendships (Dishion, Véronneau, & Myers, 2010)—with consistent patterns of associations (despite mean differences) across African American and European American youth. Second, a major study of children at risk for alcohol problems using cascade methods has shown that effects of parental alcoholism on offspring substance use disorders in adulthood is mediated through adolescent substance use, academic achievement, and affiliation with a substance-using peer group (Haller, Handley, Chassin, & Bountress, 2010), with some differences in effects for alcohol versus other drugs (e.g., less evidence for selection effects for binge drinking as compared to illegal drug use). Third, data from the Seattle Social Development Project have shown longitudinal prediction from depressive symptoms at age 10, through school failure in adolescence, to risk for a major depressive episode at age 21 (McCarty et al., 2008); however, this longitudinal mediated path was evident only for girls, in contrast to several other reports already noted. Although early social problems were also tested in this model and showed a zero-order correlation with earlier depressive symptoms, they did not show independent prediction to adult depressive episode risk for either gender. McCarty and colleagues (2008) noted that in their study, stronger prediction may have been seen for girls for both academic failure and early conduct problems to later major depression due to gender differences in base rates of the former problems: that is, girls identified with these problems may have been relatively more severe cases. Evaluation of one's competence in the school context may also have different consequences by gender on average, although other cascade studies have generally not shown supportive evidence for this assertion.

Although not employing the typical cascade methodology, Nocentini, Calamai, and Menesini (2012) studied a bivariate growth curve model of delinquent behavior and depressive behavior across 3 years of Italian high school (grades 9–11). Interestingly, the authors found a somewhat different pattern of time-invariant versus time-varying effects for the two domains, with stronger evidence for distal effects (i.e., present at the start of the study and operating uniformly throughout) of academic and social failure on delinquent behavior but proximal effects (varying year to year, and sometimes operating indirectly) of dual failure for both delinquent behavior and depressive symptoms.

Examining developmental task domains more broadly, Staff and colleagues (2010) emphasized the nature of role transitions across adolescence and young adulthood in analyzing data from the Monitoring the Future study, focusing on prediction of substance use. Similarly to comparing social selection versus social causation effects (Martin et al., 2010), a focus was on comparing role selection versus socialization explanations for associations between adult family and work roles and reduced substance use. Generally, their results showed strong support for the socialization hypothesis, showing that changes in social roles lead to changes in substance use controlling for several prior risk factors. Looking across domains, Staff and colleagues found that changes in family roles (e.g., marriage, parenthood) appeared to have stronger effects than did changes in social and work roles, controlling for age to account for differential timing of role transitions. Changes in socializing (spending evenings out for fun and recreation) and religiosity partially mediated these effects. This work suggests that the emerging adulthood years can be a key point of change for the continuation versus reduction of substance use, one aspect of their importance in developmental psychopathology more generally (Schulenberg, Sameroff, & Cicchetti, 2004).

Summary and Future Directions: Academic and Social Competence Cascades

The research reviewed is compelling in its broad support of dual failure models across wide ranges of the childhood and adolescent years. In particular, the inclusion of both academic functioning and social competence (or related constructs, such as peer rejection and victimization) in single longitudinal models demonstrates that these two aspects of global competence can themselves interact and that cross-domain effects seen via one domain are not typically proxies for the other but rather may compound in interesting ways. For example, there is evidence that high academically achieving students generally self-select into peer groups with other high-achieving students by early adolescence (Véronneau, Vitaro, Brendgen, Dishion, & Tremblay, 2010). One implication from these findings,

highlighted by van Lier and Koot (2010), is that early prevention efforts should be focused on enhancing *both* academic success *and* effectiveness in social relationships wherever possible, especially since peer affiliative groups may be easier targets for intervention compared to global peer status (Véronneau et al., 2010).

Common to many studies of cascade modeling, important future directions for research include better delineation of the timing of effects, testing of moderators, including but not restricted to gender, and consideration of additional mediators. As an example of potential mediators, one study has shown evidence for increased parent-child conflict as a mediator of longitudinal externalizing-internalizing links from grades 4 to 8 in a model that also included academic and social competence (Yong, Fleming, McCarty, & Catalano, 2014). Regarding timing of effects, it is broadly seen that longer time intervals have resulted in stronger magnitudes of cross-domain predictive paths in this research. However, very few studies have explicitly planned time intervals to maximize strength of effect, as recommended by Cole and Maxwell (2003). It is possible that careful reanalysis of data sets with many time points, systematically testing subsets of varying time lags, could prove useful in clarifying this issue. However, any such work should be theoretically informed and should account for issues of multiple statistical comparisons rather than being purely data-driven. Future studies would also do well to heed Dodge and colleagues' (2008, 2009) method of systematically isolating and combining the most theoretically relevant predictive variables at each assessment period. In addition, it is an obvious but important point that the influence of a specific process cannot be tested unless it is accurately assessed. Thus, work by Dishion et al. (2010) demonstrating the key impact of deviancy training in close friendships (and highlighting the importance of identifying and preventing the growth of deviant peer clusters) was possible only by employing observational recording of adolescent dyadic friendships. Many of the studies reviewed are more limited in their range of measurement, often relying on primarily questionnaire-based assessment due to the resource cost of assessing multiple constructs across several time points (cf. Cox, Mills-Koonce, Propper, & Gariépy, 2010).

Additional Studies of Cascade Methodology: Links Across Generations and Diverse Constructs

Although not focused explicitly on broad developmental task domains, several additional recent studies have advanced the literature on developmental cascades by extending aspects of the studies reviewed by use of new populations, new methods, and broader key constructs. Some of the ways in which cascade studies have been extended include studies of continuity and change in behavioral/emotional problems across generations as well as expanding established cross-domain links to encompass additional constructs such as life stress, effortful control (EC), and broad self-regulation. In addition, other studies represent potential methodological strengths, such as the use of latent growth curve models in studying cross-domain effects and/or the inclusion of intervention or prevention designs.

As a key example of studying intergenerational effects from this perspective, Garber and Cole (2010) presented longitudinal data from adolescents ages 12 to 18 years and their mothers, oversampled for a history of depressive symptoms. In a similar fashion to the study by Nocentini and colleagues (2012) described earlier, Garber and Cole distinguished between distal effects of maternal depression, which affected the *intercept* of adolescent depressive symptoms in a growth curve model, and proximal effects via other intermediate variables, which affected the *slope* of adolescent depressive symptoms in a growth curve model. Mediating variables included risk factors of negative family life events, overall family climate, and self-worth, all assessed in early adolescence. Importantly, the direction of effects was consistently from the risk factors to growth in depressive symptoms rather than the reverse. Despite the strengths of this design, one limitation is the inability to parse the interplay of genetic and environmental influences across generations. However, other work focused earlier in development (ages 9–27 months) used an adoption design to separate out risk for toddler externalizing problems from both biological maternal depressive symptoms (which appeared to operate via pregnancy risk) and risk from each adoptive parent's depressive symptoms (Pemberton et al., 2010). This work highlights the potential for bidirectional influences between children and their environment, which is consistent with work examining links between SES and adolescent problem behavior across two generations in the Iowa Family Transitions Project (Martin et al., 2010). Although not focused on biological variables, results from this model suggested support for both social causation (parent SES influencing adolescent behavior problems) and social selection (adolescent behavior problems influencing their adult SES) processes.

Other research on intergenerational associations in antisocial behavior has emphasized potentially differing mediating pathways depending on which parent is the focal point of investigation. For example, Thornberry, Freeman-Gallant, and Lovegrove (2009a,b) demonstrated that in the ethnically diverse Rochester Intergenerational Study, parental delinquency and drug use in adolescence

were associated with offspring externalizing behaviors primarily via effective parenting for mothers (nearly all of whom lived with their children) but via multiple mediating paths (parenting stress, effective parenting, and parent's age at first birth) for fathers who had high levels of contact with children; some influence of parental depressive symptoms was also noted. Importantly, the intergenerational associations were not present for fathers who had low contact with their children. Related intergenerational research from the Seattle Social Development Project has reported that although harsh discipline was associated with childhood externalizing problems across two generations, the intergenerational association of externalizing was mediated more by parental substance use than by harsh discipline (Bailey, Hill, Oesterle, & Hawkins, 2006, 2009). Despite some differences in findings, both data sets support the clear disruptive effects of parental substance use problems on offspring adjustment.

Given the importance of behavioral and emotional regulation for the development of broad competence across childhood, it is not surprising that multiple investigations have examined longitudinal links between EC or other aspects of regulation and preceding, concurrent, and subsequent externalizing and internalizing problems. Examples from this literature include a study of 18- to 42-month-olds by Eisenberg and colleagues (2010) that examined parenting, EC, and internalizing and externalizing problems at three time points. Briefly, study results showed support for maternal unsupportive reactions during an observational session negatively predicting subsequent EC; however, a mediating role of EC was not evident. This may have been due to high rank-order stability among the tested constructs in this sample (e.g., many standardized paths >.80). Work from the same research team has focused on later childhood, using bivariate semiparametric mixture modeling techniques to examine subgroups of youth with distinct trajectories of externalizing and two indices of EC: attention focusing and behavioral persistence (Zhou et al., 2007). This work suggests that although the population association of EC and externalizing may be driven by a subgroup of well-adjusted youth who are persistently high on the former and low on the latter, trajectories of externalizing for youth with more mixed longitudinal profiles of EC are more variable. Other work supports the importance of behavior regulation by demonstrating mediating effects of self-regulation in later years on associations between cumulative risk and externalizing, controlling for earlier externalizing problems (Doan, Fuller-Rowell, & Evans, 2012). In addition, work from a positive youth development (PYD) perspective analyzing the well-known 4-H study of Positive Youth Development has shown cross-domain longitudinal links across late elementary and middle school from positive parenting, to child internal self-regulation, to an integrative PYD construct (Lewin-Bizan, Bowers, & Lerner, 2010), which we return to in more detail when discussing prevention.

Cascade research has also examined how individual- and family-based stressful life events interact with externalizing and internalizing problems over time. Yates, Obradović, and Egeland (2010) presented data from the Minnesota Study of Risk and Adaptation, drawing on three assessments spanning 24 to 72 months of age, showing both direct and indirect (through child dysregulation) longitudinal paths between maternal contextual strain (a combination of stressful life events, social support, and romantic relationship quality) and child externalizing. In addition, Herrenkohl and colleagues (2010) used data from the Seattle Social Development Project to demonstrate independent prediction from family adversity and conduct problems in middle childhood to health risks and service use in young adulthood.

Focusing on self-reported stressful events, Brody, Chen, and Kogan (2010) demonstrated that self-reported negative emotions mediated the association between life stress, including racial discrimination, and the slope of a risk behavior growth factor (alcohol use, drug use, and having sex under the influence) in a sample of rural African American youth assessed through late adolescence and early adulthood: Data were collected as part of a family-based prevention program, which we discuss further in a subsequent section. Overall, their results were consistent with theories of stress proliferation in which major life stressors lead to secondary stressors (e.g., increased negative affect and problems in close relationships) that have enduring consequences (Pearlin, Schieman, Fazio, & Meersman, 2005). Although not directly assessed, the authors speculated that processes of peer differential affiliation and perceptions of risk behavior and substance use among peers operate to "carry" the observed effects.

A potential advantage of the methodology employed by Brody et al. (2010) over traditional cross-lagged panel designs is the ability to draw inferences on intraindividual (within-person) change in the construct of interest. That is, Brody et al. were able to demonstrate that paths from life stress, through increased negative emotions, predicted actual increases over time in risk behavior, not just the rank-ordering of youth in the sample on this variable, although their statistical analysis was conducted in two steps (SEM then linked to a separate latent growth curve model). Other researchers interested in developmental

cascades have employed similar analytic methods to tap into within-person or within-group change over time in constructs of interest, such as broad externalizing and internalizing problems, interparental conflict, and substance use. For example, in related fashion to the analysis conducted by Brody et al. (2010), Lynne-Landsman, Bradshaw, and Ialongo (2010) used growth mixture modeling to identify separate subgroups of cigarette, alcohol, and marijuana use across high school in a predominantly African American and urban sample. The authors embedded this growth mixture model in a larger mediation model, allowing prediction both from middle school risk factors to high school substance use classes and from high school substance use to young adulthood outcomes. Results suggested that male gender, lower parental education, and earlier oppositional behavior and peer rejection were associated with increasing trajectories of cigarette and marijuana use. Substance-using peer affiliation in middle school mediated effects of earlier predictors, including academic performance, on trajectory of alcohol use in high school. Overall, results are consistent with earlier cascade theories of the development of problem behavior (e.g., Patterson, DeBaryshe, & Ramsey, 1989) and suggest potential differences of effects across class of substance (cigarettes versus alcohol versus marijuana).

The latent growth curve model can be applied to more than one construct of interest at a time, in an analysis termed parallel process modeling (Cheong, MacKinnon, & Khoo, 2003). This approach was employed by Kouros, Cummings, and Davies (2010) to test relations among trajectories of interparental conflict and child externalizing problems in a community sample throughout early childhood (ages 6–8). Parallel process growth modeling allows testing of associations between both initial level (intercept) and within-person change over time (slope) across multiple constructs, and Kouros and colleagues showed that slope of interparental conflict predicted slope of externalizing, while the reverse was not the case. In addition, slope of externalizing predicted social competence/prosocial behavior across multiple informants later in childhood (age 12), suggesting that externalizing problems mediated an association between changes in interparental conflict and later social competence. Gender differences were observed in mean levels of constructs of interest but not in associations. This work extends earlier in development the processes between marital conflict and behavior problems previously identified in adolescence by Cui, Conger, and Lorenz (2005), and is notable for operationalizing an environmental risk (interparental conflict) as a dynamic process unfolding over time.

Klimes-Dougan and colleagues (2010) provided an intriguing example of how one might employ a growth curve modeling approach to examine cascade-related processes, analyzing relations among externalizing, internalizing, and thought problems in a sample of offspring of healthy versus unipolar depressed versus bipolar depressed mothers (youth assessed at four time points from approximately ages 5 to 20). Drawing from concepts in systems biology, Klimes-Dougan and colleagues argued that a cascade across domains can be conceptualized as a cumulative process in one domain affecting change in another domain of interest. More specifically, this approach used a cumulative externalizing problems score as a focal predictor of the growth curve of internalizing problems and thought problems (considered separately), with interactions with parental mood disorder status also tested. Key results of this analysis showed evidence for cumulative externalizing problems (rather than concurrent problems) predicting estimated age 20 thought problems and internalizing problems, accounting for change over time in the latter domains. In addition, there was some evidence that the cascade to thought problems was more characteristic of offspring of bipolar mothers while the cascade to internalizing problems was more characteristic of offspring of unipolar depressed mothers.

Cascade Research Employing Randomized Controlled Trials

Reports from prevention trials often test longitudinal links among constructs of interest within the framework of a randomized controlled trial (RCT), typically by including group assignment as a key exogenous predictor in the model. This analysis is potentially quite powerful, since it blends the causal-inference strengths of an RCT with the statistical controls of cross-lagged panel SEM. For example, McClain and colleagues (2010) tested longitudinal relations among several adolescent outcomes 6 years after families were randomized to an intervention program for middle childhood youth who experienced a recent parental divorce and were living primarily with their mothers (see also Zhou, Sandler, Millsap, Wolchik, & Dawson-McClure, 2008). Results suggested that program participation caused changes in two key parenting constructs—the mother-child relationship and effective discipline—which were then associated longitudinally with different classes of problems. More specifically, an improved mother-child relationship mediated program effects on child internalizing problems, while improved discipline practices mediated program effects on child externalizing problems. Although effects were generally

small in magnitude, the impressive 6-year prediction in this study shows promise for theory-driven interventions for youth adjusting to divorce (McClain et al., 2010).

Striking evidence for cascading positive effects following successful intervention for childhood behavior problems are discussed in detail by Patterson et al. (2010), who provided an overview of four decades of work from the Oregon Social Learning Center on the development of serious antisocial behavior and aggression in youth: the Parent Management Training—Oregon Model framework. Two points from this work are of particular relevance. First, work from the Oregon group broadly parallels the work by Dodge and colleagues (2009) just described, detailing a progressive sequence in which disrupted early parenting and minor-to-moderate forms of child externalizing lead to association with deviant peers, broader ranges of externalizing problems and continued family conflict, eventuating in high risk for adult criminality. Second, Patterson and colleagues described somewhat unexpected and long-lasting positive "spillover" effects into parents' own lives, following successful reduction in child behavior problems through the intervention. More specifically, mothers with children whose problems were reduced reported subsequent improvements in their own social relationships. This exciting set of findings provides evidence that intervening early in one domain can show systemic effects across other domains. In addition, reported effect sizes from this series of analyses were larger than many seen in nonintervention studies, and in some cases maintained or even increased over time, suggesting that at least for some families, intervention participation created lasting changes in the family context (Patterson et al.). We review additional results from these two research groups later when discussing model prevention programs.

Cascade Models: Summary

The work just reviewed shows interesting convergence of broad findings across a variety of domains, samples, and methods. Generally speaking, these empirical investigations confirm the crucial significance of early behavioral regulation and rule-abiding conduct (i.e., lack of externalizing problems/aggression) for transitioning to school and success in the childhood years. At the same time, when such problems affect academic functioning and social relationships, effects can feed back to amplify externalizing difficulties as well as lead to difficulties in the broad internalizing domain (i.e., anxiety and depressive symptoms). Extensions of cascade modeling have noted related empirical findings in domains of EC and self-regulation, alcohol and substance use, and several other areas of interest for developmental psychopathology.

Importantly, cascade-related research can also be informative in cases where cross-domain longitudinal links are absent. For example, Tully, Iacono, and McGue (2010) reported analyses from the Minnesota Twin Family Study examining the covariation across ages 15 to 21 of two prominent mental/behavioral disorder symptoms: nicotine dependence and major depressive disorder. Results from this genetically informed study, which also noted increasing heritability of both constructs with age, supported models in which the two sets of symptoms were related only through concurrent covariation, ruling out one domain having a direct effect on the other.

The work just reviewed opens methodological and statistical avenues for future research on the interplay of competence and psychopathology over time. In particular, the use of latent growth curve modeling and the embedding of growth models within larger mediation models (Brody et al., 2010; Klimes-Dougan et al., 2010) may allow for more detailed testing of some of the theoretical predictions made in this area of research. More generally, the papers reviewed show that both cascade theories and developmental psychopathology orientations have motivated researchers to expand their statistical and analytic toolboxes, often resulting in intriguing modeling combinations. Although the contribution of these different modeling approaches is expected to vary across future work, it is heartening to see the simultaneous exploration of new theory and new methods. It is also consistent with broader recent calls in psychology for modeling-based inference (Rodgers, 2010), even if models are developed within narrow domains, as well as calls for building analytic models that rule out observations as well as rule them in (Roberts & Pashler, 2000).

However, at the current stage of cascade research, it seems clear that additional theoretical work is also crucially needed. That is, the field is in need of stronger theories that make more precise predictions about how varied domains of competence and psychopathology will interact and affect each other. It is likely that as with so many other domains of social science research, progress in theory development is slowed by a continuing reliance on null hypothesis significance testing, which does not motivate more stringent theoretical predictions (Meehl, 1967; Roisman, Booth-Laforce, Belsky, Burt, & Groh, 2013). One possible way forward is a move toward theories that make rank-order predictions regarding the values of model parameters rather than ones that posit the presence or absence of nonzero parameters. This work will be difficult,

since some of the strongest theoretical advances to date have focused on specific domains of functioning across relatively narrow time ranges. However, the integrated work by Patterson, Dodge, and others regarding the chain of effects in the development of violence and other antisocial behavior provides a model for related work in other areas of functioning, as does the work by DeFoe and colleagues (2013) unpacking the chain of effects surrounding contextual disadvantage, low academic achievement, juvenile delinquency, and depressive symptoms. More generally, an increased focus on effect sizes and their interpretation in cascade research is needed.

With very few exceptions, the work reviewed above relies on passive, nonexperimental study of target samples. One of the strongest means the field has to test causal theories in development is by intervening in hypothesized processes and observing whether the externally manipulated change in a target process or mediator then changes the (downstream) target outcome and comparing that to a group which did not receive the experimental manipulation. Well-designed and implemented prevention and intervention studies can represent a powerful window of observation on developmental process. We now turn to a review of selected prevention and intervention work that focuses on the bidirectional associations between competence (success in age-salient developmental tasks) and psychopathology.

INTERVENTIONS TO PROMOTE COMPETENCE AND REDUCE PSYCHOPATHOLOGY

In the second edition of this chapter, we argued that preventive interventions are a particularly useful tool for examining the associations between competence and psychopathology, because randomized controlled trials can serve as true experiments in testing hypothesized causal relationships among variables or as tests of developmental theory (Cicchetti & Hinshaw, 2002). Often researchers think of their interventions as "interactions with development" (Coie et al., 1993; Kellam & Rebok, 1992; Tolan, 2002), such that the intervention is altering one developmental process or trajectory—for example, promoting a specific cognitive, emotional, or behavioral skill—in an effort to achieve a different developmental outcome, such as health and well-being or reduced problem behavior or psychopathology. Theories of how and why competence and psychopathology are connected in individual development have important implications for practice and policy, particularly given the twin societal goals of increasing competence and reducing the psychological, social, and economic suffering associated with psychopathology. Empirically supported conceptual models that link healthy adaptation or competence with behavior problems or psychopathology can serve as conceptual guides for developing and evaluating interventions. We also noted that prevention science was distinct from health promotion or PYD in some important ways, yet the two disciplines seemed to be converging toward a more unified framework for understanding intervention effects (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004).

Competence has been a central target of prevention efforts for decades, although this focus has not always been acknowledged, with some criticizing prevention science as maintaining a deficit orientation (Benson, 1997; R. M. Lerner & Benson, 2003). Indeed, the 1994 Institute of Medicine report on prevention science, *Reducing Risks for Mental Disorders: Frontiers for Preventive Intervention Research*, explicitly excluded mental health promotion efforts. Nonetheless, as we noted in our 2006 chapter, competence promotion efforts have been a fundamental aspect of prevention from the time of President Kennedy's efforts to build community mental health (Kennedy, 1963), to President Carter's Task Panel on Prevention (1978) as part of his Commission on Mental Health, through the American Psychological Association's Board of Professional Affairs Task Force on Promotion, Prevention and Intervention Alternatives in Psychology and its efforts to promote prevention through publication of *14 Ounces of Prevention* (Price, Cowen, Lorion, & Ramos-McKay, 1988), one of the first compendia of efficacious prevention programs. Of the ten programs described in that document that focused on working with children and adolescents, eight are designed to enhance competence by building specific social, emotional, intellectual, or behavioral skills that are linked with successful adaptation. Four also emphasize building strengths in other social environmental contexts, such as parenting, as a method of influencing youth development.

Since our 2006 chapter, there have been several tangible markers of the convergence in approaches to explicitly link a PYD/health promotion framework with a prevention science approach. One of the best examples of this change in philosophy is the name change for one of the premier venues for accessing information about prevention programs. Since 1996, the Center for the Study and Prevention of Violence at the Institute for Behavioral Sciences at the University of Colorado, Boulder has produced the *Blueprints for Violence Prevention*, a website and list of efficacious prevention programs to combat violence, problem

behavior, and deviance. The outcome criteria for programs to be included on the list were rigorous and narrowly focused on violence as an outcome. Over the years, its website and publications have been some of the primary and most well-respected resources for learning about evidence-based programs for both community members and researchers seeking information about prevention programs that work. *Blueprints* is now funded by the Annie E. Casey Foundation and has extended its focus from problem behavior exclusively to broader developmental outcomes in the areas of behavior, education, emotional well-being, health, and positive relationships. In doing so, the name also has been changed to *Blueprints for Healthy Youth Development*. The criteria remain rigorous with less than 5 percent of reviewed programs making the list of model or promising programs. This change represents more than just a shift in language; it appears to be an indicator of the broad conceptual shift that we referenced in the second edition.

Equally informative over the intervening years has been the continued accumulation of empirical evidence that preventive interventions work. A rapidly increasing number of interventions to prevent the occurrence of mental, emotional, and behavioral (MEB) disorders have been implemented and evaluated over the past two decades. Many of these have been tested in RCTs, the gold standard of evaluation, and shown to reduce risk factors, increase protective factors, and decrease the rates of MEB disorders and/or substance abuse for individuals receiving the intervention. It is no longer correct to note that there is no evidence that interventions can change the rates of MEB disorders (National Research Council [NRC] & Institute of Medicine [IOM], 2009). The number of efficacious programs has grown substantially, and this increase, coupled with communities' needs to implement high-quality interventions that work, has generated a variety of mechanisms to disseminate the information about effective programs and best practices for implementing them. Many different websites now contain lists of model or promising programs selected by expert panels after review of the literature or compendia of programs with documentation of their relative efficacy available for community organizations to review.

Along with progress in documenting the evidence of interventions have been advancements in the conceptual foundations of these interventions; of note is the extent to which the interventions are guided by an understanding that MEB disorders are developmental. That is, prevention science has reoriented toward a focus on the question "What does the child need 1, 3, and 5 years down the line?" (Beardslee, Chien, & Bell, 2011, p. 248) and emphasizes intervening with children and adolescents because of the high rates of MEB disorders seen by age 24 (Kessler et al., 2005). Similarly influential has been a refocusing of the conceptual models that undergird intervention design, implementation, and evaluation toward a developmental framework that focuses on both MEB disorders and aspects of positive health, referred to in the Institute of Medicine report "Preventing Mental, Emotional and Behavioral Disorders Among Young People" as "developmental competencies" (NRC & IOM, 2009).

In the most recent Institute of Medicine (IOM) report on prevention (NRC & IOM, 2009), the committee reconsidered the evidence regarding mental health promotion and determined that although it can be distinguished from prevention of mental disorders in many ways, there is considerable overlap in these approaches conceptually and practically, and mental health promotion is an important component of the intervention spectrum (see also Weisz, Sandler, Durlak, & Anton, 2005). This conceptual shift acknowledges that promoting mental health (a goal of youth development programs) and preventing problems (a goal of prevention science) need not be competing endeavors (Catalano, Berglund, Ryan, Lonczak, & Hawkins, 2004). The primary tenets of these two approaches seem to derive from many common roots; they appear to have arrived at similar conclusions about the essentials for helping young people develop successfully, and both now reflect a developmental approach that includes building competence or wellness as a mechanism for preventing problems (Catalano et al., 2004; E. L. Cowen, 1991, 1995; Masten & Coatsworth, 1998; Weissberg & Greenberg, 1998). This advancement appears to return us to a point in which "prevention at its best represents both an effort to foster competence and prevent problems" (Masten & Coatsworth, p. 216). Although the connections are strong at the broadest level of conceptual organization, specific conceptual models still differ across philosophical approaches and even within approaches across interventions. We note that across these models, competence is conceptualized at different levels of measurement. For example, some models emphasize specific skills (e.g., problem solving, emotional awareness) while others conceptualize competence as broad constructs akin to our developmental task approach. Clear understanding regarding which specific skills or "developmental competencies" are linked directly or indirectly to psychopathology and should be promoted to prevent MEB disorders is at a relatively early stage. In the effort to integrate promotion and prevention, several different conceptual models have been

proposed across psychology, social work, and education (e.g., Collaborative for Academic Social and Emotional Learning, 2005; Guerra & Bradshaw, 2008; Haegerich & Metz, 2009; Kia-Keating, Dowdy, Morgan, & Noam, 2011; Kurtines et al., 2008; Schwartz, Pantin, Coatsworth, & Szapocznik, 2007). We highlight three of these models: core competencies, social emotional learning (SEL), and positive youth development (PYD).

Conceptual Models

Core Competencies Model

One promising framework that has been proposed as a mechanism linking theoretical and empirical work across promotion and prevention is the *core competency framework* (Guerra & Bradshaw, 2008). Based on a review of the basic developmental and intervention literatures, a panel of experts in developmental and intervention science selected five core competencies as markers of healthy development. These five competencies were selected because they were closely aligned with assets and strengths proposed in the PYD literature (discussed later), were securely grounded in the human development and developmental psychopathology literature, and captured important aspects of promotive and preventive interventions (Guerra & Bradshaw, 2008). Moreover, these competencies showed empirical linkages to a variety of risk behaviors, problem behaviors, or psychopathology. The five proposed core competencies build on a broad developmental model that incorporates concepts of competence and developmental tasks (Havighurst, 1972; Masten & Coatsworth, 1998). However, core competencies are not isomorphic with competence in age-salient developmental tasks. Specifically, the core competencies in this model are: (1) a positive sense of self; (2) self-control; (3) decision-making skills; (4) a moral system of belief; and (5) prosocial connectedness.

Each of these core competencies may actually comprise several more specific skills. Positive sense of self reflects three aspects of the sense of self that emerge early in development and remain salient across important points of increased risk for problem behaviors. First is "self-awareness," which captures a realistic and accurate assessment of one's psychological and behavioral characteristics. This awareness becomes more acute and sophisticated with age such that during adolescence, youth can provide a more refined assessment of who they are and where they are going. Success in adolescence is partially dependent on youth constructing a positive future perspective, clear goal orientation, and positive and realistic possible selves (Cross & Markus, 1991). A positive view of oneself and one's future is positively associated with good developmental outcomes and negatively related to problems. Self-esteem, high aspirations, and a sense of mastery is related to less frustration in school, better academic outcomes, and less school dropout (Harter, Bresnick, Bouchey, & Whitesell, 1997); youth with a positive future orientation are also less likely to use alcohol (Henry, Swaim, & Slater, 2005; Robbins & Bryan, 2004). Second, agency, or a sense of volition over one's behavior, is critical for development as youth become more able to direct their own development. Having a strong belief in one's ability to control their actions and environment may be critical for success in many developmental domains (Bandura, 2001) but also with regard to preventing specific problem behaviors, such as substance use, through mechanisms such as developing strong peer refusal skills (Schier, Botvin, Diaz, & Griffin, 1999). Third, self-esteem is often used as a marker of PYD, although it is controversial what high self-esteem means and whether it is associated more with positive or negative outcomes (Baumeister, Campbell, Krueger, & Vohs, 2003). Self-esteem seems to be related to indices of well-being and life satisfaction (Diener, 1984), but relatively little evidence suggests that a global sense of self-esteem is promotive (Fearnow-Kenney, Hansen, & McNeal, 2002): rather, domain-specific evaluations may be more important to one's overall functioning (Marsh & O'Mara, 2008).

Self-control, or the ability to regulate and manage one's emotions and actions, is the second core competency. Developing effective self-control skills is a critical developmental task that spans childhood and adolescence (Zelazo & Carlson, 2012). Better regulation in young children is associated with fewer problem behaviors, better peer relationships, and better academic achievement. During adolescence, effective self-control (as reflected in planfulness, problem-solving ability, willingness to delay gratification and restrain impulses) reduces risk for problem outcomes, such as aggression/violence, substance use, and criminality (Gottfredson, 2007; Wills, Walker, Mendoza, & Ainette, 2006). Longitudinally, cascade evidence for EC as a mediator of stress-psychopathology relations is emerging, as already discussed.

The third core competency is effective decision-making skills, which also increases with age. By adolescence, youth may be capable of coordinating future goals and perspectives with decisions to be made at the present time and are more capable of understanding the linkages between their decisions and consequences (Reyna & Farley, 2006). SIP models have been implemented in a wide variety of longitudinal and intervention studies and indicate that

better decision-making skills reduce the likelihood of drinking and smoking (Epstein, Bang, Zhou, & Botvin, 2007) or being aggressive with peers (Crick & Dodge, 1994) and increase the probability of doing well in school (Zins, Weissberg, Wang, & Wahlberg, 2004) and graduating from high school (Hawkins, Catalano, Kosterman, Abbott, & Hill, 1999).

A moral system of belief, the fourth proposed core competency, includes judgments about moral issues such as fairness and involves development of aspects of perspective taking and empathy (Guerra, Nucci, & Huesmann, 1994). A sense of morality has been proposed as central to prosocial action and development of a moral identity (Damon, 2004). Moreover, related aspects, such as sense of respect, trustworthiness, caring, and citizenship, are related to this broad competency and are constructs promoted in character education and PYD programs (Benson, 1997; Berkowitz & Beir, 2007). For example, youth who believe that it is morally wrong to drink alcohol tend not to (Beyers, Toumbourou, Catalano, Arthur, & Hawkins, 2004), youth who are empathic and more prosocial tend not to be aggressive (Pardini, Lochman & Frick, 2003), and youth who are better able to take another's perspective, respond empathically and resolve interpersonal problems effectively are more likely to do well in school as well (Roeser, Eccles, & Sameroff, 2000; Wentzel & Wigfield, 1997).

The fifth competency, prosocial connectedness, is broad and encompasses constructs such as attachment and bonding across families, schools, and peers. A variety of conceptual models propose that youth connections across these domains are primary determinants of adjustment. For example, the Social Development Model proposed by Catalano and colleagues (1996) hypothesized that prosocial bonding to parents, schools, and positive peers will reduce the likelihood of problem behaviors, such as delinquency and substance use. When opportunities, involvement, and rewards are in place, youth are more likely to develop strong bonds with positive role models and to internalize the moral messages and positive values that are being taught. This, in turn, reduces the likelihood of poor developmental outcomes, including aggression, substance use, and poor academic performance.

The primary contention of this framework is that mastery of the five core social and emotional competencies naturally or through intervention will yield healthy development and reduce the likelihood of problem behavior. This conceptual model helps researchers organize their intervention approaches, provides specific targets for intervention, and helps guide evaluation of an intervention's effects. This model shows marked similarities to the broad developmental models of competence proposed by our prior writing (e.g., Masten & Coatsworth, 1998; Masten et al., 2006).

Social Emotional Learning

A second model integrating the prevention and promotion perspectives is the SEL model, which has also received a substantial amount of interest and research attention over the past 15 years. Building from a foundation of developmental and intervention research indicating that inability to master core social-emotional competencies can lead to a variety of problem behaviors and social difficulties (Masten & Coatsworth, 1998; Weissberg & Greenberg, 1998), researchers hypothesized that promoting social and emotional learning in schools would enhance health and well-being and reduce the problems of students. Moreover, leaders in the SEL movement contended that schools' roles in promoting healthy development for children and youth include promoting ways that students can behave responsibly and interact well with others socially and emotionally while also building academic skills. The SEL approach is inherently developmental and focuses on helping youth acquire the competencies that allow them to recognize and manage emotions, set and achieve positive goals, appreciate the perspective of others, establish and maintain positive relationships, make responsible decisions, and handle interpersonal situations constructively (Elias et al., 1997). The five key competencies in the SEL framework were developed in a review of theoretical models of emotional intelligence, social emotional competence promotion, SIP, as well as behavior change and learning theories (e.g., the Health Beliefs Model and the Theory of Reasoned Action). The SEL framework shares considerable overlap with the core competencies model, so is described more briefly here.

The framework proposes that a key set of SEL competencies is related to youth health and well-being, academic achievement, and risky or problem behaviors. In establishing their core competency framework, the leaders of the Collaborative for Academic Social and Emotional Learning (CASEL) drew from theories of SEL, theories of behavior change and empirical findings linking children and youth social adjustment with their health outcomes (Payton et al., 2008). The five key SEL competencies are: (1) self-awareness; knowing what one is feeling, having a realistic assessment of one's abilities and a well-grounded sense of self; (2) self-management, meaning handling emotions well, delaying gratification and persevering in the face of obstacles to goals; (3) social awareness, meaning understanding what others are feeling and being able to take

their perspective, and maintaining appreciation for and positive interactions with diverse groups; (4) relationship skills, meaning handling emotions in relationships well, maintaining mutually positive relationships, having the ability to negotiate conflict and resist peer pressure; and (5) responsible decision making, making decisions based on accurate appraisal of the information available and the likely consequences of action and taking responsibility for one's decisions (CASEL, 2005).

Beyond articulating this list of competencies, the SEL framework also describes characteristics and features of quality SEL programs that are likely to improve overall effectiveness (Durlak, Weissberg, & Pachan, 2010; Payton et al., 2008). Basic features of the program, such as whether the conceptual rationale was sound and clear, whether the program used effective teaching strategies, whether it was coordinated across an entire school with good connections to the community, and whether it provided adequate teacher training and technical support and used high-quality research methods to evaluate its outcome, are included as recommended features of quality programs that will increase the probability that a program will alter the competencies (Payton et al., 2008). Moreover, CASEL contends that interventions that are Sequenced, Active, Focused, and Explicit (SAFE) will be more effective than those that do not have these characteristics. This acronym suggests that for effective programming, skills should be taught in a sequenced manner in which they build on each other over time, curricula should incorporate active learning techniques that provide sufficient time and focused attention to learning the skills at hand, and finally that there are clear and explicit objectives for what is being taught and learned.

Positive Youth Development: The Five Cs

The Five Cs model was conceptualized and constructed to provide a concise description of PYD and a simple model for youth practitioners that could effectively and efficiently capture outcomes of natural positive development and specific youth development program effects. It was also intended to be more parsimonious than lengthier lists of PYD attributes, such as the 40 developmental assets proposed by the Search Institute (Scales & Leffert, 1999) or a proposed list of ten tasks of adolescent development (Simpson, 2001; Simpson & Roehlkepartain, 2003), although there are clear connections between these and related constructs from resilience research (Masten, 2014). This model highlights five dimensions representing healthy youth development: Caring, Character, Competence, Confidence, and Connections (R. M. Lerner et al., 2005). Together, these dimensions form a holistic overview of youth development that includes positive personal development, social-emotional skills, moral values, and cognitive competence (Catalano et al., 2004; Moore & Lippman, 2005). Featured protective factors include positive self-concept, perceived competence, youth-parent relationships, and interpersonal skills. In addition, the framework includes multiple aspects of a person, from internal representations (confidence), values and moral compass (character), empathy and concern for others (caring), efficacious behaviors, skills, and knowledge (competence in personal and interpersonal situations), to external networks with others (connections; R. M. Lerner et al., 2005; Pittman, Irby, Tolman, Yohalem, & Ferber, 2003).

Several youth studies have utilized the Five Cs model (e.g., R. M. Lerner et al., 2005), and studies in the United States have demonstrated that parents', youth, and youth practitioners' conceptualizations of thriving and positive development can be summarized using the Five Cs framework (King et al., 2005). At the same time, empirical evidence that the Five Cs can be categorized as a second-order factor of PYD has been demonstrated by R. M. Lerner and colleagues (2005). Although this early work focused strongly on understanding the structure of the Five Cs PYD model and how attainment of the Five Cs promoted thriving, or contribution, described as youth active engagement in citizenship (R. M. Lerner, 2009), the broad PYD model hypothesized negative associations between PYD and risk behaviors (R. M. Lerner et al., 2005). In more recent work, Lerner and colleagues (see Bowers, Geldhof, Johnson, Lerner, & Lerner, 2014; J. V. Lerner et al., 2012; R. M. Lerner et al., 2011) have more clearly integrated these associations into their model. This clearer articulation of the processes by which PYD leads to positive outcomes, such as thriving, and is associated with negative outcomes, such as risky problem behavior (Arbeit et al., 2014), parallels the recent conceptual advancements made in prevention science.

Substantial similarities exist across these models, even if the language describing their core aspects is different for each. Other broad and more narrowly defined developmental contextual models also exist (e.g., Kia-Keating et al., 2011; Kurtines et al., 2008) that incorporate many similar features to the three described here. Broadly speaking, they all reflect to some degree an individual's ability to manage emotions, gain a clear and positive sense of self, make responsible decisions, and show respect and cooperation in interacting with others. These dimensions are similar to those broad domains described by Masten and

Coatsworth (1998). When considered in their entirety, they reflect the developmental perspective articulated by Waters and Sroufe (1983) in defining a competent person as one who is able to generate and coordinate flexible adaptive responses to interact effectively with the environment.

Overview of Interventions Targeting Improvements in Core Competencies

The broad integrative models just discussed are drawn from and have inspired intervention studies to demonstrate the associations between the models' core competencies and outcomes of healthy and unhealthy behaviors. In one of the largest meta-analytic studies of SEL interventions to date, Durlak and colleagues (2011) analyzed results from 213 studies involving 270,034 students from grades kindergarten through high school. This study expanded the already substantial body of research examining effects of school-based interventions (e.g., Durlak & Wells, 1997; Losel & Beelman, 2003; Tobler et al., 2000; S. J. Wilson & Lipsey, 2007) primarily because it included studies published in the preceding decade and focused on both positive social emotional skills and risk/problem outcomes. The primary aim of this analysis was to examine whether SEL programs yield positive effects across social and emotional skills, attitudes toward self and others, positive social behavior, conduct problems, emotional distress, and academic achievement. Results indicated that mean intervention effects (calculated using Hedge's *g*, a measure similar to Cohen's *d*) ranged from a high effect size (ES) of .57 for program influence on social emotional skills to a low of .22 on conduct problems and were statistically significant for all six categories of outcomes. Follow-up data, with a median elapsed time of 52 weeks, showed a slight decrease in size of effects, but all remained statistically significant (ES = .11 to .32). Quality of implementation was an important moderator of these overall effects: Programs that were delivered following the SAFE criteria were significantly more likely to obtain stronger effects. Non-SAFE programs failed to show significant effects in all measured outcomes except three—attitudes, conduct problems, and academic performance—and programs that reported implementation problems showed significant effects on only two outcomes, attitudes and conduct problems. These results highlight that high-quality and well-implemented SEL programs can promote development in key social emotional competencies (i.e., promote PYD) and reduce problem behaviors (e.g., prevent conduct problems). Interestingly, the poorly implemented SEL programs may not have influenced competencies but still seemed to have some effect on youth problem behavior. This meta-analysis helps support findings from other analyses and reviews (Durlak, Weissberg, & Pachan, 2010; Greenberg et al., 2003; Weissberg & Greenberg, 1998) indicating that SEL acts as both a promotive and a preventive intervention. More information, however, is needed to support conceptual models that hypothesize change in skills competencies and change in problem outcomes. Mediation, as described, is a critical step in demonstrating these linkages. Next we describe select programs with evidence that promoting competence mediated the effect of program participation on problem behavior reduction or prevention.

The largest study to date that evaluates the PYD framework is the 4-H Study of Positive Youth Development (J. V. Lerner et al., 2012). The study is not a randomized controlled trial of a specific intervention curriculum; rather, the 4-H study is a naturalistic longitudinal study of youth, many of whom are participating in various competence promotion activities through 4-H and other organizations. The study started when youth were in fifth grade in 2002–2003 and has collected data through grade 12 from over 7,000 youth in 42 states (R. M. Lerner et al., 2011). Although not a controlled test of youth development program participation, the study has yielded important information about participation in structured youth activities, the promotion of youth competence and well-being, and the prevention of problem behaviors. The strength of the PYD approach has always been on understanding the positive aspects of youth behavior, but the inherent approach to understanding development across time has consistently examined how positive development was associated with problem behaviors (e.g., Jelicic, Bobek, Phelps, Lerner, & Lerner, 2007; R. M. Lerner et al., 2005) and how involvement in youth development programs could affect positive and negative development and their associations (e.g., Mueller et al., 2011).

Findings confirm hypothesized associations among participation, PYD, and negative behaviors but also suggest some interesting complexities (Arbeit et al., 2014; Lewin-Bizan et al., 2010; Mueller et al., 2011; Phelps et al., 2007). When focused on broad constructs in variable-centered analyses, findings from the 4-H study generally support the hypothesized negative association between a second-order PYD factor and problem behaviors such as depression, substance use, and delinquency (Jelicic, Bobek, et al., 2007; Phelps et al., 2007). And when examining specific outcomes rather than broad composites, PYD shows a significant negative association with tobacco use, with marijuana use and sexual initiation for girls, and with hard drug use for both boys and girls (Schwartz

et al., 2010). When accounting for individual difference variations in patterns of PYD and problem behaviors over time, however, and when examining associations of different longitudinal patterns, the findings are more complex. Although most youth cluster into stable patterns of high, moderate, or low positive or negative behaviors, some youth show more marked change in these characteristics across time (Mueller et al., 2011; Phelps et al., 2009). Additionally, although youth with high PYD over time tend to also show a pattern of consistently low problem behaviors and depressive symptoms across time, this is not uniform. Some youth with consistently high PYD show a pattern of increasing risk behaviors (substance use and aggressive/delinquent behaviors) around grades 7 to 9 and then declining in grade 10 (Lewin-Bizan et al., 2010). Similarly, although a pattern of increasing or stable high depressive symptoms was generally related to stable low PYD, some youth also showed relatively high levels of PYD and increasing depression. These patterns are similar for youth who participated in youth development programs. Using latent class analysis, Arbeit and colleagues (2014) examined profiles of problem behaviors (e.g., delinquency, substance use, depression) when youth in the 4-H study were in sixth to twelfth grades and tested whether these were associated with the Five Cs. Distinct profiles of problem behaviors emerged (e.g., "low risk," "alcohol and aggression") across time points and demonstrated complex associations with the Five Cs. For example, although youth in both the "alcohol and aggression" and "mental health and other risks" groups were using alcohol, their patterns of use differed, and the "alcohol and aggression" group showed higher scores on confidence and competence, while youth in the "mental health and other risks" group scored higher on character and caring.

In general, the findings indicate that youth are involved in many out-of-school activities, with sports being the most common (Zarrett, Peltz, Fay, Carrano, Li, & Lerner, 2007), but it is the combination of sports and participation in more structured activities, such as Boys & Girls Clubs and the YMCA, that has the largest association with broad PYD in sixth to eighth graders. Using a matched comparison design, youth who participated in 4-H activities were compared to youth who participated in other out-of-school activities. Results from eighth grade indicated that 4-H youth reported higher levels of PYD, were more likely to be in the optimal PYD group (i.e., high levels across multiple indicators), had greater contribution, and had higher expectations to go to college (R. M. Lerner et al., 2008). These youth also had lower likelihood of expressing depressive symptoms and of showing other risk behaviors. In grade 11, youth who had participated in 4-H activities and for whom longitudinal data were available reported greater contribution, more overall school engagement and academic competence, and lower rates of engaging in health risk behaviors (e.g., drug use, sexual intercourse; R. M. Lerner et al., 2011). Agans and colleagues (2014) extended this work to examine how patterns of involvement across a variety of activities (breadth of involvement) are associated with positive and problematic outcomes. Results indicated that youth who participated in a broader variety of activities across time generally showed higher levels of the Five Cs and contribution, but youth with high participation also showed higher rates of depressive symptoms. Across time, a pattern of maintaining high involvement in multiple activities was strongly related to higher scores on PYD and less problem behavior. Patterns that showed a decline in involvement across time were associated with greater chances of substance use, depression, and delinquent behaviors.

The findings linking program participation to outcomes are not as strong as might be found in a randomized controlled trial that specifically accounts for baseline differences in important individual characteristics and experiences. Often those baseline characteristics may be related to selection into activities and to outcome measures. For example, when modeling how intentional self-regulation skills (e.g., setting goals, planning how to achieve them, and mounting internal and external resources when confronted with barriers to achieving goals) and participation in youth development programs in grades 8 and 9 relate to PYD outcomes (i.e., the Five Cs and contribution) in grade 10, findings show strong associations of intentional self-development with PYD outcomes and only modest associations between participation and contribution. Participation in grade 8 had a weak association with intentional self-regulation at grade 9, suggesting that these programs may affect PYD at least in part by building self-regulation skills. However, more detailed analyses of the mediating effects are needed.

Promotion and Prevention by Building Nurturing Environments

A commonality of the SEL, PYD, and prevention approaches is the emphasis each places on the contextual characteristics necessary to promote positive behavior and prevent problem behavior. Each identifies the important contribution that nurturing environments, whether they be schools, families, or out-of-school programs, have for reducing adverse social conditions, promoting

and reinforcing "prosociality" (D. S. Wilson, O'Brien & Sesma, 2009), limiting problem behaviors, and promoting psychological flexibility (Biglan, Flay, Embry, & Sandler, 2012). This approach is clearly seen in SEL interventions due to their emphasis on providing safe, supportive, and caring learning environments to foster a strong bond to school that will in turn facilitate the youth's acquisition of social-emotional skills (CASEL, 2005; Greenberg, 2003). Reviews of PYD programs emphasize characteristics of programs that work, including positive adult-youth bonds, in a safe environment in which youth can build mastery through challenging experiences and feel valued by their communities (e.g., Eccles & Gootman, 2002). Prevention programs also focus on building protective resources in the environment, such as parenting and family skills (Sandler, Schoenfelder, Wolchik, & MacKinnon, 2011) or community mobilization and organization (Oesterle et al., 2010).

Schools and families are the two contexts that have been studied more comprehensively in association with PYD and problem behavior. Not surprisingly, these are also the two contexts that are the foci of many prevention and promotion programs (e.g., Greenberg, 2003; Spoth, Kavanagh, & Dishion, 2002). Various reviews and meta-analyses, with a focus on RCTs, have illustrated the ability of well-conceptualized and well-implemented interventions to influence parenting practices (Kaminski, Valle, Fiese, & Boyle, 2008; Lochman & van den Steenhooven, 2002; Sandler et al., 2012; Taylor & Biglan, 1998) and school contexts (Durlak & Wells, 1997; Durlak et al., 2011; Foxcroft & Tsertsvadze, 2011; Greenberg, 2004; Greenberg, et al., 2003; Weissberg & Greenberg, 1998). Parenting interventions for parents of infants, children, and adolescents have successfully changed ways in which parents provide guidance, support, discipline, and nurturance. Parent- and family-focused interventions are able to change important processes associated with youth positive and negative behaviors: parents' sense of competence (Sanders, Markie-Dadds, Tully, & Bor, 2000), maternal responsiveness (Brotman et al., 2008), parents' use of effective discipline (Tolan, Gorman-Smith, & Henry 2004; Wolchick et al., 2007), positive communication (Kosterman, Hawkins, Spoth, Haggerty, & Zhu 1997), family problem solving (DeGarmo & Forgatch, 2005), parent youth relationship quality (Coatsworth, Duncan, Greenberg, & Nix, 2010; Dishion & Andrews, 1995), and parental monitoring (Coatsworth et al., 2010; DeGarmo & Forgatch, 2005; Soper, Wolchik, Tien, & Sandler, 2010). School-based interventions alter the context of school by creating a safe, caring learning environment, improving classroom management, and building a community in which youth are interested and invested (CASEL, 2005; Elias et al., 1991; Hawkins et al., 2004; Pianta & Hamre, 2009; Schaps, Battistich, & Solomon, 2004). Moreover, as noted earlier, these school-based interventions effectively promote the development of critical social-emotional skills (Durlak et al., 2011). Finally, there is ample evidence from both school-based and family-based interventions to indicate that that these effects persist over time, with some effects from family-focused interventions sustaining for up to 20 years (Botvin & Griffin, 2004; Durlak et al., 2011; Sandler et al., 2012).

The same interventions that foster nurturing environments promote healthy youth development and can also influence problem behaviors. Many parenting and family-focused interventions as well as school-based interventions are effective in reducing youth mental, emotional, and behavioral problems (Durlak & Wells, 1997; Durlak et al., 2011; NRC & IOM 2009; Tobler et al., 2000). Effects are evident on a wide range of outcomes, including externalizing problems (e.g., Greenberg, Kusche, Cook, & Quamma, 1997; Sandler et al., 2010; Tolan, Gorman-Smith, Henry, & Schoeny, 2009), internalizing problems (e.g., Cowan, Cowan, & Hemming, 2005; Trudeau, Spoth, & Acevedo, 2007; Wolchick et al., 2002), delinquency (e.g., Botvin, Griffin, & Nichols, 2006; DeGarmo & Forgatch, 2005; Eckenroade et al., 2010) academic engagement and performance (e.g., Elliott, 1997; Oyserman, Bybee, & Terry, 2006; Spoth, Randall, & Shinn, 2008; Stormshak, Connell, & Dishion, 2009; Tolan et al., 2009), substance use (Botvin & Griffin, 2004; Prado et al., 2007; Spoth, Shin, Guyll, & Acevedo, 2006; Wolchik et al. 2002), and risky sexual behaviors (Pantin et al., 2009; Wolchik et al., 2002).

Testing Mediating Processes

The true scientific benefit of these kinds of interventions comes when they are conducted in a rigorously employed and rigorously evaluated RCT with a prospective longitudinal design that can capture changing developmental processes and cascades (MacKinnon, 2008). In such studies, mediation analyses can be used to examine whether the intervention affects proximal processes, which, in turn, affect other positive or negative developmental outcomes. In these instances, the intervention trials can serve as tests of a theoretical model of development (Cicchetti & Hinshaw, 2002), including a theoretical model of how competence and psychopathology are related. Careful attention to what is manipulated is needed, however, as

most RCTs of prevention programs change several core constructs at once (Peterson, 2013).

Results from mediation analyses of experimental intervention studies are beginning to accrue and yield important information about how interventions operate and how building specific social emotional skills or constructing a nurturing environment can account for an intervention's effect on problem behavior (Biglan et al., 2012; Sandler et al., 2010). Most mediation analyses have investigated processes that operate to produce short-term positive developmental outcomes (12 or fewer months postintervention) for youth. Much less common are analyses testing the mediating processes that produce long-term (e.g., greater than 5 years) intervention effects (Sandler et al., 2011). Yet results from several exemplary programs illustrate how mediating mechanisms can identify the sequential and cascading developmental chains produced by an intervention.

Parent Management Training—Oregon Model

As discussed in our section on cascade models, Parent Management Training—Oregon Model (PMTO^{TM}) is a set of evidence-based intervention practices that was developed at the Oregon Social Learning Center by Gerald Patterson and colleagues (2010) that focuses on decreasing and reducing the development of antisocial behavior problems in youth. The practices have been packaged in a variety of interventions designed to influence problem behavior in youth whose families are experiencing a variety of social and contextual challenges. For example, Forgatch has applied these to the context of divorced mothers to develop Parenting Through Change, a 14-session intervention designed to increase skill encouragement, limit-setting, problem solving, monitoring, positive parenting, and decrease coercive parenting in the short term and reduce mental health problems in youth in the long term (DeGarmo & Forgatch, 2005; Forgatch & DeGarmo, 1999; Forgatch et al., 2009). PMTO has been adapted and implemented successfully for diverse communities, including native Norweigians (Ogden & Almlund-Hagen, 2008) and immigrant Somali and Pakistani parents living in Norway (Bjørknes & Manger, 2013); and parents in Iceland (Sigmarsdóttir, DeGarmo, Forgatch, & Guðmundsdóttir, 2013), the Netherlands (Bekkema, Wiefferink, & Mikilajczak, 2008), and Mexico City (Baumann et al., 2014).

This intervention has produced short- and long-term reductions in youth internalizing and externalizing behaviors and long-term effects on more serious delinquency (DeGarmo et al., 2004; Forgatch & DeGarmo, 1999, 2002). Parenting practices were shown to be significant mediators of youth noncompliance, aggression, internalizing and externalizing, teacher-rated delinquency, and appropriate school behaviors 1 and 3 years postintervention (DeGarmo et al., 2004; Forgatch & DeGarmo, 2005). At 9 years postintervention, effects on both teacher-rated delinquency and number of arrests as documented by police records were mediated by both positive parenting (which included both positive interactions and low coercive interactions) and association with deviant peers (Forgatch et al., 2009). These analyses were strong tests of developmental processes hypothesized by Dishion and Patterson (2006) to contribute to the onset and escalation of antisocial behavior and enhanced understanding of mechanisms of change in the Parenting Through Change intervention.

New Beginnings

New Beginnings is a theory-based psychosocial parent training and youth coping enhancement intervention for divorced mothers. The intervention was designed to alter parenting processes and enhance youth coping in 9- to 12-year-old children (Wolchick, Sandler, Weiss, & Winslow, 2007; Wolchick et al., 2000). Results have shown that compared to a home study condition, participation in the intervention significantly improved mothers' parenting postintervention and also reduced child mental health problems but did not directly influence youth coping (Wolchik et al., 2000, 2002). At 6-year follow-up, intervention effects were found on youth internalizing and externalizing, alcohol use, drug use, number of sexual partners, and grade point average (Dawson-McClure, Sandler, Wolchik, & Milsap, 2004; Wolchick et al., 2000, 2002).

The New Beginnings research team has systematically tested hypothesized mediating mechanisms for this intervention, and analyses have revealed important information about how the program produced both short- and long-term effects on youth functioning. Analyses showed that program effects on adolescents' grade point average at 6-year follow-up were mediated by intervention-produced improvements on maternal effective discipline (Zhou et al., 2008). For youth who were at elevated risk of problems at baseline, program-induced improvement in mother-child relationship quality mediated the intervention effect on adolescents' mental health problems 6 years later (Zhou et al., 2008). Intervention effects on substance use and risky sexual behavior at 6 years postintervention for those youth who were at higher risk at baseline were mediated by program-induced changes in parental monitoring (Soper et al., 2010). RCTs of the New Beginnings program have been conducted primarily with Caucasian samples

(around 90%), but as the program enters into a stage of testing program effectiveness through delivery within the court system, adaptations are being made to ensure it is culturally appropriate for a diverse population (Wolchik et al., 2009).

As noted in our cascade discussion, mediation analyses have also shown cascading effects on different dimensions of youth functioning. For example, the program produced immediate improvements in mother-youth relationship quality, which in turn was related to decreases in child internalizing 3 to 4 years later, which led to increases in self-esteem and decreases in internalizing disorders 6 years postintervention (McClain et al., 2010). Another theoretically postulated mediating pathway was supported that showed that increases in effective discipline immediately postintervention led to fewer child externalizing problems at 3 to 4 years postintervention and then to decreased externalizing disorders, decreased substance use, and increased academic achievement (McClain et al., 2010). Moreover, although early tests of the intervention indicated no effect on youth coping (Wolchik et al., 2000), additional analyses indicated that program-induced improvements in mother-child relationship quality led to greater youth coping at 6 months and at 6 years postintervention (Velez, Wolchik, Tien, & Sandler, 2011). Altering the nurturing environment had subsequent effects on youth development of effective coping skills. Similarly, analyses revealed cascading effects such that intervention effects on high-risk youth's educational expectations and job aspirations at 6 years postintervention were mediated by intervention-induced changes in mother-child relationship quality and externalizing and internalizing behaviors (Sigal, Wolchik, Tien, & Sandler, 2012). These carefully constructed analyses yield important information about how the intervention produced both short- and long-term effects on youth adaptive and maladaptive functioning. Moreover, these analyses begin to test models of how changes in parent variables might mediate long-term intervention effects on youth outcomes by maintaining good-quality parenting, changing youth competencies, or changing the transactions between parent and youth (Sandler et al., 2011).

Positive Action

Positive Action is an evidence-based PYD and social-emotional and character development program delivered in schools that attempts to promote improvements in prosocial skills, self-control, and academic achievement while also reducing negative behaviors (Flay & Alred, 2010). It is a comprehensive, schoolwide prekindergarten-through-twelfth-grade intervention focusing on helping youth take a positive attitude toward the self, which aims to affect their self-concept, physical and intellectual actions, social-emotional skills for managing their behaviors, and positive interactions with others. Outcome analyses from quasi-experimental and experimental trials of the program have demonstrated its effectiveness in modifying overall school quality and enhancing student academic achievement and school involvement while also influencing violence, substance use, and risky sexual behaviors. Separate trials were conducted in Hawaii and Chicago with multiethnic samples (Beets et al., 2009; Lewis et al., 2012; Li et al., 2011; Snyder, Vuchinich, Acock, Washburn, & Flay, 2012). Main effects were generally comparable across studies, and moderation effects by ethnicity were not reported.

Mediation analyses of this PYD intervention have demonstrated that program-induced effects on violence, substance use, and sexual activity were mediated by changes in youth positive academic behaviors (setting goals, motivation, problem solving; Snyder et al., 2010, 2013). Focusing on the proximal social-emotional mediators, analyses from data in three separate trials show that the program reduces the decline in positive behaviors (social-emotional and character development behaviors) that occurs with the transition to adolescence (Washburn et al., 2011). Moreover, mediation analyses indicate that the relatively higher social-emotional skills of youth in intervention schools mediate the effects on substance use. This is one of the first studies to illustrate a mediation pathway in a comprehensive, schoolwide social-emotional and character development program bridging the skills taught in the program and problem behavior outcomes.

Moderation of Prevention Effects via Gene–Environment Interaction

In addition to studies of mediation, a compelling future direction for successful prevention programs is identifying moderators of program effects on outcome: that is, determining for whom programs work most effectively. Indeed, the search for mediators and moderators is often complementary, since moderation implies differential effects which may be "carried" via different paths. Although multiple classes of moderators are of interest to those who design and implement prevention programs, work of particular novelty has focused on moderation of prevention outcomes by genetic variation, thus serving as a class of gene–environment interaction (G×E) research termed gene–intervention (G×I) interaction.

An early example of this work has focused on the Strong African-American Families (SAAF) and Strong African-American Families-Teen (SAAF-T) programs, aimed at reducing substance use and other risk behaviors among African American youth living in the rural South; data from this project have also contributed to the cascade literature, as noted earlier (Brody et al., 2010). Selected findings from these studies have demonstrated that youth with the 5-HTTLPR short allele variant who were randomized to the prevention program showed risk behavior comparable to control youth (Brody et al., 2009); that a continuous multilocus genetic "risk" variable (markers from DRD4 and GABA-related loci) interacts with program status in predicting an increased frequency of alcohol use for control participants but not prevention participants (Brody, Chen, & Beach, 2013); and that prevention program participation attenuates the association of negative parenting and diminished telomere length, a biomarker associated with aging (Brody, Yu, Beach, & Philibert, 2015). Major advantages of this randomized design are the ability to rule out gene-environment correlation as a competing explanation for differential effects as well as more accurate effect size estimates for different subgroups of youth (Brody, Beach, et al., 2013). Using data from this project and several others, meta-analytic work confirms moderating effects of genotype on randomized prevention and intervention programs (Bakermans-Kranenburg & van IJzendoorn, 2015; van IJzendoorn & Bakermans-Kranenburg, 2015), emphasizing that such genetic moderation can be conceptualized in the framework of differential susceptibility to environmental effects, for better and for worse (Boyce & Ellis, 2005).

Prevention Programs: Summary

Because our chapter focus is broad links between competence and psychopathology, our review of prevention research based on competence promotion is of necessity selective. However, from this research, we can note several exciting developments. First, program terminology is evolving so as to emphasize positive aspects of development, strengths, and assets, and linguistic conflicts between prevention, competence promotion, and positive psychology are fading, as is appropriate. In addition, the empirical evidence base on prevention programs is growing, in particular work that includes large sample sizes followed longitudinally over several years and incorporates relatively intensive assessments.

Theoretically, we also observe broad similarities and connections among conceptual frameworks such as the Core Competencies model, SEL, and the Five Cs of PYD, and between these frameworks and our earlier discussion of developmental tasks. Each of these models highlights the importance of skills such as self-awareness, empathy, connections to others, and effective decision making in promoting positive development and, therefore, competence in age-salient developmental tasks. Of particular interest and relevance is the growing body of prevention program evaluations that test theoretically specified models of how proximal variables mediate the positive effects of program participation as well as recent work on genetic and biological moderation of prevention program effects. For mediation, we see similarities across programs and research teams, with parenting practices (e.g., effective discipline and monitoring), positive parent-child relationships as well as youth goal setting, problem solving, and SIP coming to the fore as key mediators in selected studies. Clearly there is more work to be done in this area: In particular, it will be important to have ongoing communication between intervention and naturalistic researchers in terms of the assessment and measurement of some of the constructs. Many, but not all, of the constructs included by prevention scientists have close referents in naturalistic longitudinal work on competence; it will be important for future work to refine taxonomies of these constructs to avoid both unnecessary overlap as well as excessive fragmentation.

CONCLUSIONS AND FUTURE DIRECTIONS

One notable change in work on competence and psychopathology seen in recent years is the acknowledgment that these two ostensibly separate areas of inquiry are mutually interdependent and mutually influencing; that this basic idea is now often implied rather than explicitly defended is progress for the field. However, we have advanced to the point where more specific claims about influences among competence and psychopathology should be made, and where, as appropriate, potential limitations of newer methodologies are starting to emerge.

First, it is clear that the dominance of the *DSM* system for the classification of mental disorders creates significant challenges for an integrated science of competence and psychopathology. Although explicitly acknowledged as a system with many stakeholders who often have competing interests, and although created from a governing body with input from developmental psychopathologists (but not guided primarily by them), the *DSM* nonetheless exerts tremendous direct and indirect influence on the

questions posed by researchers in this area. This is particularly evident in the work on functional impairment, where work that seeks to test critical alternatives to *DSM*-based scales remains limited outside of a few select instruments and where efforts to separate out impairment from diagnostic criteria, although admirable from a scientific viewpoint, are likely to be extremely difficult. Although functional impairment encompasses a very broad range of content—and includes domains less often studied in modern developmental task research, such as physical mobility, self-care, and hobbies and leisure activities—it remains important for our consideration. In particular, the inclusion of impairment measures as part of outcome batteries (and, we hope, intermediate assessments) for intervention RCTs (Becker et al., 2011; Fabiano & Pelham, 2009) is a welcome development that could help clarify the mechanisms of action for some of the field's best-documented treatments for youth mental illness.

Second, the organizing idea of developmental cascades has motivated a substantial body of recent research on longitudinal links between salient constructs. As noted, the focus of this work has broadened from early studies focusing on major competence domains and broad psychopathology dimensions of internalizing and externalizing, to studies that include a wide range of other individual and contextual variables, such as effortful control, stressful life events, and divorce. Both early and more recent work have demonstrated the key significance of academics and social competence as broad-based developmental tasks that, in multiple studies, have mediated the longitudinal associations between externalizing and internalizing problems in paths that support, among other theories, dual failure models of the development of depressive symptoms (Capaldi, 1992). Work focused on academics underscores the early development of important linguistic and pre-academic skills and the generally high rank-order continuity of academics throughout childhood and adolescence; nonetheless, multiple studies show evidence for externalizing problems potentially undermining academic achievement and for academic failures potentially contributing to increases in internalizing problems. Academic skills themselves can be predicted all the way from infancy, albeit modestly, through pathways involving physical mobility and exploration (Bornstein et al., 2013c).

Work focused on social competence has shown compelling evidence for its mediating role between externalizing and internalizing problems. In addition, multiple reports show evidence for increasingly entangled associations between social functioning and externalizing through middle to late childhood and early adolescence. Although the presence of a close friend can serve to mitigate some of the negative associations between social difficulties and internalizing problems, the nature of friendships must be considered carefully, since deviant peer associations (via deviancy training) are a key driver of escalation from moderate externalizing problems to more serious violent behavior in adolescence (Van Ryzin & Dishion, 2013).

Social competence is a particularly difficult target construct and is perhaps better conceptualized as a family of constructs. Associations between social functioning and other competence and problem domains are expected to vary depending on the breadth of assessment and, more specifically, whether peer status and friendship measures are included; they may also vary by context and rater (Dirks, Treat, & Weersing, 2007). For example, a full cascade from externalizing through self-reported peer victimization to internalizing problems was found in early childhood by van Lier and colleagues (2012), but not using a maternal-report measure of broad social competence by Burt and Roisman (2010), suggesting possible differences by either informant or construct breadth. However, we still have relatively little basis on which to theorize differential prediction depending on these varied assessments; thus, further work delineating key aspects of social competence is needed. One intriguing example, related to the NIMH RDoC initiative described earlier, is research by Iarocci, Yager, and Elfers (2007) on G×E interactions in social competence that argues for developing social endophenotypes for molecular genetic study possibly based on well-defined constructs such as sociability, face recognition, emotion recognition, and theory of mind, and the study of extreme groups formed via crossing of these constructs. Very few of the cascade studies reviewed herein assess these more specific facets of social competence.

It is important to emphasize that although our general focus on and organization of cascades by academics and social competence represents the primary salience of these two broad domains for childhood adaptation, there is a clear need for cascade-informed work that examines aspects of competence outside of these two areas. Several examples of this broader work have been noted earlier, such as work on EC (Eisenberg et al., 2010) and work on the multifaceted construct of PYD (Lewin-Bizan et al., 2010). The work we have highlighted from prevention programs provides examples of additional target constructs for future work, such as effective decision making and problem solving in youth, as well as a host of parenting-related variables that have only been rarely studied intensively over time from a cascade framework.

There is also a need for careful consideration of neuroscientific, biological, and genetic levels of analysis for future work on competence and psychopathology. Other than the prevention program G×E research discussed and a handful of other studies (e.g., Riggs, Greenberg, Kusché, & Pentz, 2006), the cascade and prevention work reviewed has not included these levels of analysis in structural models. However, blending the multiple-level assessment approach inherent in much biological and molecular genetic studies with the longitudinal and statistically sophisticated work reviewed here is a natural direction for future work. This is especially important given recent interest in the biological embedding of social and environmental experiences—work that tests how both positive and negative environments affect biological processes such as gene expression, promotion of genetic transcription factors, inflammatory immune responses, and other biomarkers of both stress and health (e.g., Boyce, Sokolowski, & Robinson, 2012). Emerging domains of inquiry in population neuroscience (blending demography insights with neuroimaging; Falk et al., 2013) and human social genomics (Slavich & Cole, 2013) highlight new visions of the "social brain" and the potential for cascading effects across levels of analysis that help elucidate precursors and consequences of social relationships as well as new moderators at both behavioral and biological levels.

Such work can clarify competence-psychopathology associations in different ways. For example, a recent twin study by Boivin and colleagues (2013) has shown evidence for the short-term longitudinal association between disruptive behaviors in kindergarten and peer problems in first grade being primarily genetically mediated, with controls for continuity in each domain. That is, via mechanisms consistent with evocative gene-environment correlation, genetically influenced disruptive behavior problems appear to lead to negative peer experiences over time. Additionally, as outlined in an earlier section, the NIMH RDoC initiative promises to focus greater research attention on multiple levels of analysis with a particular emphasis on the genetic, molecular, and neurobiological underpinnings of constructs central to this review. The potential further unpacking of social competence is a striking example, but new perspectives in epigenetics and brain-behavior interplay will also influence future causal models of academics, externalizing, internalizing, and many other constructs discussed in this chapter.

More generally, we expect that the future will bring more focus on delineating and testing explicit processes at multiple levels of analysis that may account for naturally occurring and intervention-induced connections and cascades among domains of adaptive function encompassed by the broad concepts of competence and psychopathology. Although advances in theory and empirical methods linking competence and psychopathology are clearly evident in the decade of work highlighted in this chapter, much of the theory remains quite general and abstract when it comes to explaining how competence and psychopathology become linked in development. Better specification of change processes will inform intervention as well as theory.

Additional work on measurement of key constructs also is needed. For example, although the questionnaire-based assessments of much internalizing and externalizing research have an extensive history in the field, parsing the boundaries between normal and abnormal functioning in a nuanced way and capturing the complexities of contextual interactions will likely require integration of observational and dyadic methods in addition to well-validated questionnaire and checklist measures. For example, the careful theoretically informed creation of structured observational methods, joined with novel questionnaire measures, has led to potential advances in the refinement of developmental models of disruptive behavior problems in preschoolers (Wakschlag, Choi, et al., 2012; Wakschlag, Henry, et al., 2012).

Other general considerations are important for future work on competence and psychopathology. First, as in all other areas of science, replication across independent samples is essential for continued progress (e.g., Dodge et al., 2008, 2009; Patterson et al., 2010). Although several broad findings have now shown replication in the cascades literature, amassing a more detailed body of work will continue to be challenging as research teams across the field have invested tremendous time and resources in longitudinal studies that may or may not contain equivalent assessment measures.

Second, we hope that future theoretical and empirical work in this broad domain will include a focus on both effect sizes and potential moderators of observed cross-domain longitudinal associations. We applaud the work by Durlak and colleagues (2011) who have illustrated the value of reporting effect sizes from large-scale meta-analyses in prevention work on SEL and encourage the broader reporting and discussion of effect size. In terms of moderators, it is striking that the large majority of tests of gender moderating cross-domain paths have not found evidence for differences in their strength between males and females. Thus, despite well-known mean gender differences in many of the constructs studied, the processes that link these domains may be largely similar across

gender. However, gender is only one potentially relevant moderator of competence-psychopathology associations, making the careful selection of new moderators a key task of future work. Importantly, increased attention to effect size and a search for moderators are complementary goals, because a moderator is relevant largely to the extent that effect size differences across levels of the moderator exceed a meaningful threshold. Those thresholds will necessarily vary across specific research topics, and further refinement of our theories is needed for their establishment.

Third, work on competence and psychopathology will benefit from close consideration of recent work on causal inference and causal mediation (Foster, 2010; Imai et al., 2010; Pearl, 2012). Integration of this technical work will allow for a more explicit consideration of assumptions made in both nonexperimental and experimental work related to causality and will help the field, both by using consistent terminology and also by motivating new research designs and analytic methods that may help us get closer to identifying key causes and intermediary processes that bring about these observed associations.

Finally, the field lacks comprehensive evidence on how culture, race, and ethnicity affect relations between competence and psychopathology; this gap is evident across all three major topics of this chapter. In terms of functional impairment, the growing research base on cross-cultural variation in psychopathology almost uniformly focuses on *symptoms* and only rarely considers the impairment presumably caused by those symptoms (or contributing to them). Although competence judgments based on developmental tasks can be seen as culturally-bound value judgments, less work in this area has examined processes of acculturation systematically, making this an important future direction (Chen, Fu, & Leng, 2014). In terms of race and ethnicity, several cascade studies reviewed include ethnicity as an analytic covariate, but aside from a few exceptions (e.g., Dishion et al., 2010; Hishinuma et al., 2012; Huang, 2015), these studies do not test for ethnic status as a moderator of key associations. Ideally, future cascade work will test theory-based moderators and include constructs relevant to the development of ethnic minority youth, such as discrimination and ethnic identity, which may elucidate pathways of interest. And although several successful prevention programs have been expanded cross-culturally and cross-nationally, the adapting of program content to new countries and cultures raises challenges for testing cultural moderation of program effects. For all three areas of focus, the integration of cultural context and biology through study of gene–culture interplay and cultural epigenetics (Causadias, 2013) will likely be of importance to future research in domains covered in this chapter.

It is instructive to consider the concluding remarks from the prior edition of this chapter and assess their focus, impact, and continued relevance (Masten et al., 2006, pp. 725–728). At that time, we celebrated the impact of positive psychology and the PYD movement, along with other work on resilience in youth, that continues to shine light on the competent side of adaptation in general and, in particular, how competence in certain domains at certain times can prevent psychopathology and lead to progressively better outcomes. We also noted the beginnings of complex modeling approaches, such as cascade models, that occupy a more central role in this edition. Although there is much to celebrate in terms of the field's advances in recent years, progress has been (perhaps understandably) slower in integrating mental disorder classification systems such as *DSM-5* with broader research on the nature of competence, disorder, impairment, and disability.

However, there is great hope for continued progress integrating the study of competence and psychopathology in the near future. We have a growing body of work that is exploring key questions around the definition and assessment of mental disorder and how to best separate out symptoms of disorder from impairment; a set of studies using longitudinal cascade models that collectively help to elucidate pathways by which symptoms and competence interact over time; and a robust and growing body of prevention data that has increasingly employed sophisticated tests of mediation and G×E in addition to well-developed conceptual models. We look forward to increasing integration of all three of these broad areas in the near future, with continued attention to more stringent tests of competing theories in each domain.

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CHAPTER 10

The Development of Coping: Implications for Psychopathology and Resilience

MELANIE J. ZIMMER-GEMBECK and ELLEN A. SKINNER

It's a characteristic of human nature that the best qualities, called up quickly in a crisis, are very often the hardest to find in prosperous calm. The contours of all our virtues are shaped by adversity.

—GREGORY DAVID ROBERTS, *SHANTARAM*

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A primary justification for the study of coping is the notion that, when people are faced with adversity, the ways they react to and deal with its challenges can make a material difference to their subsequent development. If they are overwhelmed, they can become more vulnerable to subsequent psychological problems and disorder; if they rise to the challenge, they can become toughened, strengthened, and more resilient to future threats and difficulties. Akin to the concept of host resistance in the study of whether exposure to germs will lead to illness or to immunity, the concept of coping refers not to the assets and liabilities people bring to their dealings with adversity but instead to how people actually interact with the real problems, setbacks, and difficulties they encounter daily,

right on the ground. These myriad ways of coping, such as problem solving, negotiation, rumination, accommodation, escape, confrontation, and help seeking, describe specific transactions along the arc of episodic encounters with stress and suggest one set of mechanisms through which adversity can erode individual resources to create long-term liabilities or, alternatively, can help individuals accrue lasting competencies for managing stress.

Surprisingly, however, the strands of research that focus on coping have not been well integrated with research on resilience and the development of psychopathology. Despite the potential centrality of coping as a moderator and mediator of exposure to stress, coping is rarely included in programs of study focusing on developmental psychopathology or resilience (cf. Cicchetti & Rogosch, 2009). By the same token, despite the fact that the adversities people face, such as poverty and maltreatment, shape both the array of problems they confront and the resources they can access to deal with them, coping research rarely considers the effects of higher-order contexts (cf. Tolan & Grant, 2009). All of these areas would benefit from a further exploration of their inherent interconnections.

The natural overlaps among coping, developmental psychopathology, and resilience have been expanded over the last several decades by a major shift in conceptualizations guiding the study of coping during childhood and adolescence. This shift was initiated in the 1980s with the publication of the book *Stress, Coping, and Development in Children* (edited by Garmezy & Rutter, 1988) and the seminal article in *Psychological Bulletin* titled "Coping with Stress during Childhood and Adolescence" (Compas, 1987a), and then it accelerated rapidly during the late 1990s (Eisenberg, Fabes, & Guthrie, 1997; Skinner & Edge, 1998; Wolchik & Sandler, 1997). Since that time, conceptualizations of coping during childhood and adolescence have branched off from work on coping during adulthood (Aldwin, 2007), after which it was largely patterned, to focus not only on individual differences but also on the *development* of coping. This "new" way of looking at coping, which takes the concept back to its roots as an adaptive process (Murphy & Moriarity, 1976; White, 1974), has forced a reconsideration of the very definition of coping as well as the meaning of ways of coping, their antecedents and consequences, the role of social partners, and, most important, qualitative shifts with age in how the adaptive processes that comprise coping are organized across infancy, childhood, adolescence, and early adulthood (Skinner & Zimmer-Gembeck, 2007, in press).

GOAL OF THE CHAPTER

The goal of this chapter is to review conceptual and empirical progress in the study of the development of coping and to identify important ways in which this work may be useful to researchers studying the development of psychopathology and resilience. We present our review and ideas in three main sections, each representing a different perspective on coping. An overview of the contributions of each of these perspectives to an understanding of the connections among coping, psychopathology, and resilience is provided in Table 10.1. First we focus on coping as a *transactional process*, basically as constituting individual differences in appraisals and ways of dealing with stressful demands and the emotions they generate. Here we review what is known about the links between different ways of coping, appraisals, and coping resources, on one hand, and different forms of psychopathology and adaptive functioning, on the other hand. We primarily draw from research on children and adolescents, but research with adults is also reviewed when it is important for identifying future directions for research with youth. We also provide conceptual and methodological critiques of this work to date.

Then we describe coping as a *fundamental human adaptive process* that involves the regulation of multiple subsystems (e.g., emotion and attention) that are activated by stress and that also shows regular age-graded developments in how such regulation is accomplished. We explain how a developmental perspective requires a reorientation of the study of coping, including a developmentally friendly definition of coping itself. We review studies of normative age differences and age changes in adaptive and maladaptive ways of coping and knit together research from within and outside the coping area to create a picture of the neurophysiological underpinnings and qualitative shifts in coping as it develops from birth to emerging adulthood. This section highlights the important roles that close relationships with caring adults play in the healthy development of coping and explains how stressful encounters can provide opportunities for the development of coping and regulatory capacities, resources, and efficacy, if demands are manageable, interpersonal supports are sufficient, and parents (and other adults) help children channel setbacks and failures adaptively—by learning and growing from them. We describe how these basic building blocks all work together to contribute to the normative development of appraisals, coping, and personal and social coping resources in order to show how they inherently provide a platform or foundation for more complex theories

TABLE 10.1 Three Perspectives on How the Study of the Development of Coping Can Contribute to Research on Developmental Psychopathology and Resilience

Transactional Perspectives: Coping as Individual Differences in Stress Reactivity and Responses
Coping is a moderator. Ways of coping represent families of adaptive and maladaptive responses to stress and so fundamentally buffer or exacerbate the effects of stress and adversity on psychopathology and resilience.
Coping is a mediator. Adaptive and maladaptive coping are parts of the pathways through which exposure to stress contributes to psychopathology and resilience.
Individual ways of coping are part of a profile of reactions and responses during the course of stressful encounters. Coping can supplement the study of individual ways of coping implicated in psychopathology (such as rumination or social isolation) by considering the repertoire, combination, or sequence of ways of coping that children and adolescents enact over the arc of multiple coping episodes.
Coping is a critical mechanism through which a variety of assets and liabilities, such as self-efficacy, pessimism, and social support, which have long been implicated in psychopathology and resilience, exert their effects.
Normative Developmental Perspectives: Coping as a Fundamental Adaptive Process
Developmentally friendly conceptualizations, which define coping as regulation under stress, integrate research on the development of both stress reactivity and the many kinds of regulation (emotional, attentional, motivational, behavioral, etc.) that are activated by stressful encounters.
Because *core families of coping represent fundamental adaptive and maladaptive processes*, they are tightly linked to other subsystems that serve to detect and deal with threats and danger, such as processes of temperament, attachment, mastery, and self-determination.
Coping influences everyday resilience and marks a site of developmental potential. Coping shapes how children and youth bounce back from daily stressors. Such episodes can be opportunities for the development of regulatory capacities and coping efficacy, if stressors are manageable, personal and interpersonal resources are sufficient, and parents (and other adults) help children channel setbacks and failures adaptively—by learning and growing from them.
Developmental Systems Perspectives: Coping as Part of Developmental Cascades
The stresses of adversity can undermine the healthy development of coping—based on its effects on the neurophysiological, psychological, and social underpinnings of coping. The development of adaptive coping requires years of deep developmentally attuned interpersonal support for dealing with just-manageable demands. Stressful overarching social conditions, such as poverty, oppression, discrimination, harsh families and parenting, maltreatment, and neglect, pose serious risks to the healthy development of coping.
Coping is reciprocally related to psychopathology and resilience. Psychopathology interferes with constructive coping and triggers maladaptive stress reactions. Hence, coping is a key marker and player in the developmental cascades from which psychopathology emerges.
Coping can be a powerful intervention lever in preventing deleterious short- and long-term consequences of stress, risk, and adversity. Upstream interventions that focus on strengthening relationships and promoting core coping resources and coping efficacy should have the biggest impact on the construction of appraisals and coping processes that foster resilience.

and research on the development of psychopathology or resilience.

The section titled "Developmental Systems Perspectives" brings together work on individual differences and normative development to consider coping from a multilevel dynamic developmental systems perspective. According to this approach, coping is always part of developmental cascades that contribute to resilience or psychopathology. Profiles of adaptive and maladaptive coping can be considered both markers and mechanisms for cascades leading in a multitude of directions, and ways of coping are important processes that shuttle individuals back and forth between different pathways. We draw from work on temperament, attachment, and family stress to identify examples of underlying biological and overarching contextual risk and protective factors that shape developmental transitions and dynamics and so likely play a role in developmental cascades that mark and contribute to psychopathology and resilience. We end the chapter with some suggestions about how future research can productively combine work on the development of coping with work on the development of psychopathology and resilience.

TRANSACTIONAL PERSPECTIVES: COPING AS INDIVIDUAL DIFFERENCES IN APPRAISAL AND COPING PROCESSES AND RESOURCES

Early work on coping during childhood and adolescence, inspired by research with adults, focused on coping as a transactional process that unfolds in several recursive steps (Folkman & Moskowitz, 2004; Lazarus & Folkman, 1984). According to this perspective, as pictured in Figure 10.1,

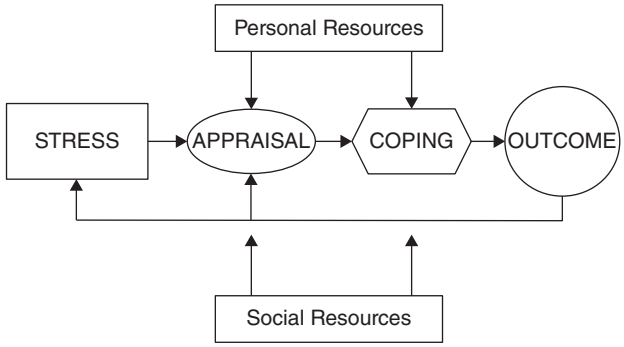


Figure 10.1 Coping Depicted as a Transactional Process of Appraising and Dealing with Demands.

coping transactions are initiated by encounters with *stress*, defined as internal and external events that individuals appraise as important to their well-being and as taxing or exceeding their resources (Lazarus & Folkman, 1986, p. 63). Cognitive appraisals, focusing on the extent to which the stressor is personally relevant and amenable to personal control, result in views of the encounter as constituting a *threat* (i.e., impending harm), a *loss* (i.e., irreversible harm that has already been incurred), or a *challenge* (i.e., a stressor the individual is confident about mastering).

These appraisals trigger bouts of coping, defined as "cognitive and behavioral efforts to master, tolerate, or reduce external and internal demands and conflicts among them" (Folkman & Lazarus, 1980, p. 223), which utilize personal and social resources to solve the stressful problem or manage the individual's negative emotional reactions to it. These efforts produce coping outcomes, which, by feeding back to both the stressful event and individuals' reappraisal processes, can terminate or prolong the stressful transaction. According to this perspective, coping can be seen as a process that involves a wide variety of ways of reacting to and dealing with stressors that are organized sequentially, forming an interconnected action sequence or coping episode (Folkman & Lazarus, 1985).

Stress, Appraisals, and Coping Associated with Adjustment and Psychopathology

A primary focus of research on stress and coping across the life span has been on correlating the many ways of coping with indicators of adjustment, such as internalizing behavior (e.g., depressive and anxiety symptoms or disorders) or externalizing behavior (e.g., behavior problems and aggression or conduct disorder). In fact, in 2000, Coyne and Racioppo reported that the cumulative number of publications with coping as a keyword totaled almost 25,000 articles, with the great majority focused on identifying stress and coping as risks or resources for mental health and adjustment. Literally thousands of additional studies have been published in the past 15 years. The size of the literature makes it difficult to achieve a comprehensive review, but a few trends are apparent. For example, in the most recent decades, contemporary research has focused on stress and coping as correlates of physiological functioning and physical health (Appleton, Buka, Loucks, Gilman, & Kubzansky, 2013; O'Leary, 1990; Penley, Tomaka, & Wiebe, 2002; Walker, Smith, Garber, & Claar, 2007), and even more recently, a small but growing number of studies focus explicitly on stress, coping, and psychopathology (e.g., Boxer, Sloan-Power, Mercado, & Schappell, 2012; Tolan, Gorman-Smith, Henry, Chung, & Hunt, 2002). Multiple reviews summarize much of this research (Bridges, 2003; Clarke, 2006; Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Compas, Orosan, & Grant, 1993; Decker, 2006; Frydenberg, 1997; Nes & Segerstrom, 2006; Penley et al., 2002; Petticrew, Bell, & Hunter, 2002; Seiffge-Krenke, 2011; Taylor & Stanton, 2007; Wolchik & Sandler, 1997).

Stressful Life Events

Across these reviews, it is clear that major life stressors, including the death of a loved one, witnessing a traumatic event, or experiencing abuse by family members or others, are common experiences among children and adolescents, occurring for about 25%. An even greater number of children and adolescents experience repeated, sometimes daily, hassles related to school (e.g., fights or problems with teachers or academic performance) and interpersonal relationships (e.g., conflicts or problems with parents, siblings, and peers; Donaldson, Prinstein, Danovsky, & Spirito, 2000). Both significant life events and daily hassles have been associated with increasing symptoms of psychopathology over time, including depression, anxiety, and delinquent behavior (Compas, 1987a,b; Compas et al., 2001). Although these associations are usually small to moderate in most studies, associations are much stronger when specific stressors are examined, such as peer victimization (Harper, 2012; Kochenderfer-Ladd & Skinner, 2002; Zimmer-Gembeck, Hunter, & Pronk, 2007; Zimmer-Gembeck et al., 2013), friendship and romantic formation or dissolution (Nieder & Seiffge-Krenke, 2001; Seiffge-Krenke, 2011; Zimmer-Gembeck, Siebenbruner, & Collins, 2001); racial discrimination (Berkel et al., 2010; Brittian et al., 2013; Pascoe & Smart Richman, 2009; Umaña-Taylor & Updegraff, 2007), or community violence (Fowler, Tompsett, Braciszewski, Jacques-Tiura, & Baltes, 2009).

Despite clear evidence that the experience of stressful life events is a risk factor for children and adolescents, it has been widely acknowledged that, in order to understand the development of psychopathology, it is important not only to attend to the intensity and chronicity of stressful events but also to take into account individuals' appraisals of stress, their coping responses, their feelings of efficacy in being able to carry out successful coping efforts, and their personal and social resources for coping (Moos & Holohan, 2003; Taylor & Stanton, 2007). In the remainder of this section we summarize and build on previous reviews linking stress and coping with psychopathology

and positive adjustment, emphasizing studies of childhood and adolescence. We begin with what is known about general coping categories and their associations with psychopathology. We then consider how psychopathology and adjustment are related to specific coping strategies, to cognitive appraisals of stressful events, to coping self-efficacy, and, more recently, to profiles or combinations of coping strategies and resources. We end with a summary of transactional models of the connections among stress, coping, adjustment, and psychopathology as well as findings from new and innovative research studies, using intensive repeated measures, which provide evidence of reciprocal linkages between coping and psychopathology.

Challenges to Summarizing Research on Coping

In integrating studies of coping, we faced three challenges that have often been noted in the literature. The first was to figure out how to compare the many ways of coping examined across different studies—which show little consistency and typically employ different or partially overlapping lists of ways of coping. Hundreds of ways of coping have been identified, which have been combined into dozens of instruments to assess them, primarily through standardized self-report questionnaires, written open-ended responses, or open-ended interviews, but also via others' reports of coping (e.g., spouses, parents, teachers, friends) and, less frequently, diary methods and observation (Skinner, Edge, Altman, & Sherwood, 2003). In efforts to manage coping's apparent complexity, many researchers who examine the links between coping and psychopathology have boiled these variegated response options down to two categories, sometimes referred to as problem-focused versus emotion-focused, engagement versus disengagement, approach versus avoidance, or active versus passive (and described in more detail in subsequent sections).

A second challenge, given their potential overlap, was to distinguish between ways of coping and psychopathology, both conceptually and in terms of measurement. Maladaptive ways of coping sometimes are so closely connected to psychopathology that researchers have questioned whether coping assessments tap *symptoms* rather than predictors of disorder (Compas et al., 2001). Moreover, studies sometimes use measures that confound personal or social attributes, stress, and psychopathology, so that, for example, interrelations between coping and psychopathology might be explained by overlapping item content related to levels of stress and emotional distress (Austenfeld & Stanton, 2004; Coyne & Racioppo, 2000; Lazarus, 2000; Park, Armeli, & Tennen, 2004). As a result, in measurement work, researchers have had to carefully remove items from coping inventories that overlap with measures of emotional distress, and internalizing and externalizing behavior (Ayers, Sandler, West, & Roosa, 1996; Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000; Treynor, Gonzalez, & Nolen-Hoeksema, 2003).

A third challenge to integrating work on coping stems from the broad array of stressor domains (e.g., medical conditions, victimization, environmental disasters) that are covered in current research on children and adolescents. It is now clear that conclusions about whether certain kinds of coping responses are adaptive versus maladaptive across a range of mental health outcomes (e.g., Kendall & Terry, 2008) depend heavily on the type of stressor with which children and adolescents are dealing, particularly on identifiable features of stressful events, such as their severity or perceived controllability (Skinner & Zimmer-Gembeck, 2011; Zimmer-Gembeck & Skinner, 2011). In fact, in recent years, this conclusion seems to be implicitly acknowledged in the coping literature as research has become even more differentiated and focused—as reflected in the increasing proliferation of special population studies in which researchers often focus on a single specific stressful health condition, chronic situation, or acute event, with the aim of explaining one or many potential adjustment outcomes.

Links between Broad Categories of Coping and Psychopathology

Problem-Focused and Emotion-Focused, and Approach and Avoidance Coping

One of the most commonly known broad categorizations of coping is the differentiation of strategies that are primarily problem-focused from those that are more emotion-focused (Lazarus & Folkman, 1984). Problem-focused coping is usually defined to include strategies enacted in an attempt to modify or directly confront the stressful event, such as problem solving and direct action. Emotion-focused coping is usually defined to include responses that serve the purpose of managing emotional reactions to stress, such as social withdrawal, distraction, and emotional venting. Studies that examine the association of problem-focused and emotion-focused coping categories with psychopathology have considered a wide range of outcomes, most frequently depression, anxiety, loneliness, suicidal ideation, self-esteem, and positive well-being. A smaller number of studies have assessed additional outcomes, such as stress reduction, physiological reactions, or physical health (e.g., Appleton et al., 2013).

In reviewing the literature on problem-focused and emotion-focused coping and adjustment among children

and adolescents, Losoya, Eisenberg, and Fabes (1998) noted two general trends: (1) problem-focused coping strategies are associated with fewer emotional and behavioral problems and greater social competence, whereas emotion-focused coping is generally associated with more internalizing and externalizing symptoms; and (2) these findings are not uniform across studies and generally depend on the type of stressor or features of the stressor. Subsequent research confirms both of these trends. For example, in one recent study, the use of more problem-focused coping responses was correlated with fewer symptoms of mental health disorders (Li, DiGiuseppe, & Froh, 2006), but other studies found no such associations (e.g., Horwitz, Hill, & King, 2011). Findings are slightly more consistent across studies of emotion-focused coping, in that greater use of these strategies is correlated with elevated symptoms of mental health disorders (Horwitz et al., 2011; Rafnsson, Johnson, & Windle, 2006).

However, a recent study by Krattenmacher et al. (2013), which also found that problem-focused coping was associated with better mental health, draws attention to the different forms that emotion-focused coping can take, producing a more differentiated pattern of associations with psychopathology (see Stanton, Danoff-Burg, Cameron, & Ellis, 1994, for similar conclusions in work with adults). In a study of 214 adolescents coping with their parents' cancer, some emotion-focused strategies, specifically those that also had an approach or active component, such as cognitive reappraisal, were associated with better mental health, whereas those strategies that had the function of venting emotions or of avoiding emotions or stressors were associated with worse mental health (see Austenfeld & Stanton, 2004, for more detail on emotion-focused coping subtypes). In summary, the general evidence points to the positive role of problem-focused coping and the negative role of emotion-focused coping in adjustment. Yet such findings are often inconsistent across studies, potentially because the broad categorization of problem-focused versus emotion-focused may not always adequately discriminate the pattern of coping responses that account for increasing mental health problems or effective resolution and adaptation.

Although the broad categorization of problem-focused versus emotion-focused coping is probably better known (Lazarus & Folkman, 1984), the most commonly used categorization of coping in recent studies of children and adolescents refers to general styles of approach (sometimes also called active or engagement coping) and avoidance (sometimes also referred to as disengagement coping; e.g., Causey & Dubow, 1992; Compas et al., 2001; Ebata & Moos, 1991; Jaser et al., 2007; Lengua & Stormshak, 2000). Definitions of approach coping, which often share many of the same responses as problem-focused coping, include cognitive or behavioral efforts to manage the stressor. These are usually measured as problem solving, cognitive reappraisal, information or support seeking, and taking concrete action. Avoidance coping includes both cognitive and behavioral responses that serve the function of avoiding the distressing event or circumstances. Most often this is measured as distraction from the stressor, ignoring the situation, denial or minimization, withdrawal, escape, and/or wishful thinking.

When reviews and the latest research are considered, there is substantial evidence that, among children and adolescents, approach and active forms of coping are associated with positive adjustment as well as with fewer symptoms of mental health problems. Such findings are generally consistent with the findings for problem-focused coping strategies (Compas et al., 2001; Fields & Prinz, 1997; Holahan & Moos, 1991; Lengua & Stormshak, 2000). Evidence is especially strong when measures of approach coping tap the use of these responses relative to avoidant forms of coping. In contrast, avoidant forms of coping are very frequently associated with risks for heightened negative outcomes, such as greater psychological distress and elevated behavior and other externalizing problems (Krattenmacher et al., 2013; Rohde, Lewinsohn, Tilson, & Seeley, 1990; Seiffge-Krenke & Klessinger, 2000).

Three reviews have summarized evidence about the associations of approach and avoidant coping categories with psychological adjustment among children and adolescents. In the first review of 21 such studies (Fields & Prinz, 1997), approach/active strategies, such as seeking social support and direct problem solving, were associated with greater social competence and fewer internalizing and externalizing behavior problems. In a second review, by Compas et al. (2001), two classes of coping—"active" coping (which typically entails problem solving, problem-focused support, and/or information seeking) and "engagement" coping (which includes not only problem solving but also constructive emotional expression and support seeking) were associated with fewer internalizing problems in 29 of 40 studies, fewer externalizing problems in 15 of 18 studies, and greater social and academic competence in 17 of 20 studies. Within the broader factors of problem-focused and engagement coping, the individual ways of coping that have been found to be linked most closely to better functioning include problem solving and positive reappraisal.

The Compas et al. (2001) review also noted that two kinds of coping, "emotion-focused coping" (which usually

includes expression of negative affect, denial, and/or wishful thinking) and "disengagement coping" (which typically entails problem avoidance, cognitive avoidance, and social withdrawal) seem to be detrimental to positive functioning, in that they are linked to elevated internalizing and externalizing problems. The individual ways of coping that have been found to be most consistently associated with poor adjustment include cognitive and behavioral avoidance, social withdrawal, wishful thinking, self-blame, resigned acceptance, emotional discharge, venting, and self-criticism (Compas et al., 2001).

Active Coping

In the third review, Clarke (2006) conducted a meta-analysis to summarize effect sizes from 40 studies of youth age 21 and under focusing on the connections between active/approach coping in response to interpersonal stressors and adjustment. In analyses of externalizing behavior, internalizing behavior, social competence, and academic performance, only the association between active coping and social competence was significant, with a mean effect of .11 (confidence interval .01–.21). The effect of active coping on internalizing was moderated by age, however, with a stronger, and surprisingly positive, effect found in adolescents (.14, 17 studies) compared to preadolescents (–.04, 10 studies). Thus, it appears that, on average, active coping with interpersonal stress may have a small link to more internalizing symptoms among adolescents, but not among preadolescents. It may be helpful, however, to interpret this finding of age moderation in connection with the controllability of the stressor. Clarke found that the type of stressor was a particularly important moderator of the effects of coping: Active coping in response to controllable events was positively associated with healthy functioning (.05 to .22) but negatively associated when used in response to uncontrollable events (–.06 to –.19). In particular, utilization of active coping is especially adaptive in situations that children and adolescents expect to be amenable to personal control, such as school-related tasks. When situations are objectively less controllable, such as the experience of parental conflict or medical procedures, active coping may not be associated with adaptation or positive outcomes and sometimes may actually predict mental health problems. In these situations, some kinds of coping that reduce the experience of stress, such as self-distraction, may be more adaptive.

Primary and Secondary Control Coping

Following up on studies suggesting that the effects of different ways of coping depend on whether target events are amenable to personal control, recent research has focused on the (objective, researcher-defined) controllability of environmental stressors (Forsythe & Compas, 1987). Most coping researchers now agree that the use of active coping is associated with fewer externalizing problems and greater social competence, but only when it is deployed in response to controllable stressors as compared to uncontrollable ones. This finding has been extended to understanding other broad categories of coping and psychopathology, specifically categories like primary and secondary control coping (Rothbaum, Weisz, & Snyder, 1982), in which the term *primary control coping* refers to attempts to change the stressful situation through typical problem-focused, active, and approach ways of coping, whereas *secondary control coping* refers to strategies that allow people to accommodate to events, placing less effort on trying to change them. Secondary control strategies include cognitive reappraisal, focus on the positive, distraction, and willing acceptance (Connor-Smith et al., 2000).

In general, research suggests that it is more adaptive to use primary control coping when dealing with controllable stressors and secondary control coping when dealing with uncontrollable ones. For example, one study found that adolescents were lower in internalizing symptoms when they used more secondary control efforts (i.e., accommodation) to adapt to the stress of having a depressed parent (an uncontrollable event; Langrock, Compas, Keller, Merchant, & Copeland, 2000). Extending this finding, another study reported that adolescents with depressed parents were better adjusted when they used active secondary control, such as positive thinking and cognitive restructuring, in response to situations that were less controllable (e.g., family stress) and used active primary control, such as problem solving and emotional modulation, in response to more controllable situations (such as peer stress; Jaser et al., 2007). Finally, in a third study of 204 children and adolescents and their experiences of uncontrollable stressors (parental depression and interparental conflict), those who used more secondary control coping strategies of acceptance, distraction, cognitive restructuring, and positive thinking were lower in both child and parent reports of anxiety and depressive symptoms as well as lower in aggressive behavior (Fear et al., 2009).

In summary, these reviews and recent empirical evidence illustrate that the fit between the situation and the use of approach or accommodative coping responses is an important indicator of likely adaptive or maladaptive outcomes among children and adolescents (and adults; also see S. M. Miller, 1992). Although it is still rare for studies to examine both the objectively defined controllability of

stressful events and participants' own perceptions of controllability, these findings highlight the crucial importance of the capacity to accurately diagnose the controllability of stressors in order to implement approach or active coping or to draw on accommodative and distraction techniques depending on the needs of the stressful situation. Rather than relying only on approach and active coping attempts, children and youth, when faced with uncontrollable stressors, may benefit from accommodation strategies, such as positive reinterpretation and distraction, in order to deal with emotions, shield themselves from stress, promote acceptance, and allow them to move forward, all of which may be more healthy for concurrent and later mental health (Brandtstädter & Rothermund, 2002; Compas, Banez, Malcarne, & Worsham, 1991; Forsythe & Compas, 1987; Losoya et al., 1998; S. M. Miller & Green, 1985; Roth & Cohen, 1986).

Connections between Specific Coping Strategies and Psychopathology

Although less frequently a focus of research than studies examining broad coping categories, there have also been more fine-grained investigations of specific coping strategies and their links to psychopathology or competence (e.g., Decker, 2006; Khurana & Romer, 2012; Zimmer-Gembeck, Skinner, Morris, & Thomas, 2013). In general, results of studies of specific coping responses and adjustment or psychopathology are consistent with the findings for approach/active/primary, secondary control/accommodative, and avoidance coping and psychopathology. In particular, problem solving, a form of active and approach coping, is one of the most adaptive specific responses for maintaining good mental health in the face of stress. In a review of 12 studies of stress, coping, and personal attributes in adolescents with cancer, two specific coping strategies were consistently related to lower levels of depressive symptoms: problem solving and seeking alternative rewards (Decker, 2006). In other research with adolescents or young adults, help seeking (Gould et al., 2004), planning (Aldridge & Roesch, 2008), and positive reinterpretation (Stewart et al., 1997), as well as problem solving (Khurana & Romer, 2012), were each associated with greater competence or fewer symptoms of mental health problems.

Yet there are also specific strategies that seem to prompt heightened or increasing adjustment problems. In particular, aggressive and ruminative coping are among the strategies that seem most detrimental to child and adolescent mental health. In one study, both were associated with more internalizing symptoms and more peer reports of withdrawal or isolation from others (Sandstrom, 2004). In a second study, however, an even wider range of maladaptive coping strategies was identified (Horwitz et al., 2011). In this study of 140 adolescents seeking pediatric emergency services, five ways of coping and appraisals were measured, including denial, substance use, use of emotional support, behavioral disengagement, and self-blame. All were associated with more heightened depressive symptoms and more frequent suicidal ideation for boys, for girls, or for both. Unique coping and appraisal correlates of elevated depressive symptoms were behavioral disengagement, self-blame, and seeking emotional support. The one unique correlate of suicidal ideation was the greater use of emotional support, suggesting that emotional support seeking may also reflect level of distress.

Other studies have found that behavioral disengagement, often assessed as behaviors that imply giving up or helplessness, is a risk factor for elevated depressive symptoms (e.g., Kaminsky, Robertson, & Dewey, 2006; Nolen-Hoeksema, Girgus, & Seligman, 1992; Wadsworth & Compas, 2002), and the use of distraction as a response to the stressor of discrimination is a risk factor associated with increased internalizing disorders over time (Brittian et al., 2013). Taken together, denial, rumination, aggression, or opposition in response to stress, as well as helplessness or disengagement, blaming the self, and seeking emotional support, are most indicative of greater symptoms of mental health problems among children and adolescents. Moreover, distraction may also be a risk for elevated symptoms, especially if it is used when stressful events are within personal control and active coping might be more productive.

Although most studies have focused on older children or adolescents, there is also evidence that there are specific coping strategies associated with problems or competence in younger children. For example, Eisenberg et al. (1997), in their study of children 2 to 4 years of age who were reassessed again at ages 6 to 8 and 8 to 10, found that the use of destructive coping (more venting and avoidance/distraction, and less cognitive restructuring), especially when reported by teachers rather than parents, was negatively associated with concurrent and future levels of social competence and positively associated with externalizing symptoms and problem behaviors. Simultaneously, constructive coping (the use of instrumental coping and support seeking) was associated with greater social competence. In a study of 153 young children (K. A. Blair, Denham, Kochanoff, & Whipple, 2004), preschoolers higher in parent-reported and teacher-reported passive coping (e.g., avoidance and denial of the problem) showed

more signs of emotional and social maladaptation, and the use of passive coping sometimes exacerbated the effects of irritable or sad-fearful temperaments on externalizing or internalizing symptoms. In contrast, actively facing the problem (e.g., problem solving) was associated with fewer internalizing symptoms. Thus, even in very young children, there is emerging evidence that active coping rather than avoidant coping or passivity in response to stressful demands from the environment may be important for maintaining mental health and building social competence. Moreover, the capacity for adaptive coping may counteract temperamental challenges in the early years of life.

Do Subjective Appraisals of Stressful Encounters also Play a Role in Psychopathology?

According to the transactional perspective, individuals' subjective appraisals of stressful encounters are a key part of the stress and coping process (Lazarus & Folkman, 1984). Appraisals, including perceptions of threat, harm, loss, or controllability, as well as attributions of causality, responsibility, or blame, are important because they are imbued with emotion, prompt other cognitions, and guide subsequent behavior (Lazarus, 1994). In particular, appraisals can be motivating or demoralizing, can calm emotion or amplify distress, and can foster continued engagement with the environment or lead to disengagement and helplessness (Roesch & Weiner, 2001; Weiner, 1985).

One complication within the research on appraisals, coping, and psychopathology, however, is that empirical distinctions between appraisals and coping are not always clear (Folkman, 1984). In some studies, causal attributions have been included as a way of coping (see Folkman, 1984, for a review). For example, self-blame, a form of internal attribution, has been examined as a coping strategy (e.g., Horwitz et al., 2011); and some multidimensional measures consider blaming others, sometimes referred to as projection, as a maladaptive way of coping (Skinner, Pitzer, & Steele, 2013). As Aldwin (2007) concluded, this research remains "muddled" (p. 182), and theories are needed that either clearly differentiate between appraisals and coping or explicitly posit that appraisals and reappraisals are integral parts of coping processes themselves.

Regardless of the challenges facing researchers, it is now widely accepted that, along with children's coping responses, it is also important to consider their perceptions of control and other appraisals of stress in the development of psychopathology (Chorpita & Barlow, 1998; Skinner, 1995; Weems & Silverman, 2006). In general, the impact of stressful events appears to depend not only on the objective stressors themselves but also on subjective appraisals of stress, and these may vary from child to child. As would be expected, appraisals are important correlates of emotional reactions to stress and to mental health (Compas et al. 2001; Zimmer-Gembeck, Lees, Bradley, & Skinner, 2009). For example, the appraisal of a stressful event as more threatening has been associated with children's self-reported symptoms of anxiety, depression, and conduct-related problems following parental divorce (Sandler, Kim-Bae, & MacKinnon, 2000).

One study illustrates the importance of appraisals in understanding how stress and coping are linked to psychopathology among children and adolescents. This study also raises the possibility that appraisals may be as important (or perhaps even more important) than coping for understanding the development of psychopathology. Lengua and Long (2002) examined threat and challenge appraisals, active and avoidant coping, and adjustment problems (depression, mother-reported internalizing and externalizing symptoms, and self-reported internalizing and externalizing symptoms) among 101 children ages 8 to 12 years old. Challenge appraisals were expected to be associated with active coping, as has been found in other research (Santiago-Rivera, Bernstein, & Gard, 1995). In contrast, threat appraisals were expected to be associated with maladaptive outcomes, because previous research had demonstrated that they were associated with depression, anxiety, and conduct problems in children experiencing parental divorce (Sandler, Tein, Mehta, Wolchik, & Ayers, 2000) and were found to be the conduit linking the stressor of interparental conflict to internalizing symptoms (Grych, Fincham, Jouriles, & McDonald, 2000). Although higher stress levels, appraisals of greater threat and use of more avoidant coping were associated with elevated internalizing and externalizing symptoms in simple correlations, coping had no direct effects on internalizing and externalizing symptoms once the significant impacts on symptoms of stress levels, threat appraisals, and temperament were accounted for in a multivariate model.

Other studies have found that the fit between appraisals and coping is important to consider when predicting psychopathology. For example, in a study of 76 adolescents who reported their coping and appraisals of the controllability of their cancer-related stress, the match between coping style and appraisals of controllability was associated with fewer depressive symptoms, less anger, less distress, and less anxiety (Sorgen & Manne, 2002). Thus, using more problem-focused coping when controllability was perceived to be high or using more emotion-focused

coping when controllability was perceived to be low was associated with less distress and fewer symptoms. These findings show that, just as has been found for objectively defined controllability, subjective appraisals of controllability can be important to understanding the implications of coping for adjustment and psychopathology. However, to date, few studies have directly tested this goodness-of-fit hypothesis in children and adolescents (cf. Forsythe & Compas, 1987), and findings remain rather mixed even in studies of adults or university students (e.g., see Park et al., 2004, for a discussion and an example of mixed findings).

Coping Self-Efficacy

An additional set of appraisals that seem to be important to coping and mental health following encounters with stress can be found in global beliefs about one's capacity to cope effectively or successfully, sometimes referred to as coping self-efficacy (Smith, Calkins, & Keane, 2006; see also Galatzer-Levy, Burton, & Bonanno, 2012, for a similar construct referred to as coping flexibility). Building on the view that a sense of efficacy in coping promotes the subsequent use of constructive coping strategies, coping self-efficacy has been defined to include beliefs about one's own ability to manage stressful events themselves as well as perceptions of one's capacity to understand and adaptively regulate one's emotional reactions to stress. Adolescents who report more coping self-efficacy tend to cope more successfully with stressful events and to receive more interpersonal support (Sandler, Kim-Bae, et al., 2000; Sandler, Tein, et al., 2000). It is not yet clear whether coping self-efficacy should be differentiated from the stress and coping process, for example, by considering it to be akin to a personal or a social resource. However, because high coping efficacy also reflects a history of successful coping, it is probably best conceptualized as an indicator of self-perceived coping success, so that it captures not what young people actually do in response to stress but how effectively they feel they have done it. In such instances, coping efficacy might be considered a mediator that links coping to mental health outcomes, and such pathways have been documented. In one study of children (Sandler, Kim-Bae et al., 2000), approach coping was negatively associated with depression and anxiety, and avoidant coping was positively associated with emotional adjustment problems, with coping efficacy fully mediating these associations.

The importance of considering both coping and coping efficacy when trying to understand mental health was also suggested by a comprehensive study of children of alcoholic parents (Smith et al., 2006). In this study, in which all constructs were assessed via multiple reporters (mothers, father, teachers, children), children who had a history of more positive parenting (supportive parenting practices and consistent discipline) used more active and support-seeking coping and were higher in coping efficacy. Moreover, all of these factors were important in explaining why children differed in their levels of externalizing and/or internalizing symptoms. In particular, children's active coping and coping self-efficacy mediated associations between positive parenting and lower symptoms. Yet some findings depended on the reporter, on whether the outcome was internalizing or externalizing symptoms, and whether the child had an alcoholic parent.

Causal Attributions

Appraisals can also involve causal attributions or explanations for why an event occurred. These appraisals and attributions include not only estimations of the controllability of the event itself but also explanations about its cause, such as whether it was caused by the self or by something outside the self (sometimes called locus) or whether the cause was stable (versus unstable) or global (versus specific). Although no review of the role of attributions in coping during childhood and adolescence could be located, one meta-analysis was conducted that included 27 studies of adults who were coping with illness (Roesch & Weiner, 2001). When the results of these studies were quantitatively combined, internal attributions were found to be associated with more approach coping responses. Attributions that stressful events were more unstable and controllable were associated with more coping responses of all kinds, (approach and avoidance, problem and emotion focused). For example, patients who appraised their illnesses as stable and uncontrollable used more avoidance coping and were less well adjusted than those who viewed their illnesses as more unstable and controllable. Moreover, there was evidence that the effects of attributions on psychological adjustment were fully mediated via all coping responses (except for behavioral avoidance). Thus, in adults, at least when they are coping with an often uncontrollable stressor like illness, appraisals are important to understanding coping responses, adaptation, and psychopathology.

The results of these studies raise the possibility that causality and attributional processes may also be critical for understanding coping prior to adulthood, or at least by late childhood or early adolescence. When focusing on these younger age groups, however, such findings should be considered only suggestive, given the cognitive changes that occur between childhood and adulthood. Perhaps the development of causal beliefs and attributions may

explain some of the changes in coping that are found with increasing age (Band & Weisz, 1990; Zimmer-Gembeck & Skinner, 2011). It may also be the case that causal beliefs and attributions become more closely tied to coping processes with increasing age (Skinner & Zimmer-Gembeck, 2011).

Strategies for Emotion Regulation, Coping, and Psychopathology

Coping is often aimed at regulating emotional experiences, either by changing one's own responses or by modifying the stressor that prompted the emotional reaction (Compas et al., 2014; Losoya et al., 1998). Overall, emotion dysregulation, usually assessed via measures originally designed to assess coping, is thought to be a core feature of many forms of psychopathology (e.g., see Aldao & Nolen-Hoeksema, 2010, 2012; Aldao, Nolen-Hoeksema, & Schweizer, 2010; Webb, Miles, & Sheeran, 2012). Because of the clear conceptual and methodological overlaps, research on emotion regulation and the dysregulation of negative affect and their links to psychopathology often seem to be tantamount to studies of stress and coping, allowing some conclusions about coping and psychopathology to be drawn from such work.

Not surprisingly, the basic findings from these two bodies of research are similar: Just as with studies of stress, coping, and psychopathology among children and adolescents (and even adults), complex interrelations have been found in the associations between psychopathology and the multitude of available emotion regulation strategies. At the same time, two general patterns can be discerned. First, three specific emotion regulation (or coping) strategies have been widely theorized to be protective against psychopathology: (1) cognitive reappraisal of the stressful event, defined as generating benign or positive interpretations or perspectives on stressful situations as a means of reducing distress (Aldao et al., 2010; Gross, 1998; John & Gross, 2004); (2) problem solving, which involves conscious attempts to change a stressful situation or contain its consequences; and (3) acceptance, which refers to willingly consenting to emotions as they are without judgment. Second, and also overlapping with research on coping, three emotion regulation strategies have been identified as risk factors for the development of psychopathology: (1) suppression, defined as the control and repression of unwanted thoughts and emotions and their expression; (2) avoidance, which involves evading an array of unwanted psychological experiences, including emotions, sensations, memories, and urges; and (3) rumination, which refers to repetitively focusing on negative and distressing experiences and emotions and their causes and consequences.

Testing these expectations using a range of measures of coping and emotion regulation associated with stress, Aldao and Nolen-Hoeksema (2010) found that university students who relied more often on cognitive reappraisal and problem solving also reported fewer indicators of psychopathology (symptoms of anxiety, depression, and eating disorders), whereas symptoms were more elevated in students who relied more often on suppression and rumination. Moreover, associations were stronger between maladaptive strategies and symptoms than between adaptive strategies and symptoms.

These patterns of findings were also confirmed in a meta-analysis of 114 studies that examined the associations between six forms of emotion regulation and four psychopathologies: Aldao et al. (2010) found that there were large effects of rumination on depression and anxiety; medium to large effects for avoidance, problem solving, and suppression; and small effects for reappraisal and acceptance. Three of these coping strategies—rumination, avoidance, and suppression—were associated with heightened levels of depression, anxiety, and (somewhat less strongly) substance use and eating disorders. The other three responses—problem solving, reappraisal, and acceptance—were associated with lower levels of symptoms. The strongest effect was for rumination, and the weakest effect was for acceptance. John and Gross (2004) also reviewed evidence of the links between adjustment and the emotional regulation strategies of reappraisal and suppression, concluding that research has predominantly supported the positive implications of reappraisal and the negative implications of suppression. Most recently, many, but not all, of these associations were confirmed in a review of 306 experimental studies of emotion regulation and its effects on a range of outcomes including distress and adjustment (Webb et al., 2012).

Much less research has examined the use of these emotion regulation strategies in children and adolescents. It may be that some of these strategies are not as widely used in younger age groups, given their cognitive complexity and the autonomous actions required to execute them. However, some research has been conducted, which has identified multiple emotion regulation deficits among children with internalizing and externalizing psychological difficulties (for a review see Zeman, Cassano, Perry-Parrish, & Stegall, 2006). Across these studies, deficits in emotion regulation and coping have been measured as biased or misguided appraisals of the

threat and challenge of stressful events and excessive emotional reactions and displays. All of these deficits appear to be heightened among children with depression, anxiety, or bulimia nervosa (compared to children without these disorders), but patterns of deficits differ for children with internalizing versus externalizing disorders. In particular, children with elevated depressive and anxiety symptoms have been found to display poorer emotional awareness and emotional understanding, report lower self-efficacy regarding their ability to regulate their emotions and cope with stress, show a less well-developed emotional vocabulary, have difficulties expressing and regulating their anger, and more often display inappropriate expressions of sadness. In contrast, children identified as having elevated externalizing disorders seem to suffer from emotional undercontrol resulting in displays of high emotional intensity, evince poorer inhibition of anger as evidenced by facial and other displays, and respond to distressing events with less sadness than would be typical for other children.

Patterns or Profiles of Coping as Correlates of Psychopathology

Emerging evidence suggests that coping strategies may be deployed in clusters or may interact in ways that heighten their effects on adjustment and psychopathology. Although recent studies have addressed this issue, the notion of coping patterns or clusters is not new. For example, Timko, Moos, and Mickselson (1993) argued for the importance of the relative or combined use of a range of coping strategies for psychopathology more than two decades ago. However, subsequent research has identified a number of important combinations of coping responses or coping resources.

First, generalizing from findings across multiple studies, positive reinterpretation combined with acceptance may be especially beneficial for adjustment in uncontrollable situations, whereas positive reinterpretation combined with active coping may be especially beneficial to adjustment in controllable situations. Second, contrary to the idea that people rely on problem-focused *versus* emotion-focused coping strategies, multiple studies have found that coping strategies such as positive reappraisal, reinterpretation, or distraction (i.e., emotion-focused strategies) actually often occur in combination with or promote or antecede problem-focused coping, suggesting that calming emotion may promote constructive problem solving and that it may be this combination that aids good adjustment when facing stressful events, especially when events are objectively controllable (e.g., Mattlin, Wetherington, & Kessler, 1990; Shimazu & Schaufeli, 2007; see also Folkman, 1984, for a review). Third, the negative effects of internalizing coping strategies, such as isolating oneself and emotional venting, may be weakened if they are used in conjunction with more active strategies, such as problem solving (Kingsbury, Coplan, & Rose-Krasnor, 2013). Fourth, social support may be most beneficial to relieving distress in situations of low personal control. In general, combinations or sequences of different coping strategies, theoretically or empirically derived, may turn out to be particularly helpful in understanding social and emotional adjustment following stressful events, both in the short and the longer term.

At least two studies of adolescents have gone somewhat further in tackling this issue by implementing person-centered approaches (i.e., data clustering techniques) to better understand how the use of particular combinations of coping strategies may contribute to adjustment and mental health problems (Boxer et al., 2012; Tolan et al., 2002). In a first study, focused on youth living in impoverished areas of the inner city (Tolan et al., 2002), 372 adolescents 12 to 16 years old provided information twice over a 1-year period about their use of 12 ways of coping when facing difficulties or feeling tense. Stress (social) was also measured, and the psychopathological outcomes were youth reports of their internalizing and externalizing symptoms as well as teacher reports of the same symptoms. About 50% of the items formed seven coping categories (seeking support, venting emotion, avoidance by substance use, distraction, positive thinking, seeking guidance, and humor), and these were subjected to cluster analysis. Five clusters were accepted as the best representation of differentiation among adolescents in their person-level patterns of coping responses, and these were labeled: (1) support and guidance seekers, (2) minimal copers, (3) emotional substance users, (4) emotion-focused copers, and (5) complex copers. After controlling for demographic differences and stress levels between coping groups, the lowest concurrent internalizing symptom levels were found for support and guidance seekers and minimal copers. Over time, minimal copers showed greater increases in internalizing symptoms when compared to support and guidance seekers. In contrast, the highest concurrent externalizing symptom scores were reported by emotional substance users and emotion-focused copers; emotion-focused copers also had greater increases in externalizing symptoms over time when compared to support and guidance seekers and complex copers. Such findings suggest that reliance on seeking support and guidance, relative to other coping strategies, to manage stressful events during adolescence

may serve to deflect the escalation of both internalizing and externalizing symptoms.

In a second study, the focus was on coping with stress and violence among 131 adolescents living in a distressed metropolitan area (Boxer et al., 2012). Coping included externalizing-internalizing coping (which included such strategies as aggressive responses, emotional venting, and high emotional reactions) and distancing; and mental health was measured as symptoms of posttraumatic stress disorder (PTSD), externalizing, and internalizing. Three coping cluster groups were found: those identified as (1) low in all forms of coping, (2) high in internalizing-externalizing coping but low in distancing, and (3) high in distancing but low in internalizing-externalizing coping. The low coping group showed the highest levels of competence, whereas the high internalizing-externalizing group reported elevated symptoms of all disorders relative to the other two coping groups. At the same time, however, this study illustrates the continuing problem of potential overlap in measures of stress, coping, and psychopathology. The measure of coping responses had obvious overlap with symptoms, and the levels of stress experienced by youth were assumed and not directly assessed, making it likely that the group of adolescents who reported the lowest levels of coping was also exposed to the fewest stressful events related to neighborhood violence. Once these methodological issues are addressed, however, person-centered analyses that identify coping patterns have much potential to inform our understanding of developmental pathways of psychopathology and resilience.

Transactional Models of the Links between Stress, Coping, and Psychopathology

Partly because the direct associations between stress exposure (or adversity) and psychopathology have been rather small, transactional theories often posit complex roles for appraisals, coping, and coping resources in the processes that protect (or harm) children and adolescents at risk for psychopathology (Fields & Prinz, 1997; Lazarus & Folkman, 1994; Moos & Holahan, 2003; Skinner & Zimmer-Gembeck, 2007). At least four kinds of general models depicting the role of coping and its associated processes can be identified (see Figure 10.2): Coping has been conceptualized as a moderator, mediator, mechanism, and reciprocal process in the relations between stress and psychopathology. Because of such theoretical developments, studies of mediators and moderators have become the norm rather than the exception in coping research. As a result, there is research to support or refute all of these more complex views, as described in this section.

Coping as a Moderator, Mediator, and Mechanism

One of the most straightforward models posits that all (or some forms) of coping are moderators that minimize, buffer, or exacerbate the negative effects of stress on adjustment or on the onset or relapse of psychopathology (Aldwin, 2007). Coping can be thought of as a stabilizing or destabilizing factor that helps maintain positive psychological adjustment during stressful periods or may explain why stressors lead to psychopathology. From this perspective, coping efforts should be most helpful when stress is severe and distress is high. Consistent with this notion, Holahan and Moos (1991) found that under high stress, personal and social resources (self-confidence, easy-going disposition, family support) were related to better psychological adjustment indirectly through their link to greater reliance on approach coping responses. Under low stress, only personal and social resources were related to adjustment (directly).

When tested, moderation effects are often found, although not consistently across studies and not for all ways of coping. Nevertheless, some of the differences are consistent with theory and conceptual frameworks. For example, in one study, moderation effects were found for problem-focused coping but only main effects of coping on psychological symptoms were found for emotion-focused coping strategies (Aldwin & Revenson, 1987). To explain this finding, the authors argued that emotion-focused coping may, to a large extent, reflect predispositional characteristics and that such characteristics may be more likely to show main, but not moderating, effects. In contrast, problem-focused strategies may be more situational specific—they are influenced by situational constraints and affordances—and, therefore, may have their effects by interfering or modifying the situation, which, in turn, has implications for adjustment.

A second model (see Figure 10.2) views coping as a mediator or an adaptive process that itself is embedded in or shaped by stress and is the primary (or only) pathway through which stress exerts its proximal effects on adjustment and psychopathology (Aldwin, 2007). According to this model, one of the reasons that adversity has deleterious effects is that stressful life events trigger maladaptive coping in children and adolescents, which then puts them at risk for the development of psychopathology. For example, avoidant coping, often measured as denial or withdrawal, has been found to mediate between stressful circumstances and distress, on one hand, and concurrent or later adjustment, on the other. In one study, avoidant coping mediated the negative effect of living in a homeless shelter on women's depressive symptoms (Rayburn et al.,

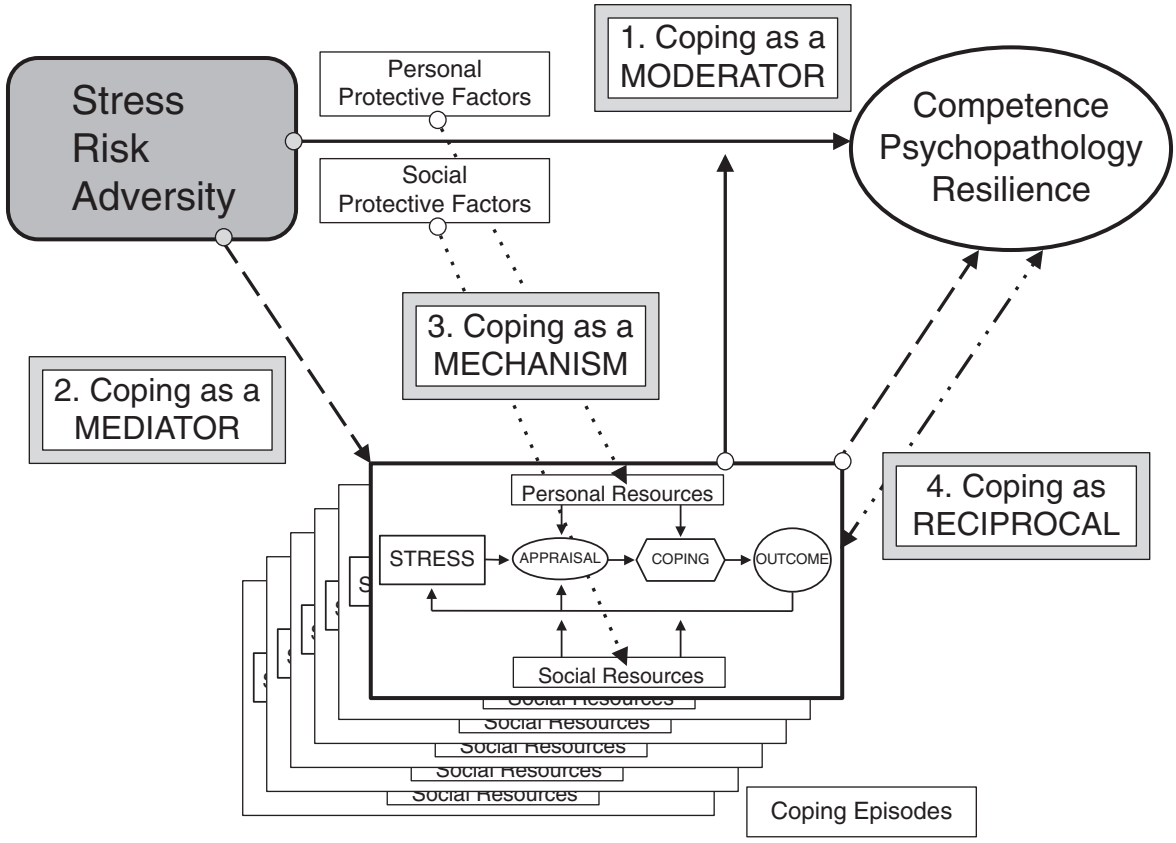


Figure 10.2 Four Models of the Role of Coping in the Processes that Connect Stress to Psychopathology, as a (1) Moderator; (2) Mediator; (3) Mechanism; and (4) Reciprocal Process.

2005). Other studies have also found avoidant coping, particularly behavioral rather than cognitive avoidance, to mediate the impact of stress on adjustment (Barker, 2007; Holahan, Moos, Holahan, Brennan, & Schutte, 2005; Roesch & Weiner, 2001). In a recent study of two samples, one of early adolescents and the other of adults, followed for 7 or 12 months, respectively, rumination mediated the association of more stressful life events with increased anxiety symptoms in adolescents and adults and mediated the association of more stressful life events with increased anxiety and depressive symptoms among adults (Michl, McLaughlin, Sheperd, & Nolen-Hoeksema, 2013). However, other studies have found that other forms of coping do not mediate the effect of stress on adjustment or psychopathology (e.g., Aldwin & Revenson, 1987) and instead may have more direct effects on adjustment in some circumstances (such as the main effect of active coping with controllable events on more positive adjustment; Clarke, 2006).

A third model (see Figure 10.2) posits coping as a mechanism through which protective factors exert their impact. Protective factors would include social resources, like social support, as well as personal resources, like optimism, personal control or mastery, self-esteem, or coping efficacy, which are hypothesized to proffer their protective effects at least in part by promoting constructive coping and discouraging reliance on maladaptive coping responses (Taylor & Stanton, 2007). From this perspective, in order to demonstrate the effects of coping per se, it would be essential to show that coping behaviors have unique effects on psychopathology over and above the effects of the preexisting personality and other characteristics that shape them (Carver & Connor-Smith, 2010).

Complicating matters even further, there is new evidence that some coping responses interact with each other and that coping responses and resources may also interact with each other, suggesting that some personal traits or environmental conditions (i.e., coping resources) may exacerbate or deflect the positive or negative effects of coping on outcomes (Dagan et al., 2011; Shimazu & Schaufeli, 2007; Taylor & Stanton, 2007). For example, Jacobsen et al. (2002) found that posttraumatic stress symptoms were most elevated among cancer patients who reported a combination of low social support and

greater use of avoidant coping. Dagan et al. (2011) found that unsupportive spousal behavior was associated more strongly with distress among adult cancer patients when the patients were also low in personal control.

Coping as Reciprocally Related to Psychopathology

The fourth model (see Figure 10.2) views coping as part of a set of reciprocal processes binding it to psychopathology. According to these models, stress, coping, and psychopathology have bidirectional or reciprocal effects, whereby stress interferes with coping processes and contributes to maladjustment or psychopathological outcomes; at the same time, maladjustment and psychopathology generate later experiences of stress and undermine the development of coping responses and resources (Conway, Hammen, & Brennan, 2012; Hammen, 2005; Lazarus, 2000; Liu, 2013; Roesch & Weiner, 2001; Rudolph & Asher, 2000).

Evidence from longitudinal studies has accumulated that documents both directions of these reciprocal effects. Results from time-lagged studies show that psychopathology can make it increasingly more difficult to cope adaptively with stress, just as multiple studies show that poor coping is associated with increasing adjustment problems and psychopathology. For example, multiple studies have shown that children (Zeman et al., 2006), adolescents (Littleton, Axsom, & Grills-Taquechel, 2011), and adults (Aldao et al., 2010; Roemer, Orsillo, & Salters-Pedneault, 2008) with elevated levels of depression, anxiety, or other forms of distress symptoms find it more difficult to use constructive coping strategies, such as cognitive reappraisal, acceptance, problem solving, and attentional redeployment. Depressed children also report using fewer strategies to regulate their negative emotions than nondepressed children (Garber, Braafladt, & Weiss, 1995), and adolescents with heightened depressive symptoms, relative to their nondepressed peers, report using more cognitive avoidance and resigned acceptance to cope with stressors, and less problem solving and positive reappraisal, all of which have been associated with the development of psychopathological symptoms (Ebata & Moos, 1991; Littleton et al., 2011). Such findings also extend to the flip side of these reciprocal relationships, as seen in the connections between coping and competence, whereby children rated higher in social competence by their parents also make more use of constructive coping strategies, such as problem solving and support seeking, compared to children rated as less competent (Zimmer-Gembeck, Lees, & Skinner, 2011).

Although both directions of effects are not typically examined together in a single study, a few investigations have explicitly targeted and found bidirectional effects. In one such study, adults with more psychological symptoms (measured with the Langner 22-item Screening; Langner, 1962) experienced increasing stress and reported more maladaptive coping over time at the same time that maladaptive coping was found to predict increasing psychological symptoms over time (Aldwin & Revenson, 1987). In another study, reciprocal associations were found between distress related to a university mass shooting, coping responses, and PTSD symptoms, with maladaptive forms of coping (avoidance, social withdrawal, wishful thinking, and self-criticism) related to increased distress over time, at the same time that levels of PTSD symptoms were associated with changes in coping over time (Littleton et al., 2011). As another example, adolescents' peer stress in the form of rejection by classmates has been associated with increasing depressive symptoms over time (Bagwell, Schmidt, Newcomb, & Bukowski, 2001; Garber et al., 1995; Panak & Garber, 1992; Parker, Rubin, Price, & DeRosier, 1995) and multiple, other forms of adolescent stress also have been associated within a chain of events that create increases in depressive symptoms over time (for a review, see Compas et al., 1993).

However, it is important to point out that some longitudinal studies explicitly looking for bidirectional effects have found evidence for one pathway but not the reverse. For example, one study which showed that coping was associated with increasing or decreasing mental health symptoms over time did not find the converse temporal associations between earlier symptoms and changes in coping (Wadsworth & Berger, 2006); and another study revealed that some forms of psychopathology (e.g., PTSD) may prompt increasing maladaptive coping with stress over time, but such coping was not associated with escalation in symptoms over time (Littleton et al., 2011).

In most cases, patterns of reciprocal relations between psychopathology and coping must be pieced together from multiple studies separately documenting complementary directions of effects. For example, studies have shown that adolescents' heightened depressive symptoms predict their reports (and their classmates' reports) of increasing peer stress over time (Zimmer-Gembeck et al., 2009) or other stress (Compas, Howell, Phares, Williams, & Giunta, 1989; Windle, 1992). Moreover, for adolescents, high levels of depressive symptoms can prompt increasing use of coping responses such as social isolation and avoidance (see Hammen, 1999, for a review), and, in turn, higher levels of withdrawal, isolation, or avoidance have been associated with increasing stress and distress among children (Gazelle,

2010; Prinstein & La Greca, 2002), adolescents (Littleton et al., 2011), and adults (Barker, 2007; Holahan et al., 2005; Shah, Gupchup, Berrego, Raisch, & Knapp, 2012). It is important to highlight the key role that avoidance coping seems to play in these bidirectional pathways between stress and depression.

Daily Stress, Coping, and Psychopathology

Stress, coping, and mental health also seem to be reciprocally linked across very short, even daily, temporal episodes. Because such series of interrelations can unfold so rapidly, stress and coping researchers have found the application of diary research designs particularly useful and informative. In these designs, participants often complete an initial assessment and then provide reports of their stress, coping, and other daily experiences for 5 or more days. Such studies tend to replicate the findings from cross-sectional and longitudinal research but also make clear that individuals differ in how rapidly they appraise stressful events, how often they use coping responses, and how necessary coping seem to be for maintaining positive emotion and well-being over time.

For instance, in a study of (mostly female) university students' stress, coping, and appraisal of stressor controllability, individual differences were found in the temporal patterns of controllability appraisals and coping (Park et al., 2004). Some individuals matched their appraisals to coping by using problem-solving coping strategies when events were appraised as controllable and using emotion-focused coping strategies when events were appraised as uncontrollable. However, others did not match appraisals and coping to the same degree. Although matching problem-focused coping to controllable situations was associated with better adjustment, matching emotion-focused strategies to stressors appraised as uncontrollable was associated with better adjustment only for a subset of participants. Moreover, the personality characteristic of neuroticism explained some of the individual differences in associations of controllability and coping with negative and positive mood across the 28 days of the diaries. In children, diary studies have also revealed the ways that coping and coping efficacy are associated with symptoms of mental and physical health problems over short periods of time. In particular, passive coping has been associated with more functional impairment, elevated depressive symptoms, and more somatization over a 5-day diary, whereas reports of coping efficacy have been associated with reduced symptoms of mental health problems, including fewer depressive symptoms and less somatization (Walker et al., 2007).

Summary of Transactional Research

Transactional research, which links reliance on different ways of coping (or emotion regulation) to different indicators of adjustment and psychopathology, is typical of the interindividual difference focus of most coping research with children and adolescents (as well as with adults). Also consistent across age groups is the pattern of findings suggesting that certain kinds of coping are positively linked to adaptive functioning and negatively to problems and disorders. These methods include active approach or engagement strategies like problem solving, positive reappraisal, constructive expression of emotions, and acceptance. In contrast, other ways of coping seem to show the reverse pattern of associations, that is, they are correlated positively to indicators of psychological problems and disorders and negatively to adjustment. These methods include avoidance and disengagement strategies, such as cognitive and behavioral escape, rumination, helplessness, suppression, social withdrawal, wishful thinking, emotional discharge, resigned acceptance, and self- and other-blame.

Several kinds of appraisals and causal attributions also show consistent links with competent functioning and psychopathology through their effects on approach and avoidance coping. Appraisals of challenge, controllability, and attributions of stressful events to internal and controllable causes generally predict higher levels of approach coping and lower levels of helplessness and, through these, higher levels of competent functioning and lower levels of depression and externalizing behaviors. Appraisals of threat, uncontrollability, and attributions of negative events to internal, stable, and global causes generally predict higher levels of avoidance, self-blame, and ruminative coping, which in turn typically are connected with higher levels of disorder and lower levels of competence. Particularly important seem to be appraisals of coping efficacy, or individuals' confidence that they can deal successfully with the problems, setbacks, and negative emotions entailed in stressful experiences.

The study of subjective and objective estimates of the controllability of stressful situations has demonstrated that it is the match between situational demands and ways of coping that both characterizes competent functioning and predicts effective outcomes. As depicted in the Serenity Prayer, individuals need "the courage to change the things I can" because active approach "primary control" ways of coping are a good fit for stressors (or aspects of stressors) that are controllable (like schoolwork); as well as "the serenity to accept the things I cannot change" because accommodative, positive reappraisal, acceptance,

and distraction coping are a better match for stressors (or aspects of stressors) that are not under an individual's personal control (like interparental conflict). Although not studied as often, this pattern of findings also implies that individuals must develop "the wisdom to know the difference" and suggests that children and adolescents would benefit from having parents who are aware of the fine distinctions and differences and can assist them in learning to make these distinctions.

Particular combinations or sequences of coping have proven to be associated with competent functioning: for uncontrollable events, cognitive reinterpretation accompanied by acceptance; and for controllable events, cognitive reinterpretation along with active forms of coping. These combinations seem to blend ways of dealing with distressing emotion with ways of guiding productive behavior, perhaps even sequencing them so that distress does not interfere with constructive action. Other combinations suggest that it is the balance between adaptive and maladaptive forms of coping that is typical of more positive functioning under negative conditions: The deleterious effects of coping strategies such as isolation or emotional discharge can be buffered by the use of problem-focused or engagement coping; and high levels of social support may help compensate for low levels of personal control. Taken together, these findings suggest that it may be most useful to examine interconnected patterns of situational demands, appraisals, and profiles of coping in order to better understand social and emotional adjustment following stressful events in both the short and the long term.

Multiple complex conceptual models have been proposed to account for the role of coping in the connections between exposure to stress, risk, or adversity, on one hand, and the development of psychopathology, competence, or resilience, on the other hand. Coping has been posited to act as a moderator, mediator, mechanism, and reciprocal partner in these connections. Evidence has been found for all these roles, but not consistently. Constructive coping, especially problem-focused coping, does seem to be especially crucial when stress is high (i.e., it seems to act as a moderator), but other forms of coping, such as those captured in typical emotion-focused amalgams, seem to be harmful under most circumstances. Avoidance coping, especially behavioral avoidance, seems to be a key pathway (i.e., mediator), in that high levels of stress and adversity elicit more avoidance and social withdrawal, which in turn is likely to create problems for psychological adjustment and functioning. However, some studies suggest that approach coping may both mediate the effects of stress and exert direct effects, irrespective of stress levels. Coping also seems to be a particularly important mechanism through which a variety of personal and social resources (such as mastery or sense of control, optimism, self-esteem, and social support), which have been found to act as protective factors under conditions of adversity, have been found to exert their beneficial effects on competent functioning and to buffer children and adolescents from symptoms of psychopathology.

Some of the strongest support for complex models comes from accumulating evidence that coping and psychopathology are reciprocally linked. Although not often investigated in the same studies, research increasingly documents the operation of each direction or pathway of influence. In terms of the effects of psychopathology on coping, studies show that emotion dysregulation and poor coping are hallmarks of many kinds of psychological disorders. In terms of the effects of coping on psychopathology, longitudinal, experimental, and intervention research show that when children and adolescents display these out-of-control emotions and maladaptive coping responses, they generate stress for themselves and their families and so initiate or exacerbate psychological problems. When taken together, most findings suggest that associations among stress, coping, and psychopathology are often reciprocal, unfolding in positive and negative developmental cascades across situations and over time.

Critique of Individual Differences Research on Coping and Psychopathology

Over the last several decades, tens of thousands of studies have examined the connections between a variety of ways of coping and a variety of indicators of psychological adjustment and disorder. Studies in this cast have multiple problems, but they can be optimized through the improvement of measurement and design strategies. In terms of measurement, overlap among indicators of stress, coping, and maladjustment continues to be problematic. Maladaptive ways of coping seem so closely connected to expressions of distress and indicators of psychopathology that researchers continue to question whether coping assessments tap symptoms rather than predictors of disorder (Compas et al., 2001). As a result, in measurement work, researchers need to continue to carefully scrutinize and remove items from coping inventories that overlap with measures of stress, emotional distress, and internalizing and externalizing behaviors (Ayers et al., 1996; Connor-Smith et al., 2000; Treynor et al., 2003).

A second set of problems is presented by typical study designs. The vast majority of individual differences

research looks at links between coping and psychopathology at a single time point. As a result, as underscored by Compas et al. (2001) in their review of this work, it is not possible to determine a specific direction of effects from these associations:

> Although it is tempting to infer that the use of engagement or problem-focused coping leads to more successful adaptation to stress, this interpretation is tautological to a certain extent. That is, these findings may simply indicate that children and adolescents that are more socially competent, who are less anxious and depressed, and who exhibit fewer conduct and disruptive behavior problems are better able to generate solutions to problems and to maintain a positive outlook when faced with stress. (p. 118)

This situation can be improved by the use of designs that include multiple times of measurement—either short term, such as daily diary time-series studies, or long term, such as longitudinal studies. These kinds of designs are essential to allow researchers to examine reciprocal effects.

The optimal study designs that allow causal inferences (in either direction) continue to be experimental or intervention studies, in which researchers foster more constructive coping and then examine the effects of these improved coping strategies on subsequent psychological symptoms. Researchers are more limited in their ability to experimentally study the reverse direction. That is, researchers are not ethically able to induce psychopathology, but they can induce dysphoria or negative mood and then examine these effects on how people cope with challenges and setbacks. Most persuasive are programs of research that utilize both experimental and naturalistic longitudinal designs to examine both directions of effects (e.g., Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008).

Despite the many contributions of transactional studies of individual differences in coping processes and psychopathology, even the best of this research suffers from an intractable problem: Any individual differences approach is inherently incomplete with respect to an understanding of psychopathology, which (at least from the perspective of the interdisciplinary field of developmental psychopathology, Cicchetti & Toth, 2009) is by nature a developmental process. This means that key questions can never be completely answered by looking at snapshots of the relations between coping and psychopathology at single time points or even at multiple points in time. Coping, like psychopathology, competence, and resilience, is inherently and reciprocally developmental: Developmental level decisively enables and constrains each of the processes depicted in transactional theories of coping: appraisals, personal and social resources, ways of coping, outcomes, and all the feedforward and feedback loops that connect them. At the same time, episodes of coping contribute to development: Through the repeated process of dealing with problems and difficulties, children and adolescents generate resources and liabilities for dealing with subsequent stressful encounters. To fully realize the value of transactional perspectives and to fully recognize the role of coping in the onset and progression of mental disorder, mental health, or the growth of resilience, an important next step is the creation and use of developmental conceptualizations of coping.

NORMATIVE DEVELOPMENTAL PERSPECTIVES: COPING AS A SET OF BASIC ADAPTIVE PROCESSES THAT ARE REORGANIZED WITH AGE

Normative developmental frameworks are grounded in the proposition that coping is a fundamental adaptive process that has evolutionary value in allowing people to detect, manage, and learn from potentially dangerous encounters (White, 1974). From this perspective, it becomes clear that coping has its roots in many functional systems designed to deal with threats and dangers. Because all these subsystems are likely to be activated by stress, developmental conceptualizations posit that the term *coping* refers to how all of them are coordinated and sequenced during stressful encounters. Hence, in the field of coping during childhood and adolescence, coping has come to be defined as "regulation under stress" (Compas et al., 2014; Eisenberg et al., 1997; Rossman, 1992; Sandler, Wolchik, MacKinnon, Ayers, & Roosa, 1997; Skinner & Wellborn, 1994; Skinner & Zimmer-Gembeck, 2007, 2009).

When coping is seen as the coordination of adaptive processes designed to detect and respond to challenges and threats (see Figure 10.3) or as "reactivity and regulation under stress," it becomes clear that the coping system needs to accomplish four tasks: (1) to detect and interpret information about internal and external demands (threat detection and appraisal); (2) to prepare a response based on internal and external guides and capacities (action readiness); and (3) to execute a response by coordinating action tendencies with internal and external demands and resources (action regulation). Moreover, in order to develop, the coping system also needs (4) to recover and learn from stressful encounters.

From this perspective, it becomes clear that coping represents a complex multilevel system (see Figure 10.4), which extends from (1) the neurophysiological level, including

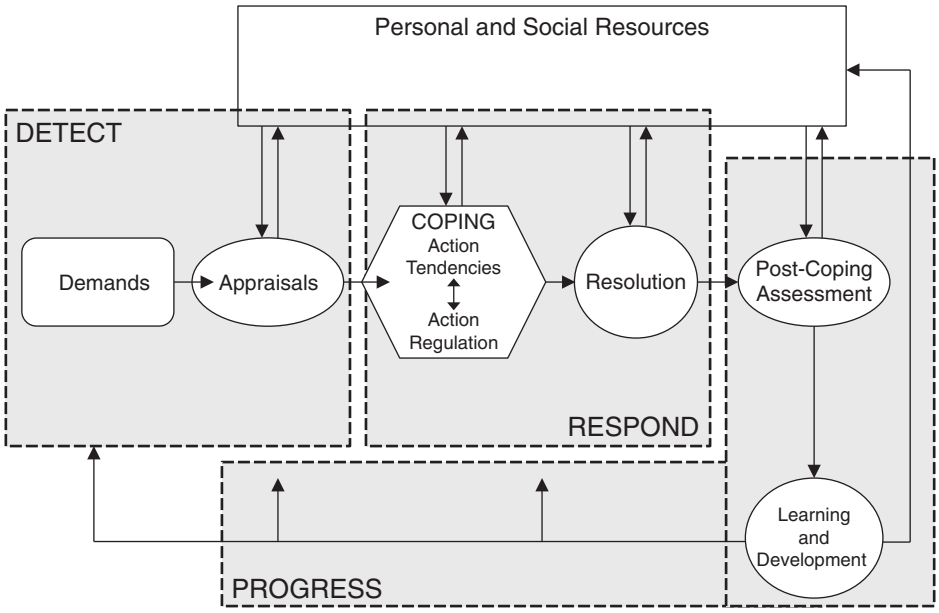


Figure 10.3 Depiction of the Coping System as a Set of Fundamental Adaptive Processes Used to Detect, Respond to, and Learn from Encounters with Potential Challenges, Threats, and Dangers.

psychobiological subsystems involved in detection and reactions to stress and the regulation of stress reactivity, most centrally the hypothalamic-pituitary-adrenocortical axis (HPA), the sympathetic-adrenal medullary (SAM) axis, the amygdala, and the prefrontal cortex (PFC), especially the anterior cingulate cortex (ACC); (2) the psychological level, including processes involved in stress reactivity and regulation, especially the attentional, emotional, and motivational subsystems; (3) the level of action, including subsystems that jointly generate action tendencies and that integrate and regulate them, especially the behavioral, cognitive, and meta-cognitive subsystems; (4) the social level, including participation in coping by social partners as well as interpersonal relationships (such as with caregivers, other family members, teachers, friends, and peers) that scaffold the development of coping's many subsystems; and (5) the societal level, including the stressors that impinge on and the resources that are available to children and adolescents themselves as well as the societal stressors and supports that influence their social partners.

After considering these five levels, the reciprocal connections between coping and development become more apparent. On one hand, development shapes coping: (1) by exerting extensive effects on the bottom-up processes that are coordinated and integrated during stressful transactions, including neurophysiological and psychological (i.e., attentional, emotional, motivational, behavioral, and cognitive) features of reactivity and action tendencies, as well as (2) exerting extensive effects on the top-down regulatory processes used to coordinate and integrate them. Higher-order developmental organizations contribute to coping by determining the nature of the tools children and adolescents have at their disposal to detect, respond to, and learn from threats at different ages as well as the sociocultural scaffolds that they can count on to protect them (or leave them vulnerable) while their own coping capacities are developing.

On the other hand, coping also contributes to development: The actual moment-to-moment transactions between individuals and stressful events can be considered "proximal processes" that act as engines of development (Bronfenbrenner & Morris, 2006). These episodes, in which individuals are trying to optimize the fit between environmental and intrapsychic demands (stress) and their internal and external resources and responses (coping), can be seen as creating a "zone of proximal development," in which strategies for dealing with stress and negotiating emotions can be discovered, practiced, and consolidated (or overwhelmed and discarded). Hence, cumulatively, such transactions can contribute to the development of capacities and resources for improved coping, regulation, and resilience (Carver, 1998; Carver & Scheier, 1998; Luthar, 2006; Tedeschi, Park, & Calhoun, 1998).

A view of coping as a basic adaptive process suggests that, at the most global level, one way of outlining the age-graded progression of coping, as well as its qualitative shifts, is to consider several broad developmental phases that are characterized by different mechanisms of

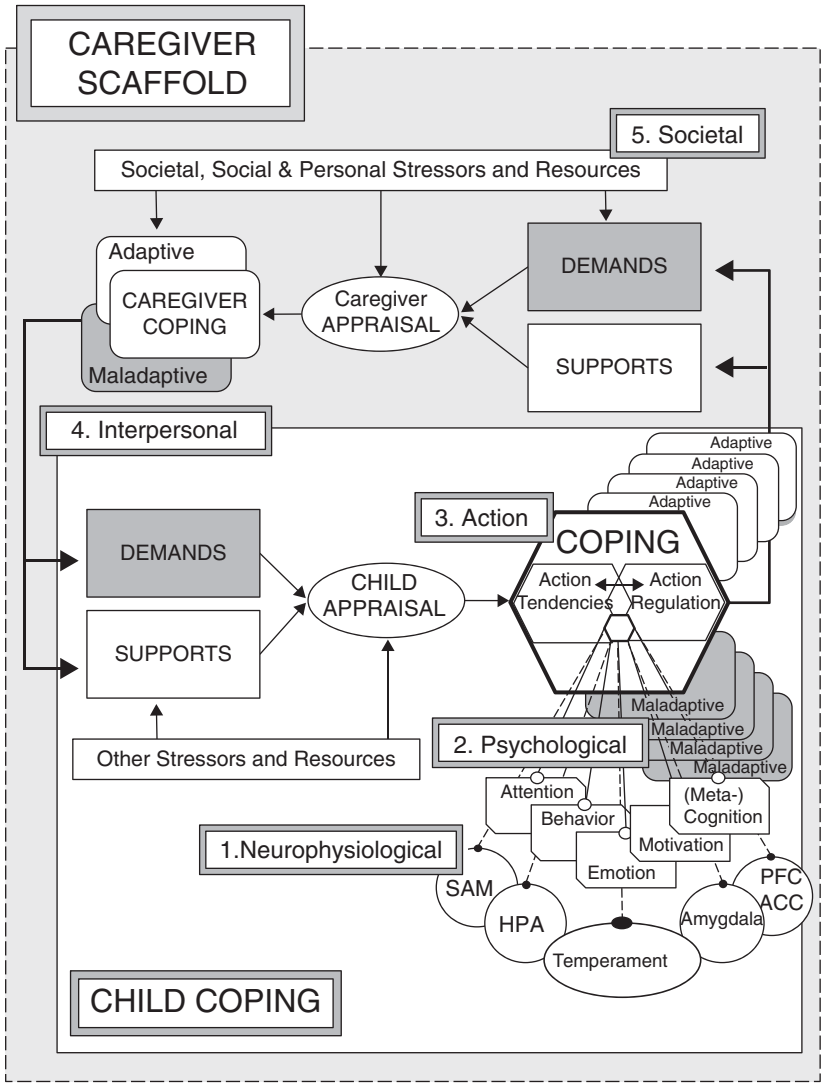


Figure 10.4 Integrative Multilevel Conceptualization of Coping as a Set of Interrelated Processes that Function on the (1) Neurophysiological, (2) Psychological, (3) Action, (4) Interpersonal, and (5) Societal Levels.

detection, appraisal, reactivity, regulation, and learning as well as different kinds of participation by social partners. As we outlined in our earlier work:

> Infancy would begin with stress reactions governed by reflexes, soon to be supplemented by coordinated *action schema*; during this period, caregivers would carry out coping actions based on the expressed intentions of their infants (interpersonal co-regulation). During toddlerhood and preschool age, coping would increasingly be carried out using *direct actions*, including those to enlist the participation of social partners; this would be the age at which voluntary coping actions would first appear (intrapersonal self-regulation). During middle childhood, coping through *cognitive means* would solidify, as described in work on distraction, delay, and problem-solving; children would be increasingly able to coordinate their coping efforts with those of others. By adolescence, coping through *meta-cognitive means* would be added, in which adolescents are capable of regulating their coping actions based on future concerns, including long-term goals and effects on others. (Skinner & Zimmer-Gembeck, 2007, p. 128)

Age-graded shifts in the basic tasks of coping (i.e., detection and appraisal, action tendencies and regulation, and learning) are shaped, on one hand, by the development of neurophysiological subsystems, and, on the other hand, by changes in the demands and resources provided by social partners, and especially caregivers. In this section, we use research on the development of coping itself and of other regulatory subsystems (including attentional, emotional, and behavioral regulation), to trace the course of age-related changes in how these subsystems are triggered

and coordinated in the face of stress. Because social partners are so critical to the development of all these subsystems, we also detail the role of caregivers (and later, other social partners) in the emergence and consolidation of these regulatory resources and capacities. We focus especially on how the caregiver's role in coping changes over development, from one in which caregivers are doing most of the coping for newborns based on their infants' expressed preferences, to one of direct participation, then cooperation, and finally acting as a resource and backup system to the relatively independent coping of which adolescents are capable by the time they reach emerging adulthood. (For more details on the normative development of coping, please see Skinner & Zimmer-Gembeck, in press.)

Normative Development of Coping during Infancy: Implicit Coping

Because systems to detect and deal with threats are essential to survival, newborns come equipped with preadapted responses to carry out these tasks. Sensory, perceptual, and attentional subsystems aid in threat detection; emotional and motivational subsystems aid in threat appraisal and action readiness; and the motor system carries out actions to express distress or respond to danger. The initial systems that coordinate newborns' threat detection and responses are based on reflexes and other automatic processes triggered by the neurophysiological stress reactivity subsystems, including the SAM, the HPA axis, and subcortical neurological subsystems, like the amygdala (Izard, Hembree, & Huebner, 1987; Ohman & Mineka, 2001).

Attachment and "External Coping"

At the level of action, these physiological subsystems initially trigger automatic motor behaviors, such as startling, huddling, crying, and diffuse whole-body reactions to physical discomfort, novelty, constraint, and other sources of psychological displeasure or distress. These expressions of distress are not initially intended as communications, but they can be read and interpreted by sensitive caregivers and so can initiate cycles of contingent and responsive caregiving. As described by decades of work on the attachment system (Ainsworth, 1979; Bowlby, 1969/1982; Carlson & Sroufe, 1995; Kobak, Cassidy, Lyons-Ruth, & Zir, 2006), these call-and-response cycles are part of species-general evolutionarily adaptive mechanisms, in which caregivers are predisposed to respond to a newborn's distress by engaging with and soothing the infant and by figuring out what is wrong and taking action to change the stressful situation, guided by the infant's needs and expressed preferences.

Such soothing and comforting, along with actually meeting newborns' expressed needs, can be considered forms of "external coping" in which the caregiver, using information provided by the infant, appraises the stressor, analyzes the "problem," and responds with emotion regulation or constructive coping actions. For the infant, such interactions cumulatively create the experience of a safe and trustworthy environment, which may be an important foundation for the infant's ability to modulate physiological stress responses (Fuertes, Dos Santos, Beeghly, & Tronick, 2006; Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996). From the first days of life, infants are also learning from stressful encounters, using mechanisms described by operant and associative conditioning (Harman, Rothbart, & Posner, 1997), in which habitual responses through their repeated use become embedded in implicit memory.

These mechanisms soon modify infants' stress responses from those of reflexes to those of action schema or habits (Rothbart & Posner, 2006), perhaps regulated by subcortical structures, such as the amygdala, that rely on cumulative experience and learning about the nature of the environment and its relation to the actions of the individual (Lewis & Todd, 2007). Based on repeated experiences in a secure relationship with a sensitive caregiver, these cumulative patterns of learning, perhaps stored in the amygdala as "hot" information, may continuously downregulate the HPA axis and the SAM. This repeated experience with sensitive responding from others may be one of the mechanisms through which infants' stress reactivity subsystems become tuned to their environments (Spangler & Grossmann, 1993; Spangler, Schieche, Ilg, Maier, & Ackerman, 1994). When infants develop in the context of a secure attachment relationship, these neurophysiological systems (especially the HPA axis) go into a period of hyporesponsivity by about 3 months of age (Gunnar & Donzella, 2002; Gunnar & Quevedo, 2007), resulting in a calmer and less stress-reactive state for the infant after the first few months of life (Lewis & Todd, 2007).

Proximity Seeking as an Omnibus Coping Strategy

As described by attachment theory (Kobak et al., 2006; Sroufe, 1996; Sroufe & Waters, 1977), a secure relationship with the caregiver is also accompanied by the development of an omnibus coping strategy over the first few months of life, namely, proximity seeking. This response, to which human infants are biologically predisposed, relies

on biobehavioral systems that are visible first in reflexes and crying and then, based at least partly on sensitive caregiving, in intentional communications and focused actions, such as looking, reaching, and distinctive vocal patterns and differentiated crying. By the end of the first 3 months of life, infants have developed, from a diffuse set of undirected expressions of distress and reflexive reactions, a differentiated set of appreciations and action tendencies that are integrated with caregivers' responses to infants' signals, including caregivers' strategies for repair and comfort (K. C. Barrett & Campos, 1991; Holodynski & Friedlmeier, 2006; Kopp, 1989). Following all of these accomplishments, coping shifts from what has largely been external coping to emotion regulation and problem solving that is coordinated between the active infant and the sensitive caregiver, and so can be more properly labeled interpersonal coping.

Internal Working Models and Coping Appraisals

Infants also construct generalized expectations, which have been referred to as "internal working models" of relationships, and they are considered to be the rudimentary beginnings of successively more complex and differentiated self-systems (Connell & Wellborn, 1990; Deci & Ryan, 1985; Laible & Thompson, 1998). Such self-systems include generalized expectancies of safety and security, or that loving care is available when one is distressed (Lewis, 1997), generalized expectancies for contingency and dependability and a sense of mastery or efficacy in the face of environmental challenges (J. S. Watson & Ramey, 1972), and generalized expectancies that one's preferences will be attended to and respected (Deci & Ryan, 1985). These kinds of generalized expectancies likely continue to downregulate stress reactivity by broadcasting benign (implicit) appraisals of potentially stressful environmental encounters.

Development of Regulation and Rudimentary Coping

Infants and toddlers make momentous early advances in their capacity for regulation, which parallel the maturation of the PFC, which is involved in the processing, intensity, and regulation of emotion during the first years of life (Grimm et al., 2006). At this time, infants exhibit nascent cognitive control, and they can manage working memory and inhibitory control tasks (A. Diamond, Prevor, Callender, & Druin, 1997). They also develop rudimentary skills that they can use to regulate their emotional displays (N. A. Fox & Calkins, 2003; Rothbart, Derryberry, & Posner, 1994; Ruff & Rothbart, 1996) and are better able to direct their attention toward or away from environmental events in order to regulate emotion and action (Kopp, 2002).

By about 18 months, toddlers can engage in effortful self-regulation primarily through self-directed attention and voluntary control of action (Feldman, 2009; Harman, Rothbart, & Posner, 1997; Kochanska, Philibert, & Barry, 2009; Ruff & Rothbart, 1996). Such attentional orienting can serve as a way to guide thinking, feeling, and behaving, and the increasing efficiency of skills in each area builds the capacity of the entire system. Emotion regulation strategies are also improved by the end of the second year of life. All of these improvements parallel what is known about the maturation of the PFC in these early years (A. Diamond, 2002) and are also facilitated by changes in vagal tone (Feldman, 2009). Overall, by the second year of life, there are marked improvements in focused attention, response inhibition, effortful control, and emotion regulation, all of which aid in generating adaptive responses to the novel and discomforting events often encountered by infants. The capacities to inhibit and to attend are adaptive for many reasons, providing a foundation for the capacity to respond to others and to comply with parental requests or other environmental demands.

Goal-Directed Action and Early "Problem-Focused Coping"

In challenging but not overwhelming interactions with social and physical contexts, infants also develop the capacity for problem-focused coping as they flexibly deploy and focus attention on their goal-directed actions (Braungart-Rieker & Stifter, 1996; Bridges & Grolnick, 1995; McCarty, Clifton, & Collard, 1999). Especially interesting are interactions in which infants cannot fully realize their intentions; these can trigger rudimentary "coping" actions—for example, infants may increase their exertions toward the goal, become more energized, and later may try out different action strategies (DeLoache, Sugarman, & Brown, 1985; McCarty et al., 1999). If goals are blocked, infants may direct energy toward removing the obstacle, or they may withdraw their efforts and switch to another goal.

These coping interactions are developmentally useful: The goals created by the stress of not being able to immediately realize their intentions spontaneously coordinates infants' biobehavioral systems, both within the associated neurological subsystems (Lewis & Todd, 2007) and between the neurophysiological subsystems and infants' action subsystems. Such interactions not only exercise or consolidate existing connections but also stretch infants' actions into a zone of proximal development, where new strategies and combinations are generated. In fact, a shifting role of social

partners is to maintain a set of conditions for infants under which they can develop increasing regulatory resources and capacities. In the most general terms, doing this involves helping infants maintain a state of biological integrity and stability while nudging interactions toward the zone of "just manageable challenge," that is, providing opportunities for exploration and focused interaction with intrinsically interesting objects and people, combined with the availability of supports on an as-needed basis.

Social Referencing and the Emergence of Interpersonal Coping

Infants also begin to tune their appraisals of novel or ambiguous events more to their caregivers' signals of distress or interest, in a process known as social referencing, which allows infants to consult their caregivers' "radar" over some distance in order to make decisions about the potential dangers present in new situations and the extent to which they should engage or withdraw from specific encounters (Fonagy, Gergely, & Target, 2007; Lewis & Ramsay, 1999). At the same time, infants become more capable of indirect coping (K. C. Barrett & Campos, 1991) in which they delegate coping actions to caregivers through the use of intentional communications designed to elicit desired outcomes, such as pointing at a desired object.

Caregivers' sensitive responsiveness can be considered a kind of coregulation in which babies and caregivers are in good communication about how to deal with challenging, and potentially threatening, encounters (L. M. Diamond & Aspinwall, 2003; Hornik, Risenhoover, & Gunnar, 1987; Lewis & Ramsay, 1999; Sorce, Emde, Campos, & Klinnert, 1985). These interactions form kinds of coping packages, which infants can initiate using increasingly differentiated intentionally communicated signals of their distress, internal states, preferences, and goals. Such episodes, repeated thousands of times, begin to synchronize infants' internal experiences of distress with their external expressions, acknowledged and mirrored by caregivers through attunement. These appreciations, or appraisals, are in turn coordinated with caregivers' external actions to relieve distress, and infants' subsequent internal experiences of relief from discomfort and satisfaction of goals.

As these packages are differentiated, based on the underlying problem (cause) and its emotional markers, two new developments emerge: (1) infants construct sets of distress appraisals and expressions that are actual representations of their genuine underlying physiological states, emotions, and motives; and (2) they build up a repertoire of constructive interpersonal coping strategies that are targeted at the actual problem and are effective in dealing with the stressor and in bringing comfort, relief, and motive satisfaction (Calkins & Hill, 2007). Using their emerging representational capacities, infants can also begin to form subjective representations of the contingencies between these elements, allowing the packages to be stored in implicit memory for later use, when triggered by similar problems or emotional markers of distress.

Normative Development of Coping during Early Childhood: Voluntary Coping

Early childhood (about age 1 to 4 years) is sometimes referred to as a period of emotional action regulation, because emotional systems seem to be coordinating toddlers' appreciations and action readiness in stressful situations (Holodynski & Friedlmeier, 2006; Kopp, 2009). Detection and responses to challenges and threats are largely carried out by the emotional and intrinsic motivational systems, which generate approach or engagement reactions to objects, people, or events that young children find attractive, and avoidance or withdrawal reactions to ones they find unattractive, frightening, or repulsive (K. C. Barrett & Campos, 1991). Based on a history of experiences with sensitive interpersonal coping and the construction of secure internal working models, toddlers become able to tolerate increasingly higher levels of stress, showing equanimity and patience, perhaps based on benign implicit appraisals of stressful situations and expectations that episodes will be resolved favorably. They are also able to clearly communicate their genuine emotions and desires and are generally ready and willing to cooperate with caregivers in regulating emotions and dealing effectively with action problems.

Caregivers participate directly in appraisals and coping of toddlers at this age, as described by Gottman, Katz, and Hooven (1996, 1997) in their depiction of "emotion-coaching" parenting (see also Calkins & Hill, 2007; Keenan, 2000; Kliewer, Fearnow, & Miller, 1996; Power, 2004; Sroufe, 1996). Caring adults help children identify and discuss differentiated emotions, as well as their causes, and jointly examine strategies for tolerating or alleviating them (aka strategies for emotion regulation or emotion-focused coping) (Dunn, Bretherton, & Munn, 1987; Kopp, 1989; P. J. Miller & Sperry, 1987). Such emotion coaching allows children to integrate their genuine internal experiences of distress with a differentiated vocabulary to accurately recognize and represent a variety of emotions (Denham, 1998; Malatesta, Culver, Tesman, & Shephard, 1989; Saarni, 1997), thus affording children access to the full range of their emotional experience, which

provides crucial information when they are appraising the meaning of a potentially stressful event and when they are coping.

Representational Capacities and Coping, and the Development of Extrinsic Motivation

The development of representational capacities, which were seen in early forms in generalized expectations and action schemes, produces a major shift in emotion regulation and coping with stress during early childhood (Denham, 1998; Derryberry & Tucker, 2006). These capacities make it possible for toddlers to maintain goals over longer periods of time, to "plan" successively more complex action strategies before carrying them out, and to communicate in more differentiated and accurate ways about their goals, desires, and emotions. The joint representation of internal states and preferences along with external affordances and conditions allows these elements to be more effectively coordinated and, with practice, to become linked; these joint representations then lead to more coherent and goal-directed interactions with social and physical partners, even under conditions of greater challenge and demand (Fonagy et al., 2007).

At the same time, the growth of representational capacities and working memory also shape the development of the emotional system, which comes to include the "other-conscious," or socially communicated, emotions of pride, shame, and guilt. These new self-conscious emotions, coupled with close relationships and the desire to please attachment figures, ushers in the development of the "extrinsic" motivation system, which allows toddlers to comply to requests from caregivers to inhibit the expression of prepotent behaviors and emotions or to show behaviors or emotions that they do not spontaneously wish to perform (Kochanska, Coy, & Murray, 2001). The prepotent bottom-up emotional action tendencies generated locally by the intrinsic motivation system and marked by emotions can now begin to defer to top-down cognitively represented goals from the extrinsic motivational system, for which no action readiness is spontaneously available. Toddlers' capacities to comply seem to depend not only on the quality of the relationship with the caregiver but also on the strength and direction of the prepotent action tendencies that are generated (Kopp, 2009).

Caregiving and the Development of Self-Regulation in Coping

To support this transition, caregivers encourage young children's use of language to express their distress and requests ("use your words"), even under increasingly stressful conditions, and begin to regulate young children's action based not only on children's desires but also on cultural norms and moral principles for appropriate behavior (Power, 2004; Tolan & Grant, 2009). The shift from heteronomous regulation (or compliance, guided by caregivers) toward autonomous regulation (or self-regulation, guided by the young child's core self) not only allows children to begin to become the agent of their own coping but also requires children to more actively and intentionally coordinate their coping efforts with the needs and desires of social partners (Eisenberg, Fabes, & Murphy 1996; Eisenberg, Valiente, & Sulik, 2009). This shift has been studied most thoroughly in research on the development of compliance, which focuses on parental demands and norms (Kopp, 2009) and the development of conscience (Kochanska, Forman, Aksan, & Dunbar, 2005), which folds moral principles and priorities into coping.

The kinds of scaffolding that seem to be most effective in promoting compliance, the internalization of conscience, and autonomous regulation more generally, include several elements that create "coping episodes" for young children (Kopp, 2009). First, parents provide consistent demands for appropriate behavior, focusing almost exclusively on insistence about only a very small number of "true moral rules," such as honesty, treating the self and others with kindness and respect, and taking responsibility for one's mistakes and messes. Violations of these principles create "interpersonal problems" for young children with their parents, preschool teachers, or peers. In helping children solve these problems, one key is warm and caring structure provided by trusted adults, who offer alternative appropriate means, both verbal and nonverbal, for children to express their true feelings and desires. Especially important, in promoting both compliance and eventual internalization, are induction strategies that support autonomy by acknowledging children's genuine goals and feelings, combined with explanations of the relevance and importance of prosocial actions to children's own goals (Hoffman, 1994). Such inductions allow children to internalize alternative means of expressing feelings and regulating actions under stressful conditions.

Executive Functions, Problem Solving, and Coping

The study of conscious control, or executive functioning, suggests that the emergence of such voluntary self-regulation is the product of neurological and cognitive developments that increasingly allow children to create and resolve conflicts in action regulation (A. Diamond, 2013; Zelazo, Muller, Frye, & Marcovitch, 2003). Previously, potential conflicts were resolved automatically by prioritizing prepotent habitual responses generated by the intrinsic motivation and emotion subsystems. With

increases in working memory and attention and improved awareness of their own goals and intentions, children are able to represent conflicting sources of regulation—such as two rules for behavior, a bottom-up urge and a top-down goal, or a habit and a current alternative intention (Nigg, 2006; Pennington & Ozonoff, 1996). Executive functions allow young children to internally mediate these conflicts, for example, to begin to inhibit prepotent responses and to show alternative nondominant responses, or to shift the guides for their action regulation from one set of rules or tasks to another (Best & Miller, 2010; A. Diamond, 2013; Nigg, 2006).

The internalization of prosocial strategies, concern for others, and moral rules for use in regulating action are combined with the continued development of the capacity to search for effective means to reach desired goals, or problem solving. Although it has its origins in contingency detection and tertiary circular reactions during infancy, intentional problem solving as a cognitive and social process comes into its own during early childhood (Keen, 2011). If handled sensitively, "stressful" transactions with uncooperative peers and materials (such as blocks, games, sports, or artwork) can become laboratories for developing problem-solving skills—allowing young children, with the help of adults and peers, to identify and generate ideas for new means or strategies, imagine their consequences, select from alternatives, try them out, and note their actual effectiveness (Berg & Strough, 2010).

Individual Coping as a Supplement to Interpersonal Coping

One of the most important reorganizations of the coping system takes place with the emergence of volitional action regulation during early childhood. By lifting regulation off emotions and integrating emotions with volition, coping becomes less reactive—that is, less a product of local conditions and implicit motives, and more flexible:—more open to top-down influences from both social partners and internal sources. The primary shift during this developmental period is from *inter*personal to *intra*personal coping. The coping packages (with their appraisals differentiated by causes and emotions and their action repertoires for satisfying motives and soothing distress) that were coproduced by the child *and* the caregiver are now increasingly handed over to the child, and "independent" coping becomes the young child's developmental task, while scaffolding from adults (e.g., caregivers and preschool teachers) creates a zone of proximal development. For some theorists, who define coping as comprising only conscious and volitional efforts (e.g., Compas et al., 2001), the development of voluntary action regulation marks the beginning of coping proper.

Such a shift requires children to reroute the interpersonal appeals that they previously directed to caregivers (with their emotional expressions of problems and desires), so that they are directed *intra*personally for satisfaction (i.e., at their own newly emerging sense of self), and to use the information contained in emotions and language that was formerly used to guide the actions of caregivers toward meeting the child's needs, so that it is now employed to guide their own actions in meeting their own needs (Holodynski & Friedlmeier, 2007). Hence, the coping repertoire that was previously enacted between children and caregivers eventually comes to be reconstructed in the domain of children's own voluntary actions.

It is important to make clear, however, that intrapersonal or individual coping does not replace interpersonal coping; it supplements it. Young children still have access to interpersonal strategies, which they can initiate through support, proximity, or help seeking, and they are likely to fall back on these strategies when the stressor is severe or the children are highly distressed, tired, or otherwise impaired (Zimmer-Gembeck & Skinner, 2011). At the same time, parents begin to dole out their direct participation, judging for themselves whether children are capable of coping on their own with the particular stressor in the current condition (Eisenberg et al., 2009). Caregivers may encourage a few bouts of independent coping and, if they see that children are intimidated or overwhelmed, may add resources or participate in a round of interpersonal coping to see whether they can tip the children back from a sense of threat and toward the experience of manageable challenge.

Caregivers continue to shape emotion and coping by protecting young children from events that are potentially overwhelming, by coaching via direct instruction, and by more general discussions of problems and emotions (Fabes, Eisenberg, & Bernzweig, 1990; Morales & Bridges, 1996; Thompson, 1990; Valiente, Fabes, Eisenberg, & Spinrad, 2004). It seems likely that the development of all of the constructive ways of coping emerge from interpersonal scaffolding—not only of prosocial ways of coping (such as accommodation and negotiation) but also ones that are not so obviously social, like strategizing and self-soothing, which may emerge from joint problem solving and the coaching of emotion regulation.

Normative Development of Coping during Middle Childhood: Reflective Coping

A major reorganization in the coping system takes place sometime during the 5-to-7 age shift (Sameroff & Haith, 1996), when children begin to internalize the mental means of regulation and slowly become able to regulate

their actions using reflective consciousness. As noted by many coping theorists (e.g., Aldwin, 2007, Aldwin, Skinner, Zimmer-Gembeck, & Taylor, 2011; Compas et al, 2001; Murphy & Moriarity, 1976; Skinner & Edge, 1998a; Skinner & Zimmer-Gembeck, 2007, 2009), this cognitive revolution ushers in a widely expanded repertoire of coping because it allows children to reconstruct and deploy mental forms of all the ways of coping that they have previously used on the plane of direct action. For example, instrumental action is supplemented by cognitive problem solving, behavioral distraction by mental distraction, physical escape by mental withdrawal, physical soothing by cognitive emotion regulation, and so on.

Regulatory Development and Coping, and Construction from Intrapersonal Coping

The capacity for voluntary coping that emerged in toddlerhood and improves up until school entry coincides with advances and increasing efficiencies in attentional skills and shifting of attention, the capacity to inhibit responses, effortful control, and emotion regulation (Fan, Fossella, Sommer, Wu, & Posner, 2003; Rueda & Rothbart, 2009). Children also exhibit great improvements in working memory by age 4, and this continues to improve up until age 7 (Luciana & Nelson, 1998). Children become able to delay gratification for longer and display decreases in impulsivity (L. B. Jones, Rothbart, & Posner, 2003; Prencipe & Zelazo, 2005). Children who are better at response inhibition by the age of 4 are better able to focus and shift their attention and are less impulsive and prone to frustration (Gerardi, Rothbart, Posner, & Kelper, 1996; Zelazo, Reznick, & Pinon, 1995). All of these capacities serve them well when coping with stress.

Thus, children show major advances in coping and self-regulation between the ages of 3 and 6, and all of these advances seem to be occurring at the same time as maturation is progressing in the dorsal ACC network (Geidd et al., 2004; Gogtay et al., 2004). Moreover, the average volume of brain activation is reduced in adults compared to children (Casey, Jones, & Somerville, 2011), which suggests that brain areas involved in executive functions are becoming more focal and efficient, at the same time as children increasingly recruit more sophisticated prefrontal systems of the brain for self-regulation (Casey et al., 2011; Luna et al., 2001; Luna & Sweeney, 2004; Rubia et al., 2000).

The brain seems to be moving toward specialization and reduction in the time needed to process information and respond. Some researchers refer to this as "fractionating" to reflect the differentiated and distributed functioning seen in the adult brain (Baddeley, 1998; Tsujimoto, 2008). Therefore, development may mean an increasing fractionation of brain function from early childhood to early adulthood in which multiple higher-level brain processes draw on common areas of functioning and covary with each other before the age of about 7, but these same processes become fractionated beginning at about age 7 or 8. This change is also apparent in neural organization, in that functions move from diffuse to more focal and fine-tuned for performance (Casey, Tottenham, Liston, & Durston, 2005; Durston et al., 2006).

The reconstruction of the coping repertoire on the mental plane is accomplished through a long process of internalization and transformation of the previously enacted coping system. This process is made easier if earlier bottom-up action tendencies are coherent and genuinely informative about children's authentic feelings, motives, and neurophysiological stress reactions; and if developing top-down self-systems for regulating action tendencies are sturdy and constructive, that is, undergirded by high levels of trust (and so are socially cooperative), mastery (and so are optimistic), and self-determination (and so are agentic).

Because coping, by definition, involves actions in potentially threatening situations of personal relevance, the system of direct coping actions is likely reconstructed on the representational plane as emotion-laden "hot" cognition. The most obvious features to be internalized are language components: of stress reactions (e.g., distress labels), appraisals (e.g., emotion and problem labels), and responses (e.g., sequences of actions). Emotionally expressive signs and emotion experiences are also internalized, which then become capable of triggering emotional reactions in the absence of direct physiological stimulation (Holodynski & Friedlmeier, 2006). Also internalized are attention and motivation—in which children come to represent the priorities and goals that matter to them (Derryberry, Reed, & Pilkenton-Taylor, 2003; Rueda & Rothbart, 2009), which can then serve to direct focused attention as well as to energize engagement and withdrawal action tendencies (Block & Block, 1980; Metcalfe & Mischel, 1999).

Advantages of Mental Means of Coping

The internalization of the coping action system allows the child to reconstruct, in his or her imagination, sequences of potential coping responses and to play out not only their likely success in accomplishing the child's goals during stressful transactions but also their likely motivational, emotional, and social costs and benefits. The capacity

to conduct such mental coping exercises confers many advantages: Children can conserve energetic resources that would be expended (and avoid the risks that would be incurred) if they were to try out these options on the plane of action. Mental constructions also allow for a qualitative shift in flexibility, as a wider variety of possibilities can be considered, including novel sequences that have not yet been directly enacted on the ground.

From the perspective of action regulation, the biggest improvement during this developmental period is the capacity to coordinate all the features of coping on the same level, namely, the cognitive level (see Derryberry & Tucker, 2006, for a similar description of self-regulation and self-organization). Reconstructions of bottom-up physiological reactions, emotions, attentional priorities, and intrinsic motivations, along with top-down recommendations from extrinsic motivations, relationship considerations, cultural and social norms, and moral principles, can now all be brought together to the same table of hot cognitive representations to be coordinated through active and reflective mental "discussion," making explicit the conflicts and trade-offs that were previously dealt with through competing action tendencies or regulation by others. These conflicts, which both create stress and are exacerbated by stress, can be consciously recognized and thoughtfully negotiated.

"Mental" Participation of Social Partners

Such internal negotiations are made easier by caregivers who are sympathetic to the dilemmas children face in stressful situations and are willing to continue coaching and cooperating with their attempts to work them out (Denham, 1998; Eisenberg et al., 1998; Gross & Thompson, 2007; Kliewer et al., 1996; Neitzel & Stright, 2003). Adults' direct participation in coping episodes slowly recedes across middle childhood, as their active participation is successively replaced with "mental participation" through cognitively mediated reflective means, such as discussions, reminders, encouragement, suggestions, and structures (e.g., routines, rules, and rituals).

If parents are able to continue providing high levels of warmth and caring, structure, and autonomy support as children practice dealing with conflicts, dilemmas, obstacles, and problems, out of these stressful situations can emerge the *autonomous* regulation of action, in which children internalize and integrate moral rules and sociocultural demands with their true selves (Mesquita & Albert, 2007; Ryan, 1992) and so become able to use these guides to organize their action even in the absence of external monitors. It is important to note that, even though children are potentially capable of autonomous self-regulation, it can still be difficult to enact under stressful conditions, for example, in conditions of "temptation," when strong prepotent conflicting action tendencies are activated (Metcalfe & Mischel, 1999).

Role of Coping Attempts and Failures

The capacity to mentally coordinate and integrate information from all coping subsystems represents a major shift in the operation of the coping system itself. And it is through repeated attempts to accomplish this mental coordination, with the cooperation of social partners, that these skills emerge, are practiced and consolidated, and eventually can be reliably executed under conditions of increasing stress (i.e., under conditions of increasing internal distress and external pressure). Continuing to be extremely important during this phase are the reactions of adults (e.g., parents, teachers, coaches) to children's failures and breakdowns, which are key experiences in the development of resilient "mindsets" (Dweck, 2008). Children need practice with mistakes and failures in order to learn how to tolerate and benefit from the negative emotions mistakes generate; to view failures constructively; to engage fruitfully despite anxiety, frustration, or shame; to take responsibility for mistakes and repair them; and to figure out how to help negative emotions dissipate.

Mental Means Supplement the Coping Repertoire and Sturdy Coping Systems

These new mental means of emotion regulation and problem solving, although built on direct coping actions, do not replace them. Children still have access to previous behavioral forms of coping, which they are likely to fall back on when stress or distress is high and when mental means are too difficult to execute or are not as effective as action means. During middle childhood, the child's mental coping repertoire is not only expanded and differentiated but also coordinated and integrated with the previous repertoire of action, interpersonal, and automatic strategies. Hence, a major developmental task during middle childhood is to learn how to flexibly deploy this repertoire over the course of a coping episode—based on the severity of the stressor, the changing internal conditions of the child, and the actual effectiveness of the previous sequence of strategies in dealing with the stressor and its emotional concomitants (for reviews see Decker, 2006; Eisenberg et al., 1997; Fields & Prinz, 1997; Losoya et al., 1998; Zimmer-Gembeck & Skinner, 2011).

Middle childhood, with its pragmatic cognition and well-developed self-systems, is a developmental phase

during which coping is often described as "sturdy," especially if coping systems are built on constructive action tendencies, guided by (1) a sense of control and competence that is calibrated to actual performance in different domains and that encourages challenge appraisals and mastery responses to problems and obstacles; (2) feelings of security and relatedness that are calibrated to the prosocial actions of the self and the actual trustworthiness of different social partners—these internal working models encourage both self-reliance in action and emotion regulation along with appropriate support seeking as needed to restabilize independent coping; and (3) feelings of self-determination and autonomy that are calibrated to the true self and that encourage both accommodation to reasonable demands and self-assertive cooperative negotiation when the child's own needs are not met by current conditions. This sturdy coping system may be one reason why middle childhood is seen as a particularly resilient period—a time during which children can withstand and sometimes even flourish under conditions of adversity (Masten, 2001).

Normative Development of Coping during Adolescence: Proactive Coping

By adolescence, much of the brain structure and circuitry that allow for accurate stress appraisals and sophisticated coping responses are in place, but there are developmental changes in both the bottom-up and top-down processes that shape stress and coping during this age period. The hormones of puberty seem to reopen the underlying stress reactivity systems governed by the SAM and HPA axis so that they may become increasingly susceptible to influence from external stressors. The period of hyporesponsivity of these systems, which started in infancy, comes to an end, and a period of more intense emotional and motivational activation of the bottom-up, amygdala-regulated reactivity systems commences (Dahl, 2004; Gunnar & Quevado, 2007; Lewis & Todd, 2007; Spear, 2003).

Some theorists characterize this phase as one of imbalance between strong bottom-up emotionally charged impulses and the still developing PFC which cannot yet effectively regulate these urges (e.g., Casey et al., 2011; Steinberg et al., 2006), making emotion regulation and the focusing of cognition and attention when affect is high quite challenging for youth until later in adolescence or even into the mid-20s. This imbalance may also make adolescents vulnerable, especially under stressful conditions, to the short- and long-term consequences of highly attractive but highly risky behavior in a variety of domains (Fischhoff, 2005; Michel, Kropp, Eyre, & Halpern-Felsher, 2005; Reyna & Farley, 2006; Steinberg & Morris, 2001; Zimmer-Gembeck & Helfand, 2008; Zimmer-Gembeck, Siebenbruner, & Collins, 2004). In terms of coping, these challenges to emotion regulation in highly emotional environments during the earliest years of adolescence provide one explanation for trends suggesting that, after improvements in most ways of coping across early and middle childhood, during early adolescence, some youth seem to use more of a variety of maladaptive coping strategies (e.g., aggression, Pelligrini & Bartini, 2001) and become reluctant to seek help from adults (Newman, Murray, & Lussier, 2001).

Regulatory Developments and Coping

At the same time, increasingly stronger top-down regulatory capacities are slowly added, as can be seen in the growing efficiency of adolescents' executive functioning, involved in skills such as inhibitory control, problem solving, planning, logic, reasoning ability, and understanding consequences (Best & Miller, 2010; Reyna & Farley, 2006) along with other neurological developments (Spear, 2003). The PFC and the dorsal system of the brain, including parts of the ACC, have a prolonged course of development continuing into adolescence, which is consistent with research showing improvements in executive control and inhibitory skill during this time (Dennis, 2010; Luna, Padmanabhan, & O'Hearn, 2010).

Inhibitory control is relevant for stress and coping because it is critical for inhibiting both responses to threatening events and negative emotions. By about 13 to 17 years of age, many adolescents show adultlike performance on inhibitory control tasks, although their performance continues to require more effort than from adults (Flair et al., 2007; Luna et al., 2010). Similar to inhibitory skill, the development of emotional control seems to shows a prolonged pattern of development, but it has not yet been examined as thoroughly as cognitive control and executive functioning. Hence, it is not known, for example, whether it is the generation of emotion that changes with age or the capacity to control or manage it. In the same vein, working memory, a central component of executive function, operates quite well early in life but also improves substantially all throughout adolescence (Luna & Sweeney, 2004).

Nevertheless, adolescents' cognitive capacities have not yet fully matured. Studies of cognitive control using functional magnetic resonance imaging (fMRI) have generally identified two critical differences between adolescents and adults: Adolescents have more difficulties with response inhibition, and their working memory performance may

not yet be as fully developed (Luna et al., 2010). Because voluntary planned behavior depends on advanced cognitive skills, such as retaining goals online via working memory, preparing and planning responses, and suppressing task irrelevant responses (response inhibition), it seems clear that these types of tasks challenge adolescents' coping responses more than adults.

Although development and participation of the PFC may be partial explanations for these improvements in cognitive control and the increasing efficiency of response inhibition and working memory, all of these advances in functioning also are supported by the increasing integration of diverse brain systems outside the PFC as children get older (Luna et al., 2010). As Luna et al. (2010, p. 109) described:

> Overall, these results imply that an important part of development is the process of specializing and segregating circuitries that support task ability, response state, and default processing. The ability to utilize cognitive control to perform a response, the ability to retain a response state, and to suppress internal thoughts improves with development, as the circuits supporting these distinct processes become independent. These suggest age-related improvements in white matter connectivity but also functional integration as seen in spontaneous waves of synchronized activity (Fair et al., 2008; Uhlhaas et al., 2009, p. 109)

Metacognition and Coping

These developing executive functions and the cognitive abilities of formal operations should result in a major reorganization of the coping system, brought about by the emergence during adolescence of metacognitive capacities, that is, the capacity to think about one's own thinking and cognitive activities (see Compas et al., 2001, for a review; also see Frydenberg, 1997; Kuhn & Franklin, 2006; Seiffge-Krenke, 1995). Metacognitive capacities supplement the mental system of coping that was internalized during middle childhood, by integrating it with the adolescents' capacity to reflect on, evaluate, critique, and improve their own coping.

Metacognitive capacities open the way for increasing and intentional self-regulation of all the coping families, such as problem solving (as seen, for example, in increasingly self-regulated learning), reflective emotion regulation, and the exercise of volition through identified self-regulation (Band & Weisz, 1990). All of these capacities combine to enable more proactive coping (Aspinwall & Taylor, 1997), in which regulation under stress comes to include not only a concern for current internal action tendencies and external opportunities but also future, long-term considerations. Coping responses that seem attractive in the short term come to be informed by graphic imaginations of the future, such as the possibility of being physically or psychologically hurt; of getting caught; of losing valued outcomes, relationships; and even one's own self-evaluations.

As with mental means of regulation, these newly developing metacognitive capacities allow adolescents to differentiate and consider any aspect of the coping system, including appraisals, emotions, desires, action tendencies, and regulatory strategies. For example, metacognition allows adolescents to reflect on their interpretations of complex emotional states, their strategies for regulating them, and their potential to enact alternative strategies that might be more constructive. Moreover, "meta-emotions" allow adolescents to have emotional reactions to their emotional reactions, for example, feeling embarrassed about being afraid. Adolescents' increasing capacities for reflection, although generally positive, may also help to explain the increases seen during this age and in ways of coping focused on self-criticism and rumination and in reluctance to seek support (Zimmer-Gembeck & Skinner, 2011): The same capacities that allow adolescents to *reflect* on their emotions allow them to *criticize* their emotions; the same capacities that allow adolescents to *plan* for the future make them more vulnerable to *worrying* about the future; and the same capacities that allow adolescents to *recognize* they need help can also trigger *concern* that others may lose respect for them if they seek help.

Identity Development and Coping

Adolescent metacognitive capacities may also exert an influence on the nature of the self that is participating in regulation, as suggested by the fact that a major task of adolescence and young adulthood is identity development (Kroger, 2007; Meeus, 2011). The facets of the self that were differentiated by domain and calibrated to actual performance during middle childhood can now be thought of as parts of a whole that can be compared to each other and to the criteria of social norms and demands, with evaluative consequences for the self. To the extent that, in the process of identity construction, these disparate parts can be integrated successfully with each other, with the genuine self, and with the reflected regard of trusted others, a positive and coherent sense of self and identity can be achieved (Harter, 2012) that allows identified and autonomous self-regulation to become the dominant mode of coordinating bottom-up action tendencies and top-down considerations, even under increasingly higher levels of temptation and stress.

Coping Flexibility, Attunement, and the Importance of Social Partners

These emerging metacognitive capacities may also help to explain the increases in coping flexibility that are seen during this developmental phase (Babb, Levine, & Arseneault, 2010), which is perhaps most noticeable in adolescent support seeking (Zimmer-Gembeck & Skinner, 2011). Adolescents become more differentiated and flexible about the kinds of support they request and the person to whom they turn for these social resources, seeking out parents, friends, teachers, or other adults or peers, and asking for comfort, distraction, advice, or instrumental help, depending on the local conditions: the domain and specific problem, the social partner's authority over the situation, and the kind of supports they need. With this new level of representation, it seems that the entire repertoire of previous forms of *inter*personal coping can be integrated into the intrapersonal repertoire of support seeking, eventually enabling youth to initiate, access, and guide the deployment of available social resources while coordinating them with their own self-reliance and independent coping.

This same pattern, in which coping strategies become more differentiated and more selectively applied and coordinated with local internal and external conditions, can also be seen in other families of coping—even in those more focused on independent or cognitive coping. For example, youth are increasingly likely to use problem solving in response to stressors which they perceive as controllable (e.g., academic problems) whereas they are more likely to use accommodation or distraction strategies when dealing with problems that are uncontrollable (e.g., medical issues or parental problems) (Compas et al., 1991; Zimmer-Gembeck et al., 2011). This finding suggests that, although the repertoire of coping strategies is still expanding at this age, coping can also become less flexible in its execution during adolescence as youth discern the most effective strategies for dealing with common problems and begin to deploy the strategies more efficiently and with less effort.

Throughout adolescence, social partners continue to be crucial to the development of adaptive coping systems. Close and caring parental, family, and peer relationships along with meaningful cultural roles and activities (e.g., after-school programs, sports teams, youth groups) provide the external regulatory structures needed to keep adolescents safe during this risky period while their own coping capacities are still developing. Judicious support from caring adults (parents, teachers, extended family, etc.) is central, in which these grown-ups carefully monitor adolescents' "adventures in coping" (even when adolescents are not keen on having their activities monitored) while remaining sympathetically available to be called on as a backup system for whatever advice and comfort might be requested. Since adolescents' willingness to reveal their problems and failures to adults is a sensitive proposition at this age, the past dyadic history of communication, comfort, and joint interpersonal coping is critical in determining whether, when feeling overwhelmed, adolescents will bring their current coping concerns to an adult.

Reflection and Reappraisal

Adolescents' growing capacity to reflect on the entire coping system expands their potential to view and utilize coping episodes, whether they are "successes" or "failures," as increasingly valuable opportunities for learning. Reappraisal processes following mistakes and failures, which were practiced in cooperation with adults during middle childhood, now become highly inferential and can be reconstructed on the plane of the adolescents' own reflective coping systems, providing internal metaregulatory and metamotivational "commentary" during each phase. Supportive adults, through caring, coaching, and modeling, can help youth cultivate compassion for the fallibility of the self and others in stressful circumstances while also holding the self and others accountable for their actions, thus allowing adolescents to increasingly take ownership for the ways they deal with challenges and setbacks (i.e., for their own coping). These experiences can lead adolescents to supplement their coping repertoires with proactive or antecedent regulation or coping (Aspinwall & Taylor, 1997; Gross, 1998; Gross & Thompson, 2007), in which they make intentional decisions about the states or situations they let themselves get into, to make sure that their regulatory and coping capacities allow them to create the outcomes that they desire.

Conclusion

At each level, ways of coping are supplemented with new means of reactivity and regulation. Strategies that were initially neurophysiological and external at birth become interpersonal during infancy and toddlerhood, then individual or intrapersonal during early childhood, eventually to be reconstructed at the reflective level during middle childhood and finally transformed into metacognitive proactive strategies during adolescence and emerging adulthood. At each age, previous means of coping are differentiated and integrated with new modes, supplementing them and providing a wider repertoire that can be deployed

more intentionally and flexibly, in concert with changing internal and external conditions and resources.

Taken together, these developmental shifts can be seen as creating a system that gets better and better at detecting and responding to threats and problems, eventually realizing its full developmental potential. As we tried to make clear in our earlier work (Skinner & Zimmer-Gembeck, 2007):

> These developmental potentials depict a system that can increasingly monitor and appropriately appraise more (current and future) demands using its own and other's "radar"; maintain composure under higher levels of appraised threat with more capacity to withstand multiple demands and better "fallbacks"; respond increasingly in measured socially competent ways that reflect integration of ongoing emotional, attentional, and motivational reactions; more flexibly adjust actions to meet changing environmental demands without losing sight of genuine priorities; recover more quickly from setbacks; and at the same time take more away from stressful encounters, learning how to prevent and deal with future challenges and how to deploy coping in line with future goals. (p. 136)

Normative Development of Coping and Developmental Psychopathology

An understanding of the normative reorganizations of the coping system is helpful to researchers interested in developmental psychopathology for multiple interrelated reasons (Cicchetti & Toth, 2009; Egeland, 2007; Rutter, 2005; Sroufe, 2007). Most important, it allows researchers and interventionists to fully appreciate the complexity of the coping system and the many essential elements orchestrated and consolidated within it. From a developmental perspective, appraisals are not simply fleeting perceptions, and ways of coping are not simply lists of strategies; appraisals reflect "apparent reality" (Fridja, 1987), and ways of coping reflect basic configurations that infants, children, and adolescents have adopted as they organize their actions to deal with demands in the environments in which they are developing (Bowlby, 1969/1982; Garmezy & Rutter, 1983; White, 1974).

A normative description provides a basic yardstick for determining whether children and adolescents of all different ages are on track in the development of their coping resources and strategies (i.e., whether they seem to be accomplishing the age-graded developmental tasks that would serve the dual purpose of allowing them to deal effectively with current demands and stressors as well as providing a foundation that prepares them to deal with subsequent challenges successfully). It also allows interventionists to calibrate their prevention and remediation efforts to target the attitudes and skills that are most central to children at their current developmental levels as well as those they will need to be successful at subsequent ages.

Explanatory theories and research depict the many factors that allow the healthy development of the coping system to proceed and so allow researchers and interventionists to identify positive pathways through which children and adolescents can obtain robust tools for dealing constructively with stress. They also allow researchers to identify children and adolescents who may benefit most from interventions, because a range of problems in the subsystems that underlie or scaffold coping may put children at risk for the development of psychological and behavioral difficulties. Prevention and remediation efforts could rely on explanatory research to help locate likely intervention levers that would allow the systems that support the healthy development of coping to be repaired or optimized.

At the broadest level, developmental conceptualizations have created much overlap between the study of coping and the study of the development of psychopathology and resilience. Approaches that frame coping as part of multilevel integrative systems designed to detect and respond to threats and challenges have identified subsystems that extend from neurophysiology to social context and culture. Such perspectives on the development of coping create broad conceptual overlap with the approaches that have guided the study of developmental psychopathology (Cicchetti & Toth, 2009) and resilience (Compas, 2004; Masten, 2007) over the last five decades (Luthar, 2006). All these traditions consider their phenomena to extend from the biological (genetic, neurophysiological) through the behavioral to the psychological, social, and cultural levels of analysis (Cicchetti & Curtis, 2007). Definitions of coping as "reactivity and regulation under stress" link coping to the burgeoning research on regulation of the many processes (e.g., emotion, attention, behavior, motivation) that are activated during stressful encounters and that have been found to be implicated in the development of psychopathology (Cicchetti & Toth, 2009).

To understand coping—and especially its development—it is necessary to understand the multiple systems that give rise to it and how they work together over time. This is a central tenet of an integrative multilevel approach. The assertion that coping actions are diagnostic of the state of the entire "coping system," which includes psychological and social stressors, demands, resources, and their underlying neurophysiological and overarching social contexts, suggests that during transactions with stress, children and adolescents can and do move through successive (re)appraisals of challenge, threat, and loss as well

as through a repertoire of adaptive and maladaptive ways of coping. Hence, when current developmental researchers refer to the "coping system," they typically view coping actions as outward manifestations of an orchestra of biopsychosocial forces, very similar to the ways resilience researchers refer to their phenomena, *mutatis mutandis*. In other words, coping is part of an open and dynamic system and, as such, can be considered part of the same set of (sub)systems that contribute to (and are reciprocally shaped by) developing psychopathology and resilience (Marshall, 2013).

DEVELOPMENTAL SYSTEMS PERSPECTIVES: COPING AS PART OF DEVELOPMENTAL CASCADES TOWARD PSYCHOPATHOLOGY AND RESILIENCE

A description of normative age-graded reorganizations of the coping system provides an outline of a set of broad and healthy pathways that lead toward constructive and cooperative repertoires for detecting, dealing with, and learning from challenges, threats, and losses. The identification of the many subsystems that work together to give rise to coping actions, as depicted in Figure 10.4, makes it clear that optimal development and the avoidance of psychopathology entail a large number of essential ingredients, which typically serve as reciprocally self-righting, in that they work together to assist the organism toward pathways that channel growth in positive directions. For example, the newborn's intact neurophysiological and communication subsystems, the caregiver's sensitive responsiveness, and their emerging joint secure attachment, co-create a calmer and more stable infant stress reactivity subsystem that is easier to soothe and also provides clearer communication to the caregiver, which in turn informs and sustains sensitive responsive caregiving and lays down implicit infant learning that supports benign appraisals of ambiguous interactions and triggers constructive coping through focused exploration and proximity seeking.

At the same time, if any of these essential ingredients is missing or incapacitated, it can pose a risk for children and adolescents, nudging them toward maladaptive coping and psychopathology. In principle, problems can arise from any of the components described in the previous section on normative development, but we focus on three factors that play crucial roles in shaping the architecture of the coping system: (1) differences in the stress and regulatory neurophysiology that underlie coping, especially as captured in work on temperament; (2) differential histories of caregiving relationships involved in scaffolding action tendencies and regulatory processes under stress, especially as examined in work on attachment and parenting; and (3) differential exposure to stressful life events (especially those that originate in the family) that can undermine or overwhelm developing coping systems.

To integrate and extend research that has documented links among these factors, maladaptive coping, and psychopathology, we use several key principles from dynamics systems perspectives, which have been clearly articulated in approaches to developmental psychopathology (Cicchetti & Toth, 2009; Masten, 2007; Sroufe, 2009). First, building out from previous research, we assume that the connections between coping and psychopathology are bidirectional and cascade over time. Second, we explore the idea that one way in which risk factors can exert their effects on psychopathology is by creating perturbations in (neurophysiological, interpersonal, individual, reflective, or proactive) coping systems. These perturbations should create lasting effects to the extent that they not only interfere with the concurrent functioning of the coping system but also damage the foundations that are under construction and upon which subsequent developments of the coping system will be built.

Third, we think it unlikely that any one factor (e.g., difficult temperament or avoidant attachment) would be sufficient by itself to eventuate in a nonnormative pathway of maladaptive coping. In cases where a single factor is a little off, protective and compensatory processes can (and typically do) redirect divergent pathways back toward healthy development. Instead, risk accrues when the functioning of one factor is very seriously compromised or is part of a pattern of cumulative impairment or stress, because these conditions may combine to initiate self-amplifying patterns of maladaptive (neurophysiological, interpersonal, and individual) coping. Fourth, there are likely to be multiple pathways from coping to psychopathology, and different families of coping, rather than being considered global indicators of "good news" or "bad news," might suggest different markers of and routes toward different disorders. Finally, episodes of maladaptive coping may be expected to routinely participate in a wide range of "developmental cascades" (Masten & Cicchetti, 2010), both signaling and igniting problems in multiple domains—problems in individual functioning and in relationships—that cumulatively put children and adolescents at risk for the development of psychopathology.

In this section, we select illustrations of how extremes in the functioning of each of these three subsystems

(i.e., temperament, attachment and parenting, and family stress) can act as risk factors for both coping and psychopathology. Whenever possible, we focus especially on longitudinal studies that directly explore this possibility (for more detailed analyses, see Skinner & Zimmer-Gembeck, in press). In every case, the research base is inconsistent and cannot confirm all the connections that we posit. In fact, consistent with previous descriptions of the coping literature as dominated by correlational studies of individual differences in ways of coping, much of the research connecting coping to temperament, attachment and parenting, and family stress is cast in this mold, making connecting the developmental dots challenging.

At the same time, however, when the findings are considered as a whole, we think they are encouraging and together suggest that it may be useful to further explore the ideas presented in this section. Specifically, we argue that coping is *always* a part of the developmental cascades that lead to psychopathology: The neurophysiological, psychological, and social factors that predispose children to the eventual development of psychopathology typically result in maladaptive forms of stress reactivity and coping, and these forms of stress responses in turn set successive chains of negative events in motion, including the formation of habits, action tendencies, implicit and explicit self-systems, and (perhaps especially) reactions from social partners that are likely to further exacerbate behavioral problems and cumulatively potentiate the onset or escalation of disorders. These ideas are depicted graphically in Figure 10.5, which shows the cascades that start with temperament and attachment, are embedded in family stress, and, along with parenting, lead to different forms of psychopathology or resilience.

Temperament, Differential Pathways of Maladaptive Coping, and Psychopathology

Researchers have suggested multiple ways in which temperament and personality factors contribute both directly and indirectly to the development of problem behaviors and psychopathology (e.g., Calkins, 1994; Carver & Connor-Smith, 2010; Caspi, Roberts, & Shiner, 2003; Connor-Smith & Flachsbart, 2007; Derryberry et al., 2003; Mezulis, Hyde, & Abramson, 2006; Nigg, 2006;

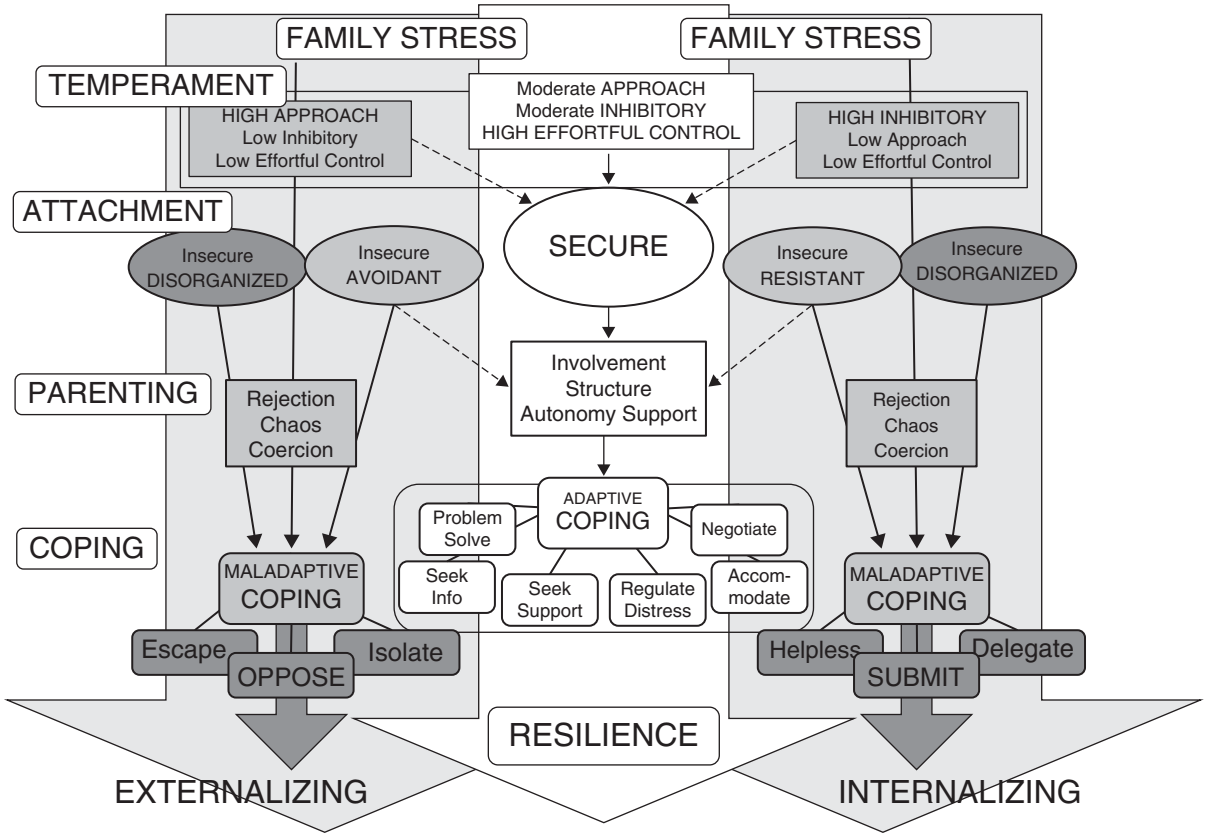


Figure 10.5 Underlying Neurophysiological Factors and Overarching Socialization Factors that Contribute to the Differential Development of Maladaptive Coping and Increase the Risk of Behavior Problems and Psychopathology.

Rothbart, 2011, Table 10.1; Rueda & Rothbart, 2009; D. Watson, Kotov, & Gamez, 2006). For example, research indicates that children who have an easy temperament are less prone to develop both internalizing (e.g., depression and anxiety) and externalizing problems (e.g., behavioral problems; Jaffee, Caspi, Moffitt, Polo-Tom, & Taylor, 2007), and children with temperaments characterized as high in negative reactivity or as very inhibited may be at risk for anxiety and other disorders (Belsky & Pluess, 2009; Eisenberg et al., 1997; McClure & Pine, 2006). This body of research is substantial and complex, and has been very useful for identifying individual differences in the kinds of physiologically based temperamental characteristics that may tip a child toward or away from developmental pathways marked by maladaptation or health and resilience. Yet it may also be useful to supplement this growing body of research by explicitly considering the differential patterns of stress reactivity and coping that stem from such temperamental predispositions in order to understand when, how, and why temperament provokes risk or provides protection from psychopathology.

Temperamental Patterns as Differentially Tuned Primitive Coping Systems

In principle, the coping systems of all newborns are built on their own individual temperaments, which refer to heritably based neurophysiological processes that predispose them to patterns of responding to environmental challenges and stressors (Rothbart, 2011). Most interesting from a coping perspective are temperamental classifications that focus on reactivity and regulation (Derryberry et al., 2003; Rothbart, 2011; Rueda & Rothbart, 2009; Shannon, Beauchaine, Brenner, Neuhaus, & Gatzke-Kopp, 2007). In this context, "reactivity" is closely connected to stress reactivity, in that it refers to how easily the appetitive/approach and the defensive/ inhibitory systems can be triggered by external and internal stimuli; and "regulation" has close ties to action regulation, in that it refers to how effective the executive attention system is in facilitating volitional control of emotional, motor, and attentional reactivity (Rueda & Rothbart, 2009).

As pointed out by Derryberry et al. (2003), "the appetitive and defensive systems can be viewed as relatively primitive 'coping' systems. The defensive system is designed to help the person cope with dangerous situations where it is crucial to recognize the threat, inhibit inappropriate responses, and find a source of safety. In contrast, the appetitive system is designed to help the person attain positive outcomes in appetitive contexts, where it is crucial to avoid or overcome obstacles in order to obtain the reward" (p. 1052). Individual differences in newborns' stress responses and regulation (i.e., coping) are shaped by the balance among these three neurophysiological systems: the appetitive, defensive, and executive attention systems. The appetitive and defensive systems are generally antagonistic in their functioning, so that overactivation of one system can be modulated by the activation of the other. Moreover, over- or underactivation of the appetitive or defensive systems can be compensated for by the executive attention system, which, if capable enough, can modulate the effects of the other two systems.

Research on Temperament and Coping

A growing body of research has focused on direct associations between coping and temperament or personality during childhood and adolescence by examining whether particular coping responses are more or less common in children and adolescents with particular temperamental characteristics or personality traits, such as negative emotionality, neuroticism, effortful control, or introversion (Markovic, Rose-Krasnor, & Coplan, 2013). Several of these studies show, for example, that an "easy" temperament is associated with constructive ways of coping, such as problem solving and support seeking (Zimmer-Gembeck et al., 2011), and with resilience (Luthar, 2006; Werner, 1993). Taken together with research on the links between temperament and psychopathology, such studies provide hints about how temperament might shape coping under conditions of stress.

Most interesting are studies that have begun to more directly investigate these processes by focusing on whether coping serves as a moderator or mediator in the connections between temperament and psychopathology. Moderation has been found in studies testing whether temperamental traits are more relevant to the development of symptoms of depression or anxiety (or other forms of psychopathology) depending on the presence or absence of certain coping responses (Seiffge-Krenke, 2011; Sugimura, Rudolph, & Agoston, 2014). In general, these studies focus almost exclusively on the more risk-producing temperamental traits, such as negative emotionality, and yield patterns of findings suggesting that adaptive forms of coping (such as reliance on primary control strategies when stressors are controllable and on secondary control or accommodative coping when they are not), can reduce the elevated or increasing levels of internalizing and externalizing symptoms that children or adolescents with these temperamental characteristics would otherwise be likely to experience over time. Mediation has been found in studies testing models in which coping acted as a conduit of the

impact of particular temperament or personality traits on symptoms or healthy outcomes (Compas, Connor-Smith, & Jaser, 2004; Mezulis, Simonson, McCauley, & Vander Stoep, 2011; K. S. Miller et al., 2009; Van De Ven & Engels, 2011). For example, in one longitudinal study of preadolescents, avoidant coping mediated the impact of temperamental impulsivity on heightened internalizing problems. Thus, preadolescents who were more impulsive used more avoidant coping, which in turn was related to their increasing internalizing symptoms over 1 year (Thompson et al., 2014). Some studies have examined both moderation and mediation, showing that they are not mutually exclusive; they can co-occur even when the same coping constructs, temperamental traits, and adjustment outcomes are examined (K. S. Miller et al., 2009).

"Easy" and "Difficult" Temperaments

When the research on temperament is filtered through the lens of developmental perspectives on coping, it suggests that temperamental characteristics of newborns can be thought of as neurophysiological set points for the development of their coping systems and so provide early foundations that start to channel infants' coping down differential pathways. The healthy development of coping should be facilitated by an "easy" temperament, which involves moderate responsiveness of the appetitive and defensive systems along with the capacity to flexibly modulate emotion and action using attentional and behavioral processes (Rothbart, 2011). Moderate stress reactivity comprises a threat detection system that is calibrated appropriately to external demands and conditions, in both approach and defense, along with the capacity to flexibly modulate reactions when conditions improve, allowing rapid recovery from stress. From the first days of life, this kind of temperament should make it easier for newborns to participate in effective interpersonal coping: Distress signals are moderate and informative and so more easily converted into directed distress communications, and infants are more easily satisfied and soothed by caregivers' coping efforts on their behalf (Rothbart, 2011).

More "difficult" temperaments, which involve high reactivity and poor regulation, should be a liability in the healthy development of the coping system (see Rothbart, 2011; Rothbart, Posner, & Kieras, 2006). The kinds of problems presented to the developing coping system and their likely effects on subsequent patterns of coping should differ depending on whether overreactivity originates in the defensive/inhibitory or in the appetitive/approach system. In either case, a temperamental profile would be more extreme to the extent that one of the systems is set very high while at the same time the other subsystems that would typically balance it out (namely, the opposing subsystem and the executive attention system) are set very low. Such extreme temperaments create challenges for both infant and caregiver in establishing a calm, well-calibrated and modulated neurophysiological coping system as well as co-constructing a positive interpersonal coping system. Based on their low levels of effortful control, such temperamental patterns may also interfere with the shift toward voluntary self-regulated coping and the subsequent systems that build on this type of coping (i.e., the reflective and proactive coping systems).

Inhibited "Fearful" Temperaments, the Differential Development of Maladaptive Coping, and Internalizing Psychopathology

Most research attention has been paid to infants with inhibited fearful temperaments that likely reflect an overreactive defensive/inhibitory system (N. A. Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Kagan, 1997; Kemen & Block, 1998). By definition, newborns high in neurophysiological stress reactivity consistently overreact to external demands and internal states. In response to novel stimulation, they typically show high and escalating emotional distress, in which attention is captured by the eliciting event (e.g., a noise or sudden movement). It is as if one of the key underlying systems upon which subsequent coping is going to be built has a hair trigger that keeps tripping the alarm of threat detection constantly and unnecessarily, making such infants' harsh distress signals less discriminating and therefore harder for caregivers to read and interpret. Moreover, weak executive attention (or effortful control) makes it more difficult for infants or caregivers to "turn off" the alarm through soothing, distraction, or other means of interpersonal coping. Attention is not easily freed from the distressing stimulus, and recovery from distress is slow and fragile, with increased risk of triggering additional distressed emotional reactions.

High levels of stress reactivity combined with low levels of effortful control may put inhibited/fearful infants and young children at risk for the development of poor coping. An overreactive defensive/inhibitory system provides a more challenging stress neurophysiology, at the same time that it makes sensitive responsive caregiving more difficult, thus interfering with the kind of secure attachment most needed to contribute to the development of a calmer hyporesponsive neurophysiological system (Nachmias et al., 1996). If neither infants nor caregivers are successful in helping recalibrate an overreactive stress neurophysiology, infants and then young children will have

repeated experiences of being overwhelmed by internal and external events.

Such experiences may in turn lead to overreliance on maladaptive forms of coping, in which children either try to avoid contact with stressors and/or with their overpowering emotional and physiological reactions to them or simply become resigned and submit to overwhelming stress. Such coping episodes can cumulatively lead young children to construct internal working models that consolidate the "message" of the overreactive defensive system, namely, that the world is a highly dangerous and uncontrollable place with which the self cannot hope to cope effectively. Over time, such a pattern of maladaptive appraisals and ways of coping might mark one step along the pathway to social avoidance, learned helplessness, rumination, and subsequent internalizing problems of depression and anxiety (Derryberry et al., 2003; Keiley, Lofthouse, Bates, Dodge, & Pettit, 2003; Lengua, Sandler, West, Wolchik, & Curran, 1999; Rothbart, 2011).

Impulsive "Fearless" Temperaments, the Differential Development of Maladaptive Coping, and Externalizing Psychopathology

Although exuberance and "surgency" are typically seen as parts of an "easy" temperament, in some cases, a high appetitive motivational system, unchecked by the defensive system or by effortful control, can still be considered a risk factor for the development of maladaptive coping (Derryberry et al., 2003). An "overactive" appetitive system can lead to forceful and impulsive actions, in which infants and young children fearlessly go after whatever it is they want without attending to dangers or to caregiver attempts to redirect their efforts. Such infants should show a pattern of strong approach tendencies, determined attempts to overcome whatever they perceive as obstacles, persistence in the face of attempts to distract or redirect them, and high levels of frustration and protest if they are thwarted.

It is easy for caregivers to see these children, whose every goal becomes a fervent demand, as strong-willed or stubborn, and they can be difficult social partners with whom to construct adaptive interpersonal coping systems because compromise, accommodation, or distraction are not natural action tendencies for them. The lack of discriminating signals about the infants' priorities can make it difficult for caregivers to remain sensitively responsive, and exhausted caregivers can easily decide to just give in and allow infants to have whatever they want, or become frustrated by infants' demands and refuse to cooperate. Both of these reactions, however, create a less than optimal interpersonal coping system. When caregivers simply give in, this reinforces children for their dogged persistence, making them even more tenacious. However, arbitrarily terminating goal pursuit can also trigger the highly reactive appetitive system, which is focused on overcoming obstacles, thereby escalating protest, frustration, and externalizing problems (Bates, Pettit, Dodge, & Ridge, 1998; Shaw et al., 1998).

Both of these caregiver reactions may also contribute to experiences that reinforce implicit appraisals of the world as one that requires strong and unyielding opposition on the part of infants if they are to reach their goals. Such generalized expectancies can, in the face of even mild stressors, such as being asked to wait or settle for another goal, cumulatively strengthen prepotent bottom-up action tendencies of explosive reactance or resistance. These reactions may then become increasingly difficult for caregivers to modulate in interpersonal coping episodes and can become very problematic for toddlers and young children to manage with their emerging executive functioning skills, as they encounter the developmental task of self-regulation, a task that is a prerequisite for the construction of the intrapersonal coping system. Without these personal and interpersonal buffers, such impulsive and strong-willed temperaments may contribute to the development of maladaptive forms of coping, such as opposition or perseveration, that are precursors or markers of emerging externalizing disorders, such as aggression (Eisenberg et al., 1996, 2001; Rothbart et al., 1994).

Temperament and Differential Pathways of Coping and Psychopathology

Although research on the role of coping in the connection between temperamental characteristics and the development of psychopathology is just beginning, it does seem to suggest at least three important working hypotheses that could be tested in future studies. First, it seems likely that extreme neurophysiological temperamental patterns (which combine high levels of reactivity in the defensive or appetitive subsystem with low levels in both the opposing subsystem and executive attention) should predispose infants and young children to corresponding differential patterns of stress reactivity and coping, and such patterns are likely to be exacerbated by experiences of stress. Second, it seems possible that these strong reactions to stress could be overwhelming to infants and their caregivers and that if caregivers cannot gently curb and compensate for them during infancy, an integrated base of neurophysiological, implicit learning, and relationship problems, as manifest in patterns of maladaptive coping, may emerge as a result. Third, it also seems possible (based on studies

with older children) that adaptive ways of coping, first laid down in interpersonal relationships with caregivers, could be one set of strategies that eventually allow young people to adapt and constructively manage the demands created by their own temperaments. By learning to "listen" compassionately to one's own neurophysiological messages about stress reactivity and to respond to them with caring suggestions about how to "keep calm and carry on," infants and their caregivers may be able to strengthen the (interpersonal and then intrapersonal) coping and regulatory systems that can complement and compensate for the potential neurophysiological liabilities implied by temperamental risk.

Attachment, Differential Pathways of Maladaptive Coping, and Psychopathology

Although most attachment theorists agree that patterns of caregiver-infant interactions and attachment relationships formed in the earliest years of life will set in motion differential patterns of coping with stress, empirical research has been slow to directly substantiate these claims. Very few studies have directly examined secure and insecure attachment relationship classifications as correlates of coping responses, and those that do tend to focus on older children. For example, several studies have shown that parental warmth and support, or attachment quality (as measured, e.g., by the Parent and Peer Attachment measure; Armsden & Greenberg, 1987) are associated with more adaptive coping, such as active problem solving or support seeking, in children and adolescents (e.g., Dusek & Danko, 1994; Gaylord-Harden, Taylor, Campbell, Kesselring, & Grant, 2009; Kliewer et al., 1996). Moreover, in one study of coping and emotion regulation in 87 children ages 10 to 12, attachment security was associated with less difficulty recognizing emotions, but it was not associated with more adaptive coping (Brumariu et al., 2012). Instead, it was disorganized attachment, and not anxious or avoidant attachment, that was associated with less active coping and more catastrophizing, suggesting that children who have experienced some of the most significant caregiver-infant relationship failures will register the greatest impact on their coping (Kobak et al., 2006).

Attachment and the Differential Development of Coping

When viewed through the lens described in the previous section on the normative development of constructive coping, however, it becomes clear that the healthy growth of the coping system is predicated on sensitive responsive caregiving and a secure caregiver-infant attachment relationship. Initially, sensitive responsiveness provides "external" coping on newborns' behalf, and, cumulatively, it shapes interactions that allow caregivers to co-construct a cooperative interpersonal coping system with infants (Contreras & Kerns, 2000; Raby et al., 2012; Sroufe, Egeland, Carlson, & Collins, 2005). If infants' coping systems have to operate without the scaffold of this sensitivity, and insecure attachment relationships form, infants are required to adapt to caregiving that does not always protect them or help to soothe them effectively and to social interactions that are not tuned to their signals, are not responsive to their expressed needs, and may even add to their distress (Cassidy & Berlin, 1994; Mikulincer & Florian, 2003; Thompson & Meyer, 2007). It is as if, when infants' systems are calibrated to insecure or disorganized attachment relationships, the coping system has received the message that the world is stressful and dangerous, or at least cannot be relied on to provide consistent help or comfort when stress and distress occurs (Kobak, Little, Race, & Acosta, 2001).

For infants with highly reactive temperaments, such experiences seem to result in continued stress reactivity, instead of the more normative establishment of equanimity and hyporesponsivity seen in infants who are part of secure attachment relationships (Nachmias et al., 1996). When infants adapt their behavior and coping to these experiences of maladaptive interpersonal coping over the first year, nascent problems can be observed in their physiological and emotional reactivity, communication, and action tendencies, presaging the development of maladaptive patterns of coping with stress (Bosquet & Egeland, 2006; Cicchetti & Rogosch, 2009; L. M. Diamond & Aspinwall, 2003; Mikulincer & Florian, 2003). The particular form that problems with coping will take likely depends on the kinds of responsiveness that is provided, as depicted in different kinds of insecure or disorganized attachments.

Anxious-Resistant Attachment Relationships

When the early caregiving environment is behaviorally inconsistent and emotionally unreliable—when caregivers are sometimes forthcoming but mostly are unresponsive to expressed needs, and when they can be at times neglectful and at other times intrusive and overstimulating—these experiences tend to yield insecure attachment relationships that are referred to as anxious and/or resistant. When considering the effects of a history of these experiences on coping, it is as if infants must adapt their systems to compensate for the lack of a reliable coping partner by trying to amplify their own part in the exchange, essentially ramping up the volume—leading to greater emotional reactivity,

louder and more unrestrained signaling of distress that is harder to turn off, more indiscriminate proximity seeking, and more wary monitoring of the caregivers' whereabouts (Nolte, Guiney, Fonagy, Mayes, & Luyten, 2011).

Moreover, when coping develops within such a shaky interpersonal scaffold, secondary attachment patterns, called hyperactivating regulatory strategies (Mikulincer & Florian, 2003; Wei, Heppner, & Mallinckrodt, 2003), may form and emerge as anxious preoccupation about the availability of support. Thus, the developing organism ends up with little opportunity and energy to devote to learning constructive strategies for exploring the world or dealing with negative emotions or problems. Hence, infants (and later toddlers) are likely to overrely on proximity seeking (which can become dependency), but since the relief that proximity is supposed to provide is available only intermittently, their coping is also laced with irritation, frustration, and opposition, directed toward the caregiver. Because of the lack of contingency between their actions and caregivers' responses, they should also increasingly show coping that is fragile, helpless, and easily derailed. Just as with the overreactive physiologies characteristic of certain temperaments, this history of caregiving would be another pathway to stress reactivity that is so high that it becomes challenging (for anyone) to successfully (co)regulate it.

Insecure Avoidant Attachment Relationships

A different pattern of coping would be likely to result from avoidant attachment relationships, in which infants must adapt their coping to caregivers who reject their expressions of distress, who show some hostility in response to signals indicating discomfort, and generally appear to resent infants' bids for attention and help. In these relationships, infants basically discover that, if they want to maintain proximity with their caregivers, they must learn to overregulate (Martins, Soares, Martins, Tereno, & Osorio, 2012): Their expressions of distress fall away when it becomes clear that they can elicit negative reactions; they restrain their appeals to caregivers for regulating their emotions or for instrumental help; over time, even when they are in situations that elicit physiological stress reactions, they do not seem to be calmed by the caregivers' presence.

Infants who experience a history of rejecting or unavailable caregiving must construct a coping system without the usual reliance on the interpersonal matrix needed to learn adaptive strategies, and so they remain reliant on the primitive actions they can carry out for themselves. The development of such secondary attachment patterns, referred to as deactivating patterns (Mikulincer & Florian, 2003; Wei et al., 2003), results in a coping system that develops within an intrapersonal bubble, unconnected to the wider world of interpersonal resources that could nurture and protect infants locally and that could guide them to more constructive ways of dealing with problems and emotional distress. As a result, toddlers, young children, and adolescents with an avoidant working model of attachment figures may come to rely on social isolation and have difficulty coordinating their coping with other social partners in the future. Such children would be less likely to express (or understand) their distress, less likely to turn to others when they are upset or in trouble, less able to benefit from support offered by others, and less able to cooperate when others try to participate in their coping efforts. Cumulatively, these experiences would be one pathway toward overreliance on maladaptive coping strategies, such as avoidance, escape, and social isolation.

Disorganized Attachment Relationships

The third and more recently identified pattern of insecure attachment has been referred to as disorganized; this form of an attachment relationship is more likely to emerge from a history of maltreatment or other multiproblem family circumstances. In the case of child abuse, caregivers not only fail to protect their infants from danger, they actually augment infants' exposure to stress by neglecting to take care of their basic needs or through abusive interactions (Cicchetti & Rogosch, 2009). Hence, the internal coping systems of these infants, which must try to adapt to a dangerous and maladaptive interpersonal coping system, can become confused, exhausted, and chaotic—in other words disorganized—marked by a fundamental dysregulation of emotion combined with chaotic attempts to regulate it (DeOliveira, Bailey, Moran, & Pederson, 2004); to denote the riskiness inherent in these kinds of attachments, they are sometimes referred to as catastrophizing (Brumariu, Kerns, & Seibert, 2012).

Insecure Attachments and Stress Reactivity

Over time, stress-inducing interactions with caregivers can have a negative effect on the normative development of both neurological and emotional functioning (Cicchetti & Rogosch, 2009; Herbert et al., 2006; McEwen, 1998; 2004; Sapolsky, 1999). Overall, children in dyads with insecure attachment relationships of any kind, but particularly the disorganized form, show greater risk of atypical cortisol responses to threat (Ahnert, Gunnar, Lamb, & Barthel, 2004; Nachmias et al., 1996; Spangler & Schieche, 1998). Although cortisol reactivity to stress is adaptive in the short term, *chronic* activation of the HPA axis (the systems involved in rapid threat appraisal and response, including

parts of the PFC) has been associated with physical and psychological impairment and neuronal death, resulting in a system primed for stress and unable to regulate (recover from) the stress response once it is activated (Gunnar & Cheatham, 2003; Gunnar & Vasquez, 2006).

Additionally, cortisol level has been associated with affective responses and regulation. Children have greater cortisol responses when they have less knowledge of emotion control (Gunnar, Marvinney, Isensee, & Fisch, 1989) and when social support resources are not available (Gunnar, Larson, Hertsgaard, Harris, & Brodersen, 1992). These findings suggest that cortisol is higher when individuals perceive they are unable cope or have few response options when confronted with threat or challenge (Dawson, Hessel, & Frey, 1994; Stansbury & Gunnar, 1994), and this reaction is more likely when there is an insecure attachment history.

Cumulatively, chronic stress reactivity can result in disruptions to the typical pattern of cortisol over a day; in humans, glucocorticoids demonstrate a circadian rhythm with the highest levels in the morning on awakening and the lowest levels in the evening prior to onset of sleep (Sapolsky, 1992). A departure from this typical pattern has been found among children neglected or otherwise maltreated by their caregivers. Children with such a history tend to show low levels of cortisol in the early morning and blunted adrenocorticotropic hormone and cortisol responses to stressors (referred to as hypocortisolism). Children placed in foster care because of maltreatment also have atypical cortisol diurnal rhythms compared to children without such histories (Loman & Gunnar, 2010).

Secondary Attachment Strategies and Coping

Connections between attachment status and ways of coping have been investigated most thoroughly by researchers who have proposed upward theoretical extensions of attachment theory beyond childhood, focusing on attachment as an affect regulation system during adolescence (e.g., Allen & Manning, 2007; Allen & Miga, 2010; Cassidy & Berlin, 1994; Compas, Worsham, & Ey, 1991) or adulthood (Mikulincer & Florian, 2003; Shaver & Mikulincer, 2002). More specifically, current theoretical views highlight the notion of secondary attachment strategies, which depict configurations of emotion regulatory strategies used by older children, adolescents, and adults when dealing with, managing, or confronting stressful life events.

According to this perspective, attachment relationships early in life, sometimes included as one aspect of the overall emotional climate of the family (Morris, Silk, Steinberg, Myers, & Robinson., 2007), result in different patterns of emotion recognition and expression and differential utilization of strategies for dealing with stress that emphasize reliance on others versus self-reliance or social isolation. A few researchers have extended the range of secondary attachment strategies under investigation to consider how attachment could be associated with all the core families of coping—from support seeking and active problem solving to emotion expression, avoidance, distraction, and withdrawal during infancy (Roque, Verissimo, Fernandes, & Rebelo, 2013), adolescence (Gaylord-Harden, Taylor, Campbell, Kesselring, & Grant, 2009), and adulthood (Holmberg, Lomore, Takacs, & Price, 2010; Wei et al., 2003).

It may be the case that attachment emerges as a stronger correlate of coping after interpersonal and intrapersonal forms of coping have been fully internalized, which we argue takes place by early adolescence. This internalization may help to explain why studies of adolescents and adults, compared to studies of children, typically find more consistent associations between attachment categories and patterns of coping. For example, in one study of adults, the two types of insecure attachments (avoidant and anxious) were differentially associated with theoretically specified ways of coping: Attachment avoidance, but not attachment anxiety, was associated with less use of social support; and attachment anxiety, but not attachment avoidance, was associated with more use of emotion-focused coping (Holmberg et al., 2010).

Attachment and Coping with Interpersonal Stressors

Patterns of findings linking attachment to coping during adolescence suggest that the effects of attachment history may be more pronounced when individuals are dealing with *interpersonal* stressors. For example, two studies have shown that secure attachment is related to more active coping with the interpersonal stressors of conflict and relationship dissolution (Creasey & Hesson-McInnis, 2001; Davis, Shaver, & Vernon, 2003). Moreover, one of the few longitudinal studies of these connections from adolescence to early adulthood also found clearer patterns when examining changes in coping with relationship stressors (Seiffge-Krenke, 2006). Researchers followed 64 girls and 48 boys for 7 years through five waves of data, collected at ages 14, 15, 16, 17, and 21 years. Associations between perceptions of the severity of relationship problems (parent, peer, partners) and three kinds of coping (active coping, which combined problem solving and support seeking, internal coping, and withdrawal) were examined as correlates of attachment classification (secure, dismissing,

or preoccupied, as measured via the Adult Attachment Interview at age 21).

As expected, the secure group stood out as utilizing increasingly more active coping responses over time when dealing with stressors in both the parent and the peer domains. Secure group members were more active than the dismissing group in responding to parent stress, more active than the preoccupied group when responding to peer stress, and used less withdrawal in response to all stressors when compared to the preoccupied group. Although not directly examined in this study, the pattern of results for the insecure groups suggests that it is not the level of a particular coping response that may signal problems but rather the combination of different responses. For example, the preoccupied group had an ambivalent style of coping that involved high levels of both active coping and withdrawal, and the dismissing group used internal coping at a level that did not differ from the secure group but, compared to the secure group, also used less problem solving and support seeking (i.e., active coping).

Such patterning may also be important in detecting differences based on attachment status when coping sequences are examined. Although not yet investigated in children and adolescents, a study of 75 adults revealed that attachment classification was related to the point in the coping sequence at which participants reported using specific ways of coping, such as social support, distancing, and emotion-focused coping (Holmberg et al., 2010). When coping with major events, those classified as avoidant-dismissing (via the Experiences in Close Relationship-Revised; Fraley, Waller, & Brennan, 2000) reported using distancing to cope earlier in the stressful encounter and resorted to seeking support from a partner only later in the coping episode. In contrast, those classified as anxious-preoccupied reported the use of emotion-focused coping earlier in the coping sequence.

Coping as a Mediator of the Effects of Attachment on Psychopathology

Many researchers have suggested that coping could be a mediator that links attachment to psychopathology, given evidence that both coping and insecure attachment, particularly disorganized attachment, are associated with the development of multiple forms of psychopathology (Kobak et al., 2006). In piecing this literature together, some longitudinal research has shown that the form of insecure attachment classification (or continuous measures of attachment anxiety and avoidance) partially accounts for different forms of emotion dysregulation, consistent with theory, and emotional dysregulation has been found to mediate associations between attachment and psychopathology (e.g., Kullik & Peterman, 2013; Wei et al., 2003).

However, little research has examined these pathways directly. In one of the few such studies, children's constructive coping was found to mediate the association between maternal attachment and peer competence (Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000). In a second study, 515 undergraduate students completed measures of attachment anxiety, attachment avoidance, a range of symptoms of psychopathology, and perceived ineffective coping, modeled as a latent variable marked by three ways of coping, namely (1) low levels of problem solving, (2) low levels of a reflective style involving planning and systematic responses to stress, and (3) high levels of a suppressive style involving denial and avoidance. Using structural equation modeling, researchers discovered that attachment anxiety and avoidance were each uniquely associated with higher levels of perceived ineffective coping and that perceived ineffective coping and attachment avoidance (but not attachment anxiety) both showed unique concurrent associations with heightened psychological distress. Thus, as had been argued, ineffective coping did mediate, at least partially, the associations between insecure attachment and psychopathology symptoms (see Lopez, Mauricio, Gormley, Simko, & Berger, 2001, for similar findings with attachment orientations and distress in college students).

Although few studies targeting attachment assess the full range of responses that can be used to cope with stressful events, it is possible to draw on research that assesses a narrower set of emotion regulation strategies in order to discover why or how different forms of attachment, even during infancy and toddlerhood, have implications for the ways individuals react to and cope with stress. For example, in one longitudinal study of very young children (Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002), infant boys classified as securely attachment (at age 1.5 years) were shown to possess more effective anger regulation skills (i.e., emotion-focused coping) at 3 years of age.

In a second (cross-sectional) study, all three attachment classifications during infancy (assessed via the Strange Situation) were shown to correspond concurrently to the differential use of theoretically predicted sets of emotion regulation strategies, including positive and negative social engagement, object use, and self-comforting (Crugnola et al., 2011). As would be expected, infants classified as secure, compared to those who were anxious-resistant or avoidant, used more positive social engagement to regulate their distress. Also consistent with theory, anxious-resistant infants displayed more negative social engagement and

less object use to comfort themselves compared to the other two attachment groups. Finally, infants classified as avoidant displayed less use of social engagement strategies (combined positive and negative) compared to both other attachment groups and relied more on use of objects to regulate emotion than did infants in the anxious-resistant group (see also Smith et al., 2006, for another study of infant attachment and emotion regulation).

Perhaps most important, upward extensions of attachment theory provide a foundation for proposing that individuals with different types of insecure attachments are likely to use different predominant models for regulating emotions (Brenning & Braet, 2013; Ein-Dor, Mikulincer, & Shaver, 2011; Shaver & Mikulincer, 2007). In particular, individuals with an insecure-anxious attachment relationship history have been found to rely predominantly on hyperactivating strategies, which entail heightened negative emotions in times of stress combined with overly dependent or energetic reliance on promixity and support from others. In contrast, individuals with an insecure-avoidant relationship attachment history seem to use as their predominant approach the deactivation or suppression of social needs and emotions and the inhibition of proximity seeking. Similar ideas have been proposed in self-determination theory, which identifies emotion dysregulation and suppression as two primary contrasting styles of emotion regulation (Ryan, Deci, Grolnick, & La Guardia, 2006).

The literature remains quite limited, but emerging (mostly cross-sectional) evidence supports theoretical ideas regarding the differences in emotional regulatory approaches that would be expected between those classified as insecure-anxious compared to those classified as insecure-avoidant (see e.g., Cassidy & Berlin, 1994; Thompson & Meyer, 2007). In a series of two cross-sectional studies of Belgian adolescents, youth with insecure-anxious attachments showed greater dysregulation of emotion, whereas youth with insecure-avoidant attachment showed more suppression of emotion (Brenning, Soenens, Braet, & Bosmans, 2012). In a second series of two studies, the type of emotion mattered (Brenning & Braet, 2013): Youth with anxious attachments showed greater dysregulation of sadness and anger, whereas youth with avoidant attachments showed more suppression of sadness but more dysregulation of anger. The authors argued that the type of emotion should shape how it is regulated by insecure-avoidant youth—because expressions of sadness elicit support from others whereas expressions of anger warn others to back off. Thus, it makes sense that insecure-avoidant adolescents, who wish to be left alone, should deactivate sadness but amplify anger.

Attachment and Differential Pathways of Coping and Psychopathology

Taken together, this work suggests that early attachment relationships may set a template for current interpersonal and subsequent intrapersonal strategies for coping and emotion regulation. Research supports the notion that individuals' emotional and behavioral expressions in response to stress, which include emotion regulatory as well as coping responses, are grounded in their attachment relationship history—and so should differ markedly between individuals with a history of secure versus insecure attachment relationships as well as between individuals with the two different insecure types of relationships. This research also suggests three hypotheses that warrant further investigation. First, insecure forms of attachment, which originate in infancy and toddlerhood, likely have quite specific relations with emotional reactions and relate to different coping responses and emotion regulatory processes. These may be adaptive for managing stress in the short term but may limit optimal development and put infants at risk for the development of psychopathology in the longer term. Second, coping seems to be one important mediator of the association between attachment relationships and later resilience or symptoms of psychopathology. Third, it is possible that many of the sequelae of early attachment relationships for the whole range of coping strategies do not emerge until adolescence or later, when the capacities for intrapersonal and reflective coping are fully integrated. Before this time, infants, toddlers, and young children have a more limited range of coping responses (which are often assessed and studied as emotion regulatory strategies) that are carefully scaffolded (and so may be proscribed) by concurrent interpersonal relationships (Zimmer-Gembeck & Skinner, 2011). Although research is still in its infancy, findings point to the role that coping should play in future studies focused on attachment relationships and their links to the development of psychopathology and resilience.

Parenting, Differential Pathways of Maladaptive Coping, and Psychopathology

Reviewers of research on coping and emotion regulation have identified a wide variety of pathways through which parents can shape how their offspring interpret and deal with stressful events (Bradley, 2007, Table 2; Kliewer, Sandler, & Wolchik, 1994; Power, 2004, Tables 1, 2, and 3; as well as Calkins & Hill, 2007; Grant et al., 2006; Kochanska & Kim, 2013; Morris et al., 2007; Schwarz, Stutz, & Ledermann, 2012; Skinner & Edge, 2002a; Thompson &

Meyer, 2007). In fact, when examined through the lens of normative development described in the previous section, it becomes clear that the participation of responsive adults, in successively age-graded roles, is essential to every step in the development of children's own adaptive coping. Hence, one way to consider the role that parenting plays in the differential development of maladaptive pathways of coping is to scrutinize each of these parental practices and to focus on their specific negative contribution, considering a wide spectrum of parenting behavior—which might range from allowing children to be exposed to overwhelming stress, to modeling self-blame, to suggesting coping strategies that are ineffective (see Skinner & Zimmer-Gembeck, in press, for a more detailed analysis).

A second strategy, more consistent with developmental systems perspectives and upward extensions of attachment theory, would be to consider the interpersonal support systems provided by parents as a whole and to try to consider, when these systems are not adequate, what happens to children's own coping systems when they must adapt to these nonoptimal contexts. Particularly useful in such an endeavor are theories of parenting that identify a relatively small set of umbrella dimensions that describe the basic functions of parenting in meeting children's psychological needs (Bradley, 2007, Table 1; Connell & Wellborn, 1990; Deci & Ryan, 1985; Grolnick, 2002; Skinner, Johnson, & Snyder, 2005). The dimensions that theories converge on, depicted in Table 10.2, include parental provision of warmth, structure, and autonomy support. By the same token, parental interactions that undermine children's basic needs, also presented in Table 10.2, include rejection, chaos, and coercion. Although they are referred to using a variety of labels, the study of each of these dimensions has a long history in work on parenting (see Skinner et al., 2005, for a review over the last five decades).

From this broad perspective, there are two primary ways in which parents can undermine the development of healthy coping: through errors of omission (i.e., by *not* creating an adaptive interpersonal coping system within which children's coping can develop) and through errors of commission (i.e., by dealing with their offspring in times of stress in ways that are actively unproductive or harmful). These pathways, as described in more detail in the remainder of this section, can potentially provide a rudimentary map to a line of next studies that would add to the growing literature on the role of parents in children's coping (Bradley, 2007; Power, 2004), perhaps extending its investigation to consider children's maladaptive coping as a mediator between risky parenting and the development of psychopathology and resilience (Barber & Harmon, 2002; Compas et al., 2010; Cummings & Davies, 1999; Kobak et al., 2006; Repetti, Taylor, & Seeman, 2002; Rutter, 2013).

TABLE 10.2 Six Dimensions of Parenting

Dimension	Description
1	**Warmth:** Through caring and affectionate interactions, parents communicate their emotional availability, unconditional love, and positive regard for the child.
2	**Structure:** Through dependable, reliable, and contingent interactions and routines, parents create a sturdy durable context that children can count on as being organized, predictable, responsive, and available to provide instrumental help when it is required or requested.
3	**Autonomy support:** Through interactions that are attuned to the child's own genuine desires and best interests, parents express respect, encouragement, deference, and trust in the child's authentic self.
4	**Rejection:** Parents overtly or covertly express their aversion, repugnance, or dislike for the child through interactions that are hostile, dismissive, derisive, sarcastic, callous, uncaring, or cruel.
5	**Chaos:** Parents create a context that is unstable, disorganized, and tumultuous through interactions that are erratic, unpredictable, inconsistent, and noncontingent.
6	**Coercion:** Parents behave in ways that are controlling, pressuring, and disrespectful, either through intimidation, force, demands for obedience, and threats of punishment or through guilt-inducing criticism and threats of love withdrawal.

These dimensions of parenting behavior can be seen as interpersonal resources and pressures that parents can either add or subtract during stressful interactions (Skinner & Edge, 2002a) and that create interpersonal coping systems to which children's own coping must adapt (Grant et al., 2006; McCarthy, Lambert, & Seraphine, 2004; Seiffge-Krenke, 2011; Skinner & Edge, 2002a; Valiente, Lemery-Chalfant, & Reiser, 2007). Negative dimensions of parenting permeate the development of coping systems because they increase objective demands, intensify the experience of threat, escalate distress, interfere with the detection and identification of the actual nature and source of negative emotions and action problems, trigger action tendencies that are compelling yet destructive, divert personal regulatory resources, lead to over- or underregulation of emotion and action, undermine constructive action regulation, and interfere with learning.

For example, when a child is dealing with a demanding situation, parental rejection, such as negative responses to emotional displays (Eisenberg, Fabes, Carlo, & Karbon, 1992; S. Jones, Eisenberg, Fabes, & Mackinnon, 2002) or harsh discipline (Grant et al., 2006) generally makes things worse: It adds the stress of parental disapproval and

criticism; it communicates that the parental relationship may be at stake, increasing distress and the probability of threat appraisals; it can trigger action tendencies that propel the child away from the parent (e.g., social withdrawal or escape), shutting down communication of feelings and concerns and thus making it more difficult for the parent to diagnose the problem and be supportive (further subtracting social resources); because the child must also regulate his or her distress about the parent's reaction, it reduces the regulatory resources available for dealing with the stressful situation, making maladaptive coping strategies more likely; and it focuses the child on the conditionality of parental regard rather than on what can be learned from the stressful episode (Assor, Roth, & Deci, 2004).

Over time, the interpersonal coping systems created by the general absence of parental warmth, structure, or autonomy support as well as the presence of rejection, chaos, or coercion can be problematic, even when such bouts of parenting are intermittent but especially when they are more chronic, pervasive, and severe, as in cases of parental child abuse and neglect (Cicchetti & Rogosch, 2009; Maughan & Cichetti, 2002; Shipman et al., 2007). They are likely to exert a downward pressure on children's own functioning, cumulatively leading to increasingly consolidated appraisals of implicit threat, maladaptive action tendencies, and poor regulation (Eisenberg et al., 1998; Valiente et al., 2007). The effects of children's attempts to adapt to the interpersonal coping systems created by negative interactions with parents should be visible in their own developing coping systems, as expressed through high emotional reactivity and distress, powerful but ultimately unconstructive action tendencies of different stripes (e.g., reactions to parental coercion that are submissive or oppositional), nonautonomous systems for action regulation that may be weak or rigidly overcontrolled, and a profile of coping that is low in adaptive and high in maladaptive strategies, including a noxious admixture of coping, such as helplessness, escape, social isolation, delegation, submission, and opposition.

Cumulatively, these experiences (along with social partners' widespread negative reactions to such maladaptive coping actions) should contribute to children's construction of self-systems that confirm a negative view of the self (as unlovable, incompetent, or inauthentic) or the world (as untrustworthy, uncontrollable, or coercive). These stressful parent-child interactions are also likely to further undermine the quality of the dyadic relationship and so contribute to the development of both personal and interpersonal vulnerabilities for coping. Such maladaptive patterns of appraising and dealing with stress, along with the reactions they provoke from social partners (not just from parents, but also from other family members, teachers, and peers), should put children at risk for escalating cycles of stress and ineffectual coping, not only in the family but also in school and with their age mates, perhaps cumulatively contributing to forms of internalizing and externalizing psychopathologies.

Family Stress, Differential Pathways of Maladaptive Coping, and Psychopathology

The family represents a primary source of comfort and support and can serve as a basis for protection during times of stress. For this reason, stressors that occur in the family, and which threaten its connectedness, can have detrimental effects on health and reduce the likelihood of resilient outcomes (Lynch & Cicchetti, 1998; Repetti et al., 2002; Schwarz et al., 2012). Researchers have identified a long list of family-level factors that put children at risk for the development of behavior problems; these include marital discord, conflict or violence, divorce, family turmoil, death of a parent or sibling, parental problems (substance abuse, physical or mental illness, incarceration), high rates of mobility, crowding and noise, and generally living in conditions of poverty and oppression, in a dangerous neighborhood, or in communities exposed to environmental pollution, war, or natural disasters. These circumstances can all be considered "developmentally challenging" because of their effects on children: They "pose direct harm, have the potential to seriously undermine emotional security, dislodge productive coping strategies, and impede the use of existing assets or the formation of new ones" (Bradley, 2007, p. 102).

At the same time, these situations are challenging to parents: To offset the potential harm posed by these circumstances, children require more from their parents, while, at the same time, because these conditions have an impact on everyone in the family, parents have fewer resources to employ in the service of supportive parenting. Hence, researchers who study the ways that children cope with family stressors point out that events like divorce or death of a parent or sibling are doubly dangerous to children, because they stress children directly (creating neurophysiological, psychological, and social problems) and because they stress parents—and so disrupt the family system just when children need its support the most (Sandler et al., 2000).

Although full coverage of this topic is beyond the scope of this review, researchers also point out that these

developmentally challenging circumstances are not randomly distributed throughout the population (Luther, 2006). Instead, they represent profiles of cumulative risk (Sameroff, 2010) that are common to particular societal niches, such as those created by poverty and oppression, which disproportionately contain environmental risk and dangers and lack supportive resources (Evans, 2004; Evans & Kim, 2012). Hence, parents with potentially limited caregiving resources, such as adolescent single parents, are often asked to parent in conditions that are high in demands (e.g., multiple young high-needs children) and stressors (e.g., poverty, violent relationships, dangerous neighborhood) and low in supports (e.g., neglectful extended family, limited social services, few high-quality child care facilities).

These niches can be considered high in cumulative risk, or allostatic load, which is a term that refers to the total concentration or aggregate of stressors to which a person (or dyad or family unit) is subjected or exposed (McEwen, 2010). Concepts of cumulative risk and allostatic load draw researchers' attention to the larger context of stressors and supports within which children and their families function and can help to explain the vulnerabilities in family systems created by living in niches that attract a high allostatic load (C. Blair & Raver, 2012; Seeman, Epel, Gruenewald, Karlamangla, & McEwen, 2010; Tolan & Grant, 2009). Perhaps most important, as outlined in models of how contexts shape stress and coping responses (Tolan & Grant, 2009) and in models of how coping and coping resources influence psychopathology and health (Taylor & Stanton, 2007), these kinds of stressful contexts are one source of the kinds of stressors children experience, the resources that are available to cope with stress, the coping patterns that emerge, and the development of psychopathology or resilience in the face of adversity.

Higher-order contexts, such as culture, neighborhood, or society, will contribute to parent-child coping episodes that, over time, enhance or reduce both personal and social regulatory resources. The accumulation of these episodes should play a significant role in the development of self-system processes that consolidate negative views of each other and prevent both parties from learning how to deal constructively and cooperatively with problems and obstacles. In that sense, family stress can cumulatively contribute to the development of adaptive or maladaptive coping in both children and their parents, and coping responses then becomes some of the core foundations for the development of resilience and psychopathology (Cicchetti & Rogosch, 2009; Tolan & Grant, 2009).

FUTURE RESEARCH AND TRANSLATION OF RESEARCH INTO ACTION

Consistent with many researchers who study risk and resilience, we view the factors discussed in this chapter as part of developmental cascades (Curtis & Cicchetti, 2003; Masten & Cicchetti, 2010), in which early conditions (both neurophysiological and social) contribute to subsequent difficulties. These difficulties then snowball through the accumulation of risk factors, to eventually potentiate behavioral problems and psychological disorders. According to this perspective, each of the factors discussed in this chapter can be seen as a series of steps along pathways that become more difficult to reverse the longer they are followed.

For example, when infants have temperaments that are high in stress reactivity, it is more difficult for caregivers to be sensitive and responsive to them; as a result, parents and children are more likely to form insecure or disorganized attachment relationships. The parent-infant interactions characteristic of these kinds of attachment patterns shape the developing neurophysiological processes underlying reactivity, sensitizing infants and young children to the effects of stress, perhaps even at the epigenetic level (C. Blair & Raver, 2012). Moreover, with highly stress reactive children, it can become increasingly difficult for parents to remain warm, involved, structured, and autonomy supportive, and so early patterns contribute to (or are the beginnings of) more general styles of problematic parenting. The discordant parent-child interactions characteristic of these styles of parenting contribute to an atmosphere of tension and turmoil in the larger family system. This higher-order family stress permeates caregiving and has its biggest effects on children who are biologically more susceptible to environmental effects (Cicchetti & Curtis, 2006; Cicchetti & Rogosch, 2009; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & Van IJzendoorn, 2011).

The Role of Coping in Developmental Cascades toward Psychopathology and Resilience

These general dynamics have been noted by researchers from many areas, and in fact, temperament, attachment, parenting, and family stress can be considered the usual suspects in creating developmental cascades that lead to almost any kind of problem behavior or form of psychopathology (e.g., Dodge, Greenberg, & Malone, 2008). What this chapter has to add to such discussions is the idea that, during infancy, childhood, and adolescence, patterns of maladaptive stress reactivity and coping are important

parts of these cascades—both as symptoms and as players. For example, temperamental vulnerabilities, almost by definition, are most apparent under conditions of stress and are typically held to be vulnerabilities precisely because they trigger maladaptive reactions to external stressors (such as changes, novelty, and social or attentional demands). One of the primary things that makes children with "difficult temperaments" so difficult is their poor coping—their overreactions and their difficulties in accommodating to demands and recovering from stress.

By the same token, poor coping is a key marker of insecure, especially disorganized, caregiver-child attachments—the term *coping* could be used to describe the outward behaviors of infants and young children under the stress of separation and especially during recovery from that stress. For young children with a history of insecure attachments, these patterns of emotional reactivity and maladaptive coping, as carried forward into preschool, are one of the main reasons they find it more difficult to form optimally safe, supportive, and stable relationships with other adults (e.g., teachers) and peers (e.g., Contreras et al., 2000; Kobak et al., 2006). The same point can be made for problematic parenting and family stress: These conditions are risk factors for developmental outcomes for many reasons (Repetti et al., 2002), and parenting problems and family stress are conditions that can have deleterious effects on children's and adolescents' coping, including their neurophysiological and psychological stress reactivity and the development of their regulatory capacities for dealing constructively with stress (Bradley, 2007).

In future studies, researchers who specialize in either coping or psychopathology may wish to examine these processes explicitly, by focusing on the multiple ways that maladaptive coping directly participates in these kinds of developmental cascades. Investigations can explore whether the emotional reactivity and action tendencies underlying maladaptive coping (e.g., opposition, submission, delegation, helplessness, escape, social isolation) can get children and adolescents in trouble in social contexts that expect mature forms of coping, whether those contexts are organized by teachers, peers, coaches, or friends' families. It is possible that children's maladaptive coping can have the direct effect of repelling positive supports, generating stress, or provoking reactions that are intrusive, retaliatory, or rejecting (Conway et al., 2012; Liu, 2013). Difficult temperaments, high stress reactivity, and insecure attachments all shape development—and these effects may accrue partly because the poor coping they engender itself elicits negative reactions from adult and peer interaction partners.

Researchers who study profiles or patterns of coping may also wish to consider whether maladaptive coping participates in developmental cascades through the downward pressure it exerts on adaptive functioning. Chronically activated threat appraisals and poor coping may interfere with children's access to their own better natures and competencies, such as their compassion and regulatory resources, making it more difficult for them to enact adaptive strategies and potentially leading them to feel powerless in the face of their own urges. Moreover, the emotional and action impulses characteristic of maladaptive coping may be so compelling that they lead children and adolescents to feel that their negative behaviors are fully justified to defend against imminent threat (Lansford, Malone, Dodge, Pettit, & Bates, 2010). As a whole, the recursive components of maladaptive coping systems, with their high stress reactivity, threat appraisals colored by fear or resentment, experiences of ineffectiveness in dealing with problems and emotions, and the negative social reactions they elicit, together may create an integrated biopsychosocial "apparent reality" that should intensify actual and subjective stress and cumulatively channel development toward heightened reactivity, regulatory vulnerabilities, behavior problems, and psychopathology.

A comprehensive picture of the developmental cascades that lead to maladaptive coping, and through maladaptive coping to psychopathology, will clearly include more contexts and social partners than we have been able to describe here. Like all other developmental cascades depicted thus far, they will undoubtedly travel through the worlds of school and peers, where children's and adolescents' maladaptive coping will likely put them at risk for academic disaffection and underperformance, peer rejection and membership in deviant peer groups, evasion of supervision by competent adults, and eventual participation in a host of risky activities during adolescence, such as truancy, delinquency, substance abuse, and unprotected sexual activity, that further constrict life paths during emerging adulthood.

The researchers who study these phenomena do not label them all as coping or consider the problems they depict as partly the result of maladaptive coping (cf. Spencer, 2006). Nevertheless, coping researchers can profit from what has been learned about the functioning of temperament, attachment, academic progress, peer relationships, teaching, and parenting under stress. And work on coping may also be useful to researchers from these largely disparate traditions by providing some common ground where they can meet to figure out how all these components work together during stressful encounters to

shape children's short-term coping and their long-term development, including pathways toward competence and disorder.

Translation of Basic Research on Coping into Action

If indeed, as we have argued, coping is both a key marker and a central player in the development of psychopathology and resilience, it follows that work on coping and its development has the potential to provide a platform for building out preventive interventions designed to avert the onset of mental health (or other) problems as well as for creating targeted interventions designed to promote the construction of coping resources, strategies, and efficacy once problems have been identified. Evidence for the utility of coping as an intervention lever can be found in the substantial portion of the larger stress and coping research agenda that has been dedicated to translating such research into direct action—by developing and evaluating prevention programs implemented in locations with almost universal access to families and/or children (e.g., the schools). Such interventions often rely on psychoeducation to teach coping strategies with the aim of preventing the development of a range of internalizing and externalizing symptoms or of reducing the likelihood of symptom escalation (e.g., P. M. Barrett, Lock, & Farrell, 2005; Eassau, Conradt, Sasgawa, & Ollendick, 2012; J. K. Fox et al., 2012; Frydenberg & Lewis, 2000; Ginsburg, 2009). Other applied stress/coping research has tested programs designed to improve coping resources and reduce distress and symptoms of mental health disorders among select groups who are at risk due to major life stressors, such as parental divorce or serious illness (e.g., Compas et al., 2010; Conrod, Castellanos-Ryan, & Strang, 2010; Sansom-Daly, Peate, Wakefield, Bryant, & Cohn, 2012; Soper, Wolchik, Tein, & Sandler, 2010; Vélez, Wolchik, Tein, & Sandler, 2011).

As a whole, these studies have demonstrated the feasibility and efficacy of providing children and adolescents with guided practice in using coping resources or emotion regulation strategies that can be effective in dealing with many stressors or helpful in alleviating distress (Compas et al., 2009, 2010, 2014; Fresco, Mennin, Heimberg, & Ritter, 2013; Kovacs et al., 2006; Suveg, Sood, Comer, & Kendall, 2009; Tein, Sandler, Ayers, & Wolchik, 2006; Weisz, Hawley, & Jensen Doss, 200; Weisz, Thurber, Sweeney, Proffitt, & LeGagnoux, 1997). Other interventions have shown success in increasing coping efficacy (Gonzales et al., 2012; Wolchik et al., 2000). Some of the most interesting studies have examined coping as a mediator between treatment and outcome, documenting that improvement in coping capacity as a result of interventions is an important factor that accounts for whether children will show reduced symptoms of mental health disorders (or other adjustment problems) following treatment (e.g., Compas et al., 2010; Essau, Conradt, Sasgawa, & Ollendick, 2012; Tein, Sandler, MacKinnon, & Wolchik, 2004).

Yet despite the growing body of research that examines efforts to directly intervene to improve coping or coping resources or that examines coping as an outcome or as a part of the recovery process, it is surprising to discover just how few studies of this kind have been conducted and that most of them have been completed quite recently. What is equally noteworthy in this literature, however, is the number of studies that have been carried out to examine the efficacy or effectiveness of implementing enhancement programs for youth that include the aim of improving coping but never actually assess it. Nevertheless, these commonly used clinical treatments spotlight the possibility that minimizing the use of maladaptive coping strategies and identifying new adaptive strategies to use instead, through therapeutic conversation, psychoeducation, role play, direct practice, or other techniques, may be effective components of such programs. Programs implementing these methods have been shown to reduce symptoms of mental health disorders, whether the programs are directed toward youth who are experiencing family problems (Garber et al., 2009; Silverman, Kurtines, Jaccard, & Pina, 2009), chronic physical or health conditions (Sansom-Daly et al., 2011), or general and other forms of anxiety and fear (P. M. Barrett et al., 2005; P. M. Barrett, Farrell, Ollendick, & Dadds, 2006; J. K. Fox et al., 2012).

When these efforts are examined in light of research and theory on the development of coping, however, three primary ways are revealed in which the current research agenda on child and adolescent stress and coping could be broadened in order to better integrate basic research with application to clinical and educational practice. First, as can be imagined from our overall emphasis on the development of coping, we would argue that the entire agenda could benefit from more careful and systematic attention to child age as a marker of developmental level. Second, a greater consideration of the roles of child temperament and family relationship history in contributing to coping strengths and vulnerabilities might allow researchers to design more successful intervention strategies by tailoring approaches to match children's specific underlying issues. Third, there could be better integration of measures of coping in translational research, both to identify children and youth who could benefit from interventions and to

assess the mechanisms of effects in interventions—via typical questionnaires and via in-the-moment techniques.

Child Age and Developmental Level

As described in this chapter, the coping system and the multiple individual and interpersonal subsystems that support and influence it show developmental patterns that are linked with age and experience. This fact is recognized implicitly or explicitly in much of the basic research on stress and coping in children and adolescents, as can be seen in age-graded choices about the coping strategies selected for study or, more rarely, in decisions to examine age directly (Zimmer-Gembeck & Skinner, 2011). Such developmental changes can be viewed as obstacles and challenges to treatment research as well, and most interventions have not yet been tested to determine whether they are effective across the age ranges of children who receive the services (Eyberg, Schumann, & Rey, 1998).

At the same time, we now have an increasingly rich body of developmental ideas about coping, which have yet to be fully incorporated into the design of prevention and intervention programs to enhance children's coping resources, capacity, and efficacy, to reduce the fallout from stressful experiences, or to otherwise optimize children's functioning in the face of adversity. A lack of integration of research on coping into program development is partly because reviews of basic research (and basic research itself) have not often directly addressed the development of coping with an eye toward guiding intervention. We also suspect that it is partly because few studies that focus on enhancing coping explicitly attend to age either by examining whether age matters to program effectiveness or by using theory and research to intentionally adapt the program to better serve different age groups (and reporting these modifications) (see P. M. Barrett et al., 2005, for an exception; Eyberg et al., 1998). In one recent study (Farrell, Waters, & Zimmer-Gembeck, 2012), when researchers did examine age differences in the cognitive beliefs theoretically linked with anxiety symptoms, such beliefs were found only among adolescents (ages 12–17) and not among children (ages 7–11), consistent with developmental research that reveals age-graded changes in the ability to consider inner thoughts and beliefs during early adolescence and the greater use of cognitive coping responses in adolescents compared to children (see also Essau et al., 2012).

Moreover, basic researchers can help interventionists more thoroughly integrate developmental dimensions in their programs if they themselves attend more closely to developmental theory when designing studies of coping. They should more closely align their selection of age groups with the stressors and coping responses that should be most relevant. For example, enhancing active coping (problem solving or positive cognitive reappraisal) may not be appropriate for all ages or situations. The kind of accommodative coping that is most effective when dealing with uncontrollable stressors likely differs with age—only during later childhood and early adolescence do cognitive reappraisal strategies become accessible, and even then they may require practice if they are to become durable enough to utilize under stress; during middle childhood, distraction may be more effective, and behavioral distraction may be the only option for younger children, who may also need to rely on support and active distraction by others. Similarly, the kinds of coping that is effective with controllable stressors may also require different intervention responses at different ages.

Research scrutinizing the kinds of interpersonal relationships that provide developmentally graded support as children begin to enact more self-reliant forms of coping with stress would be helpful for planning interventions directed to children between ages 5 and 7. Research examining how children use different forms of social support, how they balance this with individual efforts, and how this balancing act changes from early to middle childhood would be particularly useful for identifying entry points for ameliorating deficits and bolstering strengths at these ages. And studies focusing on how the range and flexibility of adolescents' strategy use changes as they get older would also be useful for guiding practical work to help young people more intentionally match their coping efforts to situational demands during these age periods.

Finally, research using cluster analysis or person-centered approaches (Boxer et al., 2012; Tolan et al., 2002) also suggests that patterns of coping or patterns of other regulatory responses and coping need to be considered as targets for interventions. We know about the "complex ways that coping strategies are interrelated" (Gaylord-Harden et al., 2010, p. 852), and we are beginning to find out that these interrelations may change with age (Zimmer-Gembeck & Skinner, 2011). As research progresses toward identifying optimal profiles of ways of coping for different developmental periods and the type of stress under consideration (Skinner & Wellborn, 1997), this information would be invaluable for informing practice. If research is carefully designed with clinical implications in mind, future developmental research findings should be much more easily translated into the creation of practical supports, and treatment or prevention programs for young people of all ages. Perhaps coping researchers will be more

motivated to explore important developmental issues, such as what kinds of coping are and are not adaptive in particular situations and at particular ages, if they see how important such findings could be to the creation of more effective prevention and intervention practices (see also Gaylord-Harden et al., 2010; Tolan et al., 2002, for further discussions of these issues).

Coping, Temperament, and Family Relationship History

Universal intervention to assist children when dealing with stress can be beneficial by teaching a range of cognitive or behavioral strategies to put in place and practice before stress occurs (P. M. Barrett et al., 2006). Nevertheless, selected approaches have the advantage of tailoring intervention techniques—with the goals of compensating for deficits and building on strengths among individual or groups of children identified for inclusion in programs based on history (e.g., parental divorce or maternal depression; Compas et al., 2009, 2010; Soper et al., 2010; Vélez et al., 2011) or personal symptoms, such as anxiety disorders (Kovacs et al., 2006; Waters, Donaldson, & Zimmer-Gembeck, 2008).

Such focused tailoring could be guided even more explicitly by studies documenting the different patterns of maladaptive appraisals, stress reactions, and coping strategies children are likely to exhibit, given developmental differences in temperamental status, attachment history, and parenting experiences. This knowledge might also be useful in assisting children to cope more effectively and compassionately with their own temperamental tendencies and to modify their own behaviors with the goal of reducing "dependent" stress events, which are stressful experiences that are partly self-generated (Conway et al., 2012; Liu, 2013). The study of children's differential histories could also be useful in order to identify potential appraisal biases that will prompt inappropriate coping responses (Kochenderfer-Ladd & Skinner, 2002; Zimmer-Gembeck & Nesdale, 2013; Zimmer-Gembeck et al., 2013), including reliance on coping strategies that are not well matched to the situation. Not only could such studies guide interventions as they directly tackle biased appraisals and maladaptive coping, but they could also identify the kinds of promotive opportunities children are likely to have missed, given their temperamental and attachment histories; some children may never have participated in constructive interpersonal coping or experienced practical success in coping, suggesting that interventions could be enriched by providing new opportunities for such children to acquire these skills as well as to build feelings of trust, cooperation, efficacy, and agency (Larson, 2011), which might all feed back into increasingly more beneficial coping patterns over time.

Integrating Coping Measures More Fully into Prevention and Intervention Research

Better translation of basic coping research into practice also depends on expanding present intervention research to more frequently consider ways of coping, as well as closely related regulatory processes, as "active ingredients in the prevention [or escalation] of mental health problems in children and adolescents" (Compas et al., 2010, p. 623). Coping measures can serve as screening devices to identify children and youth who could benefit from services. Coping also represents a valid and important measure of the goals, aims, and outcomes of treatment (or other types of prevention/intervention programs) for young people and should be assessed more routinely.

Given the challenges of measuring coping, doing so will require careful thinking on interventionists' parts. Current multidimensional measures of coping (e.g., Ayers et al., 1996; Connor-Smith et al., 2000), as reported by children, youth, and their adults, provide a valuable menu from which researchers can select the range of ways of coping that are most appropriate to the developmental level of their target population (Zimmer-Gembeck & Skinner, 2011) and best suited to the situation and treatment approach (Eyberg et al., 1998). Measurement development work is needed in order to assess coping in a way that is sensitive to developmental age, situation, and prior history but is also sensitive enough to detect changes when comparing assessments at pre- and posttreatment or later. Perhaps daily diary assessments of distress and coping (e.g., Walker et al., 2007) will turn out to be especially useful for these purposes. As assessment becomes more sophisticated, such translational research incorporating coping measures will help to locate the particular components of interventions that yield positive and lasting treatment outcomes (Kazdin, 2008).

SUMMARY AND CONCLUSION

We hope that some of the ideas outlined in this chapter (such as those summarized in Table 10.1) may provide grist for thought about how future research can productively combine research on the development of coping with work on the development of psychopathology. These are two rich empirical traditions that attempt to understand how adversity and stressful events in the lives of children and adolescents can shape their developmental pathways, for

better and for worse. We have suggested that coping—with its strategies, resources, and efficacy—should always be considered a part of these developmental cascades and also a part of intervention and prevention efforts to optimize them. Both developmental psychopathology and the development of coping have much to contribute to our understanding of how children and adolescents, when faced with stressful life events, whether they are woven into lives of privilege or derived from chronic adverse circumstances, can (with or without our help) nevertheless create pathways that lead to the development of enduring competence and resilience.

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CHAPTER 11

Temperament and Developmental Psychopathology

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INTRODUCTION

The field of developmental psychopathology has relied extensively on the study of normal development in order to understand psychological maladjustment (Cicchetti & Cohen, 2006; Sroufe, 2009). Along with current models of development that consider multiple determinants of developmental outcomes, developmental psychopathology is concerned with understanding how both child and environmental factors predict the development of problem behavior in children. And, consistent with research in adult psychopathology, research in developmental psychopathology has examined how individual differences in emotionality, attention/regulation and activity, better known as temperament, have contributed both directly and indirectly to behavioral disorders.

Although there is a long tradition behind the concept of temperament and its role in psychopathology, it was not until the twentieth century that individual variation in child behavior became the focus of study. And it was not until the early 1960s that such variation became the focus of child psychologists and psychiatrists interested in understanding the origins of children's behavioral problems (Thomas & Chess, 1977). Since that time, various developmental models of temperament have been proposed leading to a vast array of instruments and observational methods for assessing temperament in children, all in the service of understanding the defining characteristics and structure of temperament as well as its impact on other developmental outcomes, including psychopathology.

In this chapter we review the current literature linking infant and child temperament to developmental psychopathology. Our review is an update to the reviews found

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in previous editions of this volume provided by Rothbart and colleagues in 1995 and in 2006 (Rothbart & Posner, 2006; Rothbart, Posner, & Hershey, 1995). We concentrate on studies published after 2000, a period of increased study in this area (Zentner & Shiner, 2012). Paralleling this wave of new research was a growing understanding of the biological systems underlying both temperament and psychopathology (Fox, Henderson, Pérez-Edgar, & White, 2008). Likewise, temperament theory and research was going through a renaissance of sorts with an update of the definition of temperament and introduction of new approaches to the study of temperament. Hence, another goal of this chapter is to review these exciting changes. Before the review of the most current research in temperament and developmental psychopathology, we introduce the concept of temperament and consider a number of agreed-on principles. We follow this with a discussion of the structure of temperament, including a review of the contemporary theoretical models, as well an examination of the more traditional dimensional approach and the more recent (resurgent) categorical approach to the structure of temperament. We then consider the measurement of temperament by questionnaire, laboratory/home observation, and other methods. We conclude our introduction by discussing the proposed links between temperament and developmental psychopathology. Following our review of the current research on temperament and developmental psychopathology, we provide a brief overview of the biological underpinnings of temperament and their links to developmental psychopathology. Based on our review of the research literature, we conclude the chapter with directions for future research.

WHAT IS TEMPERAMENT?

In 1987, several prominent and active researchers in the field of temperament gathered for a roundtable sponsored by the Society for Research in Child Development (Goldsmith et al., 1987) to discuss the current state of the field. Although there was significant consensus, the participants' conceptualizations differed in several ways depending on what they chose to emphasize in their models. For example, A. Buss and Plomin (1984) emphasized the genetic basis of temperament while Goldsmith and Campos's framework (1982) was emotion based. In his commentary on the roundtable, McCall attempted a definition that integrated the agreed-on concepts: "temperament consists of relatively consistent, basic, dispositions that underlie and modulate the expression of activity, reactivity, emotionality and sociability" (Goldsmith et al., 1987, p. 524). More recently, researchers who were affiliated with each of the original roundtable participants met in the same format 25 years later to review what was learned about temperament in the interim (Shiner et al., 2012). Based on their own research and knowledge of the current literature on child temperament, the progeny of the original roundtable participants updated the definition of temperament as "early emerging basic dispositions in the domains of activity, affectivity, attention, and self-regulation, and these dispositions are the product of complex interactions among genetic, biological, and environmental factors across time" (Shiner et al., 2012, p. 437). As can be seen, this definition was expanded to illustrate that temperament is not a static construct but one that develops.

This definition of temperament is consistent with the six key criteria for temperament identified by Zentner and Bates (2008). (Zentner & Bates, 2008). Several of the criteria overlap with the preceding definitions of temperament (domains of affect, activity and attention; early appearance; linked to biological mechanisms; relatively enduring). Additional criteria included: (1) variations in expression as reflected in response intensities, latencies, durations, thresholds, and recovery times; (2) comparability with individual differences observed in other social mammals; and (3) predictions to "conceptually coherent outcomes," such as internalizing and externalizing problem behaviors. These current definitions/criteria of temperament are important as they provide a consensual framework to guide future research and allow for the comparison across studies on child temperament.

The Principles of Temperament

The contemporary definitions of temperament strive to include the many principles of temperament on which the different models agree (Goldsmith et al., 1987). It is worth discussing a few of these principles in light of the following review of the literature linking temperament to developmental psychopathology. The first principle is that *temperament reflects individual differences that are relatively stable*. Stability, which comes in many forms (e.g., homotypic, heterotypic; Caspi, 1998), applies theoretically to temperament, given the characteristics used to define temperament such as "basic," "disposition," and "enduring." That temperament is stable also increases its predictability. That is, parents may expect their child to respond similarly across situations. Likewise, when asked to describe their children, parents use descriptions that reflect stable characteristics, such as "She is outgoing" and "He is shy," which

are easily understood by others (Kohnstamm, Mervielde, Besevegis, & Halverson, 1995). Despite this notion that temperament is stable, the qualifier "relatively" has been added in current definitions of infant and child temperament, reflecting an understanding that temperament traits may change over time, given biological maturation and environmental input. Evidential support for relative stability of temperament is found in studies that show the consistency of temperament to be low to moderate with stability coefficients ranging from zero (0) to around .50, depending on how temperament is measured as well as the ages over which stability was calculated (Durbin, Hayden, Klein, & Olino, 2007; Lemery, Goldsmith, Klinnert, & Mrazek, 1999; Roberts & DelVecchio, 2000). Greater consistency is usually found for parent ratings, older children (>3 years of age), and across shorter lengths of time while lower stability coefficients are typically found for laboratory/observational measures, infants and toddlers, and across longer periods of time. Further evidence is provided by quantitative behavior genetic studies. High heritability of a temperament trait would indicate excellent stability, and for many traits, heritability effects are robust. However, genetic effects across studies range from .20 to .60, and there is little consistency across studies examining the same dimension. Taken together, these data suggest the possibility of environmental effects as well as error in measurement (Saudino & Wang, 2012). Recent research examining the genetic influences on continuity and change in temperament from infancy to preschool revealed that the modest continuity of several observed traits was due to genetic factors, but other dimensions, such as shyness, were influenced by genetic and environmental factors (Saudino & Cherny, 2001). Although these studies indicate the genetic bases for stability of temperament, it is important to note that the average age-to-age correlation was .24, confirming that stability of temperament is modest, particularly in early childhood.

A second principle of temperament is that *temperament develops*. This is an often-neglected principle given the folk theories about the endogenous nature and stability of temperament. However, the modest correlations of temperament across age suggest that change in temperament is more likely to occur; this may be due to maturation of biological systems, the emergence of other temperament dimensions, as well as input from the environment, particularly parents. Many of the dimensions found within contemporary temperament models can be said to develop. Consider Rothbart and Derryberry's (1981) definition of temperament; they define temperament as individual differences in reactivity and regulation. Although several forms of reactivity are observable at birth, its expression is undifferentiated in terms of emotion (e.g., distress) and diffuse with relation to motor activity. With development, different emotions emerge and consequently reactivity becomes more specific. For example, anger reactivity and social smiling emerge around 3 months of age while fear emerges after 6 months of age and is dependent on the start of self-locomotion (Barrett & Campos, 1987). Studies examining the emergence of fear-based inhibition support this later emergence of temperamental fear, demonstrating that prior to 6 months, infants approach low-intensity (e.g., plate, saucer) and high-intensity toys (e.g., flashing light) with similar latencies but by 12 months of age, latencies to approach lengthen to high-intensity toys, and individual differences in latencies to approach are predictive of later inhibited/uninhibited temperament (Putnam & Stifter, 2002; Rothbart, 1988).

Regulation, in contrast, begins to develop at the end of the first year, although attentional behaviors, such as focusing and sustained attention that form the foundation of self-regulation (Garon, Bryson, & Smith, 2008), can be observed earlier. By the end of the first year, infants are demonstrating rudimentary self-regulation or effortful control, as demonstrated by their ability to initiate, maintain, and cease activities and their awareness of rules (Kopp, 1982). Throughout the next 2 years, the ability to control emotions, behavior, and cognition develops rapidly, moving from voluntary inhibition of behavior to the ability to suppress a dominant response in favor of a nondominant response (Kochanska, Coy, & Murray, 2001). Likewise, executive control of attention, which is linked to activation of the anterior cingulate cortex (ACC) (Rudea, 2012) emerges during this period. The emergence of temperamentally based self-regulation or effortful control overlaps significantly with the development of executive functions, a rubric that subsumes cognitive processes that control thought and action including planning, working memory, set shifting, error detection, and inhibitory control of prepotent responses (Blair, Zelazo, & Greenberg, 2005; Welsh, Pennington, & Groisser, 1991).

Thus, both temperamental reactivity and regulation develop across infancy and early childhood. Indeed, while specific forms of reactivity emerge within the first year, development continues across childhood such that levels of reactivity typically decrease due to increases in self-regulation. Whether these changes are due to the structure of temperament or its expression continues to be debated. What is known is that the inability to regulate emotional reactivity is related to risk for behavior problems and is symptomatic of child clinical disorders.

It is important to note that *self-regulation* refers to voluntary, executive control, which is contrasted with what Rothbart (Rothbart & Bates, 2006) calls "passive control" and Eisenberg (Eisenberg & Morris, 2002; Eisenberg et al., 2004) calls "reactive control." Although these terms appear to be opposing, they are quite similar in that both terms define nonvoluntary or automatic control that is driven by approach/withdrawal processes. Rothbart's term is focused exclusively on fear-based behavioral control, such as when inhibited children withdraw from an object/person they perceive as a potential threat. Thus, their fear constrains or regulates their behavior. Interestingly, passive control is related to later effortful control such that fearful children exhibit better effortful control than fearless children (Kochanska & Knaack, 2003). Eisenberg extended Rothbart's term to include impulsive approach as a form of reactive control in that impulsive children are fueled by their approach system without any voluntary regulation. Importantly, both forms of reactive control have been related to problem behaviors (see below).

Acknowledging that temperament develops may be particularly important for understanding how temperament influences developmental psychopathology. The central tenet of developmental psychopathology is that behavioral and emotional disorders are the result of a complex developmental process (Sroufe & Rutter, 1984). Research on this process requires prospective longitudinal study that starts in infancy and includes genetic, physiological, contextual, and experiential components and their development over time (Sroufe, 2009). Assessing the development of the emotional and regulatory components of temperament is essential to identifying the pathways to and away from psychopathology. For example, understanding when children develop regulatory strategies in light of their temperamental reactivity and how effective these strategies are developmentally will assist in the assessment of anger reactivity as a symptom of psychological maladjustment rather than the extreme end of a temperamental characteristic.

A third principle to which all contemporary temperament models subscribe is that *temperament interacts with the environment to affect the child's development*. This principle is consonant with the premise that interactions between children and their parents are bidirectional (Bell, 1968) and transactional (Sameroff, 2009) such that the characteristics of children, including temperament, contribute to their own development through interactions with the parenting environment across time. Children's temperament can, for example, evoke certain responses from parents, which can, in turn, affect how children consequently respond. Studies have shown how specific parenting behaviors interact with temperament either to attenuate or exacerbate later reactivity as well as to support or undermine the development of self-regulation, which has been shown to have implications for the development of psychopathology (Kiff, Lengua, & Zalewski, 2011).

Several theoretical approaches attempt to explain how temperament by environment interactions impact developmental outcomes, including psychopathology. The organismic specificity hypothesis (Gandour, 1989; Wachs, 1991) proposes that similar environments will affect children differently due to inherent individual differences in each child. Thus, a highly negative infant will respond to parental soothing differently from an infant who is low in negativity. This differential response may impact the development of the child, depending on how the parent adjusts his or her behavior accordingly. This model of development parallels the diathesis-stress or dual-risk model utilized to describe the development of psychopathology (Ingram & Luxton, 2005). More specifically, the diathesis-stress model views individuals who possess certain vulnerabilities that serve as a diathesis to increase their risk for negative outcomes (e.g., psychopathology) when combined with adverse environments while those who are not characterized by vulnerabilities are unaffected by the same environments and thus considered resilient (Luthar, 2006). In other words, some children are more strongly affected by poor environmental conditions, whereas other children appear to be more resilient to difficult environmental situations; this resilience frequently is believed to be a result of the child's temperament. A child who is temperamentally fearful, for example, and who has multiple nonparental caregivers with little predictability may develop general anxiety disorder while a less fearful child in the same circumstance would be a low risk for such a disorder (Degnan, Almas, & Fox, 2010). An important aspect of this model is that all children, including both those who are resilient and those who are vulnerable, thrive similarly in supportive or nonmaladaptive environments.

Some researchers have recently argued that most research in developmental psychopathology has not considered the full range of environments or outcomes, ranging from positive to negative (van IJzendoorn & Bakermans-Kranenburg, 2012a). Two very similar developmental models have been put forward to address this gap: the differential susceptibility hypothesis (Belsky & Pluess, 2009) and the biological sensitivity to context theory (Boyce & Ellis, 2005). These models propose that certain individuals are susceptible to both "risk-promoting and development-enhancing environmental conditions"

and that this susceptibility is found within the individual's biology (B. J. Ellis, Boyce, Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2011). In other words, susceptible individuals are not only more affected by adverse environments than less susceptible individuals but are also more open to positive, enriching environments that will affect outcomes for these individuals above and beyond those individuals who are less susceptible (Belsky, 1997; Belsky & Pluess, 2009).

Temperament, particularly difficult temperament or high levels of negative emotionality, and the biological systems and genetics that underlie temperament, have been used as examples of a susceptibility factor. Van Zeijl and colleagues (2007), for example, found that children with difficult temperaments were more susceptible to both negative and positive discipline than were children with easy temperaments in predicting the highest and lowest levels of externalizing problems, respectively. In another study, Kim and Kochanska (2012) demonstrated that infants with high negative emotionality exhibited the lowest self-regulation when their mothers were not mutually responsive and the highest levels of self-regulation when their mothers were very responsive. Biological sensitivity might be exemplified by activity in the parasympathetic nervous system (PNS) as measured by respiratory sinus arrhythmia (RSA). Findings from a study on marital conflict showed that when children with low RSA live in a household high in marital conflict, they are most anxious; when children with low RSA live in households with low marital conflict, they are least anxious (El-Sheikh, Hager, & Whitson, 2001). It is important to note that fearful children are characterized by low RSA, suggesting that their propensity for anxiety disorder would not only be lowered under positive conditions but buffered to the extent that they are the least anxious among other fearful and nonfearful children.

As many of the proposed pathways to developmental psychopathology include the role of the environment, these developmental models become increasingly important in understanding the relationship between temperament and psychopathology as well as in guiding future research. Moreover, the differential susceptibility and biological sensitivity models of person by environment interactions have only recently been fully tested because they are relatively new. However, several studies show the pattern suggested by these models. In the Temperament and Psychopathology: A Review of the Literature section we note which studies are supportive of temperament as a differential susceptibility in the development of child psychopathology.

THE STRUCTURE OF TEMPERAMENT

Conceptually and empirically, the structure and measurement of temperament in childhood has traditionally been dimensional. This is likely because the predominant conceptualization of adult personality/temperament that influenced the consideration of temperament earlier in life was dimensional, and that measurement of personality in adults and temperament in children was and is based primarily on questionnaires.

In this chapter, we focus on the four contemporary models of temperament that dominate the field: Thomas and Chess's (1968) behavioral-style model, A. Buss and Plomin's (1975) genetic criteria model, Rothbart and colleagues' (1981) psychobiological model, and Goldsmith and Campos's (1982) emotion-based model. Drawn from the dimensions that emerged from the interviews of Thomas and Chess and subsequent theory-driven and factor analytic work on child temperament, researchers converged around defining temperament as individual differences in three major areas: emotions, activity, and attention/regulatory behaviors (see Mervielde & De Pauw, 2012; Zentner & Bates, 2008, for a more expanded list of converging traits). Table 11.1 lists the specific dimensions of the four child temperament approaches that correspond with these three broad temperament factors as well as those dimensions that are specific to the temperament model. As noted, each theory emphasizes different aspects or criteria for temperament as well as the different developmental ages that each model covers. Both of these factors influenced the type and number of dimensions proposed by each theory. Here we describe briefly the dimensions from each temperament model that fall within these broad factors. In addition, these broad temperament factors are used later in the chapter to guide the organization of our review of the current research on the links between temperament and developmental psychopathology.

The broad factor of *emotionality*, which describes intensive and temporal variations in emotion expression, is defined either generally or specifically, depending on the theoretical framework. For example, Thomas and Chess (1968) include children's quality of mood, which ranges from positive to negative, while A. Buss and Plomin's (1975) emotionality dimension focuses broadly on negative emotions and does not include consideration of positive emotions. Other researchers view individual differences in discrete emotions, such as happiness, anger, and fear. Rothbart's (1981) positive emotion dimension includes smiling/laughter and high-/low-intensity pleasure. Smiling, as a reflection of joy, is also included in Goldsmith and

TABLE 11.1 Dimensions of contemporary developmental models of temperament

Thomas & Chess (1968)	A. Buss & Plomin (1975)	Goldsmith & Campos (1982)	Rothbart et al. (1981)	
			Infant	*Child*
Emotionality				
Intensity of reaction; Threshold of response; Quality of mood	Emotionality	Anger Fear Smiling	Distress to limitations; Fear; Sadness; Low/high intensity pleasure; Smiling and laughter	Anger/frustration; Fear; Sadness; Low/high intensity pleasure; Smiling and laughter; Discomfort
Activity Level				
Activity level	Activity level	Activity level	Activity level	Activity level
Attention Behaviors				
Attention span		Interest	Duration of orienting	Attentional focusing
Regulation				
Approach/ withdrawal	Sociabilty		Approach	Approach; Shyness
			Falling reactivity; Soothability	Falling reactivity and soothability
				Inhibitory control
Distractibility	Impulsivity			Impulsivity
Other dimensions				
Rhythmicity; Adaptability			Cuddliness; Perceptual sensitivity; Vocal reactivity	Perceptual sensitivity

Campos's (1982) framework. Similarly, individual differences in anger and fear are described in both theories. However, these are termed distress to limitations (anger) and distress to novelty (fear) in the infant version of Rothbart's model (1981). The attention to discrete emotions in these models emphasizes the understanding that the functions of these emotions are different (Barrett & Campos, 1987) and thus individual differences in their expression may lead to different outcomes (Putnam & Stifter, 2005). Indeed, among negative emotions, some may be positively related, as was found between anger and sadness (Dyson, Olino, Durbin, Goldsmith, & Klein, 2012), while others may be unrelated, as in the case of anger and fear (Goldsmith, 1996). Interestingly, factor analytic data (Rothbart, Ahadi, Hershey, & Fisher, 2001) on parent ratings of child temperament and observational studies (Gagne, Van Hulle, Aksan, Essex, & Goldsmith, 2011) indicated that in some cases, happiness and anger are positively linked. This is consistent with Carver's (2004; Carver & Sheier, 1998) theoretical model of affect, which proposes that positive and negative emotions are generated in response to the effectiveness of approaching incentives (happiness and anger) or withdrawing from threat (relief, fear).

Activity level, which reflects an individual's level and intensity of motor activity, is included in all modern theories of child temperament (A. Buss & Plomin, 1975, 1984; Rothbart & Derryberry, 1981; Thomas & Chess, 1968, 1977). Activity level is commonly viewed as such a critical aspect of temperament that it is even considered in Goldsmith and Campos's (1982) emotion-focused temperament framework. They proposed that motor activity is tied to each emotion and thus represents the child's emotional arousal (Goldsmith & Campos, 1982; Goldsmith & Campos, 1990). Its inclusion in A. Buss and Plomin's (1984) genetic criteria model is due to its moderate to high heritability in children, which has been found in both parent ratings of activity (Saudino & Eaton, 1991) as well as objective measurements, such as actigraphs (A. Wood, Saudino, Rogers, Asherson, & Kuntsi, 2007). Activity level is often associated with other temperament dimensions. For example, it is positively associated with anger and negatively associated with fear (Rothbart, Ahadi, & Evans, 2000). This finding confirms Goldsmith and Campos's (1982) proposal that activity level, at least in very young children, reflects emotional arousal. High levels of activity are also linked to high levels of approach. As we discuss later, these traits along with high-intensity pleasure and impulsivity, to name a few, make up the superfactor "surgency" identified by Rothbart (Rothbart, Ahadi, & Hershey, 1994).

The third broad factor of temperament that emerges from these four theories is *attention/regulatory behaviors*. Regulation is the process that modulates (e.g., increases, decreases, or maintains) emotional and behavioral reactivity, and attention is foundational to this ability (Posner & Rothbart, 2000). Thomas and Chess's (1977) attention span dimension and Rothbart's (Rothbart & Derryberry, 1981) duration of orientation and attention focusing dimensions

reflect individual differences in attention. Goldsmith and Campos's (1982) model includes the construct of interest, which is conceptualized as an emotion resulting from attention to stimuli and thus is included under this factor. Approach/withdrawal behaviors found in the Thomas and Chess and Rothbart models are listed under regulation because they increase positive affect by approaching or moving toward novel stimuli while withdrawal from novel stimuli decreases negative affect. Of course, who is more likely to use approach or withdrawal behaviors will depend on their reactivity to novel stimuli. A. Buss and Plomin's (1984) sociability and Rothbart's shyness dimensions represent approach/withdrawal in social situations. As regulation is central to Rothbart's definition of temperament, this model has several dimensions not seen in the other models. Falling reactivity and soothability reflect the child's ability to recover from the height of reactivity and to be regulated by others. Inhibitory control, which is defined as the child's ability to plan activities and suppress reactivity when instructed, develops in early childhood and thus is not seen in measures of infant temperament. Finally, as can be seen in Table 11.1, distractibility and impulsivity were included under this broad factor. Although these dimensions represent the speed with which a child responds to stimuli, we conceptualize them here as reflecting the lack of regulation. Impulsivity was initially included in Buss and Plomin's framework and then removed upon findings of lower than criteria heritability. Recent findings, however, suggest that there is a significant genetic influence on impulsivity (Gagne & Saudino, 2010).

Higher-Order Temperament Factors

As with the development of the Three-Factor (Eysenck, 1970) and Five-Factor (Costa & McCrae, 1976) models of personality and their numerous variations, temperament researchers have also examined how dimensions of temperament might relate in a coherent fashion. Examining the presence of higher-order factors is theoretically consistent with the proposal that temperament, like adult personality, is organized hierarchically (Zentner& Shiner, 2012). The use of higher-order temperament factors also has both methodological and interpretative advantages. As it is expected that many of the dimensions covary (e.g., activity level and high intensity pleasure) creating broad traits increases the power to predict relationships with other nontemperament factors (Putnam, Ellis, & Rothbart, 2001). Higher-order temperament factors also align quite well with the Three- and Five-Factor models of personality such that investigations of the links between temperament and personality are better executed and interpreted (Rothbart, Ahadi, et al., 2000). Likewise, since there is no unifying model of temperament, higher-order factors are useful for comparing across studies of temperament using different theoretical and methodological approaches.

Rothbart and colleagues (Putnam et al., 2001; Rothbart, Ahadi, et al., 2001) have done the most extensive quantitative analysis of temperament dimensions across childhood. Using factor analysis on the 15 dimensions (see Table 11.1) measured with the Child Behavior Questionnaire (Rothbart et al., 2001), three superfactors were identified: Negativity, Surgency, and Effortful Control. Negativity reflects a general tendency toward negative affect and is composed of anger/frustration, fear, sadness and low soothability. The surgency factor, which defines an approach orientation that generates positive affect and activity, is comprised of positive loadings of high-intensity pleasure, activity level, impulsivity and approach, and a negative loading of shyness. Effortful control, which results from positive loadings of inhibitory control, attention focusing, low intensity pleasure, smiling/laughter, and perceptual sensitivity, represents the child's regulatory capacity. These factor structures were similar across ages 3 years to 7 years and replicated in a Chinese sample (Ahadi, Rothbart, & Ye, 1993; Rothbart, Ahadi, et al., 2001) and a Dutch sample (Mervielde & De Pauw, 2012). The three superfactors subsequently emerged from questionnaires aimed at infants (Gartstein & Rothbart, 2003) and toddlers (Putnam, Gartstein, & Rothbart, 2006), demonstrating considerable coherence of these broad factors across childhood. Interestingly, these broad temperament factors map well onto adult personality factors, supporting the proposed link between temperament and personality traits (Shiner & Caspi, 2012).

The three factors identified by Rothbart were all derived from parent ratings of their children's temperament. Recently researchers have attempted to identify higher-order factors using observational methodology. Using procedures from the Laboratory Assessment Battery (Lab-TAB; see the section on Observational Measures of Temperament for further details, Goldsmith, Reilly, Lemery, Longley, & Prescott, 1993), which was designed to measure a number of lower-order traits, such as anger, sadness, fear, activity, and inhibitory control, Dyson and colleagues (2012) took a two-stage factor analytic approach. Exploratory factor analysis identified five factors, which were confirmed with a second sample: Sociability, Positive affect/interest, Dysphoria, Fear/inhibition, and Constraint versus impulsivity. In another study,

examiner ratings of child behavior across a number of cognitive and motor tasks were used to assess such temperamental characteristics as fearfulness, emotional lability, and impulsiveness (Caspi, Henry, McGee, Moffit, & Silva, 1995). Three factors emerged from the factor analysis: Lack of control, Approach, and Sluggishness, which described children who were passive, quiet, and withdrawing from novelty. When examining the relationship among these temperament factors and child behavior problems, lack of control was the most robust predictor. Similar results have been found with parent-reported effortful control. Taken together, the factors that emerged from studies using observations overlap (e.g., positive affect/interest, approach and surgency; constraint, lack of control, and effortful control) but are not identical to those that emerged from analysis of parent questionnaires.

Higher-Order versus Lower-Order Traits

Although there are several advantages to using higher-order factors in temperament research, this does not diminish the benefits of a fine-grained approach examining lower-order traits. Consideration of specific temperament traits may reveal more definite relations with outcomes such as behavioral and emotional disorders in childhood. So while there is evidence that the higher-order factor of Negativity, which includes variations in fear, anger, sadness, and general distress, is related to child behavior problems, an examination of the lower-order traits of anger and fear reactivity show that they are differentially related to the broad-band dimensions of problem behavior. For example, anger is positively associated with externalizing while fear reactivity is associated with internalizing (see the Review of Literature section). This finding should not be surprising, as these emotions have very different adaptive goals and action patterns (Barrett & Campos, 1987). It is interesting to note that in the factor analysis that derived the three higher-order factors of Surgency, Negativity, and Effortful control, anger reactivity loaded equally across the Surgency and Negativity factors (Rothbart, Ahadi, et al., 2001). Surgency includes high approach and activity level, characteristics that, when restrained, may lead to frustration and anger. Indeed, anger is often referred to as an approach emotion (Carver & Harmon-Jones, 2009; He et al., 2010). The use of higher-order temperament factors, therefore, may obscure important individual differences reflected in lower-order traits. Finally, it is important to note that the higher-order factors were derived from factor analysis of parent-rated temperament. As we discuss later, this method of assessing temperament is highly subjective, which may account for the associations found among the different types of infant and child negative emotions. Researchers interested in the links between temperament and developmental psychopathology, therefore, should be guided by the underlying emotions or behaviors defining the disorder. Researchers interested in oppositional defiant disorder (ODD), for example, which is characterized by ease of frustration, might consider focusing on anger reactivity, while those examining anxiety disorders would benefit from a more focused examination of fear reactivity.

A Categorical Approach to Temperament

Although the dimensional approach to temperament is the predominant method by which this construct is described, the categorical approach to understanding individual differences in reactivity and regulation has recently come to the forefront. The emergence of advanced statistical techniques, such as latent profile analysis, has allowed researchers to more fully examine how patterns of temperament characteristics define homogeneous groups of individuals.

The categorical approach to the study of temperament, however, is not new. In the second century, Galen described temperament categorically (e.g., sanguine, melancholic) based on the balance of the four humors of yellow bile, black bile, phlegm, and blood (Kagan, 1994). Interestingly, these types persisted across a number of cultures until the nineteenth century, when empiricism and later behaviorism emerged to explain individual differences. In the second half of the twentieth century, Thomas, Chess, and Birch (1968), the first developmentalists to consider temperament as important to understanding developmental psychopathology, created nine dimensions (see Table 11.1) based on interviews with parents which were then collapsed into three child temperament types. The easy type, which made up 40% of the sample, was more approaching of unfamiliar objects and persons, more positive in mood and adaptive. The difficult type described a child who withdrew from the unfamiliar, had an irritable, negative mood, and exhibited poor adaptation and comprised 10% of the sample. Children of this type were most likely to be rated as high in behavior problems. The third type, slow to warm up, comprised 15% of the sample and was most likely to exhibit withdrawal from novelty with some emotional distress and moderate adaptation. These categories were developed through qualitative analyses followed by factor analyses.

The recent resurgence of research examining categories or types of temperament resulted in part from

the person-oriented approach to individual functioning discussed by Block (1971) and further developed conceptually and methodologically by Magnusson and colleagues (Bergman & Magnusson, 1997). The theoretical basis of the person-oriented approach is holistic in that the person is viewed as integrated and hierarchically organized, and individual differences are investigated for patterns among the behaviors of interest (Magnusson, 1998) rather than a summation of the variables. Person-centered or typological methods aim to create subgroups of individuals with similar patterns of behaviors or traits (Kagan & Fox, 2006; Zentner & Bates, 2008) based on the premise that members of a specific subgroup are more similar to each other than to members of a different subgroup (Bergman & Magnusson, 1997). This approach provides increased statistical power to identify complex interactional associations among multiple temperament traits (Laursen & Hoff, 2006; Magnusson & Bergman, 1990).

It is important to note that temperament typologies were based on observations of behaviors rather than questionnaires, the predominant method of studies using the dimensional approach (cf. Dyson et al., 2012; Gagne, Van Hulle, et al., 2011). This contrast in methodology raises the issue of comparability across the dimensional and categorical approaches to temperament. However, the variable-centered and person-centered methods of studying temperament might be considered complementary to one another, not competing (Laursen & Hoff, 2006; Magnusson, 1998). Both approaches have utility in temperament research, are aimed at answering different research questions, and offer different methods of examining the data. The variable-oriented, dimensional approach might ask what the implications are of being high or low on a temperament characteristic for behavioral problems. For example, are high levels of anger reactivity related to aggressive behaviors? Research taking a person-oriented, typological approach, however, would consider the developmental outcomes of distinct subgroups of children with patterns of temperamental reactivity and regulation, such as how behaviorally inhibited children might develop anxiety disorders.

There are several ways in which personality and temperament types might be identified (Robins, John, & Caspi, 1998): (1) typologies based on extreme groups; (2) typologies based on a bimodal distribution; (3) bivariate or two-dimensional typologies where two independent dimensions are crossed to form four groups of individuals; and (4) a multivariate approach to creating groups. At least two of these methods have been used to create temperament types. Using the extreme groups approach, Kagan (1995) and others (Fox, Henderson, Rubin, Calkins, & Schmidt, 2001) identified behaviorally inhibited children and uninhibited children based on a number of characteristics that reflected their approach/withdrawal tendencies that fell into the top 10% and bottom 10% of these behaviors. Research from these labs has shown that the two temperament types are distinct behaviorally, physiologically, and physically. Behaviorally inhibited children, for example, are characterized by low verbal and emotional spontaneity with unfamiliar adults, long latency to relax in new situations, a reluctance to take risks, blue eyes, and a narrow face (Kagan, 1994). As we discuss later in this chapter, they have a distinct physiological profile. In addition, several studies have shown strong associations between extreme behavioral inhibition, particularly if it is stable across childhood, and later internalizing disorders. It is important to note that the groups used by these researchers were not exhaustive, and similar to the Thomas and Chess's (1977) creation of temperament types, several children were left unclassified.

A number of studies have employed a variety of multivariate approaches to derive temperament types. Using multivariate methods allows for the identification of types based on a configuration of a number of traits/dimensions. Cluster analysis is one such multivariate method and has been used to classify all children in a sample. For example, Caspi and Silva (1995) found five replicable types based on examiner ratings of several emotional, approach/withdrawal, and regulatory characteristics of 3-year-olds: well adjusted, inhibited, undercontrolled, confident, and reserved. Using coded behaviors of children observed during a number of laboratory tasks designed to elicit approach/withdrawal and emotional reactivity, Putnam and Stifter (2005) identified three temperament types in toddlers using cluster analysis: exuberant, inhibited, and low reactive. The exuberant type was high on approach and showed high levels of positive affect whereas the inhibited children showed the lowest levels of approach and the highest levels of negative affect. The low reactive type was so labeled as they showed lower levels of both positive and negative affect as well as moderate levels of approach. One of the goals of this study was to distinguish among low approach that was due to high levels of fear to novelty and low approach due to low interest in novelty.

Another multivariate method for identifying groups of children based on their temperament is to use a latent variable approach (e.g., latent class analysis, latent profile analysis) which classifies individuals based on probabilities of membership for each class. Using latent profile analysis based on variables coded from a risk-room procedure,

Dollar, (2011) identified three temperament types similar to those of Putnam and Stifter (2005): exuberant, inhibited, and average. Importantly, this replication was conducted with a slightly older preschool sample using a different statistical technique. In another study, Loken (2004) replicated the infant reactivity groups first identified by Kagan (1994) using latent class analysis. Latent variable analyses have also been used to identify longitudinal profiles. For example, stable high versus stable low profiles across infancy and early childhood emerged for behavioral inhibition (Chronis-Tuscano et al., 2009) and exuberance (Degnan et al., 2010). These longitudinal profiles have been successful in predicting later behavioral disorders.

Summary

Contemporary temperament research has viewed the structure of temperament as dimensional. The dimensions identified by the four most popular models of temperament converge somewhat and coalesce around three general domains: emotionality, activity level, and attention/regulatory behaviors. Higher-order factors or superfactors have emerged through factor analysis of these temperament dimensions demonstrating some distinct associations among temperament traits. A resurgence of the categorical approach to temperament has produced a number of temperament types. The inhibited/shy type and the exuberant/social type have emerged rather consistently from studies using varied methodologies and samples. Both the dimensional and categorical approaches to the structure of temperament have their advantages, which should be considered when investigating the link between temperament and developmental psychopathology.

TEMPERAMENT AND PERSONALITY

When discussing the definition or criteria for temperament, it is important to consider how temperament is related to personality. Personality in children of school and adolescent age has recently been studied, and the evidence suggests that children's personality is structured very similarly to adult personality. Although the approach to child temperament is considered bottom up in that Thomas and Chess (1977) interviewed parents about their children's enduring characteristics, contemporary temperament theorists have said that they were influenced by adult personality research at the time (Goldsmith et al., 1987). A number of scholars focused on understanding the distinction between temperament and personality, and several models have emerged (McCrae et al., 2000; Rothbart, Ahadi, et al., 2000; Shiner & Caspi, 2012); however, very little empirical study has been conducted to test the conceptual link between temperament and personality (De Pauw, Mervielde, & Van Leeuwen, 2009). As a result, the boundaries between what is temperament and what is personality still are fuzzy. In general, the term *personality* describes individual differences that are the product of early emerging constitutionally based temperament traits in interaction with the social and physical environment and development in cognitions, self-concept, and more complex emotions, such as guilt and pride. Thus, personality incorporates traits that may be the continuation of temperament traits, though labeled differently, as well as attitudes, values, and coping mechanisms, all of which are proposed to be influenced by temperament (Rothbart, 2011; Shiner & Caspi, 2012). Importantly, these characteristics may be specific to a particular time or place (McAdams & Pals, 2006).

Thus, the most direct link between temperament and personality is hypothesized to be through dispositions or traits: behaviors, thoughts, and emotions that are consistent across time and situation. In personality, these traits are referred most often as the Big Five and include Neuroticism, Extraversion, Agreeableness, Conscientiousness, and Openness to New Experiences (McCrae et al., 2000). These personality traits, which are composed of a number of lower-order dimensions, have been conceptually linked to both higher-order factors and lower-order temperament traits. Extraversion is similar to the higher-order factor of surgency, and both extraversion and surgency include components of approach and positive emotionality. Neuroticism, which reflects individual differences in anxiety, fearfulness, moodiness, and low frustration tolerance, overlaps with the temperament trait of negative emotionality. Conscientiousness, which reflects general self-control, is very similar to temperamental effortful control. The two remaining personality factors, agreeableness and openness to experience, do not have direct conceptual overlap with any temperament higher-order factor, but some of the characteristics of each of these personality factors can be found in lower-order temperament traits. For example, agreeableness, which reflects individual differences in the capacity to form and maintain positive relationships, is negatively related to anger reactivity and positively related to early attention (Caspi & Shiner, 2006).

Much of the recent research on the links between temperament and personality has been conducted with the goal of demonstrating that personality can be measured in children (Halverson et al., 2003; Shiner & Masten, 2008). Studies on the structure of child personality have found

personality in children to be structurally similarly to adult personality, increasing in similarity with age (Soto, John, Gosling, & Potter, 2011). Likewise, several studies have measured personality in children as young as preschool (e.g., Halverson et al., 2003) and suggest a significant overlap with temperament at the trait level of personality. Using principal components analysis on three temperament questionnaires and one personality instrument, De Pauw and colleagues (2009) recently demonstrated that many of the temperament dimensions factored with the personality items to produce a six-factor model distinguishing sociability, activity, conscientiousness, disagreeableness, emotionality, and sensitivity. Interestingly, these new factors were more differentially predictive of internalizing and externalizing problem behaviors than the individual temperament and personality measures.

Shiner and Caspi (2012) have argued that temperament traits develop into personality traits through four developmental processes that emerge at different times in childhood. Learning processes, which include positive and negative reinforcement, are proposed to begin early in life and be influenced by temperament traits. Likewise, environmental elicitation processes operate early in infancy and describe how the child's temperament elicits specific responses from others that may influence their behaviors over time. For example, infants who are high in positive emotionality elicit positive responses from parents, which may in turn affect their developing relationship. The third process, environmental construal, which is proposed to emerge after significant cognitive maturation, describes how temperament shapes the way children think about their environment and experiences. Fearful children, for instance, construe novel situations as stressful and overwhelming while fearless children interpret the same situation as exciting and stimulating. Environmental selection and manipulation, the fourth developmental process by which temperament traits influence personality, defines the ways in which temperament guides or shapes children's selection of which environments to engage. With age, children are given more opportunities to choose their environments, and it is proposed that temperament affects this choice. Thus, children who are more shy and withdrawn may be more cautious in their choice of friends.

In sum, strong arguments have been put forward that temperament and personality are linked. However, empirical evidence is still needed to clarify the processes by which temperament influences or "is" personality. Although some studies indicate that temperament develops into the traits of personality, there is little data on how child temperament influences the other aspects of personality, such as self-concept and attitudes. This information will be important toward understanding whether temperament influences the development of psychopathology through its relation to personality (Clark, 2005).

THE MEASUREMENT OF TEMPERAMENT

The measurement of any construct should follow closely the theoretical assumptions of that construct. As temperament is defined broadly as individual differences in the intensive and temporal parameters of emotion, activity, and attention/regulation, temperament researchers must be able to assess the subtle variations of child behavior, subtleties that cannot be reported by the children themselves. Consequently, the measurement of temperament has relied almost entirely on questionnaires aimed at parents' ratings of their children's behavior, particularly in infancy and childhood. Contemporary temperament researchers rarely interview parents about their children's behavior, but such interviews had a critical role in the development of questionnaires in use today (Thomas et al., 1968). Another method for assessing temperament is to observe children either in a natural situation, such as their home or school, or in a laboratory setting where target behaviors are elicited. Finally, with technological advances in electrophysiology, neural imaging, gene identification, and neuroendocrine assessment, researchers are now able to assess biological activity proposed by some theoretical models to underlie temperament. Next we describe each of these methods and discuss their advantages and disadvantages. We review the research on the neurobiology of temperament in a separate section later in this chapter.

Questionnaire-Based Assessments of Temperament

Likely because of the ease of their administration, a number of questionnaires have been developed, most of which are based on the four contemporary models of temperament. These instruments differ, quite obviously, on the dimensions they assess but also on several other factors, including: (1) the number of items comprising the dimension of interest, (2) the specificity of the behavior and its context, (3) the reference group (e.g., comparison to other children), and (4) attention to developmental period and changes across development. One of the earliest parent-report temperament instruments developed were those based on Thomas and Chess's (1977) New York Longitudinal Study including the Infant Temperament Questionnaire (Carey, 1970), the Behavioral Style

Questionnaire (McDevitt & Carey, 1978), and the Middle Childhood Questionnaire (Hegvik, McDevitt, & Carey, 1982). These questionnaires assess the nine dimensions proposed by Thomas and Chess as well as the broad factor of "difficultness." Although used quite extensively across a number of studies, these instruments have demonstrated marginally acceptable psychometrics (Rothbart, Chew, & Gartstein, 2001; Vaughn, Bradley, Joffe, Seifer, & Barglow, 1987).

Designed to assess temperament dimensions that are heritable, A. Buss and Plomin (1975) developed the EASI Questionnaire as well as the Colorado Childhood Temperament Inventory (Rowe & Plomin, 1977). Due to the low number of items (30–50), these measures have been popular with researchers interested in assessing temperament; however, many of the items are decontextualized (e.g., "child gets upset easily"), and the instruments do not take into account developmental changes in behaviors.

Perhaps the most thoughtfully constructed and researched set of questionnaires are those developed by Rothbart and colleagues. Based on their psychobiological approach, these questionnaires are tailored to ask specific questions about the child's behavior within different contexts. On the Infant Behavior Questionnaire–Revised (IBQ-R; Gartstein & Rothbart, 2003), caregivers are asked questions about the child's emotional and motor reactions to, for example, being bathed within the last 2 weeks. Importantly, Rothbart has designed questionnaires for each developmental level. Aside from the IBQ-R, caregiver reports on toddlers (Early Childhood Behavior Questionnaire; Putnam et al., 2006), preschool/school-age children (Child Behavior Questionnaire; Rothbart, Ahadi, et al., 2001), and a self-report instrument in adolescence (Early Adolescent Temperament Questionnaire; Capaldi & Rothbart, 1992) have been tested and found to have good to excellent reliability and validity (Putnam et al., 2001). Factor analysis of each questionnaire has produced surprisingly consistent superfactors of surgency, negative affectivity, and orienting/effortful control with interesting shifts of some of the dimensions from one factor to another with development (Putnam et al., 2001). These changes reflect a more mature, organized system that is less reactive and more self-regulatory over time.

The advantages of questionnaire measures are numerous and include the ease of administration, the low cost in terms of time and money, and the ability to tap into infrequent behaviors that are descriptive of a child's temperament. And because parents observe their infants across a number of contexts, parent reports also provide a fuller, more ecologically valid description of their child's behavior than other methods. Indeed, although some instruments do not consider context in their questions, we can assume, for example, that parents are able to judge the likelihood that their child will respond negatively to novel persons because they view them across many different settings.

Despite the advantages of temperament questionnaires, the accuracy of parent reports has been the topic of much debate (see Kagan & Fox, 2006; Rothbart & Bates, 2006). Parents may be biased in their view of their children, have differing interpretations of the questions posed, and have varying experience with other children for comparison purposes (Kagan, Snidman, McManis, Woodward, & Hardway, 2002). Studies on parental bias have convincingly demonstrated that many factors influence how parents rate their children's temperament, a fact that has led some researchers to advocate either disregarding parent report all together (Kagan, 1998; Seifer, Sameroff, Barrett, & Krafchuk, 1994) or using them in conjunction with other measures, such as laboratory observations (Rothbart & Bates, 2006; Stifter, Willoughby, & Towe-Goodman, 2008).

The question of validity of parent report is largely due to the small to insignificant association between parent ratings and laboratory observations of child temperament. Although several studies have reported significant correspondence, the correlations are in the weak to modest range (rs < .30). Moreover, a similar number of studies have reported no such association (Mangelsdorf, Schoppe, & Buur, 2000). These findings have prompted many researchers to examine the source of disparity between what parents observe and what is observed in the laboratory. As mothers are typically the parent who reports on the child's behavior, the preponderance of these studies have focused on the characteristics of the mother. For example, maternal depression (Leerkes & Crockenberg, 2003; McGrath, Records, & Rice, 2008), anxiety (Vaughn et al., 1987; Voegtline & Stifter, 2010), and personality (Bates & Bayles, 1984; Hayden, Durbin, Klein, & Olino, 2010) have been related to mothers' reports of their children's temperament. Such factors may alter parent perceptions of their children's behavior, thus impacting their ability to objectively report on their children's emotional reactions and regulatory behavior. Indeed, in some studies, maternal characteristics were more strongly related to the mother's ratings of the child than with observed child behavior (e.g., Sameroff, Seifer, & Elias, 1982).

Another reason for this disagreement between parents and observers is that the contexts in which they observe the child are vastly different. As noted, mothers have access to a variety of different settings while observers may see the child only in the laboratory or over a few hours in

the home. In an attempt to control the conditions under which parents and observers rate a child's temperament, researchers compared parent and observer ratings under the same conditions. Seifer and colleagues (1994) had both parents and observers rate infant reactions to the same tasks using the same rating system. The findings demonstrated that even after aggregating multiple observations, parents and observers did not agree. In a second study, Seifer (Seifer, Sameroff, Dickstein, Schiller, & Hayden, 2004) had mothers and observers rate the mother's own child and another child. Observers' and mothers' ratings of temperament showed strong convergence when rating another child but poor agreement when rating the mother's own child. Expanding on this methodology, Durbin and Wilson (2012) had mothers and naive observers rate children during the same tasks and compared both to objective coding of the behavior. Mothers and observers had weak agreement, and observers agreed with objective coding more than mothers. To explain this weak convergence, the researchers examined the effect of maternal mental health on mothers' ratings and found that mothers higher in depression and anxiety were more biased toward viewing their children more negatively than both naive observers and objective coders. Thus, even under conditions that are designed to maximize agreement, maternal characteristics operate to bias mothers' views of their children's temperament. Researchers should be aware of these biases when designing studies and consider using multiple informants and measures. We discuss this issue later in this chapter.

Observational Measures of Temperament

A second method by which researchers assess the temperament of young children is through observation, in a laboratory setting or the more naturalistic settings of the child's home, daycare, or school. Typically, child behavior is elicited through a series of tasks designed to provoke a temperament dimension. To illustrate, children's approach/withdrawal tendencies and their accompanying emotional responses might be assessed by having an unfamiliar person interact with children or putting children in uncertain situations, such as the "risk room" (K. Buss & Goldsmith, 2000; Rothbart & Goldsmith, 1985), which contains structures/objects that may be unusual or "threatening" (large black box, tunnel). Variations in children's behavior, such as proximity to the black box, willingness go through the tunnel, and the number of spontaneous vocalizations exhibited during the interaction with the unfamiliar person, are then coded, usually from a video recording.

There are many advantages to using observations to measure temperament. For one, observations that are conducted in the laboratory standardize the procedures, tasks, and setting across subjects, which cannot be expected from parent reports. That is, the contexts even with questionnaires such as the IBQ-R are not identical across families and thus introduce error into the assessment. A second advantage is that laboratory assessments target specific temperament behaviors that may not be as frequently observed by parents. Indeed, some parents may limit, for example, the number or type of novel situations their child is exposed to, which in turn can alter the expression of their fear reactivity. Laboratory measures, in contrast, may specifically create such situations to examine the range of reactions to novelty. A third advantage is that laboratory observations are usually recorded, which allows the researcher to examine the temporal and intensive qualities of behaviors that are related to temperament. Additionally, researchers can code different modalities of expression (facial, vocal) that may be less accessible to parents. It may be more difficult for a parent to recall the latency with which their children become facially and vocally angry, for example.

Despite the many advantages, observations are not the gold standard, as suggested by studies that examine the relationship between parent-rated questionnaires and laboratory measures. The lack of agreement might be due to problems in both measurement approaches or to differences in what is being measured by each approach (Goldsmith & Gagne, 2012). So, while data drawn from observations are less biased than that drawn from questionnaires, observational methods have their own issues. For one, observational measures do not capture temperament behaviors across a wide range of contexts. If we accept that temperament reflects cross-situational responses, then assessing behavior across more than one situation is essential. Observations provide a snapshot of children and thus may not be truly representative of their temperament. Second, the ecological validity of the laboratory setting is questionable. The unfamiliar laboratory and experimenters, no matter how friendly, can influence children's reactions to many of the tasks designed to evoke temperament, especially in more fearful, inhibited children. Unless one is interested in measuring behavioral inhibition, researchers must be aware of the degree to which the laboratory setting may affect behavior. Often researchers will have a warm-up period and allow children access to the parent at all times to alleviate this concern. A third disadvantage is the cost of conducting laboratory assessments of temperament, especially in terms of

time. Parents must travel to the lab, observations must be video-recorded, and behaviors must be coded before data are available for analysis. Even if researchers decide to code online, which is not standard practice, the time it takes to train coders to become reliable on these coding schemes is substantial.

Naturalistic observations are more ecologically valid, but they have similar disadvantages in that researchers are unfamiliar and the introduction of a person and/or camera in the setting may change aspects of the home or school. In addition, the setting is less controlled, which may affect the ability to administer standardized measures. Despite these disadvantages, observational measures of temperament have provided exceptional insights into the temporal and intensive features of individual differences in emotionality, activity, and regulation, particularly as it relates to behavioral adjustment.

Many studies have employed observations to assess temperament, particularly if children's temperament is the primary construct. Because of the time and effort required to collect and code observational data, temperament researchers usually focus on one or two temperament dimensions. Kagan (1994), Fox et al. (2001), and others have used observational measures to examine behavioral inhibition, while Stifter (Dollar, 2011); Putnam & Stifter, 2005; Stifter, Putnam, & Jahromi, 2008), and others (Degnan et al., 2010; Pfeifer, Goldsmith, Davidson, & Rickman, 2002) have used tasks to elicit exuberance. Observational measures have also been used to measure anger reactivity/frustration (Braungart-Reiker & Stifter, 1996; Calkins, Dedmon, Gill, Lomax, & Johnson, 2002) and positive affect (Aksan & Kochanska, 2004; Goldsmith & Campos, 1990; Kochanska, Aksan, Penney, & Doobay, 2007). Effortful control has also been observed in a laboratory setting and presents an interesting contrast to measures of approach/withdrawal, emotionality, and activity level. As effortful control overlaps with the construct of executive function (Zhou, Chen, & Main, 2012), its assessment involves standardized tasks, such as the delay of gratification task or the Day/Night Stroop (see Other Objective Measures of Temperament section).

In an effort to provide standardized behavioral tasks that tap a list of temperament dimensions, Goldsmith and colleagues created the Lab-TAB (K. Buss & Goldsmith, 2000; Goldsmith & Rothbart, 1996; Goldsmith et al., 1993; Kertes et al., 2009) for premotor (infants), locomotor (toddlers), and preschool children. Not only are tasks provided for each dimension, but coding schemes for the parameters of latency, duration, and intensity of the behaviors are included. As an example, for assessing anger reactivity in toddlers, the Lab-TAB offers several frustrating tasks, such as the gentle arm restraint, confinement to a car seat, and a toy behind a barrier, which can then be coded from video recordings for the latency, duration, and intensity with which toddlers display the facial, vocal, and bodily expressions of anger. As the Lab-TAB is developmentally sensitive, the preschool version assesses anger reactivity with different tasks but uses the same parameters of emotional reactivity. Other dimensions that can be assessed using the Lab-TAB include positive affect, fear, sadness, shyness, approach, activity, persistence, and inhibitory control.

Just as they have used questionnaires, researchers have been using observational measures to derive temperament dimensions or factors. Because of the difficulty and cost of conducting multidimensional longitudinal studies using observational methods, few studies have addressed the psychometrics of this approach. In one of the few existing studies examining the psychometrics of observed temperament measures, Durbin and colleagues (2007) examined positive and negative emotionality and their lower-order traits (e.g., sociability, interest, sadness, anger, fear) assessing behaviors from 12 tasks designed to elicit these traits at 3, 5, and 7 years of age. Results from this study indicated good to excellent stability as well as discriminant validity. Similar levels of short-term stability were reported in another study using Lab-TAB episodes to measure the dimensions of anger, fear, sadness, exuberance, and activity level (Majdandzić & van den Boom, 2007). Consistency across situations, as well as moderate convergence with parent ratings (both mother and father), was found for the observational measures. Using 12 episodes of the Lab-TAB during home visits, Gagne and colleagues (Gagne, Van Hulle, et al., 2011) created nine higher-level temperament composites mirroring those derived from questionnaire-based assessments. Cross-method convergence was found for most measures and parent-rated temperament, although postvisit ratings by observers were more closely related to the micro-coded measures. Predictive validity to a number of socioemotional outcomes has also been demonstrated by observational studies, many of which examined behavioral problems. These studies are reviewed later in this chapter.

An alternative to the more microanalytic observational approach is to have experimenters observe behaviors across a laboratory or home visit and then globally rate specific aspects of the child's temperament (Braungart, Plomin, DeFries, & Fulker, 1992; Matheny, 1983; Saudino, 2009; Voegtline & Stifter, 2010). The majority of these measures are based on the Infant Behavior Record/Behavior Rating

Scales, a behavioral assessment of the child while being administered the Bayley Scales of Motor and Mental Development (Bayley, 1969, 1993). Such items as social responsiveness, affect, activity level, irritability, reactivity, and task orientation are rated using a 9-point scale. Because these measures use global ratings and are based on behaviors across tasks and during transitions between tasks, they are proposed to mimic parent ratings of temperament (Stifter et al., 2008). However, in one study, when compared to parent ratings, only measures of positivity, not negativity, converged (Stifter et al., 2008). In another study that compared observers' ratings with parent ratings and coded behaviors, observer ratings converged more strongly with coded behaviors than did parent ratings of child temperament (Gagne, Van Hulle, et al., 2011). That observer ratings across the lab/home visits were correlated with microcoding of behavior suggests that this method might be substituted for the more time-consuming coding approach to observing temperament.

Although temperament observed in the laboratory/home and rated or coded by observers unrelated to the child may more closely reflect the true nature of the child than parent ratings, it does not necessarily present as the best alternative to parent ratings. Aside from being costly and limited in context and the types of behaviors that can be elicited, observational data may be influenced by other factors related to the raters/coders, such as experience with variations in child behavior and less sensitivity to the nuances of the temporal and intensive aspects of temperament. Training and inter-rater reliability calculated regularly can increase the accuracy of the ratings/coding systems. Likewise, reducing behaviors to observable parts that do not require significant judgment can also eliminate error. Researchers interested in observational studies should consider these limitations when designing studies on temperament and developmental psychopathology and when interpreting results from studies using this methodology.

Other Objective Measures of Temperament

The most objective measure of a temperament dimension is one that does not use individuals close to the children to rate their behavior or observers to code behavior elicited in the laboratory, home, or school. One temperament dimension amenable to such a method is activity level. Using actigraphs, a device designed to detect frequency and intensity of motion within the range of normal human movement, researchers have examined the heritability of activity level as well as its relation to hyperactivity–attention-deficit disorder (Ilott, Saudino, Wood, & Asherson, 2010). The only requirement for actigraphs is that the more actigraphs used (one per limb) and the longer they are used, the more reliable the data (A. Wood, Rijsdijk, Saudino, Asherson, & Kuntsi, 2008). In a study of twin toddlers, actigraphy was related to parent ratings and observations of activity level, but the degree of agreement was different, with parents being less accurate than observers (rs = .25 versus .67), even when assessments were done within the same context (Saudino, 2009). In addition, the overlap in genetic effects between parent and mechanical measures of activity level was modest compared to the robust shared genetic effect between observers and the actigraph data.

With advances in technology, automated methods have been developed and applied to facial expressions of emotion, which are central to the emotionality component of temperament. Using computer vision software that codes the action units of facial expressions of emotion automatically (Cohn & Kanade, 2007), researchers have successfully coded dynamic expressions of emotion in adults. More recently, automated facial coding has been applied to infants during a mother-infant interaction, and the data demonstrated concurrent validity with a manual anatomically based facial coding system and construct validity with naive raters (Messinger, Mahoor, Chow, & Cohn, 2009). Importantly, these systems can measure the intensive quality of a facial expression of emotion (Messinger, Mattson, Mahoor, & Cohn, 2012), a temperament parameter identified in several temperament models (e.g., Rothbart's [Rothbart, Ahadi, et al., 2001] high- and low-intensity pleasure dimensions and Thomas and Chess's, 1977, intensity of mood dimension).

Finally, standardized tests can also be used to tap certain temperament dimensions, specifically inhibitory control and the superfactor effortful control. Although this method involves an experimenter, the standardized administration and scoring (e.g., number correct; errors of commission/omission) decreases the subjectivity that is found in both parent ratings and observations. Standardized tests from other research domains, specifically the area of executive function, have been used by temperament researchers to measure effortful control. This is because the concept of effortful control overlaps significantly with several core components of executive function (Zhou et al., 2012). Effortful control is defined by Rothbart and Bates (2006) as the ability to inhibit a dominant response in favor of a subdominant response, to plan, and to detect errors. Executive function, like temperament, is an umbrella term that describes top-down goal-directed processes that

operate to control attention, cognition, and behavior (Blair et al., 2005). Thus, both effortful control and executive function describe voluntary control in the face of challenging or competing demands. Unlike most measures of temperament, developmental researchers interested in executive function have developed a battery of tests that have been accepted by the research community as reliable and valid measures of these cognitive processes. Consequently, temperament researchers have adopted these measures, including the Day/Night Stroop, Go/No Go, and the Delay of Gratification task, to measure effortful control (Cipriano & Stifter, 2010; Kochanska & Knaack, 2003; Kochanska, Murray, & Harlan, 2000).

Multimethod Approach to Measuring Temperament

As can be seen from the previous discussion, the two most utilized methods of assessing temperament, parent ratings obtained by questionnaires and laboratory/home observational measures, have their advantages and disadvantages. Although parent ratings are easy to administer, cost less, and provide an assessment of children's temperamental disposition across a wide range of contexts, studies suggest that parents are biased in their assessments, and researchers should be cautious about these biases when using parent reports of temperament in their studies. This advice is well heeded by researchers who are interested in the association between child temperament and problem behaviors since many studies rely on parent report of behavior problems as well.

Despite this caveat, temperament questionnaires can be useful, depending on the focus of the study. If one is interested in mother-child interactions, how a mother views her child may be important toward understanding how she interacts with him or her. In a study of preterm infants (Voegtline & Stifter, 2010), mothers who were anxious rated their preterm infants as more negatively reactive than mothers of full-term infants, even though these infants were not observed to be more negative during home observations. Knowing this bias may improve our understanding of how the transactions between mothers and their preterm infants may lead to poorer socioemotional outcomes. If due to time and money constraints researchers need to employ parent ratings of children's temperaments, it is advised that they obtain information from multiple sources, such as daycare providers/teachers, as they may be less biased and base their ratings on child behavior in different contexts than parents might (Bishop, Spence, & McDonald, 2003; Goldsmith, Rieser-Danner, & Briggs, 1991). In addition, using questionnaires that ask about specific behaviors within a reasonable time frame that are tied to a context and do not require parents to compare their child to other children of the same developmental age are highly recommended. Rothbart's infant, toddler, childhood and adolescent questionnaires attempt to reduce parent bias through these means (Putnam et al., 2001).

Likewise, the decision to use observational measures should be driven by the theoretical approach and the questions researchers are attempting to address. Although costly, observation of children's reactions in tasks designed to elicit the behaviors of interest are likely to be more accurate than asking parents about specific parameters of behavior that characterize the temperament trait and to recall those situations that elicited these reactions. Observational measures have been criticized for the lack of validity (Rothbart & Bates, 2006); however, more recent reports indicate that observations of behaviors reflecting temperament dimensions, particularly if they aggregate across a number of tasks, are indeed valid (Goldsmith & Gagne, 2012).

Ideally, research in temperament should consider multiple methods for assessing this construct. As Rothbart and Bates (2006) suggested, these measures represent components of variance in child temperament; each method contributes to a shared (parents and observers agree) and individual (that which is unique to the method) assessment of the child (Rowe & Kandel, 1997). A recent study on the quantitative genetics of temperament, specifically activity level, supports this conceptualization. Saudino (2009) found only modest overlap for the genetic effects of activity level measured mechanically and by parent report in the same situation. These findings suggest that different measures may be engaging different processes.

Following this call for multiple methods, a handful of studies have combined laboratory/home observations and parent report of child temperament. Using principal components analysis, studies examining behavioral inhibition (Kertes et al., 2009) and social withdrawal (Kiel & Buss, 2011) have combined laboratory observations with questionnaire data. In one case, parent ratings, observer ratings, and coded behavior during parent-child interaction were combined to assess task persistence; the resulting composite measure correlated well with age, cognitive performance and behavior problems (Deater-Deckard, Petrill, Thompson, & DeThorne, 2005). Most studies have combined parent and child report (Lengua, 2006) and mother and father ratings (e.g., Leve, Kim, & Pears, 2005). Even home and laboratory observations (Dougherty, Klein, Durbin, Hayden, & Olino, 2010) have been combined

to measure temperament. The availability of statistical techniques amenable to quantifying shared and independent variance across methods, such as structural equation modeling, should allow for a more reliable measure of child temperament and thus more confidence in understanding the role of temperament in adaptive and maladaptive behavior.

Summary

A number of methods for assessing child temperament exist. The most widely used and affordable method is parent ratings of child temperament. Due to reporter bias, however, findings based on parent report alone should be interpreted with caution. Although observational methods avoid reporter bias, they also have their limitations. Automated measures and standardized tests appear to avoid many of the pitfalls of both parent ratings and observations of temperament, but they do not assess every temperament dimension. Perhaps with the advancement in digital and mobile technologies, innovations in the measurement of temperament will emerge. For now, researchers, guided by their research questions, should carefully weigh the advantages and disadvantages of each method and consider utilizing multiple measures of temperament. It is also important for researchers to keep in mind that these measures are tapping into different components of child temperament and are not interchangeable, as each method may be assessing different processes (Saudino & Wang, 2012).

TEMPERAMENT AND DEVELOPMENTAL PSYCHOPATHOLOGY

There is a long tradition linking temperament to psychopathology. Galen, in adopting the ancient Greek and Roman belief in the four humors (blood, yellow bile, black bile, phlegm), proposed that an imbalance of humors led to the temperaments of the sanguine, choleric, melancholic, and phlegmatic types. The idea that temperament influenced one's vulnerability to develop emotional and behavioral disorders carried through to the nineteenth-century psychoanalytic theories of Freud and Jung (Kagan, 1994). Importantly, contemporary models of temperament were instigated by a search for how child characteristics affected the development of child behavior problems. The primary aim of Thomas and Chess (1977) was to understand how the children they saw in their clinical practice with similar behavior problems came from both dysfunctional and "good" families prompting them to consider the child's contribution to his or her development of these problems.

Many scholars have hypothesized the means through which temperament and psychopathology are linked. Rothbart, Posner, and Hershey (1995), in the first edition of *Developmental Psychopathology* (Cicchetti & Cohen, 1995), proposed several ways in which temperament might contribute to psychopathology, developmentally and with regard to treatment. Here we review seven of the hypothetical pathways from temperament that would most affect the development of behavioral/mental disorders in children.

1. Extremes in temperament may constitute a behavioral problem, such as extreme shyness or attention deficits.
2. Relatedly, extremes in temperament may predispose a child to develop a related disorder, such as when a highly fearful child develops general anxiety disorder or when the lack of attention regulation leads to conduct disorder (CD).
3. Temperament may affect others to act in ways that put the child at risk for developing problem behaviors. High levels of infant irritability, for example, may frustrate a vulnerable parent, who in turn may treat a child harshly, leading to the development of conduct problems.
4. Another pathway may be through self-regulation, such that deficits in self-regulation would allow the expression of a temperamental extreme, as in the case of an easily frustrated child who develops ODD.
5. Alternatively, overregulation of attention or behavior may lead to clinical levels of inhibition or anxiety.
6. A temperamental characteristic may heighten a child's response to a given event, for example, when a child's high negativity heightens his or her stress levels, leading to depression.
7. Another possible pathway is that a certain temperamental disposition may protect a child from developing psychopathology, such as when some level of fear protects against CD or when positive affect protects against trauma.

Thus, there are a variety of ways in which temperament contributes to developmental psychopathology, and recent research in this area supports many of these pathways.

The means through which temperament influences the development of psychopathology proposed by Rothbart and colleagues (Rothbart & Posner, 2006; Rothbart et al., 1995) are aligned with the models linking adult personality to psychopathology (Krueger & Tackett, 2003), which were recently applied to the developmental

literature (Tackett, 2006). These include the scar model, the pathoplasty/exacerbation model, the spectrum model, and the vulnerability/predisposition model. The scar model proposes that the development of psychopathology changes the individual's personality such that multiple occurrences of depression can increase neuroticism. According to the pathoplasty/exacerbation model, personality will affect the course, severity, and presentation of a disorder. In a review of research linking child personality to developmental psychopathology, Tackett (2006) concluded that empirical tests of these two models are rare, likely due to the methodological challenges of measuring personality before the emergence of a disorder and continuing to measure personality and psychopathology longitudinally. The remaining two models, however, have been supported by recent studies examining child temperament/personality and psychopathology.

The spectrum model hypothesizes that personality traits and characteristics of psychopathology lie on a continuum, thus sharing a similar etiology. For example, attention-deficit/hyperactivity disorder (ADHD) may lie on the extreme end of inhibitory control/impulsivity. This model maps onto the first two pathways proposed by Rothbart (Rothbart et al., 1995) just reviewed. Studies that have investigated the spectrum model have found shared genetic links between such temperament traits as negative emotionality and effortful control with externalizing problems and CD (Tackett, Martel, & Kushner, 2012). The spectrum perspective is similar to that of Clark (2005), who proposed that the temperamental dimensions of negative affectivity, positive affectivity, and disinhibition are the shared factors that underlie the link between personality and psychopathology. This hierarchical model hypothesizes that these temperament dimensions differentiate through biological and environmental developmental processes into personality traits and that, at their extremes, they put the individual at risk for psychopathology. Clark's conceptualization of the link between temperament and psychopathology also aligns with the precursor model, a more specific spectrum model, which assumes a developmental sequence in that temperament is evidenced before the onset of a disorder. The temperament trait of negative emotionality, for example, would be an early manifestation of internalizing disorder (Klein, Kotov, & Bufferd, 2011).

The vulnerability/predisposition model incorporates many of the proposed temperament-developmental psychopathology links of Rothbart (Rothbart et al., 1995). In this model, certain personality traits are proposed to place an individual at greater risk for developing certain clinical disorders, such as when impulsivity, a characteristic of low conscientiousness (and temperamental surgency), is related to antisocial behaviors. This model assumes a distinction between temperament/personality and psychopathological disorders and includes the potential for the interaction between temperament/personality and environmental factors to increase risk for psychopathology. The vulnerability model is analogous to the diathesis-stress model discussed earlier. One of the challenges in testing the vulnerability model is that the measures of temperament, personality, and psychopathology overlap. We consider this issue later in this section.

Internalizing and Externalizing Problem Behaviors

The most prevalent outcomes examined by research on the link between temperament and developmental psychopathology are the broad dimensions of externalizing and internalizing problem behaviors. Based on Achenbach's (Achenbach, Edelbrock, & Howell, 1987) conceptualization and empirical work assessing childhood behavioral problems, externalizing and internalizing problem behaviors form a hierarchical model that accounts for the systematic covariation among behavioral and emotional symptoms commonly observed in childhood. Externalizing behaviors, so called because they represent outward behaviors that are uncontrolled, include aggressive and rule-breaking behaviors (Achenbach & Edelbrock, 1978). Several subscales of the externalizing dimension can be derived from the Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1983), one of the most commonly used instruments assessing childhood behavior problems. Importantly, the CBCL overlaps with constructs defined in the *Diagnostic and Statistical Manual of Mental Disorders* (Tackett, 2006). ODD is characterized by negativistic, noncompliant, and argumentative behavior and is considered an earlier and less intense form of CD. CD is primarily characterized by rule violations, such as aggression, destruction of property, and theft. The third subscale, ADHD, is not included in Achenbach's externalizing broad band but can be derived from items measuring inattention, impulsivity, and hyperactivity.

Internalizing behaviors are those that are directed inward and subsume the disorders of anxiety and mood (depression). These problem behaviors are less studied in early childhood due to the inability of children to report on their internal states and the reliance on parent or teacher observations of behaviors reflecting anxiety and depression (Achenbach, McConaughy, & Howell, 1987; Edelbrock, Costello, Dulcan, Conover, & Kala, 1986; Kolko & Kazdin, 1993). Several studies have examined

internalizing behaviors in children younger than 5 years, but there is some question as to whether they constitute problematic behavior or just more extreme temperamental distress or inhibition (Goldsmith & Lemery, 2000). In addition, the reliance on parent report also raises questions as to parents' interpretation of child behavior, particularly given what is known about the accuracy of parent report. However, by middle childhood, self-reports of internalizing problems are relatively valid and reliable (Ebesutani, Bernstein, Chorpita, & Weisz, 2011; J. Goodman, Meltzer, & Bailey, 1998) but should be considered along with other informants' observations (Achenbach, 2006). Symptoms of anxiety include excessive worry and irritability whereas depressive symptoms can include sad mood, loss of interest, and sleep and eating disturbances.

Perhaps because of their disruptive nature, externalizing behaviors are reported more often and earlier than internalizing behaviors. Research indicates that children as young as 3 years of age are at high risk of developing clinical levels of externalizing disorders if a constellation of noncompliance, overactivity, poor regulation, and aggression occurs frequently beyond the age-appropriate period, increases in intensity, and cuts across several contexts and domains. Moreover, children who exhibit externalizing behaviors early and persistently are more likely to develop antisocial behaviors in adolescence and adulthood (Odgers et al., 2008). A six-site, cross-national study of physical aggression in childhood, for example, demonstrated that boys with developmental trajectories of consistently high levels of physical aggression were associated with both violent and nonviolent delinquency in adolescence (Broidy et al., 2003). It is important to note that those behaviors that put the child at risk for the development of externalizing behaviors (e.g., overactivity, poor regulation) are temperament traits which is consistent with the spectrum model of developmental psychopathology that proposes extremes in temperament to be pathological.

The developmental trajectories for internalizing disorders mirror that of externalizing disorders in children, although they are more transient. Children who exhibit high and increasing levels of internalizing behaviors are more likely to be anxious later in childhood or adolescence (Feng, Shaw, & Silk, 2008; Ollendick & King, 1994). Likewise, adolescent anxiety or depression is a risk factor for the same difficulties in early and even late adulthood (Coleman, Wadsworth, Croudace, & Jones, 2007; Glied & Pine, 2002; Pine, Cohen, Gurley, Brook, & Ma, 1998), particularly if it is persistent in adolescence. One source of internalizing disorders is the presence and rapid increase in externalizing problems. Externalizing and internalizing disorders co-occur at greater than chance levels (Angold, Costello, & Erkanli, 1999). When examining the developmental trajectories of both externalizing and internalizing behaviors across development, the data suggest that externalizing disorders may lead to increased internalizing problems in early childhood (Gilliom & Shaw, 2004) and anxiety and/or depression in adolescence (Copeland, Shanahan, Costello, & Angold, 2009; Loeber & Burke, 2011). Some have argued that this progression from externalizing to internalizing problems may be the result of the accumulation of negative interactions arising out of the child's dysregulation that makes him or her vulnerable to anxiety or depression (Wolff & Ollendick, 2006).

Many of the studies investigating the developmental emergence and course of externalizing and internalizing problem behaviors have considered child, parent, and demographic markers of risk. Child temperament has been identified as one of those factors. However, a problem unique to the examination of the link between temperament and developmental psychopathology is the method used to assess both constructs: parent ratings. Not only are both assessments based on the same reporter, but the instruments may be confounded.

Measurement Confounding

Identified as a significant issue in research on personality and psychopathology, the confounding of measures of temperament and symptoms of psychopathology in children takes on more methodological importance because of the reliance on parent report. As with child temperament measures, the assessment of problem behaviors in children, such as the broad bands of externalizing and internalizing disorders and the more specific subtypes of ODD, CD, ADHD, anxiety, and depression, is typically accomplished through parent ratings of the child's behavior. Consequently, many of the studies examining the link between child temperament and developmental psychopathology utilize the same informant, typically the mother, which can artificially inflate the relationship between the two constructs. To address this issue, the removal of overlapping items has been recommended, but this may decrease the validity and reliability of the measures.

Lengua, West, and Sandler (1998) proposed two reasons for this overlap in measures, one theoretical and the other methodological. The spectrum model of the temperament-psychopathology association discussed earlier reflects the potential for similarity in items measuring temperament and symptoms of developmental psychopathological disorders. As many of the externalizing

and internalizing disorders constitute emotional and behavioral reactivity at the extreme, overlap among measures might be expected. The dispositional/vulnerability model proposes that temperament and behavior problems are distinct but related; thus, any overlap in measures would be an issue for testing this model as well (Lemery, Essex, & Smider, 2002). In addition, overlap might be expected because the development of each temperament and problem behavior measure was done independently without consideration of the items tapping the other construct. Consideration of overlap in items would increase discriminant validity (Lengua et al., 1998).

At least three studies have directly examined the measurement confounding issue using similar techniques (Lemery et al., 2002; Lengua et al., 1998; Sanson, Prior, & Kyrios, 1990). Using both expert ratings and factor analysis, several items in the temperament measures and symptomology measures were confounded. In one study, 38% of the symptom items and 10% of the temperament items were rated by experts as confounded; factor analysis of caregiver reports revealed overlap in 23% of symptoms and up to 14% of temperament items (Lemery et al., 2002). After eliminating confounding items, each of these studies reanalyzed the correlation between the "purified" measures of temperament and symptoms and found reduced but still significant association, even when tested longitudinally (Lemery et al., 2002).

Taken together, the findings from these studies (Lengua et al., 1998; Lemery et al., 2003; Sanson et al., 1990) suggest that the overlap in items measuring temperament and behavioral problems does not affect their relationship. Many of the studies to be reviewed utilized parent reports of both child temperament and problem behaviors, concurrently and longitudinally. However, although simple correlations indicate some association, as predicted, the results should continue to be viewed with caution as the reporter of temperament and symptomology is typically the same, usually the mother. Current research has, and future research should, continue to consider multiple informants as well as observational measures.

TEMPERAMENT AND PSYCHOPATHOLOGY: REVIEW OF THE RESEARCH LITERATURE

In this section, we discuss research that has addressed the link between various temperament traits and styles and the development of behavior problems and early psychopathology. Most research considering the association between temperament and different forms or precursors of psychopathology has measured direct, linear effects. In such studies, the research questions address how a single temperament trait contributes to the development of behavior problems or psychopathology. Additive effects are also possible in which multiple temperament traits linearly increase the child's risk of developing a problem behavior, such as when fearfulness or negative emotionality predict children's internalizing behavior problems (Gilliom & Shaw, 2004)

There are also indirect processes by which temperament is associated with psychopathology. We discuss two forms of these indirect pathways: mediation and moderation. Research on mediated associations largely has focused on the manner in which temperament affects a child's interactions with the environment, which, in turn, shape the child's development of psychopathology. For example, Eisenberg and colleagues (Eisenberg, Zhou, et al., 2005) found support for the role of effortful control in mediating the relation between parental warmth/positive affect and children's later externalizing behavior problems. The second indirect process widely used in temperament studies involves investigating the conditions by which certain temperament traits are associated with behavior problems and psychopathology; specifically, these investigations consider moderating factors on the relation between temperament traits/styles and psychopathology. There are two central types of moderation that we consider in this review due to their large presence and influence: temperament × environment interactions and temperament × temperament interactions. It should be noted that studies on temperament × environment interactions hypothesize the moderating effects differently; some research investigates the moderating effects of the environment (i.e., parenting behaviors) and others measure the moderating effects of temperament. Although these views are complementary, we largely focus on studies investigating the moderating role of the environment on the relation between temperament and developmental psychopathology.

It is important to note two fundamental issues when reviewing the research literature linking temperament to psychopathology. First, as previously discussed, it is critical to keep in mind that there is potential confounding of measurements of temperament and behavior problems in much of the existing literature (Lemery et al., 2002; Lengua et al., 1998). This is especially true with research solely using parental reports of children's temperament and behavior problems. Thus, it is essential to take into account that the association between temperament and behavior problems may be overly inflated in some existing research. Another point to consider is the difficulty

determining the direction of influence in a large majority of this research. More recent temperament studies have used statistical and methodological techniques to provide information regarding the direction of effects from temperament to psychopathology; however, this point warrants attention when reviewing the literature. Finally, it is critical that the reader consider the sample employed within each study. Overall, most research is best generalized to community-based samples rather than clinically referred populations since most studies include only a few children who meet the cutoffs for clinically significant behavior problems. Indeed, the reader should keep in mind that the number of investigations focused on clinically significant levels of psychopathology in children is quite small in most of the research reviewed. With that said, the basis of a developmental psychopathology perspective is to consider both normal and abnormal, adaptive and maladaptive developmental processes (Cicchetti, 1984, 1990, 1993; Cicchetti & Toth, 2009; Rutter, 1986; Sroufe, 1990), and, thus, the examination of the role of temperament in the development of psychopathology in both normative and at-risk populations is important.

We organized our review of the research on the links between temperament traits/styles and the development of behavior problems and early psychopathology around the three broad temperament factors of negative emotionality, surgency, and effortful control (Rothbart & Bates, 2006). Within those broad categories, we also included research examining temperament types, specifically the exuberant and behavioral inhibited temperamental types, which have been extensively researched in the last 20 years. We also organized the review to include studies that focus on the specific temperament traits included in the superfactors that have also been theoretically and empirically related to developmental psychopathology. Thus, after reviewing the research on negative emotionality, we review the research on fear reactivity and anger reactivity. Likewise, we review the temperament traits of positive emotionality and activity level after reviewing the surgency research literature. Within each section, we first provide a broad description of the temperament factor/trait and then review the literature outlining direct linkages between the temperament trait and behavior problems/psychopathology. Next, we review relevant studies examining temperament × environment interactions in predicting behavior problems/psychopathology. Each section concludes with a summary and brief discussion of future directions. We end with an overview of temperament × temperament interactions that have been the topic of some of the most recent research in this area.

Negative Emotionality

Negative emotionality is a temperament factor that includes the emotions of frustration/anger, fear, anticipatory anxiety, sadness, guilt, and discomfort. Children high in negative emotionality are prone to cry, fuss, and show more negative emotions overall, as well as display more intense emotional reactions in a variety of situations (Rothbart & Bates, 2006). Historically, research has linked temperamental negative emotionality to various aspects of later development, including psychopathology (Rothbart & Bates, 2006). Indeed, this temperament factor has been shown repeatedly as an important predictor of both externalizing and internalizing behaviors across development, beginning in infancy (Bates, Bayles, Bennett, Ridge, & Brown, 1991; Eisenberg, Sadovsky, et al., 2005; Hagekull, 1994; McClowry et al., 1994; Rothbart, 2011; Rothbart & Bates, 2006). Although the direct relations between negative emotionality in the first years of life and internalizing and externalizing behaviors are modest, replication of these findings across various studies provides support that these are reliable associations.

Garstein Gartstein, Putnam, and Rothbart)2012) found that children's externalizing problems in preschool were predicted by high negative emotionality in infancy, toddlerhood, and preschool, providing evidence for the influential role of negative emotionality across early development. Indication of the importance of negative emotionality across early childhood in predicting internalizing behavior problems has also been provided. In the Uppsala Longitudinal Study, for example, parent-reported negative emotionality when the children were 10 to 15 months old predicted children's self-reports of internalizing and externalizing behaviors when they were 4 and 8 to 9 years old (Bohlin & Hagekull, 2009). Although negative emotionality predicted both internalizing and externalizing behaviors in this study, there was a much stronger relationship between negative emotionality and internalizing behaviors. Of note, negative emotionality was not a significant direct predictor of anxiety or depression when these individuals were 21 years old, although there were other direct and indirect temperament effects.

In addition, some research has examined negative emotionality as it relates to trajectories of behavior problems. This line of research is based on evidence that early behavioral and emotional difficulties often precede psychopathology later in development (e.g., Caspi, Moffitt, Newman, & Silva, 1998; Hofstra, Van der Ende, & Verhulst, 2002; Mesman & Koot, 2001) and are critical for our understanding of the stability, growth, and continuity

of behavior problems across development. Gilliom and Shaw (2004) found in a study of disadvantaged boys that children's expression of negative emotionality predicted their levels of externalizing behaviors at the first time point (2 years of age), but it was not associated with children's changes in externalizing behaviors from age 2 to age 6. Importantly, this study employed multiple methods of observed and maternal report of children's negative emotionality, maternal report of behavior problems at age 2, and maternal and teacher report of behavior problems at age 6, which, as previously discussed, adds to the validity of this study. Findings from this study suggest that children's negative emotionality may contribute to the onset of their early externalizing behaviors but perhaps not its continuity.

Even though there has been extensive research outlining the association between negative emotionality and later psychopathology, more recent research has acknowledged the importance of examining the specific negative emotions of anger, sadness, and fear that are commonly combined in measures of negative emotionality. Indeed, researchers have pointed to the differential roles of these specific negative emotions in children's developmental trajectories toward behavior problems and later psychopathology; thus, the importance of these specific negative emotions will be reviewed.

In addition to studies investigating the direct association between negative emotionality and psychopathology, researchers have also considered the interaction between negative emotionality and aspects of the child's environment in predicting children's development of behavior problems. Within this literature, there is a strong emphasis on parental personality and parenting behaviors as the measure of "environment." For example, mother's internalizing affect moderated the relation between toddler's negative emotionality and depression concurrently, such that children high in negative emotionality who had mothers with higher levels of internalizing symptoms were rated as showing greater depressive symptoms than highly negative children whose mothers were not high on internalizing symptoms. Interestingly, this association was not found for children's anxiety (Marakovitz, Wagmiller, Mian, Briggs-Gowan, & Carter, 2011). Research has also indicated moderating effects on the relation between negative emotionality and externalizing behavior problems. Infant males high in negative emotionality, according to both parent report and laboratory observations, were more likely than boys low in negative emotionality to be rated as high in externalizing behaviors at age 3 if their parents also showed high intrusiveness and negative affect (Belsky, Hsieh, & Crnic, 1998). Importantly, results from this study incorporated both parent report and laboratory observations of children's negative emotionality. Additional research examining this topic area has been conducted with a similar, yet distinct, temperament construct, difficultness, which is reviewed in the next subsection.

Examination of trajectories of externalizing behaviors, not just measures of externalizing behaviors at one point in time, has provided support for the interaction between negative emotionality and parenting in predicting behavior problems, as well. Owens and Shaw (2003) reported that children low in negative emotionality at 18 months of age with mothers high in depression had a faster decline in externalizing behaviors from age 2 to age 6 than children high in negative emotionality. This finding suggests that low negative emotionality could be a protective factor when children are at risk for developing externalizing behaviors due to their mothers' high depressive symptoms. Also of interest, results from this study showed that when mothers were low in depressive symptoms, the opposite finding was revealed. Children high in negative emotionality who had mothers low in depressive symptoms showed greater improvement in externalizing behavior over time so that by the time the children were 6 years old, highly negative children were comparable in externalizing behaviors to children low in negative emotionality. Drawing from the same study but examining different maternal behaviors, Gilliom and Shaw (2004) showed that the combination of negative emotionality, fearlessness, and negative maternal control was related to a high, nondecreasing trajectory of externalizing behaviors from age 2 to age 6.

In general, this literature supports the widespread perspective that environmental risk, such as negative parenting behaviors, exacerbates the potentially deleterious effects of negative emotionality in the development of behavior problems (Bates & Pettit, 2007). However, the potentially maladaptive outcomes that are associated with negative emotionality can be tempered by positive, supportive, and warm parenting behaviors. It is noteworthy that a recent meta-analysis (Paulussen-Hoogeboom, Stams, Hermanns, & Peetsma, 2007) suggested that the relations between negative emotionality and parenting characteristics/behaviors in predicting children's behavior problems are dependent on other factors, such as context (high-risk and low-risk samples) and the methodology employed in the study (e.g., micro- or macro-level approaches, modeling trajectories of behavior) and thus should be considered in future research. Further, as argued previously, the measurement employed in studies of temperament should be taken into

account. Specifically related to the negative emotionality × parenting literature, Paulussen-Hoogeboom and colleagues (2007) found in their meta-analysis that forms of negative parenting behaviors were associated with children's negative emotionality only when parental reports were employed. This finding again highlights the importance of multiple methods and informants, such as using observational measures in conjunction with parent reports of child behavior.

"Difficult" Temperament

Temperamental "difficulty" is a construct that is closely related to negative emotionality. As previously discussed, Thomas and Chess (1977; Thomas et al., 1968) identified a group of children, labeled "difficult," who were defined as high in withdrawal, negative mood, unadaptable to change, intense, and irregular (Thomas, Chess, Birch, Hertzig, & Korn, 1963). Historically, difficultness has received considerable attention by researchers interested in the relationship between temperament and maladaptive developmental outcomes, and the results support this association concurrently and longitudinally (e.g., Bates et al., 1991; Keenan, Shaw, Delliquadri, Giovannelli, & Walsh, 1998). However, this construct has been widely criticized (e.g., Plomin, 1982; Rothbart, 1982) and more recently put aside in temperament research in favor of more reliable measures of negative emotionality or more discrete temperament traits. One central issue with the use of the "difficult" label is that it identifies children as a problem early in life. The ramifications of attaching this negative characterization on children so early may cause unnecessary issues for them. For example, parental expectations that a child is difficult may influence their behavior toward the child, thereby worsening the child's behavior while reinforcing parental perceptions. This label may also influence the child's developmental trajectories in many ways, such that the difficult label may restrict the contexts the child is exposed to, thereby potentially affecting his or her experiences and opportunities. Further, the difficult label may also be inaccurate, as "difficult" behavior may cause problems in some contexts but be beneficial in others. Yet such behavior is less likely to be viewed as beneficial because of the negative connotation associated with the term *difficult*. Another issue with the use of the "difficult" label to describe child temperament is the inconsistencies in its operationalizations. In particular, there have been problems replicating the difficult temperament cluster, which has led to various forms of this construct. For example, algorithm-based perspectives (Fullard, McDevitt, & Carey, 1984; McDevitt & Carey, 1978) include rhythmicity, whereas Bates (1980, 1989) does not include rhythmicity and instead argues that the central aspect of temperamental difficulty is negative emotionality (Rothbart, 2004). Because of this issue, comparisons across studies can be problematic, and caution should be used when interpreting results from studies that examine "difficult" temperament since studies may be tapping into different aspects of a child's temperament (Rothbart, 2012).

Although there are issues with the use of the difficult temperament construct, a wide body of literature has examined its relationship with problem behavior. Because of this fact, we provide a brief review of some prominent studies that have measured a form of "difficult" temperament as well as more recent studies that have incorporated the differential susceptibility perspective using this construct. As mentioned, children labeled "difficult" are more likely to develop a variety of maladaptive developmental outcomes. For example, temperamental difficultness, measured by the Infant Characteristics Questionnaire as frequent and intense negative affect and attention demanding, has been shown repeatedly to predict children's later internalizing and externalizing behaviors (Bates, Maslin, & Frankel, 1985; Bates et al., 1991). Indeed, difficult temperament, as rated by the mother when the infant was 6 months of age, was predictive of conduct problems at age 3 (Bates et al., 1985), and a similar relation was found for report of children's externalizing behaviors at ages 7 to 8 (Bates et al., 1991). Further, infants rated as difficult and fussy at 6 months were rated as showing high levels of hyperactivity and aggression at age 17 (Olson, Bates, Sandy, & Lanthier, 2000). Other studies have found that temperamental difficultness, as measured by the Infant Characteristics Questionnaire, was predominantly associated with internalizing behavior problems, not externalizing behaviors (e.g., Keenan et al., 1998). As mentioned, many of these studies should be interpreted with caution, not only because they examined difficult temperament but also because both temperamental difficultness and behavior problems were both measured via maternal report.

Similar to the negative emotionality × environment interactions, many studies have examined the interactive effects of difficult temperament and parenting and have shown that children with difficult temperaments are much more likely to develop behavior problems when their parents behave in a punitive, negative manner (Bates & Pettit, 2007; Kochanska & Kim, 2013; Rothbart & Bates, 2006). Recently the model of differential susceptibility has been utilized to provide greater understanding of the relation between difficult temperament and parenting in

predicting children's developmental outcomes. Several studies support the hypothesis that difficult children are more susceptible to a range of parenting qualities, both positive and negative, than are easy children (Belsky, 1997; Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007; van IJzendoorn & Bakermans-Kranenburg, 2012b). For example, difficult children have been found to be more susceptible to negative parental discipline by showing more externalizing behavior problems as well as more susceptible to parental positive discipline by showing less physical aggression and fewer externalizing behavior problems than children with easy temperaments (van Zeijl et al., 2007). Additional support shows that children with difficult temperaments whose mothers were high in maternal sensitivity had the strongest decrease of externalizing problems from ages 2 to 5 (Mesman et al., 2009). More recently, Kochanska and Kim (2013) found that children's observed difficult temperament, as measured by poor effortful control and high anger proneness, moderated the relation between mothers' responsiveness at 30 to 33 months and children's externalizing behaviors at 40 months of age. For difficult toddlers, maternal unresponsive behaviors was related to higher levels of children's externalizing behaviors, whereas high levels of maternal responsive behavior with difficult children was related to low levels of externalizing behaviors. It is worth noting that the results from this study did not find that difficult children who received responsive parenting were statistically lower in externalizing behaviors than were the easy children, thereby providing support for a diathesis-stress model, not differential susceptibility.

Anger Reactivity

It has been suggested by many that anger, sadness, and fear reactivity, encompassed in negative emotionality, might better be treated separately. Specifically, high levels of anger/frustration are hypothesized to underlie externalizing behaviors whereas greater sadness and fear reactivity are consistent with symptoms of internalizing problems (Rothbart & Bates, 2006). For example, in a sample of preadolescents, higher fear reactivity was associated with internalizing problems and higher anger reactivity was related to externalizing problems (Oldehinkel, Hartman, De Winter, Veenstra, & Ormel, 2004). It is important to note that this association is not perfect, as outlined next (i.e., anger sometimes is associated with internalizing behaviors).

The association between anger and externalizing and aggressive behaviors has been found repeatedly across decades of research, providing considerable support for their relation (Eisenberg et al., 2009; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Lemery et al., 2002; Lengua, 2006; Rothbart, Ahadi, et al., 1994; Rothbart, Derryberry, & Hershey, 2000; Rydell, Berlin, & Bohlin, 2003). For example, infant frustration observed in the laboratory was related to parent-rated aggression when children were 7 years old (Rothbart, Derryberry, et al., 2000), and 5-year-olds high in parent-rated anger were more likely to be rated as high in externalizing behavior problems by teachers in preschool and elementary school and by parents at home (Rydell et al., 2003). Unfortunately, it is still unclear how the relation between anger and externalizing behaviors emerge developmentally. In particular, it is unknown if anger motivates externalizing types of behavior and/or if children who exhibit aggressive behavior become more angry and volatile across development because their aggressive behavior leads to peer rejection (Rubin, Bukowski, & Parker, 2006). Indeed, even though a functionalist view of emotions proposes that anger motivates goal-oriented behavior and therefore can serve an adaptive purpose (Saarni, Mumme, & Campos, 1998), inappropriate levels and/or expression of anger may generate aggressive behaviors that negatively affect peer interactions and prevent socially adaptive problem-solving abilities.

Some research finds that children prone to high levels of anger early in development are at a higher risk of developing externalizing *and* internalizing problems later in childhood and adolescence than children low in anger (Eisenberg et al., 2009; Frick & Morris, 2004; Gartstein et al., 2012; Rothbart & Bates, 2006). However, these associations tend to be stronger for externalizing behaviors than for internalizing behaviors (Eisenberg et al., 2001; Oldehinkel et al., 2004). Although the link between anger reactivity and internalizing behavior is somewhat counterintuitive, the approach/withdrawal model of emotions proposed by Carver and Scheier (1998) suggests that sadness and depression can result from an individual repeatedly failing to approach a goal. Thus, children might initially experience anger when progress toward a goal is blocked, but after continued efforts to obtain this goal are hindered and presumed lost, the internalizing emotion of sadness may develop. An additional explanation for this association comes from research indicating that increases in externalizing behavior problems coincide with increases in internalizing behavior problems across the preschool period (Gilliom & Shaw, 2004). Thus, there may be multiple pathways from anger reactivity to the development of both internalizing and externalizing behaviors.

As outlined by Patterson (1976, 1982) in his coercion theory, interactions between parents and children that are negative and/or coercive in style are likely to persist

and accumulate over time, thereby increasing children's likelihood of developing externalizing, aggressive behaviors. This could be especially true for children prone toward experiencing negative emotions, specifically anger. In addition, within hostile, harsh environments, it is likely that children prone to experiencing and expressing anger will not learn appropriate methods of regulating their emotions, thereby exacerbating their risk of developing behavior problems and later psychopathology.

There is much correlational support for the notion that children's anger is negatively associated with supportive parenting. For example, anger is concurrently associated with lower levels of parental warmth in infancy (Kochanska, Friesenborg, Lange, & Martel, 2004) and increased levels of harsh parenting (Rhoades et al., 2011). Further, it is hypothesized that for anger-prone children, the effects of negative parenting behaviors, such as hostility, rejection, inconsistent discipline, and the like, might engender greater anger and aggressive behavior, characteristics of both internalizing and externalizing behavior problems. Thus, the effects of poor environmental conditions, such as negative parenting behaviors, might be especially detrimental to children temperamentally high in anger, given that low-quality and negative parenting seem to amplify behaviors already at risk (Calkins & Fox, 2002; Morris et al., 2002). In support of this position, Morris and colleagues (2002) found that first- and second-grade children high in temperamental anger were rated as higher in teacher-reported externalizing behavior problems if children viewed their mothers as high in overt hostility. Interestingly, anger-prone children were also high in teacher-rated internalizing behavior problems when these children rated their mothers as high in intrusive control. Lengua (2008) reported similar results when examining change in problem behaviors. Children high in frustration had greater increases in externalizing behaviors across 1 year during middle childhood (average age at Time 1 was 8.5 years old) within the context of child-reported maternal rejection. Interestingly, inconsistent maternal discipline predicted increases in internalizing behaviors for children high in frustration.

Person-centered methodological approaches also have been employed in research linking anger and the development of behavior problems. For example, Degnan, Calkins, Keane, and Hill-Soderlund (2008) created longitudinal profiles from age 2 to age 5 of children's disruptive behavior, which can lead to antisocial behaviors later in life (Broidy et al., 2003). The findings showed that children high in observed anger were more likely to be members of the high disruptive profile (high levels of disruptive behavior across time) when they had mothers who were high in control (adult-oriented goals and strictness/punitiveness). However, results from this study provided support that high physiological regulation, as indexed by vagal withdrawal, served as a protective factor for anger-prone children by leading toward a greater likelihood of being a member of the normative profile than the high disruptive profile. Thus, similar to findings on negative emotionality × parenting interactions, parenting behaviors high in control and hostility seem to intensify the relation between children's anger and later behavior problems. It is important to note that the developmental process by which parenting moderates children's anger reactivity in predicting behavior problems is still unknown. It could be that children temperamentally prone to anger/frustration have difficulty internalizing rules of conduct, which elicits harsh parenting, increasing the likelihood of behavior problems. Or it is possible that children high in anger might respond with increased frustration and irritability to negative parenting behaviors, leading to a greater likelihood of developing behavior problems. The developmental transactional process for anger reactive children warrants additional research.

Fear Reactivity

Additional support for the importance of considering the specific components (fear, anger, sadness) of negative emotionality comes from researchers linking individual differences in fear, measured as early as infancy, and the development of internalizing behavior problems (Biederman, Rosenbaum, Bolduc-Murphy, & Faraone, 1993; Biederman et al., 2001; Chronis-Tuscano et al., 2009; Hirshfeld-Becker et al., 2008). For example, Gartstein and colleagues (2012) reported that fear in toddlerhood and childhood, as reported by mothers, predicted children's internalizing scores both cross-sectionally and longitudinally. In another study (Rydell et al., 2003), parent-rated temperamental fear was positively associated with internalizing behavior problems longitudinally, although it is important to note that both were parent-rated. Further, children's low regulation of fear was related to higher internalizing behavior problems, both at home when the children were 6.5 years old (parent-reported) and in elementary school when the children were 8 years old (teacher-reported).

A more recent perspective on the relation between temperamental fear and the development of internalizing behavior problems proposes the importance of examining context. K. Buss (2011) found that 2-year-old children's observed expression of fear in a highly threatening context was not associated with anxiety symptoms when

the children were in kindergarten. Instead, dysregulated fear, characterized by high fear across all contexts including low-threat contexts, was related to higher maternal-reported anxiety when children were in preschool as well as social withdrawal when they were in kindergarten. Importantly, although children's inhibition (i.e., shyness, withdrawal) was related to maternal reports of social withdrawal during kindergarten, dysregulated fear predicted variance in social withdrawal over and above inhibition. As an extension of these findings, K. Buss and colleagues (2013) found that children with greater dysregulated fear at age 2 consistently predicted social wariness and social anxiety disorder symptoms throughout the child's kindergarten year.

Although predominantly discussed as a strong predictor of internalizing behavior problems, temperamental fear is also reported as negatively associated with externalizing problems and is hypothesized to protect children from developing aggressive behaviors (Rothbart & Bates, 2006). For example, infants' expression of fear in the laboratory has been shown to predict lower maternal reports of aggression when the children were 7 years of age (Rothbart, Ahadi, et al., 2000). One explanatory mechanism through which fear reactivity early in life is believed to counteract the development of externalizing behavior problems is through the development of conscience, which is negatively related to children's externalizing and aggressive behaviors (Eisenberg, Fabes, & Spinrad, 2006; Kerr, Lopez, Olson, & Sameroff, 2004). Indeed, children high in temperamental fear have been found to demonstrate better internalization of rules and standards (Kochanska, 1995; Kochanska et al., 2001) as well as show more empathy/guilt (Kochanska, Gross, Lin, & Nicholas, 2002; Rothbart, Ahadi, et al., 1994). It is worth mentioning that although temperamental traits, such as fear reactivity, are believed to contribute substantially in the development of conscience, which may lower the risk of externalizing behaviors, there are multiple factors involved in this development. One in particular, parenting behaviors, is discussed next as a moderator of the relation between fear reactivity and children's conscience.

Various parental behaviors have been examined for their moderating role on the relation between temperamental fear and the development of internalizing behavior problems. It has been suggested that fearful temperament encourages warm, supportive parenting behaviors (Lengua, 2006); however, there is also evidence that temperamental fear is not associated with either more or less parental support (Paulussen-Hoogeboom et al., 2007). Although it is not clear if infant and childhood fear reactivity is more likely to elicit a certain type of parenting, there is evidence that negative parenting behaviors increases the relation between temperamental fear and internalizing behavior problems. Gilliom and Shaw (2004) found that children high in observed and parent-rated negative emotionality and fearfulness with mothers high in observed negative control were more likely to develop increasing internalizing behavior problems from the ages of 2 to 6. Moderated mediation analyses have also been conducted in investigations regarding the association between temperamental fear and later anxiety. Kiel and Buss (2010) found that maternal protectiveness mediated the relation between fearful temperament and later anxiety, but only for mothers who were able to accurately predict when their child would be fearful.

Another central line of research on temperamental fear has been conducted by Kochanska (1991, 1995, 1997; Kochanska, Aksan, & Joy, 2007). In this research, she looked at the interaction between parenting behaviors and children's fear and fearless behaviors in predicting the development of moral and behavioral self-regulation, an important component of behavioral adjustment and predictor of fewer problem behaviors (Calkins & Keane, 2004; Keenan & Shaw, 2003). Kochanska (1991, 1995) hypothesized that since fearful children have a low threshold for fear arousal, parenting behaviors that are gentle, positive, and cooperative in nature will promote children's internalization of rules and morals in fearful children. In support of this hypothesis, she found that when mothers of temperamentally fearful children showed higher levels of gentle, low-power discipline and guidance, their children displayed more committed compliance and internalization than fearful children of mothers who did not show these behaviors. Therefore, it was concluded that an optimal level of anxiety arousal is elicited in fearful children when mothers use gentle discipline, thereby promoting compliance and internalization (Kochanska, 1997).

It is important to note that temperamental fear is proposed to underlie a number of behaviors that are included in temperament models, such as withdrawal, behavioral inhibition, and shyness, all of which have been studied in relation to the development of internalizing behaviors, specifically anxiety and social withdrawal. Fear reactivity, for example, is a major component, along with other behavioral and physiological traits, of the behavioral inhibited temperamental type or category, which we consider next.

Behavioral Inhibition

As mentioned, the construct of behavioral inhibition is closely related to other temperamental traits, such as negative emotionality, fear, and shyness. In general, behavioral

inhibition reflects the inability to appropriately handle uncertainty rather than a predisposition to fear (Kagan & Snidman, 2004). In the 1980s, Kagan and colleagues (e.g., García Coll, Kagan, & Reznick, 1984; Kagan, Reznick, & Snidman, 1987b) introduced the construct of behavioral inhibition to the developmental community. Since then a number of studies have examined its development, physiological bases, and relation to developmental psychopathology. Taking an extreme groups/categorical approach, Kagan defined behaviorally inhibited children as those who tend to withdraw and show negative affect in response to novelty. Research has shown that when presented with unfamiliarity, children who are behaviorally inhibited display high levels of negative affect, distress, wariness, and anxiety (Calkins, Fox, & Marshall, 1996; García Coll et al., 1984; Kagan, 1997) and are likely to exhibit social withdrawal or reticence in early childhood (Fox et al., 2001; Rubin, Burgess, & Hastings, 2002). Individual differences in emotional and behavioral reactivity to novelty, according to Kagan (Kagan et al., 1987b), are functions of excitability in the amygdala and proximate areas of the brain. This excitability is thought to generate heightened fear responses to unfamiliar and novel situations, people, and things. For example, adults who had been identified as inhibited in toddlerhood, compared to those individuals who had been identified as uninhibited, had a greater amygdala response to novel versus familiar faces (Schwartz, Wright, Shin, Kagan, & Rauch, 2003). Behaviorally inhibited children also evidence greater autonomic reactivity than uninhibited children (Perez-Edgar & Fox, 2005a; Schmidt, Fox, Schulkin, & Gold, 1999). The results of multiple longitudinal studies have demonstrated moderate stability of behavioral inhibition across childhood (Kagan, Reznick, Snidman, Gibbons, & Johnson, 1988; Pfeifer et al., 2002; Rimm-Kaufman & Kagan, 2005). Approximately 15% to 20% of children are likely to show high levels of behavioral inhibition (Fox, Henderson, Marshall, Nichols, & Ghera, 2005), and about half of these children continue to show indicators of behavioral inhibition across childhood (Degnan & Fox, 2007).

Understanding the developmental course of children categorized as behaviorally inhibited in early childhood has been important to developmental psychopathology. In general, research has found behavioral inhibition to predict later social behaviors and behavior problems (Kagan, 1994; Kagan, Reznick, & Snidman, 1987a; Rubin et al., 2002; Schwartz, Snidman, & Kagan, 1999). But more specifically, children who were consistently labeled as inhibited developed social anxiety disorders (e.g., Biederman et al., 1990, 2001; Hirshfeld et al., 1992; Schwartz et al., 1999). Interestingly, children identified as having anxiety disorders as early as 3 years of age displayed higher levels of behavioral inhibition as well as lower levels of positive affect (Dougherty et al., 2013).

As with other studies on the moderating role of the environment on the relation between temperament and psychopathology, research focused on behavioral inhibition has examined the role of parenting behaviors in the development of psychopathology. Overall, this literature suggests that intrusive, controlling, and/or oversolicitous parent behaviors increase inhibited toddlers' risk of developing social reticence and children's wary, anxious behavior in social situations (Rubin, Cheah, & Fox, 2001; Rubin, Hastings, Stewart, Henderson, & Chen, 1997; Rubin et al., 2002; Van Leeuwen, Mervielde, Braet, & Bosmans, 2004), whereas maternal warmth, sensitivity, and responsiveness are related to lower levels of behavioral inhibition and more socially acceptable behavior (Hane, Cheah, Rubin, & Fox, 2008; Park, Belsky, Putnam, & Crnic, 1997). Conversely, there are also findings from studies on behaviorally inhibited children showing that sensitive, overly responsive parenting behaviors, sometimes discussed as overly solicitous, maintain children's behavioral inhibition. It may be that by catering to the child's proclivity to avoid unfamiliarity, over-solicitous parents may be fostering the continuity of inhibited behaviors (Kagan, Arcus, & Snidman, 1993; Putnam, Sanson, & Rothbart, 2002). Moreover, oversolicitous parents may be reinforcing children's behavioral inhibition by rewarding their children's initial signs of distress with parental warmth and precluding any opportunity for children to develop and use self-regulatory skills (Fox et al., 2005). Although the research is mixed depending on how the parenting behaviors are defined (i.e., sensitive versus intrusive), the findings indicate that parenting behaviors aimed at encouraging children to engage socially may protect behaviorally inhibited children from developing social anxiety by lowering their attention bias to threat and promoting exploration and engagement with other children (Fox et al., 2005; J. Wood, McLeod, Sigman, Hwang, & Chu, 2003). In turn, this mastery of the environment will assist in the development of self-regulatory behaviors. Similarly, Kagan (1994) has posited that if fearful children are forced to face and deal with situations that cause them discomfort (e.g., fear or frustration) within the context of responsive parenting, they will be more likely to learn to regulate these emotions and therefore show fewer fearful behaviors with time.

It is worth noting that a few studies have examined the moderating effect of other nonparenting environmental influences. For example, Essex Armstrong, Burk,

Goldsmith, and Boyce (2011) examined the effect of teacher-child relationships in the first grade on mental health outcomes at grade 7 for behaviorally inhibited children. Behaviorally inhibited children developed worse mental health symptoms under conditions of high teacher-child conflict but the lowest levels of symptoms when there was low teacher-child conflict. Therefore, this study provided support for the differential susceptibility hypothesis for inhibited children. Another nonparental environmental context that is associated with behaviorally inhibited children's development of anxiety is that of the child care context (e.g., Fox et al., 2001). In this study, highly negative infants at 4 months of age were less likely to become inhibited later in development when they were placed in nonparental child care for 10 or more hours per week. As stability of behavioral inhibition is a risk factor for internalizing behaviors, the effects of child care in lessening this risk is achieved by exposing behaviorally inhibited children to other children and adults, encouraging social interaction, and requiring the use of regulatory strategies. However, it is important to consider that these effects may differ depending on the level of positivity and supportiveness within the child care environment (Clarke-Stewart & Allhusen, 2002; Gazelle, 2006). For example, Morrissey (2009) reported that preschoolers who experienced a greater number of child care environments, such as in-home care, center care, and care by grandparents, were rated by their parents as higher in internalizing behavior problems. Thus, the amount of child stress created by nonparental care should also be considered when examining the effects of child care on children varying on their levels of behavioral inhibition.

Summary

In sum, negative emotionality, a temperament factor that includes the emotions of frustration/anger, fear, anticipatory anxiety, sadness, guilt, and discomfort, has been shown repeatedly to be a reliable predictor of both externalizing and internalizing behaviors across development. Direct links between negative emotionality and behavior problems at one time point exist as well as the association between negative emotionality and trajectories of behavior problems. Although there has been extensive research outlining the association between negative emotionality and later psychopathology, recent work acknowledges the importance of examining the lower-order traits that make up the negative emotionality factor; indeed, evidence of the differential roles of these specific negative emotions in children's developmental trajectories toward behavior problems and later psychopathology has emerged. For example, there is considerable support for the association between anger reactivity and externalizing behavior problems. Although temperamental anger is more strongly related to externalizing behaviors than to internalizing behaviors, growing empirical evidence indicates that children prone to high levels of anger early in development are at a greater risk of developing both internalizing and externalizing problems later in childhood and adolescence than are children low in anger reactivity.

Temperamental fear has been shown to be a good predictor of internalizing behavior problems. However, it is also important to note that fear is negatively associated to externalizing problems, which suggests that it may operate as a protective factor for aggressive behaviors. Behavioral inhibition, a temperamental type characterized by high levels of fear/uncertainty along with other behavioral and physiological traits, has also been linked to internalizing behaviors, such as social withdrawal and reticence as well as anxiety.

The moderating role of the environment on the association between negative emotionality and later behavior problems has also been investigated. The findings support the widespread perspective that negative parenting behaviors exacerbates the maladaptive effects of negative emotionality in the development of behavior problems, whereas positive parenting behaviors can temper this relationship. The effects of parenting behaviors are thought to be especially detrimental to children temperamentally high in anger within the context of low-quality and negative parenting. These findings support the transactional nature of the parent-child relationship such that highly negative children are likely to evoke more negative responses from their parents, which may develop into a pattern of maladaptive interactions that decrease the children's opportunities for meeting developmental milestones, such as learning appropriate regulatory behaviors. Fewer studies have examined parenting and temperamental fear in predicting behavior problems. Parenting behaviors that are intrusive, controlling, and/or oversolicitous are related to temperamental fear, behavioral inhibition, and social reticence, whereas maternal warmth, sensitivity, and responsiveness are related to lower levels of behavioral inhibition and more socially acceptable behavior. However, there is also research supporting the notion that sensitive, overly responsive parenting behaviors maintains children's behavioral inhibition, a risk factor for internalizing, by catering to children's proclivity to avoid unfamiliarity. Important research questions remain regarding the specific types of parenting behaviors that lower fearful children's risk of developing internalizing behavior problems.

Overall, researchers have begun to address important questions related to the trajectories of negative emotionality as well as models of differential susceptibility, both of which are important areas of future research. Although the role of negative emotionality in the development of psychopathology is well established, we encourage future research to focus on individual differences in the expression and experience of the more specific emotions of fear, anger, and sadness rather than the broad constructs of negative emotionality and difficult temperament. In addition, despite these consistent and promising findings, it is still unclear how the relation between anger reactivity and externalizing behaviors and fear reactivity and internalizing behaviors emerges developmentally. For example, some studies suggest that anger and aggression share similar neural circuits (Coccaro, McCloskey, Fitzgerald, & Phan, 2007), adding to the complexity of our understanding of the association between anger and the development of behavior problems and psychopathology. Moreover, the existing research literature largely does not acknowledge the direction of effects. Thus, we urge researchers to continue to investigate anger reactivity as influencing the development of behavior problems across multiple levels of analysis (e.g., molecular, neural, emotional, behavioral, environmental) transactionally in an effort to address this important area of developmental psychopathology research.

Surgency

Whereas inhibited children are biologically predisposed to experience high negative affect in response to novelty (García Coll et al., 1984; Kagan, 1997), another temperamental superfactor, surgency, and associated temperament type, exuberant, that is characterized by approach, rather than withdrawal, to novelty, and the high levels of positive affect, activity, and impulsivity that accompany approach has been identified. Historically, temperament research focused largely on negative emotionality, including fear and anger reactivity, difficult temperament, and behavioral inhibition. More recently, temperament constructs including positive reactivity and approach have become of interest to more researchers. This growing interest has been attributed at least in part to an understanding that some children are not simply low in behavioral inhibition but instead take pleasure encountering novelty (Polak-Toste & Gunnar, 2006). As noted earlier, varying research approaches have examined and defined the characteristics of these children. Rothbart's surgency superfactor has been used to label variations in approach to novelty (Gartstein & Rothbart, 2003; Rothbart, Ahadi, et al., 2001). Categories of children with these characteristics may also be labeled uninhibited or exuberant, depending on the methodology and/or perspective employed (Calkins et al., 1996; García Coll et al., 1984; Putnam & Stifter, 2005; Rothbart, Ahadi, et al., 2001). For the purposes of this literature review, we use the terms that were used in the studies reviewed but consider them very similar in conceptualization.

The growing area of research on surgent, uninhibited, and exuberant children has indicated that although these children display high levels of positive affect, which is typically thought to be an adaptive quality, they are at risk for developing later behavior problems, within the realms of both externalizing and internalizing behaviors (Putnam & Stifter, 2005; Rubin, Coplan, Fox, & Calkins, 1995; Schwartz, Snidman, & Kagan, 1996; Stifter et al., 2008). Concurrent associations between exuberance/surgency and externalizing behavior problems have been found in toddlers (Gartstein et al., 2012; Putnam & Stifter, 2005), elementary school children (Oldehinkel et al., 2004; Rothbart, Ahadi, et al., 1994), and adolescents (Muris, van der Pennen, Sigmond, & Mayer, 2008). There is also evidence for a longitudinal association between exuberance and externalizing behavior problems (Rothbart, Ahadi, et al., 2000). Stifter, Putnam, & Jahromi (2008) found that children identified as exuberant at age 2 were more likely to be rated as higher in externalizing behavior problems at age 4 than other children. Dollar and Stifter (2012) found that highly surgent children were more likely to show negative peer behaviors observed in the laboratory as well as higher parent-rated aggression than children lower in surgency longitudinally. In addition, Degnan and colleagues (2011) reported that a high stable exuberance profile over toddlerhood and early childhood was associated with higher ratings of 5-year externalizing behavior and disruptive behavior. This association was especially strong for exuberant children who showed left frontal electroencephalographic (EEG) asymmetry.

Exuberant children may also be at risk for developing internalizing behavior problems; however, this evidence is mixed. In one study (Stifter et al., 2008), exuberant children were not only more likely to be rated as high in externalizing behavior problems but also higher in internalizing behaviors than inhibited children. Some studies, however, suggest that exuberance may offset the risk for internalizing behavior problems. For example, low exuberance has been linked to depressive and anxiety disorders in toddlerhood (Dougherty et al., 2011). There are theoretical explanations for each of these associations, and the mixed findings could be the result of differences in measurement. As this area

of research is relatively new, additional research examining the associations between exuberance the development of internalizing and externalizing behavior problems is warranted. In addition, research examining specific types of externalizing behaviors that exuberant children are at risk for developing is greatly needed.

There has been a recent surge of interest in the developmental trajectories of surgent/exuberant children; yet there still is a dearth of research examining the moderating role of environmental factors, such as parenting behaviors, in affecting children's later psychopathology. The limited research that exists has largely examined the development of behaviors and deficits in skills associated with psychopathology. Root and Stifter (2010) found that high-approach children (similar to children high in surgency) showed higher levels of teacher-rated disruptive behavior in the classroom when they had mothers who reported high levels of punitive, dismissive responses to their children's negative emotions. Also, as previously mentioned, Kochanska and colleagues (Kochanska, 1991, 1995, 1997; Kochanska, Aksan, & Joy, 2007) have extensively examined the interaction between parenting behaviors and fearless children's (similar to exuberant children) behaviors in predicting the development moral and behavioral self-regulation, factors related to problem behavior (Calkins & Keane, 2004; Keenan & Shaw, 2003). Kochanska (1991, 1995) hypothesized that because the fear threshold is higher in fearless children, as compared to fearful children, gentle discipline would not induce enough fear arousal to foster self-regulated compliant behavior. However, simply increasing the applied pressure with these children, termed *power assertiveness*, was not associated with internalization of rules and standards for fearless children. Rather, Kochanska (1997) found that a mutually positive orientation reflected in shared positive affect or a secure attachment that optimizes positive motivation was more effective at promoting internalization and compliance with fearless children. Additional support has been found for the important role of parental warmth in promoting exuberant children's self-regulatory abilities in research showing that exuberant children whose mothers used commands and prohibitive statements coupled with a positive tone were more likely to show effortful control later in childhood (Cipriano & Stifter, 2010). Similarly, the development of self-regulation in exuberant children may depend on maternal attention-directing behaviors. Conway and Stifter (2012) found that exuberant children of mothers who helped themmaintain their attention during a problem-solving task developed better inhibitory control than exuberant children whose mothers did not use this attention strategy. Thus, early parenting behaviors appear to moderate child exuberance to predict important regulatory behaviors that protect against the development of problem behavior. Although this research is an excellent start in identifying important developmental processes in exuberant/surgent children, more research is needed to examine how these processes work together to affect development of behavior problems in these children.

Positive Emotionality

Despite the focus on negative emotions historically, interest in temperamental positive emotionality has grown and appears to be a promising link toward a greater understanding of children's trajectories toward mental health or alternatively dysfunction. In general, a predisposition toward childhood positive emotions, generally measured in terms of happy, cheerful mood, is thought to be adaptive, as it has been found to be related to peer competence and prosocial behavior (Denham, McKinley, Couchoud, & Holt, 1990; Eisenberg et al., 1996). Indeed, there is considerable research linking positive emotionality to adaptive developmental outcomes and lowered risk for psychopathology. For example, one study found that low-intensity positive emotionality exhibited during quiet and interpersonal situations was related to the ability to self-regulate emotion and behavior (Kochanska, Aksan, Penney, et al., 2007) while another study showed parent ratings of low-intensity pleasure to be negatively associated with both internalizing and externalizing behavior problems (Gartstein et al., 2012).

Additional support for the importance of positive emotionality in lowering risk of psychopathology comes from an expanding literature showing that *low* positive emotionality, as early as toddlerhood, is a risk factor in the development of depression. For example, low levels of positive emotionality in children have been linked with EEG asymmetries believed to characterize depressed adolescents and adults as well as to a history of depressive disorders in their mothers (Durbin, Klein, Hayden, Buckley, & Moerk, 2005; Shankman et al., 2005). Further, Dougherty and colleagues (2010) found that low positive emotionality at age 3 predicted depressive symptoms at age 10, after controlling for negative emotionality and depressive behaviors at age 3. Interestingly, these authors also reported that negative emotionality predicted depression only when children were also low in positive emotionality.

Although there is theoretical and empirical work outlining how positive emotionality in children promotes them as attractive social partners and serves as a protective

factor for children in the development of depression, positive emotionality also has been linked to maladaptive social and psychological outcomes (Putnam, 2012). For example, high-intensity pleasure has been linked to expression of anger/frustration from infancy through childhood (Putnam, Rothbart, & Gartstein, 2008; Rothbart, Ahadi, et al., 1994; Rothbart, Derryberry, et al., 2000). Further, empirical work has shown that children who show more intense joy and are quicker to show joy score lower on effortful control measures (Kochanska et al., 2000); laboratory observations of smiling and laughter predict later impulsivity and lower inhibitory control (Rothbart, Derryberry, & Posner, 1994). More specific to problem behaviors, Rothbart and colleagues (1994) found that infant smiling and laughter was related to parent-reported aggression at age 7. Rydell and colleagues (2003) reported that 5- to 8-year old children's positive emotionality/exuberance was related to maternal reports of children's externalizing behavior problems, whereas children's ability to regulate positive emotionality/exuberance was associated with lower externalizing behavior problems. It is important to note that positive emotionality, particularly at high levels of intensity, is a central defining characteristic of temperamental exuberance and surgency which has been linked repeatedly to the development of aggressive, externalizing behavior problems (Degnan et al., 2011; Stifter et al., 2008). It may be that the other characteristics of exuberance, such as approach to novelty, impulsivity, and activity level, together with high-intensity positive affect, contribute toward this risk for problem behavior rather than positive affect alone.

Although the area of inquiry regarding the developmental role of positive emotionality in children's later behavior problems is still in its early stages, there is some support for the role of environmental factors as moderating the association between positive emotionality and later behavior problems. For example, there is some evidence that low positive emotionality may be related to risk of depression and other behavior problems through environmental factors such as lower parental support, acceptance, and involvement (Branje, van Lieshout, & van Aken, 2005; Lengua & Kovacs, 2005). Further, maternal rejection has been shown to be more strongly associated with children's depression and conduct problems for children who were low in positive emotionality as compared to those who were moderate and high in positive emotionality (Lengua, Wolchik, Sandler, & West, 2000). Considered conversely, these results suggest that positive emotionality may be a protective factor for children in negative environmental contexts by buffering the harmful effects of less-than-optimal parenting (Lengua & Wachs, 2012).

Activity Level

Activity level has consistently been considered an important temperament trait (A. Buss & Plomin, 1975; Henderson & Wachs, 2007; Thomas & Chess, 1977). There are two central components to activity level, tempo and vigor, and it is commonly measured as the duration of energetic behavior, displacement of body movements, and rate and amplitude of speech and movement (A. Buss & Plomin, 1975). Generally, high activity is associated with externalizing behavior problems generally, as well as ADHD difficulties (De Pauw et al., 2009). Indeed, the relationship between temperamental activity level and ADHD is well established (J. White, 1999). For example, children with ADHD are rated significantly higher on activity than community children (De Pauw & Mervielde, 2010; Foley, McClowry, & Castellanos, 2008). Foley, McClowry, and Castellanos (2008) examined the associations between ADHD and child temperament dimensions in two groups of 6- to 11-year-old children: one group of children showing symptoms of ADHD and another group of children exhibiting no symptoms of ADHD. Children exhibiting high levels of ADHD symptoms (hyperactivity, impulsivity, and inattention) were rated as significantly higher in activity level than those with no ADHD symptoms. More specifically, temperamental activity was found to be related to the hyperactive-impulsive and combined types of ADHD but not the inattentive type (Stringaris, Maughan, & Goodman, 2010).

Activity level has also been considered as a core component of the surgency superfactor (e.g., Rothbart, Ahadi, et al., 2001). Indeed, activity level may underlie the link between surgency and externalizing behaviors. And, while high levels of activity characterize children with hyperactivity problems, it also characterizes children with disruptive behaviors (Nigg, 2006). However, children with high levels of activity are also likely to be more impulsive and distractible, which might blur the relation between activity and the development of ADHD and/or externalizing behavior problems.

Summary

Historically, temperament research focused largely on negative emotionality, including fear and anger reactivity, difficult temperament, and behavioral inhibition. More recently, temperament constructs, including positive reactivity and approach, have been of interest to more

researchers. Although still a relatively new phenomenon, it is now acknowledged that exuberance is not simply the "opposite" of behavioral inhibition, and research is needed to identify the unique behavioral and neurobiological qualities of these children. Children who are more likely to approach novelty, frequently labeled uninhibited, exuberant, or surgent, are characterized as high in positive affect, activity level, and impulsivity and low in shyness and withdrawal. Although these children display high levels of positive affect, which is typically thought to be an adaptive quality, they are at risk for developing later behavior problems.

Positive emotionality has also been considered as a separate temperament trait, not only as a component of temperamental surgency or exuberance. Indeed, multiple lines of research have shown the adaptive role of positive emotionality, including the development of self-regulation and lowering risk of depression. Yet the role of positive emotionality in children's developmental trajectories is not entirely clear as there is additional research linking this construct with maladaptive behaviors, such as externalizing behaviors and low self-regulation Low positive emotionality appears to be a risk factor for depression and other behavior problems, particularly when combined with negative parenting behaviors, such as low acceptance, and low involvement and negative parenting behavior may exacerbate the risk for psychopathology for children low in positive emotionality.

Investigations on the role of surgency, exuberance, positive emotionality, and activity level in relation to emotional and behavioral disorders are just now emerging, and the results are promising. Additional research examining the associations between exuberance/surgency and the development of specific types of externalizing behaviors, however, is greatly needed, as well as identification of which children are at risk for developing comorbid internalizing and externalizing behavior problems. Although there has been a surge of interest in the developmental trajectories of exuberant children, there is still a lack of understanding regarding the mechanisms involved in risk or protective factors for these children, including both environmental and innate factors of the child. Further, there has been a dearth of research examining the interaction between children's exuberance and their environment in the development of behavior problems. Finally, although there is some support for factors associated with lowering risk of developing behavior problems for exuberant children such as effortful control), research in temperamental exuberance is still very much in its infancy, and many questions still remain.

In addition, there is still much work needed regarding the role of positive emotionality as a protective or risk factor in children's development of behavior problems. Recent reviews of the research literature on temperamental positive emotionality have highlighted the importance of considering the type and/or intensity of positive emotion in understanding its relation in children's adjustment. Specifically, positive emotionality that is associated with strong approach behavior and/or is experienced in high-intensity contexts is hypothesized to be associated with problematic behaviors in the externalizing realm, whereas low-intensity positive emotions, such as contentment and affiliation, are more likely to be associated with the development of self-regulation and desirable social behaviors. More research to support this position, however, is needed before the risk and protective qualities of positive emotionality are fully understood.

Effortful Control

The construct of effortful control was introduced by Rothbart and colleagues (Rothbart, 1989; Rothbart & Ahadi, 1994; Rothbart & Bates, 2006) to describe the self-regulatory components of temperament. *Effortful control* is defined as the ability to inhibit a dominant response in order to perform a subdominant response, to detect errors, and to engage in planning (Rothbart & Bates, 2006; Rudea, 2012) and includes the dimensions of inhibitory control and attentional focusing/control. Because effortful control is voluntary and active, this temperament construct is differentiated from more reactive forms of regulation, fear reactivity and impulsivity (Derryberry & Rothbart, 1997). Effortful control is hypothesized to affect children's developmental trajectories by contributing to their ability to process information and modulate emotion and behavior. Whereas negative emotionality and surgency are associated with behavior problems, effortful control as a temperament factor is largely considered to protect children against maladaptive outcomes, including the development of psychopathology. Indeed, a high level of effortful control is the one temperament trait that has been most often linked to behavior problems by lowering risk (e.g., Eisenberg, Spinrad, & Eggum, 2010), and the evidence is quite strong and consistent (Eisenberg, Sadovsky, et al., 2005; Lengua, 2006; Lengua et al., 1998; Oldehinkel, Hartman, Ferdinand, Verhulst, & Ormel, 2007; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005; Spinrad et al., 2007; Valiente et al., 2003). There is also evidence that the role of effortful control as a protective factor persists into childhood (Muris et al., 2008) and adolescence (L. Ellis,

Rothbart, & Posner, 2004) by being negatively associated with anxiety, depression, and aggression.

Although low levels of effortful control are related to a host of problematic behaviors, empirical evidence suggests that it is most strongly related to the development of externalizing behavior problems, even after controlling for other cognitive and social risk factors (Olson et al., 2005; Valiente et al., 2003). For example, children with externalizing behavior problems were reported to have deficits in attentional and effortful control, in addition to high impulsivity, as compared to children with internalizing behaviors and control children (Eisenberg et al., 2009). Deficiencies in effortful control have also been observed in children with ADHD (see Barkley, 1997; Nigg, 2001; van der Meere 2002), a clinical disorder often associated with externalizing behavior problems. In a large-scale study of preadolescent temperament and problem behaviors, Oldehinkel et al. (2004) reported that low effortful control was the central temperament predictor of externalizing behavior problems, reporting an effect size greater than .50. Importantly, although this study used parent ratings for both temperament and behavior problems, confounding items were removed, and the strength of the relationship between effortful control and externalizing problems was not diminished, nor did it change when the researchers examined adolescents self-ratings of externalizing behavior.

The relationship between low effortful control and externalizing behavior problems has been found across time with the stability of relations also taken into account, indicating that change in effortful control is related to change in children's externalizing behavior problems (Belsky, Pasco Fearon, & Bell, 2007; Valiente et al., 2006). For example, attentional dysregulation predicted externalizing behavior problems at the next assessment for children at 54 months, first grade, and fifth grade, while controlling for previous levels of these constructs (Belsky, Pasco Fearon, et al., 2007). However, at ages 18, 30, and 42 months, researchers found no evidence for a causal relation between effortful control at one time point and externalizing behavior problems at a later time point. Instead, externalizing behavior problems preceded lower levels of effortful control, suggesting that externalizing behaviors may counteract any growth in regulatory abilities (Eisenberg, Spinrad, Eggum, et al., 2010).

Effortful control has also been linked to internalizing behavior problems; however, the association between these two constructs is not always clear. Some researchers have found that effortful control is negatively related to internalizing behavior problems (Eisenberg et al., 2001; Lengua, 2006; Martel et al., 2007; Oldehinkel et al., 2007). For example, parent report of low effortful control and observed attentional control during middle childhood was found to be related to greater internalizing behavior problems (Lemery-Chalfant, Doelger, & Goldsmith, 2008) whereas increases in effortful control over a 2-year period was associated with fewer internalizing behavior problems in preadolescence (Lengua, 2006). In contrast, others have found a positive relation between effortful control and internalizing behavior problems (Murray & Kochanska, 2002; Rydell et al., 2003), suggesting issues of overcontrol. Adding to the complexity of the relation between effortful control and internalizing problems are findings of a quadratic relation between effortful control and internalizing behavior problems (Murray & Kochanska, 2002). Specifically, in a normative sample, a quadratic relation was revealed between preschoolers' observed effortful control and parent-rated total problem behaviors (combined internalizing and externalizing behaviors). Follow-up analyses suggested that this association was because children with higher effortful control were rated by their mothers as higher in internalizing behavior problems than children with moderate levels of effortful control.

Some researchers have hypothesized that the more specific behaviors that make up effortful control (i.e., attention shifting/control, inhibitory control) might account for the mixed findings (Eisenberg et al., 2009; Klein, Dyson, Kujawa, & Kotov, 2012). As with the other temperament superfactors (e.g., negative emotionality, surgency), effortful control is heterogeneous, and the association between it and internalizing behaviors may depend on how effortful control is measured as well as the other innate aspects of the child. A study by Gartstein and colleagues (2012) found that attentional control was primarily responsible for the negative association between effortful control and internalizing behavior problems, especially given the lack of significant associations between inhibitory control and internalizing behavior problems. Interestingly, low attentional *and* inhibitory control have been associated with externalizing behavior problems in the toddler and preschool years (Gartstein et al., 2012; Hill, Degnan, Calkins, & Keane, 2006; Lemery et al., 2002; Spinrad et al., 2007) as well as later in childhood and preadolescence (Belsky, Bakermans-Kranenburg, et al., 2007; Eisenberg, Sadovsky, et al., 2005; Eisenberg et al., 2009). Thus, it appears that it is necessary to take a more fine-grained approach to examining the link between effortful control and developmental psychopathology.

The development of effortful control is very likely to be susceptible to environmental influences and parenting, especially during the preschool years, when children's

development of these abilities is growing rapidly (Lengua, Honorado, & Bush, 2007; Rothbart & Rueda, 2005). Further, effortful control may serve as a protective factor against maladaptive environmental influences, where children low in effortful control who also experience less-than-optimal environments may be at a greater risk of developing behavior problems than children with high levels of effortful control. Morris and colleagues (2002) found that there was an especially strong relation between mother hostility and children's externalizing behavior problems for children rated as low in effortful control. For children low in effortful control, positive parental control appears to buffer this risk (Karreman, van Tuijl, van Aken, & Deković, 2009).

Eisenberg, Cumberland, and Spinrad (1998) hypothesized that parents who are sensitive, warm, and express appropriate emotions are more likely to raise children with higher levels of effortful control, thereby lowering their chances of developing behavior problems. Empirical evidence has been found for this proposal by showing that children's effortful control mediates the relation between parenting behaviors and children's development of behavior problems. For example, the relation between maternal expressivity and later internalizing and externalizing behavior problems was mediated by children's effortful control (Valiente et al., 2006). In addition, Spinrad and colleagues (2007) found that concurrently at both 18 and 30 months, children's effortful control mediated the association between supportive parenting and externalizing problems. Evidence supporting the mediating role of effortful control in the association between various environmental factors and later behavior problems has also emerged. For example, chaos in the home when children were 3 years old was indirectly related to externalizing behavior problems 2.5 years later through children's inhibitory control at age 4 (Hardaway, Wilson, Shaw, & Dishion, 2012).

Summary

Effortful control, the self-regulatory aspect of temperament, defined as the ability to inhibit a dominant response in order to perform a subdominant response, to detect errors, and to engage in planning, is comprised of inhibitory control and attentional control. Effortful control is hypothesized to affect children's developmental trajectories by contributing to their ability to process information and modulate emotion and behavior. Whereas many other temperament traits are positively associated with behavior problems and psychopathology, effortful control is largely considered a protective factor against maladaptive outcomes. Indeed, there is extensive evidence to suggest that effortful control is negatively related to children's development of behavior problems, and this association is especially strong for externalizing problems. Effortful control has also been linked to internalizing behavior problems, but this association is not always clear. The research also indicates that effortful control may serve as a protective factor against maladaptive environmental influences, where children high in effortful control who experience less-than-optimal environmental experiences may be buffered against developing behavior problems and psychopathology. Although the research indicates that effortful control has a central role in maintaining a positive developmental trajectory, how this ability develops in light of the child's level and type of temperamental reactivity and what supports are needed for its development are still unclear. Several studies have indicated that parents are especially important to the child's developing self-regulation when these parenting behaviors vary according to the child's temperament. Research linking these processes to indices of behavioral adjustment and maladjustment are needed.

TEMPERAMENT × TEMPERAMENT INTERACTIONS

There are numerous possible patterns by which one temperament trait moderates the association between another temperament trait and children's psychopathology; however, although the amount of research is growing, relatively little has been conducted on this area of inquiry. Here we provide an overview of existing research on temperament × temperament interactions in predicting children's behavior problems.

Effortful Control × Temperament

Although research examining temperament × temperament interactions is still limited, there are a number of studies examining the moderating role of effortful control on the association between other temperament traits and developmental psychopathology (Rothbart & Bates, 2006). Indeed, effortful control commonly interacts with other temperament dimensions, such as negative emotionality and impulsivity, to predict behavior problems, especially within the externalizing realm (Eisenberg et al., 1996, 2004; Valiente et al., 2003). This association is to be expected since it is widely hypothesized that the purpose of the regulatory aspects of temperament is to modulate the

reactive aspects of temperament—especially because, as outlined earlier, unregulated reactivity frequently leads to maladjustment (Rothbart & Bates, 2006). This position is supported by a number of studies. For example, Muris, Meesters, and Blijlevens (2007) found that effortful control weakened the positive relation between negative emotionality and both internalizing and externalizing behavior problems. Likewise, Lonigan, Vasey, Phillips, and Hazen (2004) reported that highly negative children were at risk for developing anxiety difficulties only when they were also low in self-regulation. Researchers have also found that a negative association between effortful control and externalizing behavior problems was strongest for children with high levels of negative emotionality (Valiente et al., 2003); temperamentally negative children who exhibited better effortful control were less likely to develop behavior problems 4 years later. The moderating role of effortful control on the relation between negative emotionality and externalizing behavior problems has also been found with pre- and early adolescents (Oldehinkel et al., 2007).

Studies examining more specific forms of temperamental reactivity found that infants and toddlers high in anger and activity level and low in effortful control (measured with executive function tasks) were more likely to develop ADHD (Auerbach et al., 2008; Willcutt, Doyle, Nigg, Faraone, & Pennington, 2005). Additional support for interactive effect of anger and effortful control has come from a short-term longitudinal study of preschoolers (Diener & Kim, 2004). Results from this study indicated that children whose mothers rated them as easily frustrated and low on self-regulation (composite of low inhibitory control and high impulsivity) were rated by their teachers as being high in externalizing behaviors. Components of effortful control have also been investigated for their role in mediating or moderating the association between other temperament traits and the development of behavior problems. Sustained attentive behavior was found to moderate the association between temperamental anger and aggressive behavior problems in children (Kim & Deater-Deckard, 2011). Evidence for this association has also been found in adolescence (Oldehinkel et al., 2004), 2004). Deater-Deckard, Petrill, and Thompson (2007) found that the link between temperamental anger and later aggressive behavior was mediated by children's regulation of sustained attentive behavior, indicating a lack of effortful regulation. As can be seen, there is good evidence supporting the importance of effortful control in altering the association between anger/negative emotionality and externalizing behaviors; however, it is important to note that other researchers have failed to find evidence of these effects (Belsky, Friedman, & Hsieh, 2001; Rydell et al., 2003).

The moderating role of effortful control is also believed to be important for children at risk for developing internalizing behavior problems, although the association is not as strong as with externalizing behavior problems. Even though there are significant associations between these variables, the role of effortful control in moderating the association between fear/behavioral inhibition and internalizing behavior problems is mixed. Some research has indicated the protective role of high effortful control in lowering risk of developing internalizing behaviors. Oldehinkel and colleagues (2004) showed that adolescents displaying high fear and shyness and moderately low effortful control were high in internalizing behavior problems. Additional support for the moderating role of effortful control has come from Eisenberg, Shepard, Fabes, Murphy, and Gutherie (1998), who found that shy children who were low in attention shifting had greater internalizing symptoms, whereas children who were better at attention shifting showed discontinuity in these behaviors over time.

However, other studies suggest that inhibitory control, defined as the ability to effortfully inhibit behavior when necessary (Rothbart & Bates, 2006), is not always adaptive, particularly for behaviorally inhibited children. Children high in behavioral inhibition who also showed greater inhibitory control were more likely to be rated higher in social anxiety by their teachers (Thorell, Bohlin, & Rydell, 2004) and were more socially withdrawn (Fox & Henderson, 1999) than behaviorally inhibited children low in inhibitory control. More recently though, greater use of attention shifting was associated with a reduced risk of anxiety for behaviorally inhibited children whereas high levels of inhibitory control were associated with increased risk of anxiety (L. White, McDermott, Degnan, Henderson, & Fox, 2011). The authors and others have proposed that it may be critical for behaviorally inhibited children to be able to flexibly shift their attention to help regulate the negative emotions they experience in certain situations. Whereas inhibitory control may serve as an important regulatory ability for most children, heightened inhibitory control may be detrimental for behaviorally inhibited children. Behaving in a rigid, inflexible, and overly cautious manner in many situations may heighten their risk for anxious behaviors and hinder their chances of developing socially appropriate behaviors.

In sum, effortful control may serve a different role for behaviorally inhibited children in increasing or lowering risk of developing internalizing behavior problems, depending on how and which subcomponent of

effortful control (attentional control, inhibitory control) is measured in the study. This is an interesting and important avenue for future research. Research identifying the mechanisms underlying the relation among attention shifting, inhibitory control, and internalizing behavior problems, particularly in behaviorally inhibited children, is needed. The work of Perez-Edgar (Perez-Edgar et al., 2010; Perez-Edgar et al., 2010; Perez-Edgar et al., 2007) on the neural and genetic underpinnings of attention bias in behaviorally inhibited children who develop anxiety highlights a promising area for further study. Likewise, examining the developmental trajectories of both attentional control and inhibitory control in behaviorally inhibited children may increase our understanding of when and how these behaviors develop into anxiety.

Surgency × Temperament

Until recently, we knew very little about the explanatory mechanisms involved in exuberant children's development of aggressive and externalizing behaviors. Although few studies exist in this area, one leading hypothesis points to the role of exuberant children's predisposition toward anger reactivity. Because limits are frequently placed on attempts to approach aspects of their environment, exuberant children are more likely to experience intense reactions of anger when their goals are blocked (Derryberry & Reed, 1994; Rothbart & Bates, 2006; Rothbart, Derryberry, et al., 2000). Indeed, past research has shown that the greater the interest or positive affect experienced when engaging with the environment (e.g., toy, mobile, prize), the more anger expressed when the stimulus was not obtainable (Dennis, 2006; Lewis, Wolan-Sullivan, & Ramsay, 1992). Consequently, early confrontations in which rules of behavior are required may provide important opportunities for exuberant children to learn emotion regulation, a form of self-regulation. If they have not acquired this ability by childhood, exuberant children may be at risk for negative outcomes, such as externalizing behavior problems, as their inability to regulate emotions may cause them to act inappropriately in certain situations, even though at other times they are highly sociable and outgoing (Polak-Toste & Gunnar, 2006).

In support of this position, Stifter and colleagues (2008) found that exuberant children who displayed higher levels of negative emotion and lower levels of positive/neutral emotion to a disappointing situation were rated by their parents as having higher levels of externalizing and total problem behaviors than exuberant children who could regulate their emotional expression. Additional research has found that although highly surgent children are at risk for developing aggressive behaviors, the ability to use specific emotion regulation behaviors in a frustrating situation lowered this risk (Dollar & Stifter, 2012). In another study, children rated as high in surgency and low in self-regulation have been found to display higher levels of aggressive behaviors, which in turn was associated with peer rejection (Gunnar, Sebanc, Tout, Donzella, & van Dulmen, 2003). Taken together, these findings indicate that the development of emotion regulation, especially the ability to regulate anger, is a critical developmental task for exuberant children.

Neurobiological models of approach (e.g., Depue & Collins, 1999; Eysenck, 1967; Gray, 1987) suggest that high levels of approach behavior, such as that exhibited by exuberant children, must be offset by appropriate inhibitory mechanisms. Based on these models, exuberant children are hypothesized to require the ability to regulate their behavior as well as their emotions. Recent evidence suggests that aspects of developing effortful control processes are critical for exuberant children. Lahat and colleagues (2013) found that exuberant children were significantly more likely to show an increased risk-taking propensity, which is associated with various aspects of psychopathology, when they were low in attention-shifting abilities.

Finally, we have found initial evidence that although positive affect, even at intense levels, can be an adaptive trait for exuberant children, the combination of intense positive affect and high activity level in an engaging task put these children at risk for developing conduct problems (Dollar, 2011). These findings suggest that for exuberant children, intense positive affect when accompanied by other "disruptive" behaviors may be a marker for developing externalizing behaviors, likely because their intense excitement becomes too active and impulsive to control. Thus, in addition to learning to regulate anger, it is adaptive for exuberant children to develop the ability to regulate their often impulsive, active behavior.

Positive Emotionality × Temperament

The growth in research examining the role of positive emotionality in the development of psychopathology has produced several studies focused on the interaction between positive emotionality and other temperament traits. One study has shown that for toddlers low in negative emotionality, low positive emotionality was associated with higher rates of parental depression, a known risk factor for childhood depression (Olino, Klein, Dyson, Rose,

& Durbin, 2010). Additional support for the interactive role of positive emotionality and negative emotionality in predicting later depression has been found in research on asymmetry in resting EEG activity in frontal and posterior regions, which are putative biomarkers for depression. Specifically, results from this study found that children with low positive emotionality or high negative emotionality were at risk for depression (EEG asymmetry was used as a marker for depression) and that children low in positive emotionality and high in negative emotionality were not at a greater risk than those children with only one of these traits (Shankman et al., 2011). It is noteworthy that although low positive emotionality has been linked to the development of depression, more recent research has found a temperament × temperament interaction for anxiety. Behaviorally inhibited children who exhibited low positive emotionality were more likely to be diagnosed with anxiety (Dougherty et al., 2013).

More recently, we have been interested in the moderating role of activity level on the relation between individual differences in positive emotionality and the development of behavior problems (Dollar, 2011). Children who showed low activity and low positive affect when playing a game with their mothers were rated as high in social withdrawal; higher levels of positive affect for children low in activity significantly reduced the likelihood of being socially withdrawn. Although corresponding with much extant research showing that children low in approach and activity but high in negative affect and withdrawal are at risk for being socially withdrawn (García Coll et al., 1984), our findings considered positive as well as negative affect. Because much research has focused on the importance of children at risk for developing internalizing behaviors and social withdrawal to learn to regulate their fear (K. Buss, 2011; Fox, 1994), it is important that additional research substantiate these findings that increasing positive affect may protect children, particularly behaviorally inhibited children, from developing these problem behaviors.

Summary

An important area of temperament research that is slowly accumulating empirical evidence is that examining the association between temperament and psychopathology within the context of other temperament traits, or temperament × temperament interactions. Although there are numerous possible patterns by which one temperament trait moderates the association between another temperament trait and children's psychopathology, few studies have examined this area of inquiry. One exception is a fairly extensive literature outlining the importance of effortful control in lowering highly negative children's risk of developing behavior problems; this association is especially true within the externalizing realm. Further, there is much support for the interactive and additive effects of anger with other temperament traits, especially low levels of self-regulatory abilities, in predicting behavior problems. Additional research has considered how effortful control lowers the risk of developing anxiety problems for behavioral inhibited children. However, the findings indicate that different components of effortful control, attentional shifting and inhibitory control, are differentially associated with increasing or lowering the risk of developing anxious behaviors.

Another growing area of temperament × temperament research considers the developmental trajectories of children varying on their levels of surgency. Although this research is still in its infancy, one leading hypothesis points to the importance of anger regulation for highly surgent children in lowering their risk of developing aggressive, externalizing behaviors. Other recent research has presented support for attentional regulation as a critical developmental ability for surgent children to offset their risky behaviors. Another critical ability for exuberant children that has received recent empirical support is the capacity to regulate highly active, impulsive behavior when excited while preserving the positive affect, even at intense levels. Finally, although there has been limited research examining the role of positive emotionality, recent research points to the importance of considering it within the context of the related temperamental constructs of negative emotionality, behavioral inhibition, and activity level.

NEUROBIOLOGY LINKING TEMPERAMENT AND DEVELOPMENTAL PSYCHOPATHOLOGY

Contemporary theories of temperament emphasize a biological or genetic basis for temperament and often include it as part of the definition (Rothbart & Derryberry, 1981). The central tenet of A. Buss and Plomin's (1975, 1984) theory, for example, is that temperament is largely heritable, and behaviors must be present early in life to be considered a temperament trait. The work of Goldsmith and Campos (e.g., Goldsmith & Campos, 1982; Goldsmith, Campos & Lemery, 1997; Lemery et al., 2002) also considers early-appearing individual differences primarily in emotions and emotion regulation and provides empirical support from behavioral genetics research on temperament. Likewise, the research of Kagan and colleagues (e.g., Kagan, 2002; Kagan, Reznick, Clarke,

& Snidman, 1984; Kagan et al., 1988) on behavioral inhibition is strongly rooted in the premise that a child's heritable neurochemistry affects arousal in the amygdala and/or the bed nucleus of the stria terminalis and their projections, which is reflected in the child's withdrawal from novelty. Finally, Rothbart (Rothbart, 1981; Rothbart & Ahadi, 1994; Rothbart & Derryberry, 1981) has long argued that an integrated view of temperament requires temperament research to be conducted at the genetic, neural, endocrine, autonomic, and central nervous systems levels. Rothbart's model emphasizes the autonomic basis of both reactivity and regulation, in addition to the maturation of neutral pathways and brain structures associated with the development of children's regulatory behaviors.

The theoretical links between temperament and psychopathology, particularly the spectrum model, are strengthened by studies examining their shared neurobiological bases (Goldsmith & Lemery, 2000; Nigg, 2006). Alternatively, variations in biological functioning associated with temperament may make children more vulnerable to negative or aversive environments resulting in behavioral and emotional disorders which would support the vulnerability/predisposition model linking temperament to psychopathology (McCrory, DeBrito, & Viding, 2010). Studies testing the differential susceptibility hypothesis, for example, have shown that candidate genes associated with temperament, such as DRD4), interacts with various forms of parenting to predict maladaptive behavior (Bakermans-Kranenburg & van IJzensoorn, 2006). Unfortunately, to date, studies such as these are rare.

Although theories of temperament are based on the notion that individual differences in temperament are biologically based, it is critical that the environment is also acknowledged as serving an important role in the expression of temperament (Goldsmith et al., 1987). Recent perspectives have acknowledged that there is a transaction between biological processes and the environment beginning prior to birth and occurring throughout development, suggesting that temperament is a complex process of development (e.g., Shiner et al., 2012). For example, temperament is not only heritable but is affected by genetics later in development (Saudino & Wang, 2012). This review highlights the various levels of biological functioning that underlie temperament and its link to developmental psychopathology, but as outlined throughout, we encourage the reader to consider the joint workings of biology and the environment in affecting children's development.

Cardiac Measures

Assessments of cardiac functioning have a long history of serving as central biological measures applied to the study of temperament, and the research to date indicates that cardiac measures account for some of the variation in children's observed temperament. The most popular cardiac measures of heart rate, heart rate variability, RSA, and pre-ejection period (PEP), reflect to varying degrees activity in the autonomic nervous system (ANS). The ANS, primarily responsible for the physiological arousal related to emotions, is broken down into two branches: the PNS and the sympathetic nervous system (SNS), which function synergistically. The PNS is predominantly active during moments of relative calm and functions to sustain homeostasis for the individual. The SNS, however, is active during times of stress and produces elevated physiological arousal to assist the individual to respond to physical, psychological, and social challenges.

Research on cardiac measures and temperament has focused primarily on measures of the PNS, specifically RSA (sometimes called vagal tone). Porges (2001, 2003; Porges, Doussard-Roosevelt, & Maiti, 1994) has put forth the polyvagal theory, which posits that the development of children's ability to regulate their states, motor activity, and emotion is supported by the maturation of the PNS. More specifically, this theory proposes that parasympathetic influence on the heart by way of the vagus nerve enables flexible responses to varying demands of the environment and is therefore considered a marker of physiological regulation (Porges, 2007). Effective vagal functioning is thought to assist in maintaining homeostasis when the individual is faced with situational change or challenges by allowing attention to move from internal processes to environmental demands, thereby supporting social engagement and facilitating the ability to use coping strategies (Porges, 1992, 2007). Studies have demonstrated rather consistently that PNS functioning, as reflected in RSA, is associated with the regulation of attention, emotion, and motor behavior across development (e.g., Beauchaine, 2001; Beauchaine, Gatzke-Kopp, & Mead, 2007; Calkins et al., 2002; Porges, 2001, 2007; Porges et al., 1994; Stifter & Corey, 2001; Stifter & Jain, 1996). Two RSA measures are primarily used: baseline RSA and RSA change.

Baseline RSA is measured when a person is at rest and denotes the individual's characteristic level of arousal. As such, this measure may reflect temperamental reactivity since it is considered an individual's traitlike ability to engage with the environment. Several studies have demonstrated this relationship (Blandon, Calkins, Keane, &

O'Brien, 2010; Calkins, 1997). Higher baseline RSA has been found to be associated with parent and observer reports of greater negative reactivity to anger-eliciting stimuli and positive reactivity to joy-eliciting situations (Calkins, 1997; Calkins et al., 2002; Fox, 1989; Stifter, Fox, & Porges, 1989). Many studies also report high baseline RSA to be associated with other reactive as well as regulatory behaviors, such as approach toward a stranger, activity level, regulated distress in frustrating situations, and lower levels of aggression (Calkins, 1997; Calkins & Dedmon, 2000; Calkins & Fox, 2002; Porges, Doussard-Roosevelt, Portales, & Greenspan, 1996; Stifter & Fox, 1990; Stifter & Jain, 1996). Interestingly, these temperament behaviors are consistent with the surgent/exuberant temperament profile. Also, not surprisingly, several studies have found a link between baseline RSA and behavior problems. Beauchaine and colleagues (2007), for example, found that children diagnosed with clinically high levels of externalizing behavior problems had lower baseline RSA than matched controls. Other researchers have reported low baseline RSA to be related to greater symptoms of anxiety and depression (e.g., Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996). It is important to note that some studies do not find a relation between baseline RSA and internalizing and externalizing behavior problems (Calkins, Graziano, & Keane, 2007; Fortunato, Gatzke-Kopp, & Ram, 2013; Gentzler, Santucci, Kovacs, & Fox, 2009), suggesting that this relationship may be more complex and likely involves consideration of the context in which these problem behaviors develop.

Change in RSA, specifically decreases in RSA in response to a stimulus (vagal withdrawal), is proposed to be a physiological strategy to support regulatory behaviors because it assists the individual to transition from maintaining homeostasis to increasing cardiac output for the purposes of controlling emotional or behavioral responses without engaging the SNS (Calkins, Graziano, et al., 2007; Porges, 2007; Porges et al., 1996; Propper & Moore, 2006). Research examining the relationship between RSA change, temperament, and the development of behavior problems indicates that greater vagal withdrawal is most beneficial for children (Calkins & Dedmon, 2000; Calkins & Keane, 2004; Porges et al., 1996). For example, vagal (RSA) withdrawal during a challenging situation was associated with better regulation (Degangi, Dipietro, Greenspan, & Porges, 1991; Huffman et al., 1998; Stifter & Corey, 2001) and fewer childhood behavior problems (Calkins, 1997; Calkins, Blandon, Williford, & Keane, 2007; Calkins & Keane, 2004; Porges et al., 1996). This may be due in part to the relationship between greater vagal withdrawal and children's effortful control of attention and sustained attention (Calkins, Blandon, et al., 2007; Suess, Porges, & Plude, 1994). However, more recent research has shown that moderate levels of vagal withdrawal and vagal augmentation (increases in RSA from baseline) in some contexts are associated with more adaptive outcomes, such as better executive functioning (Marcovitch et al., 2010), better academic performance (Graziano & Derefinko, 2013), and social competence (Blair & Peters, 2003).

While there has been much research examining the role of PNS functioning in temperament and children's behavioral adjustment, much less work has been conducted regarding the association among various temperament traits, problem behaviors, and cardiac measures of SNS activity. The SNS is associated with the fight-or-flight response to stress (Cannon, 1929). Historically, SNS activity was largely measured by changes in heart rate or heart period (García Coll et al., 1984; Kagan et al., 1984, 1987a), but such measures are influenced by both the PNS and the SNS. For example, increases in heart rate may be due to parasympathetic withdrawal, sympathetic activation, or both. More recently, researchers have focused on PEP. PEP is the sympathetically mediated time between the beat of the heart and ejection of blood into the aorta and has been validated as a measure of sympathetic activity in adults (Berntson et al., 1994) and children and adolescents (Matthews, Salomon, Kenyon, & Allen, 2002; McGrath & O'Brien, 2001; Quigley & Stifter, 2006). Low SNS reactivity, as indexed by longer PEP in response to laboratory challenges, is associated with externalizing behavior problems in childhood (Beauchaine et al., 2007; Boyce et al., 2001; Crowell et al., 2006). Beauchaine, Katkin, Strassberg, and Snarr (2001) also found that decreased PEP reactivity distinguished adolescents comorbid for ADHD and CD from those with ADHD only and from controls. Low SNS activity is hypothesized to be a marker of externalizing disorders because children who are unable to mount a physiological response necessary to experience fear may have deficits in the development of conscience while generating autonomic arousal may protect at-risk children from developing behavioral disorders (Fowles, Kochanska, & Murray, 2000; Frick, Ray, Thornton, & Kahn, 2014; Raine, 1993). Supporting this contention are findings from a study we conducted examining the association between PEP and temperament. Highly surgent children who exhibited both higher sympathetic tone and greater sympathetic reactivity scored lower in problem behavior than those who were less sympathetically reactive (Stifter, Dollar, & Cipriano, 2011). Likewise, PEP measures of increased sympathetic reactivity have been associated

with toddler freezing behavior during interactions with a stranger (K. Buss, Davidson, Kalin, & Goldsmith, 2004).

As the PNS and the SNS operate together in supporting physiological arousal and responses to stress, models outlining the dynamic between these two systems have been proposed (Berntson, Cacioppo, & Quigley, 1991) and applied to psychopathology (Beauchaine et al., 2001; Berntson & Cacioppo, 2004). To date, only a few studies have examined activity in both the PNS and the ANS in children. For example, children with externalizing problems were found to have low reactivity in both branches (Boyce et al., 2001). Another study that used skin conductance as a measure of SNS activity (El-Sheikh et al., 2009), found that within the context of parental marital conflict children who exhibited co-activation (both PNS and SNS are reactive) or coinhibition (both branches are nonreactive) were more likely to develop externalizing behaviors. One possible mechanism for these findings is the ability to regulate emotion. For example, coinhibition was related to children's inability to regulate their emotion during a disappointment task (Stifter et al., 2011). Although promising, none of the current research has considered temperament and its association with childhood behavior problems. Following Beauchaine (2001), future research interested in the relationship between temperament and developmental psychopathology would benefit from examining the dynamic between both branches of the ANS.

Electrical Brain Activity

Another biological construct relevant to temperament is neural activation. Historically, most of this research has focused on the EEG of infants (e.g., Davidson & Fox, 1982; Fox & Davidson, 1988) and children (Schmidt et al., 1999). Davidson (2000) and Fox (1994) were among the first to investigate how frontal hemispheric asymmetries in EEG were associated with individual differences in temperament and emotional development. Contrary to the notion that left/right-hemispheric activation was related to positive and negative emotions, Davidson and Fox determined that early in development, left activation was associated with approach to novelty while right activation was associated with withdrawal (Davidson, 1992; Davidson & Fox, 1982; Henderson, Fox, & Rubin, 2001). Accordingly, much research has focused on EEG frontal asymmetries in inhibited and exuberant children. Researchers have repeatedly found inhibited children to have greater relative right frontal EEG activity (Fox et al., 1995; Fox, Schmidt, Calkins, Rubin, & Coplan, 1996; L. Schmidt & Fox, 1994). Interestingly, Henderson and colleagues (2001) found that negative reactivity predicted later behavioral wariness only when children also showed right frontal EEG asymmetry in infancy. There is also evidence that left frontal EEG asymmetry lowers inhibited children's risk of continued behavioral inhibition and social wariness (Degnan & Fox, 2007), which in turn may buffer the development of anxiety disorders. Even though most of this research has examined frontal EEG activity for behaviorally inhibited children, there is also some indication that exuberant children show greater relative left frontal activation (Calkins et al., 1996; Fox et al., 2001; Hane, Fox, Henderson, & Marshall, 2008) and that the association between temperamental exuberance and the development of externalizing behaviors may be especially strong for exuberant children who show left frontal asymmetry (Degnan et al., 2011).

Event-related potential (ERP), which is computed from ongoing EEG activity, assesses dynamic changes in brain activity by time-locking brain electrical activity when individuals are presented with specific stimuli. As with EEG research, ERP research has examined the association between various ERPs and temperamental fearfulness/inhibition. For example, fearful children of mothers with anxiety disorders showed smaller error-related negativity, a possible biomarker for anxiety, than other children (Torpey et al., 2013). McDermott and colleagues (2009) reported that children who were behaviorally inhibited showed enhanced error-related negativity responses as adolescents, and those behaviorally inhibited children with enhanced error-related negativity responses were at a greater risk of being clinically anxious. It is important to note that other ERP components, such as the N2, also have been shown to be associated with temperamental fearfulness/inhibition (e.g., Perez-Edgar & Fox, 2005b).

Functional Neuroimaging

Recent technical advances in neuroimaging have led to a number of studies examining neural structures and functioning underlying temperamental reactivity and regulation. The majority of these studies were performed with adult subjects, but some have been conducted with adolescents and have provided insight into the specific brain areas associated with temperament. Motivating much of this research is the relationship between temperament and psychopathology and the hypothesis of their shared neurobiological bases.

A growing body of empirical work linking temperament and neural functioning has focused on two main areas of the brain: the prefrontal cortex (PFC), including

the dorsolateral PFC, the ACC, and the orbitofrontal cortice, and the limbic structures, including the amygdala, hippocampus, and nucleus accumbens (Cloninger, 2000; Kagan, 2002; Posner & Rothbart, 2007; Whittle, Allen, Lubman, & Yucel, 2006). Negative affectivity, specifically fear and anxiety, is associated with activity in the amygdala and the hippocampus while the right dorsolateral PFC and the ACC are involved in the regulation of negative emotions (Whittle et al., 2006). The nucleus accumbens and ACC appear to be involved in positive affectivity. Effortful control/executive function and the attention system are consistently related to activity in the PFC (Posner & Rothbart, 2007). Although most of this research has been done linking adult personality with neural activation, promising new research has been conducted with adolescents and adults identified in childhood as belonging to a particular temperament type. A study of older children and adolescents with aggression (Stadler et al., 2007), for example, showed low activation in the ACC in response to expressions of negative affect compared to controls. Novelty seeking, which characterized the aggressive children, was also related to reduced activity in the ACC.

Increased activation of the amygdala to emotion faces in individuals with a history of childhood behavioral inhibition also has received significant attention and empirical support (Perez-Edgar et al., 2007; Schwartz et al., 2003). More specific to developmental psychopathology, a study linking amygdala function, behavioral inhibition, and internalizing disorders (Hardee et al., 2013) revealed amygdala-prefrontal (dorsolateral PFC and anterior insula) connectivity to be negative for angry faces (greater threat) in adolescents previously identified as behaviorally inhibited, which, in turn, was also related to more self-reported internalizing problems. In addition, negative fronto-amygdala connectivity moderated the relation between behavioral inhibition and internalizing disorders. Interestingly, older children and adolescents with callous-unemotional traits (including fearlessness) had reduced amygdala response to fearful faces and lower to negative fronto-amyglada connectivity (Marsh et al., 2008).

In summary, research in brain electrical activity and functional neuroimaging has provided some insight into the biology underlying individual differences in reactivity and regulation. However, the bulk of the research has come from studies on behaviorally inhibited children and their risk for anxiety disorders. As exuberant/surgent children are at risk for externalizing problems, more research on the neural correlates of this temperament type, such as the mesolimbic dopamine system, which is involved in reward processing, may give insight to the origins of this risk.

Psychobiological Measures of Stress

Individual differences in stress-related biological measures have also been associated with temperament. The hypothalamus is the neural center for stress responses. When a stress response is triggered, the hypothalamus sends signals to the pituitary gland and the adrenal medulla. Short-term responses are produced via the sympathomedullary pathway (SAM) while long-term stress is regulated by the hypothalamic-pituitary-adrenocortical (HPA) axis. Much of the research linking temperament to behavior problems have investigated the end product of the HPA system—cortisol. Whereas baseline levels of cortisol support the individual's ability to organize and complete fight/flight responses to threatening situations, the regulation of behavioral and sympathetic reactivity is facilitated by smaller elevations of cortisol (Gunnar, Kryzer, Van Ryzin, & Phillips, 2011). Thus, cortisol responses to stressor/challenges serve an important role in challenging situations, and individual differences in reactivity and regulation are believed to prompt variations in these biological responses.

Many researchers have hypothesized that behaviorally inhibited children have a lower threshold for distress and therefore produce more cortisol in response to challenge (Kagan, 1994; Rosen & Schulkin, 1998). In support of this hypothesis, higher levels of cortisol were found to be associated with greater shyness/fearful behavior in children (de Haan, Gunnar, Tout, Hart, & Stansbury, 1998; Kagan et al., 1987a; Watamura, Donzella, Alwin, & Gunnar, 2003). Researchers have also examined changes in children's cortisol over time while also considering the child's temperament. For example, Blair, Peters, and Granger (2004) reported that inhibited preschool-age children showed increases in cortisol across a laboratory visit, while exuberant children showed a drop in cortisol across this time period. Temperamental differences in changes in cortisol also appear across a longer period of time. Tarullo, Mliner, and Gunnar (2011) found that cortisol decreased from fall assessments to spring assessments for highly exuberant and average children but not for inhibited children.

However, the association between cortisol and temperament traits appears to depend on other factors, both internal and external. External contexts, such as parenting (Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996) and day care (de Haan et al., 1998) can affect the degree to which temperament and cortisol responsivity is linked. Indeed, individual characteristics, such as social competence, peer rejection, and emotion dysregulation,

are related to cortisol levels when measured in child care contexts (Dettling, Parker, Lane, Sebanc, & Gunnar, 2000; Gunnar, Tout, de Haan, Pierce, & Stansbury, 1997; Gunnar et al., 2003). The association between temperament and cortisol may also depend on other behaviors of the child. Gunnar and colleagues (2003) reported that exuberant children who were more aggressive and experienced greater peer rejection had higher cortisol levels, whereas exuberant children who did not show these maladaptive social behaviors had lower cortisol levels than children lower in exuberance. Tarullo and colleagues (2011) also found evidence that the social experiences predictive of changes in children's cortisol over time (across an academic year) was different for inhibited and exuberant children.

Links between HPA activity and problem behaviors have also been well established such that high levels of cortisol have been found in children with either type of internalizing behavior, anxiety or depression (Gunnar, 2001; Hastings, Fortier, Utendale, Simard, & Robaey, 2009; Lopez-Duran, Kovacs, & George, 2009), whereas children with externalizing problems or disruptive behavior disorders have lower cortisol levels before and after challenging events (Fairchild, Van Goozen, Stollery, & Goodyer, 2008; Hastings et al., 2009; van Goozen, Fairchild, Snoek, & Harold, 2007). A few studies have examined the role that both temperament and cortisol reactivity have in predicting problem behaviors; the findings suggest that gender plays a significant role in this developmental process. Hastings and colleagues (2011) found that inhibition and prolonged elevations of cortisol were linked to internalizing behaviors, but only for girls. In another study, chronic inhibition, which was associated with adolescent anxiety disorder, was predicted by both earlier behavioral inhibition and high levels of cortisol, but only for girls (Essex, Klein, Slattery, Goldsmith, & Kalin, 2010). Interestingly, Perez-Edgar, Schmidt, Henderson, Schulkin, and Fox (2008) found a similar relationship for boys in that high levels of cortisol and high negativity in infancy were related to internalizing behaviors and social reticence in 4-year-old boys.

One end product of stimulation of the SAM is salivary alpha-amylase (sAA), a digestive protein found in saliva and responsive to psychological and physical stress. Similar to cortisol, sAA levels change in response to challenges and stressors presented to the individual but occur in less time because of its short-term flight/fight function. As such, sAA has been used as a surrogate marker of SNS activation. However, only recently have studies examined the link between sAA and children's temperament and problem behavior. Spinrad and colleagues (2009) reported that parent ratings of temperamental anger, impulsivity, and externalizing behaviors were negatively associated with sAA reactivity, whereas regulation was positively associated with sAA, especially for girls. In another study on toddlers, high levels of baseline sAA were related to observed positive affect and approach, and the highest levels were found in toddlers rated high in both positivity and approach (Fortunato, Dribin, Granger, & Buss, 2008).

Because both sAA and cortisol are used to assess stress, researchers have turned to examining how they interact to affect individual differences in behavior (El-Sheikh, Erath, Buckhalt, Granger, & Mize, 2008; Gordis, Granger, Susman, & Trickett, 2006; Keller, El-Sheikh, Granger, & Buckhalt, 2012; Kivlighan & Granger, 2006). For instance, high sAA and low levels of cortisol predicted higher aggression in young adolescents, whereas high sAA and high cortisol predicted internalizing behavior problems (Gordis et al., 2006). El-Sheikh and colleagues (2008) also found that school-age children had increased risk of internalizing behavior problems when they had high levels of cortisol and high sAA. Although promising, research that has examined sAA, temperament, and developmental psychopathology is not conclusive, and we await further findings.

Genetic Measures

The heritability of temperament traits is an important part of most temperament models and research. Indeed, at least one temperament model rests on evidence that temperament traits are sufficiently heritable to be included in the model (A. Buss & Plomin, 1975, 1984). Quantitative behavioral genetics research, which uses twin and adoption study designs to decompose the observed variance of a temperament trait into genetic and environmental variance, has provided strong support that many temperament traits have a genetic basis. Temperament traits such as activity level (Saudino & Eaton, 1991; A. Wood et al., 2007), anger/frustration (Goldsmith, Buss, & Lemery, 1997; Goldsmith & Gottesman, 1981), behavioral inhibition/shyness (Eley et al., 2003; Emde et al., 1992; Smith et al., 2012), and effortful control (Gagne & Saudino, 2010; H. Goldsmith, Pollak, & Davidson, 2008) have been investigated for the genetic effects, and evidence has been found across development. Based on eight twin studies, Goldsmith et al. (2008) suggest that individual differences in children's effortful control are at least moderately heritable. Although estimates of heritability vary across studies and traits, the evidence indicates that genetic differences account for approximately 20% to 60% of the variability in temperament within the population (Saudino & Wang, 2012).

Several studies have shown shared genetic influence between temperament and measures of problem behavior (Goldsmith & Lemery, 2000; Saudino & Wang, 2012). For example, observed inhibitory control is genetically linked to externalizing problems (Gagne, Saudino, & Asherson, 2011) while genetic influence explained about 94% of the association between emotionality and internalizing problems (Schmitz et al., 1999). As noted, these findings lend support to the spectrum model linking temperament to the development of psychopathology (Tackett, 2006).

Quantitative genetic research also focuses on how the environment influences the expression of temperament traits. Although much of the research shows that shared genes, not shared environments, account for similarity in temperaments (e.g., Gagne, Saudino, & Cherry, 2003; Lemery-Chalfant et al., 2008; Mullineaux, Deater-Deckard, Petrill, Thompson, & DeThorne, 2009), findings indicate that shared and nonshared environmental effects may influence the expression of temperament. For example, differential treatment by parents may affect differences in siblings' expression of shyness and activity level (Saudino, Wertz, Gagne, & Chawla, 2004). Further, although rare in temperament research, evidence of shared environmental effects for temperamental positive affect (Gagne, Vendlinski, & Goldsmith, 2009; Goldsmith, Lemery, Buss, & Campos, 1999; Goldsmith et al., 1997;) has emerged. Thus, environmental differences within and between families are important in understanding the genetic bases of temperament (Saudino & Wang, 2012).

Recent developments in molecular genetic techniques now make it possible to identify specific genes associated with various temperament traits with the understanding that no one gene is responsible for individual differences in reactivity and regulation. Thus far, molecular genetics research has identified several candidate genes related to temperament with the genes regulating dopamine and serotonin the most commonly studied genes. The dopamine genes, DRD2, DRD4, and DAT1, for example, have been implicated in reward sensitivity and novelty seeking. Genes regulating serotonergic functioning, such as the 5-HTT gene, are involved in the regulation of emotion and mood. A number of studies examining these candidate genes in samples of infants, toddlers, and children have found support for these functions; however, an equal number found null or opposing associations (see Saudino & Wang, 2012, for a review). Importantly, some of the genes associated with temperament are often those associated with clinical disorders, such as the relationship between DRD4 and ADHD (Faraone et al., 2005).

As noted, the relationship between these candidate genes and temperament is not monotonic; other genes likely work together to explain variations in temperament. Further, environmental or experiential influences appear to affect the expression of temperament for children possessing certain genes. For example, Sheese, Voelker, Rothbart, and Posner (2007) found that quality of parenting interacted with the 7-repeat allele of the DRD4 gene to affect children's activity level, sensation seeking, and impulsivity. In another study, the short 5-HTT allele was associated with behavioral inhibition, but only for those who experienced low maternal support (Fox et al., 2005). Along these same lines, Moffitt, Caspi, and Rutter (2006) have skillfully proposed that gene × environment effects are a major determinant of psychopathology and suggest a number of strategies to test this hypothesis.

Summary

Noninvasive electrophysiological and neuroimaging procedures such as electrocardiography, EEG, ERP, functional magnetic resonance imaging, and cortisol/alpha amylase assays with infants, children, and adolescents have provided insight into the biological link between temperament and psychopathology. Notably, when taken together, the findings appear to coalesce around physiological changes that characterize fearfulness, behavioral inhibition, and anxiety. High heart rate, low resting RSA, greater cortisol reactivity (particularly when paired with higher levels of sAA), right frontal hemispheric asymmetry, and enhanced amygdala activation have been consistently found in fearful children, supporting Kagan's (1994; Kagan & Fox, 2006; Kagan et al., 1984) long-held hypothesis that a low threshold for physiological arousal is a central characteristic of behavioral inhibition. Although less studied, fearless, more approach-oriented, and reward-sensitive children have been found to exhibit low heart rate, less sympathetic reactivity, and greater left frontal activation. Recently, Miskovic and Schmidt (2012) proposed a lateralized brain-body emotion model to integrate these findings and apply them to temperament, specifically fearfulness. Central to this model is the lateralization of central and autonomic function underlying approach-withdrawal whereby the right hemisphere has an excitatory role whereas the role of the left hemisphere is to generate inhibitory responses. Support for this model comes from studies in adults examining at least two biological systems, such as EEG and RSA. Few studies have been done with children, but with the availability of child-friendly, noninvasive techniques and models to test, research in

temperament and psychopathology needs to advance toward considering genetic and multiple physiological levels of analysis.

FINAL REMARKS: SUMMARY AND FUTURE DIRECTIONS

Currently there is little doubt that temperament makes up a considerable part of what the children bring to bear on their own development, including the emergence of emotional and behavioral disorders (Zentner & Shiner, 2012). Whether through extremes in temperamental reactivity or in interaction with proximal and distal contexts that increase the risk of psychological maladjustment, the influence of temperament on the development of psychopathology has been grounded in strong theoretical models and supported by empirical investigations. The recent surge in studies investigating the developmental pathways from temperament to psychopathology using sophisticated methods, multiple levels of analyses, and diverse samples has significantly improved our understanding of the processes by which a child's individual differences in reactivity and regulation directly and indirectly impacts his or her mental health outcomes. Despite this progress, there still remain methodological issues and knowledge gaps that need to be addressed. Next we summarize the findings, highlight the issues, and propose directions for future research.

Existing research has revealed relatively consistent, moderate associations between children's behavior problems and a variety of temperament factors, styles, and traits; yet there is evidence that the association between some temperament traits and behavior problems is stronger than others, such as with effortful control. Further, and as might be expected, some temperament factors/styles/traits are more strongly associated with behavior problems within the externalizing realm than the internalizing realm or vice versa. For example, high levels of anger/frustration are more likely to be related to externalizing behaviors whereas greater sadness and fear reactivity are more consistently related to internalizing problems. There are, however, several caveats to this conclusion that warrant caution and indicate the need for more research.

The temperament factor of negative emotionality has been shown to have a relatively strong association with both internalizing and externalizing behaviors. However, negative emotionality is composed of different forms of negative reactivity, each of which differs by underlying motivations and emotions (Barrett & Campos, 1987). Indeed, the finding that negative emotionality predicts both broad bands of behavior problems highlights this issue. The same could be said about difficult temperament, which has already been deemed a questionable construct. Taking a more fine-grained approach that examines specific temperament traits is recommended. By examining the link between lower-order traits and behavioral and emotional disorders, we can focus on the processes by which children develop psychopathology and achieve more precision and better predictability. We know, for example, that parents can distinguish their children's emotions in early infancy (Source & Emde, 1982). Thus, we might expect fear and anger reactivity to evoke differential parent responses, some of which may not be sensitive to the emotional reactivity of the child (e.g., ignoring fear, disciplining anger harshly). Overtime these interactions may lead to diagnosable emotional and behavioral disorders. We encourage researchers in developmental psychopathology to consider lower-order temperament traits and use theoretical models and supportive research to guide their choice of trait for inclusion in their models.

It is well understood that the environment within which children develop has a significant and long-lasting impact on their cognitive, social, and emotional outcomes even before birth. Thus, when investigating the role of temperament in the development of psychopathology, researchers have considered carefully the conditions and contexts within which the child's temperament operates and its effect on adjustment. Not surprisingly, the majority of studies reviewed focused on the parenting environment. Overall, the research indicates that negative parenting behaviors, such as intrusiveness and harsh discipline, seem to exacerbate the maladaptive effects of some temperament traits (i.e., negative emotionality) in the development of behavior problems. However, potentially poor outcomes can be tempered by positive parenting behaviors, such as warmth and sensitivity, in some cases to the point of developing the fewest problem behaviors among comparable children.

Despite the accumulating evidence that the parenting environment in interaction with a child's temperament increases or decreases the risk for the development of psychopathology, there are a number of gaps in the research. Few studies, for example, have examined the transactional process that exists between children's temperament and aspects of the environment across early development despite the strong theoretical frameworks and statistical applications to guide and support such work. Research on other aspects of the environment is also needed. Other proximal processes, such as family stress or

child maltreatment, that may be mediated or moderated by temperament to increase risk of psychopathology should be examined. Likewise, investigations of adverse contexts, such as poverty and neighborhood risk, are likely to demonstrate both the risk and resilience of temperament traits (Lengua & Wachs, 2012). Indeed, if a researcher is considering broad risk factors such as socioecomonic status, parent mental health, or trauma as they relate to the development of psychopathology, taking into account the child's temperament will determine to some degree whether these factors lead to either emotional and behavioral disorders or normal adjustment by way of the child's perceptions and responses to these environmental conditions.

A review of the current research indicates that certain temperament traits/factors appear to also serve a protective role. Although there is still limited research examining this area of inquiry, one important exception is the number of studies that have demonstrated the role of effortful control in lowering highly negative children's risk of developing behavior problems, especially within the externalizing realm. This protective role is not surprising, given the central role of self-regulation in all developmental domains. Likewise, recent research on the temperament trait of positive emotionality suggests that under certain conditions (e.g., without accompanying disruptive behaviors or when paired with low negative emotionality), greater positive emotionality can protect against both internalizing and externalizing behavior. Although these data may be seem obvious, given the number of social, cognitive, and physical outcomes associated with this trait, a growing number of studies have linked high-intensity positive affect with problem behaviors, particularly as part of the exuberant type.

Continued study of temperament × temperament interactions with effortful control and positive emotionality may elucidate what combinations of characteristics put a child at risk for problem behaviors. For example, in exuberant children, do high levels of positive emotionality combined with impulsivity in particular contexts increase risk of behavior problems, such as when presented with highly novel, exciting stimuli? Or do high levels of effortful control counteract the risk conferred on children characterized by high-intensity pleasure? There is some indication that emotion regulation is important for exuberant children's behavioral adjustment (Stifter et al., 2008), but more research is needed to examine the regulation of positive affect. The work of Klein and colleagues (Dougherty et al., 2010; Klein et al., 2011) has also implicated low levels of positive emotionality in childhood depression. All children have the capacity to feel positive emotions. Future studies might examine the conditions under which these children feel and express positive affect and whether, for example, parent up-regulation of the child's positive emotion reduces the risk of depression. Given that the examination of the link between positive emotionality and developmental psychopathology is a relatively new area of research and the findings are mixed, more studies are needed to investigate how variations in positive affect intensity, the contexts in which positive emotions are elicited, and the underlying motivations for the experience of positive emotions contribute to developmental psychopathology.

More advanced statistical modeling supports new innovative methods for examining the association between temperament and the development of psychopathology, which we have highlighted in our review of the literature. For example, studies taking a person-oriented approach have used latent profile analysis to create children's temperamental styles. This technique has advanced the grouping of children based on similar characteristics from the more simplistic extreme group approach and the somewhat problematic cluster analysis, which relies on more arbitrary criteria for classification (Vermunt & Magidson, 2002). Latent growth curve modeling has been applied to longitudinal data to examine how temperament affects trajectories of behavior problems over time. This method may be useful in testing the *pathoplasty/exacerbation* model which proposes that personality will affect the course, severity, and presentation of a disorder. According to Tacket (2006), this model has not been tested due to the methodological challenges of measuring personality before the emergence of a disorder. If we accept that temperament forms the basis of personality (Caspi & Shiner, 2012) and that a number of clinical disorders presented in adolescence are predictive of adult psychopathology, then the field of developmental psychopathology is prepared conceptually and methodologically to take up this challenge.

Researchers are increasingly implementing multiple measures in their studies of temperament. Importantly, observational and biological measures are becoming more widely incorporated into studies investigating the association between temperament and developmental psychopathology. Yet there is still room for advancement. We strongly encourage future research to consider multiple indicators of temperament across multiple levels of measurement (biological, parent report, behavioral) in single studies. A number of advanced multivariate statistics, such as structural equation modeling, can be used to address the use of multilevel, multi-informant designs.

Although improved statistical analyses encourage the use of multiple methods, much of the current research continues to rely on parent ratings of both children's temperament as well as their problem behavior. The reliance on parent report for both measures of temperament and behavioral problems introduces error into the results by way of parental bias. Although there are many advantages to using parent report, research has clearly demonstrated that other factors, particularly related to the reporter, influence parent ratings of temperament. Controlling for these variables is important but not considered in a number of the studies reviewed. Future research needs to counteract the biases in parent ratings by obtaining reports from others close to the child, such as another parent or child care worker, by including observational measures of temperament, or by obtaining ratings of problem behavior from a number of informants.

Further, several studies have examined the overlap among the instruments measuring both temperament and behavior problems and found that after removing similar items, the relationship between the two constructs was attenuated but remained significant. Research following this discovery, however, has not followed suit, with the majority of studies neglecting to remove the confounding items, thus inflating the relationship between temperament and problem behaviors. For researchers who rely solely on parent report of both temperament and behavior problems, such as in studies using large community samples, removing the confounding items is highly recommended as it is essential to the integrity of the findings.

Another methodological issue that limits interpretation is that the majority of the studies reviewed were conducted with community samples. In many cases, the results linking temperament with problem behavior did not have sufficient numbers of children meeting the criteria for diagnosable externalizing or internalizing clinical disorders. Thus, it is not clear to what extent temperament, even at extreme levels, influences the development of psychopathology. Future research needs to take the next step toward conducting studies that either target children at risk, such as children of depressed mothers (e.g., S. Goodman et al., 2011), or children living in violent homes (e.g., Towe-Goodman, Stifter, Coccia, & Cox, 2011), to increase the chances of finding children with clinical disorders, or use large and diverse community samples that produce sufficient numbers of children with diagnosable levels of behavioral or emotional problems to ensure power to test hypotheses linking temperament to psychopathology.

TRANSLATIONAL IMPLICATIONS

We end this chapter with a brief discussion of the translational implications of temperament for the field of developmental psychopathology. Temperament research emerged out of a clinical tradition; however, the application of what we have come to learn about temperament and behavioral adjustment to practice has not advanced. Only a handful of interventions focused on temperament have been conducted with the aim of reducing behavioral and emotional disorders. However, many of the methodological issues found in the studies reviewed in this chapter are also evident in these programs (McClowry, Snow, Tamis-Lemonda, & Rodrigues, 2010; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2010). Nonetheless, the research findings from the studies we reviewed in this chapter are informative in terms of understanding the developmental pathways toward clinical disorders as well as informing preventive interventions.

One way to conceive of the role of child temperament in the development of psychopathology is as a risk or protective factor. Risk is a probabilistic concept that defines the likelihood that certain individual or contextual characteristics will contribute to the development of a negative outcome. Protective factors are those characteristics that reduce the impact of risk (Lengua & Wachs, 2012). The developmental impact of a risk factor will depend on a number of circumstances, including whether the child is exposed to other risks, the context within which the risk occurs, and whether there are protections against the risk. Thus, certain temperament traits can be either a risk (e.g., negative emotionality) or a protective factor (e.g., effortful control), as the current review has highlighted. In addition, a temperament trait or style may be a risk factor in some contexts or during some developmental periods but not others. For example, anger reactivity, particularly during the preschool period, is associated with externalizing behaviors, but anger in infancy is adaptive in that it communicates the child's emotional state and elicits caregivers to change the situation (Stifter & Fox, 1990). Treating temperament traits or styles as risk or protective factors implies that it has a translational function.

The findings of the most current research in temperament and psychopathology indicate that extremes in the temperament traits that define behavioral inhibition may be a risk factor for internalizing problems generally and anxiety specifically, supporting the spectrum model. Importantly, the data suggest that it is not just the presence of extreme behavioral inhibition in early childhood that denotes risk likely because many behaviorally

inhibited children tend to move out of that class due to the development of regulatory strategies or other moderating influences. Rather, if a child remains behaviorally inhibited across early childhood, he or she will most likely develop internalizing problems or anxiety. This conclusion is supported by research on the biological indices underlying behavioral inhibition and anxiety, such as right hemispheric activation, as well as the processes through which such children may develop anxiety disorders (e.g., attention to threat). If stable behavioral inhibition is a risk factor, then mental health programs aimed at preventing the development of internalizing disorders in children might select those characterized by high behavioral inhibition over time and focus their interventions on processes that decrease the risk of psychopathology, such as parenting or self-regulation. A handful of interventions with behaviorally inhibited children have been conducted aiming the intervention on parenting behaviors hypothesized to attenuate the risk for anxiety (LaFreniere & Capuano, 1997; Rapee et al., 2010). Although somewhat successful in the short term, the children were classified based on a one-time assessment of behavioral inhibition as preschoolers. Drawing from the research reviewed, the interventions may have been more successful if the researchers had further limited their intervention group to those children who were stable in behavioral inhibition from earlier in childhood.

Taking an extreme group approach to understanding risk for developmental psychopathology may be especially informative for practice with the behaviorally inhibited type; however, most research on other temperament traits and styles supports the vulnerability model's proposed pathways to developmental psychopathology. The vulnerability model differs from the spectrum model in that it makes a distinction between temperament and psychopathology. And while it proposes that individual differences that make up temperament and personality are risk factors for particular clinical disorders, it includes the potential for the interaction with environmental factors to increase risk. We would also add that based on the research reviewed here, combinations of temperament traits found in temperament × temperament interactions increase the risk of or provide protection against the development of psychopathology.

Understandably, parent behavior, personality, and mental health have been the focus on much of the research testing the vulnerability model. Parents are particularly important in providing the context within which developmental tasks are accomplished. Likewise, depending on the type of behavior they exhibit in response to their child's emotions and behaviors, parents may influence whether the child's developmental trajectories are positive or negative. Negative parent behaviors, such as harsh discipline or poor parent mental health, are risk factors for child behavior problems, but when those behaviors are combined with children who are high on negative emotionality and more specifically anger reactivity, which are also risk factors, then the likelihood of the child being viewed as problematic increases. Many preventive interventions aimed at reducing externalizing problems select parents and children who are identified as "at risk" due to such factors as parent psychopathology, income level, or abusive history. Understanding that temperament may add to such risks via how children perceive, react to, and subsequently evoke parental responses could be helpful in creating more selective interventions. For example, low-income parents who are easily frustrated may respond to their highly active, impulsive, surgent child with negative control. Such parenting behavior has been shown to be ineffective with surgent children, increasing their risk of developing externalizing behaviors. Selective interventions that target high-risk parents (low income, easily frustrated) with surgent children may be more effective than an intervention program that targets just the family/parent characteristics.

Finally, we consider the implications of temperament × temperament interactions in the development of psychopathology. The research has clearly demonstrated that effortful control which emerges at the end of the first year of life through the preschool years is important to the regulation of temperamental reactivity. Thus, children who have poor effortful control will exhibit high levels of negative or even positive reactivity that can lead to behavior problems. These findings support current preventive interventions that focus on improving self-regulation or effortful control. However, the evidence also suggests that effortful control may not be a protective factor for the behaviorally inhibited child, demonstrating the importance of considering the child's temperament when designing preventive interventions.

Positive emotionality may also act as a protective factor for other temperament traits. The findings indicate that high positive affect may attenuate the risk of negative emotionality and high activity level. For example, exuberant children, perhaps through their high active, impulsive behavior, may be at risk for problem behaviors, but the negative effects of these behaviors may be counteracted by their positive emotionality and approach orientation. According to Fredrickson's (2001) Broaden and Build theory, positive affect builds social, cognitive, and physical resources that individuals can draw on to cope with aversive situations. Exuberant children, therefore, may have

protective factors within their own group of characteristics. Positive emotionality has a significant impact on all developmental domains, making it an excellent target for interventions, in particular universal interventions that are geared toward all families regardless of risk. Up-regulating positive emotions and learning to use them to cope with aversive events (positive reappraisal) may prove to be very effective in preventing the development of behavior problems.

CONCLUSION

Historically, temperament has been proposed to have a significant influence on the development of psychopathology. Recent improvements in the conceptualization and measurement of temperament and the progress made by studies examining the biological and genetic underpinnings of temperament have enabled researchers to test several proposed models of psychopathology. Overall, the findings are promising and support the notion that, through their individual differences in reactivity and regulation, children contribute to their own development, including their risk for emotional and behavioral disorders. Although the role of temperament in child development is no longer debatable, the degree to which temperament negatively and positively affects maladaptive outcomes and the explanatory mechanisms through which it makes its impact still requires further study.

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CHAPTER 12

Interparental Conflict and Child Adjustment

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INTRODUCTION AND HISTORY

Scientists and practitioners have long acknowledged that the quality of the parents' marital relationship affects children's development. For example, at the 1929 meeting of the American Orthopsychiatric Association, Towle (1931) discussed the importance of evaluating the marital relationship of potential foster parents, arguing "since a well-integrated marital situation affords the maximum possibility for well-adjusted children, it is essential that one understands the emotional life of the parents" (p. 281). A few years later, Hubbard and Adams (1936) concluded from an examination of case records from a child guidance clinic that parents' relationship to each other is among a handful of factors frequently found to have a bearing on the development of child problems. However, it was not until the 1970s that efforts to understand the link between marital functioning and child adjustment sharpened.

This shift toward the systematic study of effects of marital functioning on children's development was prompted by several factors. Chief among these was the rising divorce rate in the United States, which stimulated research to better understand how parental divorce affects children. One conclusion that emerged from this research was that children's adjustment was determined more by the parents' conflict with one another than by the divorce itself (R. E. Emery, 1982). The burgeoning family therapy movement during the 1960s and 1970s also prompted interest in the link between marital and child functioning. A primary tenet of family systems theories is that individual family members are inextricably rooted in a larger family context that influences their thoughts and actions, and it was explicitly asserted that parents' marital dissatisfaction could stimulate and maintain adjustment problems in their children (Satir, 1964). Some speculation about this was quite bold. For example, published articles referenced the

assertion that "whenever you have a disturbed child, you have a disturbed marriage" (Framo, 1965, p. 154), and this tenet was commonly accepted by adherents to family systems theory.

There was also growing recognition among researchers outside of the family therapy movement (e.g., behavior therapists) that marital discord could adversely affect child adjustment and that clinicians might be able to enhance the effects of behavior therapy for children by attending to the parents' marital relationship (Oltmanns, Broderick, & O'Leary, 1977; Patterson, Cobb, & Ray, 1973). In addition, during this time, well-designed empirical studies were also beginning to identify marital discord as a potentially important determinant of child adjustment problems. For example, in a large community sample, Rutter (1971) found an unhappy marriage to increase risk for child conduct problems, even after controlling for other potential risk factors.

During the latter part of the 1970s and the 1980s, research on marital functioning and child adjustment expanded considerably. Much of this research focused on answering some variation of the general question of whether there was a reliable association between parents' marital functioning and children's adjustment. Collectively, these early studies helped document the strength, robustness, and generalizability of the relation. It became clear that marital discord was indeed associated with child adjustment problems, in clinical as well as in nonclinical samples, across a very wide age range of children and across a variety of indices of marital functioning and child adjustment. Although the magnitude of the association between parents' marital functioning and child adjustment varied across studies, statistically significant associations, which were typically of small to medium effect size, emerged fairly regularly. It also started to become clear that certain dimensions of interparental conflict were more important than others in predicting child adjustment.

These early studies laid the foundation for the development of two influential theories on the nature of the link between marital and child functioning: the cognitive-contextual framework (Grych & Fincham, 1990) and the emotional security hypothesis/theory (EST) (Davies & Cummings, 1994). Prior to the 1990s, much of the research on interparental conflict and child adjustment was guided by concepts from broad theories of family functioning or social behavior or only loosely tied to theory. These two theories were unique in that they specifically described processes by which parents' marital functioning might influence children's development and, in doing so, laid the groundwork for a new generation of research. They pushed the field to move beyond simply examining the extent to which marital and child functioning are related and to begin considering factors that help explain why this is so. In addition, because studies from the 1970s and 1980s also indicated that many children in maritally discordant families did not have significant adjustment difficulties, investigators also tried to identify those factors that seemed to shield children from the adverse effects of parental marital discord. Over two decades of research following the introduction of these two theories has now been amassed, and quite a bit of progress has been made toward understanding reasons why interparental conflict can lead to child problems and the conditions under which it might not.

The next section of this chapter deconstructs the concept of interparental conflict, describing the dimensions of such conflict that, over time, can adversely affect children's social, behavioral, and emotional development. We then use these dimensions as a framework for reviewing the current state of knowledge on the association between interparental conflict and child adjustment problems. We follow the literature review with a presentation of several noteworthy explanations for the link between interparental conflict and child problems. In addition, we highlight key variables and processes implicated by this work and discuss how specific circumstances surrounding incidents of interparental conflict might influence the way it relates to child adjustment problems. We follow this with a discussion of translational implications of this research and review examples of how the research has informed practice. In the final part of the chapter, we make suggestions for future directions for this research area. Throughout this chapter, we illustrate how different methodologies have been employed and how principles of developmental psychopathology have guided and should continue to guide research on this topic.

INTERPARENTAL CONFLICT AND CHILD ADJUSTMENT PROBLEMS

Interparental conflict can be defined as opposition, disagreement, or a difference of opinion between parents; it is a normal part of adult relationships, and practically all children who have contact with their parents will be exposed to it (Papp, Cummings, & Goeke-Morey, 2002). Despite the simplicity of this definition, the phenomenon itself is complex, and the sources and manifestations of interparental conflict are many and varied. For example, a conflict may center around any number of topics, and the behaviors and emotions expressed during a single conflict

incident can range widely in type and intensity. There is also variability in conflict resolution; some conflicts may be resolved quite easily with no untoward aftereffects, whereas others linger, fester, or seem to have been put to rest, only to arise again.

These particular dimensions of conflict—topic, behavioral tactics, emotions, and resolution—provide the framework for our review. It is important to acknowledge at the outset that certain manifestations of these four dimensions are negative, but others may be benign or even positive and beneficial to children (Cummings & Davies, 2010). For example, parents whose disagreements are calm and respectful, and who come to a reasonable resolution of their differences, might provide their children with healthy models of conflict management and adaptive relationships. We make reference to some of the research that has examined positive aspects of interparental conflict in our review. Unfortunately, relatively little research has examined this side of the coin; more often the focus has been on understanding how conflict undermines child adjustment. In light of this fact, the bulk of our review focuses on the link between interparental conflict and problematic child adjustment.

In most of the research on this topic, child adjustment problems are operationalized along the broad dimensions of externalizing problems, such as aggressive, oppositional, and delinquent behavior, or internalizing problems, such as symptoms of depression or anxiety. It should be acknowledged, however, that interparental conflict has also been linked to child adjustment problems that do not fit neatly into the categories of internalizing or externalizing problems. For example, exposure to interparental conflict has been linked to various aspects of child physical health (Nicolotti, El-Sheikh, & Whitson, 2003; Wood, Klebba, & Miller, 2000), cognitive and academic abilities (Ghazarian & Buehler, 2010; Harold, Aitken, & Shelton, 2007; Jouriles et al., 2008), and behavior in romantic relationships (Jouriles, Mueller, Rosenfield, McDonald, & Dodson, 2012; Kinsfogel & Grych, 2004). These findings are consistent with the developmental psychopathology principle of multifinality, which holds that a given risk factor (i.e., exposure to interparental conflict) may give rise to a variety of possible child outcomes. Although the focus in this chapter is on externalizing and internalizing problems, other aspects of child adjustment are considered, as appropriate.

Externalizing and internalizing problems typically are conceptualized as occurring along a continuum. It is not clear in many of the studies on this topic how many children in the samples were experiencing clinically significant levels of problems or outright psychological disorders, as defined by commonly used classification systems of mental disorders (e.g., *Diagnostic and Statistical Manual of Mental Disorders*). In fact, in many studies, it appears that most of the children in the samples were not experiencing clinically significant problems (as indexed by the standard measures that were used). In other words, it should be recognized that the variation in child adjustment problems accounted for in many studies appears to be primarily within the range of normal child adjustment.

It is also noteworthy that many studies on this topic have evaluated children's immediate responses to specific incidents of adult conflict. In these studies, the investigators are measuring children's emotions (e.g., anger, sadness, fear) and behaviors (e.g., aggression) that occur immediately after a conflict incident. These are arguably symptoms of child distress, and not adjustment problems per se. However, there is evidence that children's immediate emotional and behavioral responses to interparental conflict, when collected across a number of incidents and aggregated, are associated with standard measures of child adjustment problems (Cummings, Goeke-Morey, & Papp, 2004; Goeke-Morey, Cummings, & Papp, 2007). Thus, this research is viewed as pertinent to the question of how interparental conflict influences children's adjustment.

Topic of the Conflict

Compared to other dimensions of interparental conflict, research regarding the effect on children of the topic of the conflict is limited. However, results from studies using a variety of methods converge to suggest that conflict about child-related topics can be deleterious for children. For example, studies that make use of parents' reports on questionnaire measures of child-related interparental conflict indicate that such measures are associated with child externalizing and internalizing problems (e.g., Jouriles et al., 1991; Lee, Beauregard, & Bax, 2005; O'Leary & Vidair, 2005; Snyder, Klein, Gdowski, Faulstich, & LaCombe, 1988), and these associations emerge even after accounting for other dimensions of marital functioning, such as general marital adjustment.

There is also experimental evidence that children are more likely to be immediately affected by interparental conflict that centers on a child-related topic as opposed to other topics. For example, in an analog study, Grych and Fincham (1993) had children listen to audio-recorded vignettes of conflict between a man and a woman. They asked the children to imagine that the conflict was between their parents and afterward had the children answer

questions about their own affect, cognition, and potential coping strategies. Some of the conflicts focused on child-related topics (homework time, who would take the child to an activity), whereas others focused on matters theoretically less related to the child (work, finances). Findings indicated that children reported more shame and fear of being drawn into the conflict when the conflict concerned the child. In another analog study, in which children watched videotaped vignettes depicting conflict between a man and a woman (and were asked to imagine that the conflict was between their father and mother), unresolved child-related conflict resulted in more immediate anger and sadness than unresolved and resolved conflict focusing on non–child-related topics (Koss et al., 2011).

Other evidence for the immediate effects of child-related conflict on child behavior comes from a daily diary study conducted by Cummings and colleagues (2004). Mothers and fathers kept a home diary about incidents of marital conflict and children's aggressive responses to conflict over a 15-day period. Parents recorded different aspects of the conflict, including the topics discussed (child, marital, social, or work) as well as conflict tactics (behaviors exhibited to address the conflict) and emotions around the conflict. Findings indicated that interparental conflict about child and marital (e.g., intimacy, communication) topics related positively to child aggression in response to the conflict, whereas conflict about social and work topics did not. Moreover, the link between conflict about child-related topics and child aggression emerged even after accounting for conflict tactics and emotions surrounding the conflict.

Behavioral Tactics

Research is accumulating to suggest that certain behavioral tactics used during parental disagreements are especially harmful to children. For example, studies in which intimate partner physical violence (IPV) is assessed indicate that children in families in which there has been a recent incident of IPV—common examples include pushes, grabs, and hits—are at greater risk for adjustment problems than children in families in which IPV has not occurred (see Kitzmann, Gaylord, Holt, & Kenny, 2003; Wolfe, Crooks, Lee, McIntyre-Smith, & Jaffe, 2003, for meta-analytic reviews of this literature). Moreover, this increased risk emerges for a variety of different types of adjustment problems (e.g., conduct-disordered behavior, emotional/personality problems), even after accounting for other aspects of the parents' marital relationship, such as general marital discord (Jouriles, Murphy, & O'Leary, 1989). In addition, children's exposure to particular types of IPV, such as violence that carries a high risk for physical injury (violence involving knives and guns), even further elevates the risk for child adjustment problems (Jouriles et al., 1998; Spaccarelli, Coatsworth, & Bowden, 1995). There is also experimental evidence indicating that children react more negatively to conflict involving IPV than to conflict involving other behavioral tactics. Specifically, evidence from studies employing vignette methods similar to those of the Grych and Fincham (1993) study described in the "Topic of the Conflict" section indicates that conflict involving physical aggression between adults elicits more distress and negative emotion from children than does verbal conflict (e.g., Cummings, Vogel, Cummings, & El-Sheikh, 1989; Cummings, Zahn-Waxler, & Radke-Yarrow, 1981).

In addition to physical violence, psychologically and emotionally abusive behaviors, such as insults, verbal threats, and aggression toward objects, are also associated with child adjustment problems. For example, Jouriles, Norwood, McDonald, Vincent, and Mahoney (1996) found that parents' reports of psychological aggression relate to child adjustment problems, even after accounting for acts of physical IPV. Other investigators have documented similar associations, highlighting the potentially unique contribution of these tactics in understanding the link between interparental discord and child adjustment problems (Clarke et al., 2007). Experimental evidence also suggests that interparental psychological and emotional abuse can cause immediate distress in children that is sometimes just as distressing as physical violence (Laumakis, Margolin, & John, 1998).

The two behavioral tactics just discussed (physical violence and psychologically or emotionally abusive behavior) are overt forms of conflict expression. Such behavior appears to be harmful to children, regardless of which parent engages in it (see Sturge-Apple, Skibo, & Davies, 2012, for a review that addresses this issue), and it is most harmful if both parents engage in it, as compared to only one parent (McDonald, Jouriles, Tart, & Minze, 2009). There also is some indication that more subtle forms of conflict expression, such as withdrawal or detachment (e.g., one parent ceasing to attend to what the other parent is saying), particularly in combination with overt forms of conflict expression, are harmful to children. For example, Katz and Woodin (2002) classified couples on the basis of their conflict interactions and found that child adjustment problems were most likely when the parents engaged in both attacking and withdrawing tactics during conflict. Goeke-Morey, Cummings, and Papp (2007) found that interparental conflicts that ended with one of the

parents withdrawing from the interaction were associated with greater child behavioral dysregulation (misbehavior, aggression) in response to the conflict. Related to these findings, results from experimental analog studies indicate that children are sensitive to adult withdrawal and nonverbal expressions of anger (e.g., angry glares) during adult conflicts, and they respond to these behaviors with negative emotions (Cummings et al., 1989; Goeke-Morey et al., 2007).

Although relatively little research has evaluated effects of behavioral tactics that might be conceptualized as positive, the results of several studies suggest that this might be a fruitful avenue for future research. For example, Davies, Martin, and Cicchetti (2012) created a latent variable of constructive marital conflict, which included parents' reports of responding positively toward one another during challenging/stressful times, as well as cooperation and satisfactory conflict resolution. This latent variable was negatively associated with later child adjustment problems, even after accounting for destructive interparental conflict. McCoy, Cummings, and Davies (2009) created a similar latent variable, which included data derived from observations of parents during a conflict interaction (e.g., problem solving, displays of affection) as well as parents' reports of cooperation and satisfactory resolution of their conflicts in general. Although constructive marital conflict was not directly related to later prosocial child behavior, indirect relations emerged in intervening variable models. Frosch and Mangelsdorf (2001) created a composite code, labeled positive engagement, for the coding of a nonconflictual marital interaction task. This code included behaviors such as initiating conversation and demonstrating involvement in the task, cooperation, and the extent to which spouses affirmed each others' contributions. In this study, positive engagement was negatively associated with observer ratings of child externalizing problems during a home visit. Moreover, positive engagement was negatively associated with child externalizing problems even after controlling for marital conflict.

It is important to highlight that in the few studies considering both positive and negative conflict tactics (or constructive and destructive interparental conflict), there was evidence that both contribute uniquely to child adjustment problems (Davies et al., 2012; Frosch & Mangelsdorf, 2001). In other words, it appears that it is not just the presence of destructive interparental conflict that increases risk for child adjustment problems, but also the absence of constructive or positive interparental interactions. Although some investigators have explored whether positive conflict tactics can mitigate the effects of negative conflict tactics on child adjustment problems, the results from a couple of well-designed studies suggest that positive and negative conflict tactics do not interact with one another in the prediction of child adjustment problems (Davies et al., 2012; Frosch & Mangelsdorf, 2001). We revisit this issue again in the section on conflict resolution.

Emotions

The emotions experienced and the behaviors expressed during conflict may be inextricably linked, although they are arguably separate phenomena. This link, however, may partly be an artifact of the methods used to assess interparental conflict. Specifically, some questionnaire items used in studies linking interparental conflict with child adjustment problems combine angry and hostile emotions with violent and abusive behaviors; the same could be said for the conflict vignettes that are used in experimental studies. Studies attempting to isolate or disentangle negative affect (hostility, anger) from destructive tactics during conflict suggest that both contribute independently to children's aggressive behavior (Cummings et al., 2004).

Very little research has evaluated the role of positive emotion expressed during interparental conflict. In one of the few studies on this topic, Goeke-Morey, Cummings, and Papp (2007) found that parental positive emotions expressed during conflict endings were positively associated with child positive emotions and negatively associated with child negative emotions (anger, sadness, fear) immediately following the conflicts. Similarly, Cummings and colleagues (2004) found that positive emotions expressed by either parent during conflict were associated with a lower likelihood of child aggression in response to the conflict. However, there was an important caveat to this latter finding. Conflicts about child-related topics were still positively associated with aggressive child responses, regardless of the nature of the emotions expressed during the conflict.

Resolution of Conflict

Results from a series of experimental analog studies indicate that poorly resolved conflicts, such as those that end with continued hostility or "the silent treatment," elicit negative immediate reactions from children (e.g., Cummings, Vogel, Cummings, & El-Sheikh, 1989; Cummings, Ballard, El-Sheikh, & Lake, 1991). By comparison, resolved conflicts are associated with more positive immediate reactions from children, and there is some evidence that certain tactics and emotions displayed during the resolution period can even ameliorate some of the immediate negative effects of hostile conflicts on children. Specifically, children seem to respond positively to resolution that involves

positive affect and compromise (Goeke-Morey et al., 2007; Koss et al., 2011; Shifflett-Simpson & Cummings, 1996). Apology appears beneficial when coupled with positive affect, but not when coupled with sadness or anger (Goeke-Morey et al., 2007). Interestingly, the effects of resolution are robust, emerging across many different types of conflict scenarios, including those that include physical aggression (Cummings et al., 1991; El-Sheikh, Cummings, & Reiter, 1996). In one of the few field studies examining couples' resolution of interparental conflict and child adjustment problems, Goeke-Morey and colleagues (2007) found that parent ratings of the degree to which the problem had been resolved were negatively associated with child negative emotions (anger, sadness, fear) and problematic behaviors (misbehavior, aggression) immediately following the conflicts. Similarly, Kerig (1996) found that a questionnaire measure reflecting the degree to which positive or negative affect dominates the resolution of conflict correlated in the expected direction with several indices of child adjustment.

Summary on Dimensions of Interparental Conflict

In sum, empirical evidence derived from correlational and experimental research converges to suggest that certain aspects of interparental conflict are more destructive to children than others. In particular, conflict about child-related topics and conflict that includes physical violence or psychologically abusive behavior appears to be especially detrimental to children. There is also some evidence suggesting that parental withdrawal and detachment during conflict episodes is harmful. Heightened negative emotions during conflict interactions contribute to the adverse effects of interparental discord on children. Positive approaches to interparental conflict, such as parents cooperating with one another, contribute to positive child adjustment. In addition, the outcome and immediate aftermath of conflict situations are important, with conflicts that are resolved in a positive manner (this might include compromise, apology, and the expression of positive emotions) being less harmful to children.

A Note about Frequency

Conceptually, research on interparental conflict and child adjustment is concerned with the effects of interparental conflict writ large. Only in extreme instances would one or two isolated incidents of conflict be expected to have marked and lasting effects on a child's development. Thus, in addition to considering the dimensions of conflict just reviewed (topic, behavioral tactics, emotions, and resolution), understanding how interparental conflict affects children's adjustment also demands considering the frequency of the conflict. Generally speaking, a child's history of exposure to destructive forms of interparental conflict influences how that child will respond to a specific conflict incident, and the *frequency* of children's exposure to destructive forms of interparental conflict correlates positively with the degree to which children experience adjustment problems. That is, the more frequently parents have disagreements with child-related content, the more likely the children will experience adjustment problems. Similarly, the more frequently physical IPV occurs, the more likely the children will experience adjustment problems, or the more frequently psychologically and emotionally abusive behaviors occur, the more likely there will be child problems. In other words, this frequency dimension cuts across each of the individual aspects of interparental conflict already reviewed.

Over time, however, the frequency of interparental conflict is likely to vary. There may be some periods in which interparental conflict is relatively frequent and some in which it is not. Although studies addressing this issue are sparse, there is evidence that child problems change with changes in frequency. For example, in a three-wave longitudinal study, elevations in interparental conflict over time corresponded to elevations in child externalizing problems during this same time period (Kouros, Cummings, & Davies, 2010). Similarly, changes in marital distress were positively correlated with changes in adolescents' adjustment (anxiety, depression, delinquency and hostility) over a 5-year period (Cui, Conger, & Lorenz, 2005). A related consideration pertains to the trajectories of specific types of interparental conflict over the course of time, and there is some indication that the trajectory of children's exposure to interparental conflict is important. For example, within a sample of school-age children who had recently been exposed to IPV, increases in children's exposure to IPV over time were related to increases in childhood depression (Kennedy, Bybee, Sullivan, & Greeson, 2010). Similarly, more consistent or chronic exposure to IPV predicts the development of child internalizing and externalizing problems, more so than more sporadic exposure (e.g., C. R. Emery, 2009; Martinez-Torteya, Bogat, von Eye, & Levendosky, 2009).

Developmental Considerations

The bulk of the research linking interparental conflict and child adjustment problems has been conducted with families of preschoolers, school-age children, and adolescents rather than with infants. Among the studies with infants, however, positive associations have been demonstrated between interparental conflict and general emotional

and behavioral distress displayed by infants, insecure/disorganized attachment behaviors, and temperament characteristics associated with poor adjustment outcomes (e.g., Du Rocher Schudlich, White, Fleischhauer, & Fitzgerald, 2011; Owen & Cox, 1997; Pauli-Pott & Beckmann, 2007). For example, Du Rocher Schudlich and colleagues (2011) had parents discuss an area of disagreement in the presence of their infant (ages 6–14.5 months). Destructive conflict—a composite variable that included contempt, defensiveness, demand, and anger—was related to infant distress, dysregulation, and physical frustration. Infants appear to be sensitive to positive aspects of interparental conflict as well. In this same study, constructive conflict tactics, which included problem solving, support, and positive emotion, were associated with less infant physical and emotional frustration and dysregulation.

Thus, interparental conflict is associated with indicators of child adjustment for children of all ages. It might also be argued that certain forms of interparental conflict influence child functioning, even prior to the birth of the child. For example, although empirical data are limited, women who experience IPV during pregnancy, compared to those who do not, are at increased risk for giving birth to a low-birthweight infant (Murphy, Schei, Myhr, & DuMont, 2001). Similarly, IPV during pregnancy has been linked to a weaker maternal-fetal bond and less secure maternal representations of caregiving (Huth-Bocks, Levendosky, Bogat, & von Eye, 2004; Zeitlin, Dhanjal, & Colmsee, 1999); there is also speculation that IPV during pregnancy can have lasting effects on child stress-regulatory systems (Graham, Kim, & Fisher, 2012; Levendosky, Leahy, Bogat, Davidson, von Eye, 2006). Consistent with these findings, IPV during pregnancy has been linked with child adjustment problems during the preschool years (Flach et al., 2011; Levendosky et al., 2006). Moreover, investigators have documented associations between mothers' lifetime experiences of IPV and both fetal loss and infant death (Ahmed, Koenig, & Stephenson, 2006).

It is not clear yet if there is a "sensitive period" over the course of development, during which exposure to interparental conflict is more strongly associated with child adjustment problems, as compared to other time periods. In fact, this question has received surprisingly little attention in the research literature. Yates and colleagues (2003) hypothesized that early exposures to IPV might have an especially strong and enduring effect on subsequent child development, as compared to later exposures. This is because it is during these early years that children are developing the ability to regulate their emotions and behaviors. In other words, children are developing the foundation for adapting to their environment, both in the present and in the future. In addition, during these early years, the child's foundation is believed to be especially sensitive to extreme environmental influences, such as IPV. This is not to say that later exposures to IPV are unimportant. Rather, later exposures are not expected to compromise a child's core self-regulation and adaptive stress-response capacities in the same way that early exposures might.

Yates and colleagues (2003) tested their hypothesis through the use of a longitudinal data set that followed children from preschool to 16 years. These investigators estimated the degree of male-to-female partner violence (referred to as IPV) based on interview data collected from mothers and items from Life Events Scales. These estimates were provided for two time periods in the children's lives: preschool years: 18–64 months; middle childhood: grades 1–3. Children's exposure to IPV during the preschool years made a unique contribution to adolescent (age 16) externalizing problems, above and beyond a number of control variables (e.g., socioeconomic status [SES], life stress) as well as exposure to IPV during the middle childhood years. In fact, IPV during the middle childhood years was not a predictor of externalizing problems at age 16. Similar findings emerged for IPV during the preschool years and child internalizing problems when the sample was limited to girls.

Conclusions drawn from reviews of the literature suggest the magnitude of the relations between interparental conflict and child adjustment problems are fairly consistent across age groups. For example, Buehler and colleagues (1997) found that the effect size for the relation between interparental conflict and child adjustment (.32) did not differ based on the age or age range of children included in studies. Similarly, Evans, Davies, and DiLillo (2008) found medium effect sizes for IPV and child internalizing (effect size range: .47–.51) and externalizing (effect size range: .40–.49) problems, which did not differ based on whether children in the studies were zero to 5, 6 to 12, or 13 to 19 years old. These reviews, however, examined primarily cross-sectional studies on the relation between interparental conflict and child adjustment problems. In sum, it seems clear that children's exposure to interparental conflict, at any age, can influence child adjustment problems. It is not yet clear, however, if there are specific age periods in which children's exposure to interparental conflict is especially detrimental to children (i.e., more detrimental than other age periods).

Another developmental question pertains to how enduring or long-lasting the link is between interparental

conflict and child adjustment problems. It is clear from experimental research that interparental conflict can cause immediate distress among witnessing children. It is also clear from the extant correlational and longitudinal research that this is not just an immediate, short-term effect. Specifically, prospective relations between exposure to interparental conflict and adjustment difficulties have been documented over time periods extending in excess of 10 years (Linder & Collins, 2005; Yates, Dodds, Sroufe, & Egeland, 2003). Yet there is also evidence that some of the adverse effects of witnessing IPV dissipate during the adult years. Specifically, longitudinal studies on the relation between adolescents' exposure to IPV and their involvement in violent romantic relationships suggests a relatively strong association during adolescence and even early adulthood; however, this association appears to dissipate over the course of adulthood (Smith, Ireland, Park, Elwyn, & Thornberry, 2011).

One approach to this question about the enduring effects of interparental conflict, which acknowledges the complexity in which such conflict might exert an influence on development over time, is the construction and evaluation of developmental cascade models, which propose how interparental conflict might interfere with stage-salient tasks, thereby increasing the risk for future adjustment problems (Cicchetti, 1993). Kouros, Cummings, and Davies (2010) tested a developmental cascade model and found that increasing interparental conflict in early childhood (kindergarten to second grade) was related to poor social competence in preadolescence (age 12) via externalizing problems in early childhood. The results suggested that interparental conflict may interfere with children's stage-salient tasks in early childhood, resulting in increased externalizing problems. Externalizing problems in early childhood, in turn, interfere with stage-salient tasks needed to promote optimal social competence and prosocial behavior. Similarly, Davies, Manning, and Cicchetti (2013) found evidence for a developmental cascade model in which preschoolers' exposure to interparental conflict is related to behavior problems 2 years later by interfering with the stage-salient tasks of regulating emotions, establishing autonomy, and problem solving. Additional developmental cascade models are reviewed in the section titled "Theory Explaining the Link between Interparental Conflict and Child Adjustment." Developmental cascade models that select stage-salient tasks specific to the developmental period studied offer promise for understanding developmental pathways that lead to different child adjustment outcomes across individuals and across time.

Prevalence and Degree of Children's Exposure to Interparental Conflict

It is impossible to say with certainty exactly how many children are exposed to destructive forms of interparental conflict. However, one might get a sense of this from statistics on the prevalence of children's exposure to IPV, parental divorce, and marital distress. Epidemiological data suggest that a large number of children in the United States are exposed to IPV and psychological abuse. Although annual prevalence estimates of children's exposure to IPV (e.g., pushing, grabbing, slapping) vary widely from study to study (e.g., Bair-Merritt et al., 2008; Hamby, Finkelhor, Turner, & Ormrod, 2011; C. G. Moore, Probst, Tompkins, Cuffe, & Martin, 2007), IPV has been estimated to occur in as many as 30% of dual-parent households with children in the United States (McDonald, Jouriles, Ramisetty-Mikler, Caetano, & Green, 2006), with severe physical IPV (kicks, punches, threat or use of weapons) estimated to occur in as many as 13% of dual-parent households with children (McDonald, Jouriles, Ramisetty-Mikler et al., 2006). Psychological abuse between parents or caregivers (e.g., threatening, insulting, or attempting to control a partner) appears to be even more common; a population-based survey of mothers in North and South Carolina indicated that psychological abuse occurs in the homes of nearly 50% of children over the course of a year (Chang, Theodore, Martin, & Runyan, 2008).

General marital distress and divorce are more indirect markers of children's exposure to interparental conflict, as compared to the statistics regarding children's exposure to IPV. Nevertheless, statistics about their prevalence offer a general sense of the degree to which children are exposed to potentially harmful forms of interparental conflict. Among intact couples, close to one-third report having distressed marital relationships at any given stage of the relationship (Whisman, Beach, & Snyder, 2008). Moreover, there is some indication that marital distress might be slightly more prevalent during the years in which couples are raising young children. Approximately 40% of American children experience divorce during childhood, with an estimated 5% to 25% of divorces involving high levels of interparental conflict (Lamb, Sternberg, & Thompson, 1997; Maccoby & Mnookin, 1992). Thus, it is safe to conclude from existing studies that, each year, parents of millions of American children engage in forms of interparental conflict that have been found to be harmful to children.

Yet the data just reported provide only an idea of how many children live in families in which destructive

interparental conflict occurs. At a micro-model level, a key contextual variable is the extent to which children are actually exposed to the conflict. For example, are children present when the conflict occurs, and do they directly witness it? This is in contrast to other forms of exposure to interparental conflict, which include living in a household in which it occurs but being unaware of it, or hearing about it from siblings or the parents themselves. Results from a handful of studies suggest that children are present during over a third of their parents' destructive interparental conflict episodes. Specifically, in a study examining police-reported incidents of IPV, Fantuzzo and Fusco (2007) found that children were present during 43% of the violent incidents, and when they were present, they directly observed the violence 80% of the time. Moreover, the authors also found that children were disproportionately exposed to what they described as the most unstable and dangerous types of IPV, which included weapon use and mutual assault. Papp, Cummings, and Goeke-Morey (2002) trained parents to keep diaries of their conflicts over a 15-day period and found that approximately one-third of the conflicts occurred in the children's presence. Interestingly, conflicts in which children were present, compared to those in which they were absent, were more often about child-related issues and more likely to include negative emotions and destructive conflict tactics.

THEORY EXPLAINING THE LINK BETWEEN INTERPARENTAL CONFLICT AND CHILD ADJUSTMENT

Before the 1980s, much of the research on interparental conflict and child adjustment was guided only loosely by theory and was designed simply to examine whether indicators of a troubled marriage (e.g., parent reports of poor marital adjustment) were associated with various kinds of child adjustment problems. In the late 1970s and 1980s, researchers began to apply broad theories of social behavior, such as Bandura's (1973; 1986) social cognitive theory (earlier versions known as social learning theory), to the topic of interparental conflict and child adjustment. Social cognitive theory pointed to a troubled marriage as a risk factor for child adjustment problems, and, more important, it highlighted processes by which a troubled marriage might increase risk (via children observing and modeling/learning from particular expressions of interparental conflict). This theory sparked some of the research on different manifestations of interparental conflict and their relation to child adjustment problems. For example, some of the studies in the late 1970s and 1980s were designed to evaluate whether the particular types or dimensions of interparental conflict that social cognitive theory suggested ought to be important (e.g., physical aggression, overt hostility) contributed to child adjustment problems after accounting for more diffuse measures of marital problems, such as poor global marital adjustment (e.g., Jouriles, Murphy, & O'Leary, 1989; Porter & O'Leary, 1980).

Although there was recognition during the late 1970s and 1980s that social cognitive theory might help explain the link between interparental conflict and child adjustment problems, researchers were also invoking other theories and ideas to help explicate documented relations. For example, in the 1980s, E. Mark Cummings and his colleagues conducted a number of studies focusing on very young children's (e.g., toddler-aged) immediate reactions to inter-adult anger and aggression. In this research, it was noted that the children did not appear to be *learning* aggression from these adult interactions, because their responses did not seem to precisely mimic or imitate what the adults did. Rather, the children seemed to be experiencing heightened arousal and negative emotions from these adult interactions, which transferred to other interactions that the children were having subsequent to the conflict incident. In short, children's emotional reactivity to the adult conflict was thought to be key (in contrast to learning per se), and contagion of emotion and excitation transfer theories were being used to help explain empirical observations from this early research (Cummings, Iannotti, & Zahn-Waxler, 1985).

Theory may have played a role in guiding some of the early research on interparental conflict and child adjustment, but theoretical *processes* invoked to explain why interparental conflict might lead to child problems were rarely tested in these early studies. Rather, the focus was on developing a better understanding of the parameters of the relation between interparental conflict and child adjustment problems. In the 1990s, theories specific to the link between interparental conflict and child adjustment began to appear in the scientific literature. Two of the more prominent theories were Grych and Fincham's (1990) cognitive-contextual framework and Davies and Cummings's (1994) EST. These two theories helped prompt and guide the development of more process-oriented studies designed specifically to explain how interparental conflict might lead to child adjustment problems. Many of the studies conducted during the 1990s and afterward were direct tests of components of the cognitive-contextual framework or EST. In addition, new theoretical explanations for the

link between interparental conflict and child adjustment problems began to arise and other preexisting ones were revisited during these years.

In this section of the chapter, we describe some of the theories and explanations for the link between interparental conflict and child adjustment problems in more detail. Following the lead of other investigators (Davies & Cummings, 2006), we organize this section by distinguishing between direct and indirect theorized effects of interparental conflict on the child. The "direct-pathway" or "direct-effects" models suggest that children's exposure to destructive interparental conflict triggers processes *within the child* (e.g., cognitions, emotions, biological factors) that increase their risk for adjustment problems. In contrast, the "indirect-pathway" or "indirect-effects" models suggest that interparental conflict influences variables *outside of the child* (parenting behavior) that lead to child adjustment problems.

It is important to acknowledge several points before proceeding. First, many explanations of the link between interparental conflict and child adjustment have been advanced. Our review is not intended to be exhaustive. Rather, we cover what we believe to be the most influential theories on this topic as well as several other interesting theories that have received relatively little research attention but that help give a sense of the breadth of explanations that have been offered to explain this link. Second, several of the theories on the link between interparental conflict and child adjustment are quite elaborate; some have had entire books devoted to them (e.g., EST; Cummings & Davies, 2010). We review what we believe are the key ideas and concepts of these theories because a comprehensive review of each theory is beyond the scope of this chapter. Also, several of the more comprehensive theories include both direct and indirect pathways by which interparental conflict influences child adjustment problems. For example, EST (Davies & Cummings, 1994) proposes that children's exposure to destructive interparental conflict triggers processes within the child that can lead to child adjustment problems; in addition, EST accepts the notion that interparental conflict influences whether, and how, children use their parents as a source of support and protection, which can also lead to child adjustment problems. By organizing our review into direct and indirect pathways, some of the complexity and nuance of the more comprehensive theoretical explanations is unfortunately lost.

Third, the vast majority of the research on the topic of interparental conflict and child adjustment problems has been conducted from the perspective that interparental conflict influences child behavior. Child-effect hypotheses are rarely examined in this research literature. Yet early studies offered some acknowledgment that child behavior problems influence the nature of the interparental conflict. For example, interparental conflict on child-related topics has been suggested to be more common in families in which the children are exhibiting problematic behaviors, because these behaviors might prompt parents to discuss, and perhaps disagree about, how to address them (Jouriles et al., 1991). More recently, investigators have begun to examine how certain child responses to interparental conflict (e.g., helping behavior performed by the child with the intent to diminish interparental conflict) might influence subsequent interparental interactions (e.g., Schermerhorn, Cummings, DeCarlo, & Davies, 2007). In addition, investigators have also begun to examine how child problems themselves might lead to more severe forms of marital discord and dissolution (e.g., Wymbs et al., 2008). Our review is limited to theories and ideas on how interparental conflict influences children, but we acknowledge that the effects likely go both ways.

Fourth, it is now generally accepted that "any single theory is inadequate in capturing the reality of children's lives" in highly conflictual or violent families (Jaffe, Wolfe, & Campbell, 2012, p. 17). Researchers recognize that certain aspects of the various theories on the link between interparental conflict and child adjustment are complementary, or at least not in opposition to one another (e.g., Davies & Cummings, 1998). Indeed, many possess similar concepts or ideas but label and/or package them differently. For example, children's "internal representations" (e.g., EST) and "cognitive scripts" (e.g., social cognitive theories) of interparental conflict essentially refer to the same general concept: structures/processes within children that probabilistically govern what they anticipate will happen once a parental conflict has started.

Direct-Effects Models

Social Learning and Social Cognitive Theory

Social learning and social cognitive theories suggest that children learn from observing others, and parents are powerful models for children's observational learning (e.g., Bandura, 1973; 1986). In the case of interparental conflict, parents model ways of addressing and handling interpersonal conflict. Some parents model angry and hostile conflict behaviors, failing to provide their children with respectful and productive models (Margolin, 1981). Through observing their parents' conflicts over time, children learn or acquire, among other things: (1) a

repertoire of behavioral tactics to use in conflict situations, (2) cognitions about the effectiveness of those tactics in achieving desired outcomes, (3) cognitive scripts for how conflict situations play out, and (4) general beliefs about the acceptability and justifiability of certain types of behavioral tactics, including which are condoned or considered permissible. Children who repeatedly observe destructive conflict (e.g., angry and hostile parental interactions) presumably acquire behavioral tactics and cognitions that contribute to the development of angry and hostile social interaction patterns.

Social cognitive theories on the development and perpetration of aggressive and violent behavior sometimes distinguish between the development of explicit and implicit cognitions (e.g., C. A. Anderson & Bushman, 2002; Crick & Dodge, 1994; Jouriles, McDonald, Mueller, & Grych, 2012). Explicit cognitions are the articulated ideas of conscious and effortful thought. An example is the belief that aggressive behavior is justified under certain circumstances or that it facilitates the achievement of desired outcomes. Implicit cognitions, in contrast, can be unarticulated, automatic, and outside of awareness. Knowledge structures that increase access to aggressive thoughts are an example of an implicit cognitive mechanism that heightens the likelihood of aggressive behavior. More precisely, increased access to aggressive thoughts is hypothesized to increase the likelihood that ambiguous situations will be interpreted in a hostile manner. Social cognitive theories posit that explicit and implicit cognitions that facilitate the likelihood of aggressive behavior develop as a result of social experiences, including the observation of destructive interparental conflict, and, once developed, these two different types of cognitions operate jointly to shape future behavior.

Dodge and colleagues' social information processing model has been especially influential in enhancing the understanding of child and adolescent aggressive behavior (Crick & Dodge, 1994; Dodge, 1986). It has also been applied to the topic of interparental conflict and child adjustment. This model proposes four sequential processes that culminate in a response to a social situation: (1) encoding, which is attending to the external and internal cues in the situation; (2) interpretation, which involves formulating attributions regarding others' intent; (3) response generation, which is generating possible responses to the situation; and (4) response evaluation, which is evaluating the possible responses based on the child's goals, anticipated results, and self-efficacy for enacting the response. Similar to other social cognitive theories, a child or adolescent's information-processing style is hypothesized to develop as a result of their social experiences, including the observation of interparental conflict. Dodge's model suggests that by observing how their parents' conflicts emerge and are handled, children may note and internalize situational cues that bear on conflict, make inferences about motives pertaining to conflict, gain a specific repertoire of possible responses to conflict, and evaluate the effectiveness and consequences of those responses. Once developed and integrated, this information-processing style is hypothesized to influence children's future social interactions.

Quite a bit of research examining the link between interparental conflict and child adjustment, especially child externalizing problems or aggressive behavior, is consistent with tenets of social cognitive theory. Most studies directly evaluating processes derived from social cognitive theories find that children exposed to destructive forms of interparental conflict are more likely to have cognitions that facilitate aggressive behavior, such as attitudes more accepting of violence or a hostile attribution bias (Calvete & Orue, 2011; Marcus, Lindahl, & Malik, 2001). These cognitions, in turn, have been found to mediate the association between interparental conflict and various types of child adjustment problems, especially those that involve aggressive behavior. For example, a number of researchers have found key social cognitive processes to mediate associations between different forms of interparental conflict (especially IPV) and violence in romantic relationships (Fite et al., 2008; Kinsfogel & Grych, 2004; Riggs & O'Leary, 1996). It should be noted, however, that most of the research evaluating associations between interparental conflict and the cognitive processes proposed by social cognitive theory focuses on older school-age children and adolescents.

Before concluding this section, it is important to acknowledge the role of reinforcement in social learning theories. Both positive (providing a positive stimulus) and negative (removing a negative stimulus) reinforcement of behaviors increase the likelihood that those behaviors will be repeated. Through observing their parents' conflicts and experiencing their own conflicts with others, children learn what is likely to be reinforced, thus shaping their own behavior and cognitions, in conflict situations and beyond. That is, through reinforcement (vicarious and direct), children form expectancies about the utility and consequences of certain behavioral tactics and develop cognitive scripts for how conflict situations are likely to play out. These expectancies and scripts, in turn, guide future behavior.

Emery and colleagues (R. E. Emery, 1989; R. E. Emery & Kitzmann, 1995) describe a model of children's immediate reactions to interparental conflict, which illustrates how

negative reinforcement might shape children's behavior in conflict situations and has implications for the development of more general child adjustment problems. In this model, interparental conflict is viewed as an aversive event for children that can prompt a variety of negative cognitive, affective, and behavioral reactions, some of which might be construed as antisocial (yelling at or arguing with a parent). An antisocial child reaction that is sufficient to prompt the parents to stop their immediate conflict negatively reinforces that child reaction. That is, the aversive event, interparental conflict, is removed; thus, according to the principle of negative reinforcement, the child reaction that prompted the removal of the aversive event (displays of fear or anger, yelling at or arguing with a parent) is likely to be repeated. The model further proposes that, over time, through repetition of this family dynamic, this pattern of cognitive, affective, and behavioral reactions to conflict becomes internalized and ingrained in the child.

Consistent with Emery's theory, research on children's immediate responses to conflict suggests that exposure to destructive conflict is aversive for children, prompting reactions of fear and anger (see Cummings & Cummings, 1988; Cummings & Davies, 2010; Davies & Cummings, 1994, for reviews). In fact, most children have an adverse emotional response to their parents' arguments (Peterson & Zill, 1986). In addition, there is quite a bit of evidence that destructive forms of interparental conflict sometimes prompt behavioral reactions from children that might be interpreted as aggressive or oppositional, such as yelling and arguing with a parent (Jenkins, Smith, & Graham, 1989; Shelton & Harold, 2008). These immediate affective and behavioral reactions to interparental conflict have been linked to more general measures of child behavior problems (e.g., Cummings et al., 1989). However, it is not entirely clear from the available data whether negative reinforcement is the key mechanism operating to link children's immediate reactions to interparental conflict with more general measures of their adjustment.

Cognitive-Contextual Framework

According to Grych and Fincham's (1990) cognitive-contextual framework, when children witness an incident of interparental conflict, they attempt to derive meaning from it. They do so by appraising the situation and attempting to understand what is happening and how it might affect them and their family (threat appraisals), as well as why it is happening (blame appraisals) and what they can do in response (coping appraisals). These appraisals are posited to lead to behavioral responses to the immediate situation (coping behaviors). In figures illustrating the framework (e.g., Grych & Cardoza-Fernandes, 2001; Grych & Fincham, 1990), appraisal processes and behavior are depicted in a sequence of three steps or stages, with threat appraisals (primary processing of the conflict) preceding blame and coping appraisals (secondary processing of the conflict), which, in turn, lead to a behavioral response (coping behavior). However, Grych and colleagues acknowledge that these steps can occur simultaneously and that their influence on each other can be reciprocal. Children's threat and blame appraisals are held to be especially important. Although the model is called "cognitive"-contextual, these appraisals are actually conceptualized to include both cognitive and affective processes. For example, threat appraisals include thoughts about danger (e.g., a parent might be harmed or the family might split up) and the emotion of fear, whereas blame appraisals include thoughts about responsibility and, with self-blame, the emotion of guilt.

The cognitive-contextual framework offers hypotheses about how specific aspects of interparental conflict and the family context might influence children's threat and blame appraisals (Grych, 1998; Grych & Fincham, 1990). For example, when interparental conflict is about a child-related issue, as compared to something else (e.g., parents' work), it is hypothesized that children are more likely to blame themselves for the conflict. It is also hypothesized that conflict about child-related issues is likely to be more threatening to children, because of the potential spillover into parent-child interactions and negative consequences for the children. As interparental conflict becomes more hostile and angry and includes physically aggressive and emotionally abusive behaviors, it is hypothesized that children are more likely to view the conflict as threatening. Children's prior exposure to interparental conflict is hypothesized to influence appraisals as well, because these previous experiences have presumably shaped children's expectations about the course of future conflicts. Prior exposure to IPV, for example, is expected to sensitize children to the possibility that future conflicts might also culminate in violence.

The original formulation of the cognitive-contextual framework (Grych & Fincham, 1990) focused on children's immediate responses to interparental conflict—that is, their appraisals and coping behaviors in response to an incident of conflict. Yet they also offered some hints about how particular appraisals and coping behaviors in response to a conflict incident might lead to maladaptive behavior more broadly. For example, they made reference to R. E. Emery's (1989) model described earlier in the section "Social Learning and Social Cognitive Theory" as a process that might maintain children's maladaptive cognitive, affective, and behavioral responses to interparental

conflict. In later writings, Grych and colleagues expanded on how these immediate appraisals and coping behaviors might lead to child adjustment problems more broadly. For example, Grych, Seid, and Fincham (1992) proposed that children who frequently appraise interparental conflict as threatening may develop symptoms of anxiety disorders, particularly if the conflict occurs very frequently; similarly, children who frequently appraise interparental conflict as their fault may develop symptoms of depressive disorders. Along this same line, children who appraise interparental conflict as both threatening and their fault, and who are unable to stop it from occurring, may develop a sense of hopelessness that leads to a variety of internalizing problems (Grych, Fincham, Jouriles, & McDonald, 2000).

Many studies find that as children feel increasingly threatened by or at fault for interparental conflict, their risk for adjustment problems increases. In fact, a robust empirical literature has linked children's threat and self-blame appraisals to their internalizing problems (Rhoades, 2008). Although there is some evidence that these appraisals are also linked to externalizing problems, the findings are much more consistent with internalizing problems (Fosco et al., 2007; Rhoades, 2008). It should also be acknowledged here that there is quite a bit of evidence suggesting certain child coping behaviors in response to interparental conflict (particularly children attempting to interrupt parental conflict in an aggressive or oppositional manner) are consistently linked with broad measures of children's internalizing and externalizing problems (Rhoades, 2008). Moreover, the results of a handful of studies have now accumulated to suggest children's threat appraisals, self-blame appraisals, or both mediate effects of interparental conflict on child adjustment problems (e.g., Fosco & Grych, 2008; Gerard, Buehler, Franck, & Anderson, 2005; Grych et al., 2000; Grych, Harold, & Miles, 2003; Kim, Jackson, Conrad, & Hunter, 2008; Mann & Gilliom, 2004). Most of this research has focused on school-age children and young adolescents, but the theorized processes linking interparental conflict with child adjustment are likely to apply to younger children as well, with the caveat that their appraisals are likely to be less complex and more concrete than those of older children (McDonald & Grych, 2006).

Consistent with the cognitive-contextual framework, the family context in which the interparental conflict occurs influences how interparental conflict relates to children's threat and blame appraisals. Deboard-Lucas, Fosco, Raynor, and Grych (2010) demonstrated how several different family variables moderate relations between interparental conflict and blame appraisals. For example, the association between interparental conflict and children's self-blame appraisals was stronger when mothers reported low levels of support for their children's negative emotions; when mothers responded to their children's negative emotions in a dismissive, punitive, or upset way; and when mothers were more coercive.

Another pathway by which exposure to interparental conflict might adversely affect adjustment is by undermining adolescents' sense of self-efficacy (Fosco & Feinberg, 2015). Adolescence is an age marked by a striving for a sense of autonomy (Bandura, 1994); it is also an age when individuals are confronted with many challenges (Laursen & Collins, 2009). Self-efficacy is the belief that one is capable of achieving one's goals, despite challenges (Bandura, 1994). It has been described by some as the foundation for well-being (Pajares, 2006). Fosco and Feinberg (2015) found evidence for a developmental cascade model, in which interparental conflict was positively linked to adolescents' threat appraisals, which were negatively related to adolescents' self-efficacy beliefs. In turn, self-efficacy beliefs were associated with adolescent adjustment (subjective well-being, internalizing problems, externalizing problems).

Fosco, DeBoard, and Grych (2007) proposed several modifications to the cognitive-contextual framework to better represent children's experiences in families characterized by IPV, especially in families where the violence is frequent and severe. For example, the scope of appraisals was expanded. Specifically, in addition to the threat, blame, and coping appraisals described in the original model, children are hypothesized to appraise interparental conflict (and the specific behavioral tactics, such as violence) along the degree to which it is justified or acceptable. Blame appraisals also include self-blame for failure to protect family members from getting hurt by the violence (e.g., protecting the mother from the father). In addition, some of the modifications put a greater emphasis on how externalizing problems might emerge within the context of IPV. For example, the meaning children ascribe to interparental conflict is theorized to affect not only their behavior but how they regulate their emotions and how they perceive various family members and close relationships within the family. Drawing from the work of Jenkins (2000), children exposed to interparental conflict that is characterized by anger are hypothesized to develop patterns of emotional responding that are organized around the emotion of anger. That is, anger becomes the default or automatic response to upsetting stimuli, and this begins to occur even in situations when anger is not typically elicited. These children, over time, are hypothesized to develop automatic anger responses to conflicts with others.

The modifications to the cognitive contextual framework have not yet received much research attention within families characterized by frequent and severe IPV. However, some of the modifications are consistent with the results of empirical evaluations of tenets of social cognitive theories, indicating that attitudes about the acceptability of violence mediate associations between IPV and both child aggressive behavior and adolescent violence in romantic relationships. Similarly, several studies now indicate that the experience and expression of anger mediates the association between exposure to IPV and adolescent violence in romantic relationships (Kinsfogel & Grych, 2004; Wolfe, Wekerle, Scott, Straatman, & Grasley, 2004).

Emotional Security Hypothesis Theory

According to Davies and Cummings's (1994) emotional security hypothesis and subsequent writings about emotional security theory (EST) by Cummings and Davies and colleagues, the concept of children's emotional security in the *interparental* relationship is central to understanding how interparental conflict affects child adjustment. Children are hypothesized to have a higher-order goal of wanting their parents' marital relationship to be stable. That is, in order to preserve a feeling of being safe, secure, and protected within their family, children need to feel confident that their parents can effectively work out their differences and resolve disagreements. Children who are emotionally secure in the interparental relationship have confidence in the stability of their parents' relationship with one another. They have confidence that interparental conflict will not threaten this stability; nor will it adversely affect children's own physical or psychological well-being. Children's emotional security in the interparental relationship is conceptually distinct from their emotional security in the parent-child relationship. Children can be insecure about the interparental relationship but secure in their parent-child relationships, and vice versa.

Children's emotional insecurity (or difficulties in preserving a sense of security) in the interparental relationship is inferred from three interrelated component processes, each of which is a type of response to interparental conflict. First, there might be generalized negative emotional reactivity (e.g., fear, anger, and sadness in response to the conflict). As suggested earlier, children often respond to displays of destructive conflict with negative emotions. However, when children are emotionally insecure in the interparental relationship, the negative emotions are likely to be heightened and more persistent. Second, interparental conflict might prompt children to behave in a manner that reduces either their parents' conflict or at least the children's exposure to it. Examples of such behaviors might include antisocial behaviors (yelling at or arguing with a parent), avoidance behaviors to minimize exposure (running away from conflict incidents), and even behaviors that might be construed as prosocial or helpful (trying to help solve the disagreement, trying to comfort one or both parents). Third, interparental conflict may result in internalized representations or working models of relationship functioning. This might include pessimistic expectations about the implications of the interparental conflict that children may hold for themselves and their families (e.g., the conflict will lead to the breakup of the family). These three component processes have been referred to as the "ABCs" of children's responses to interparental conflict (Cummings & Davies, 2010), referring to affect, behavior, and cognition. It is not necessary for each of the three component processes to be operating to infer emotional insecurity. Rather, these three responses are hypothesized to be distinct but interrelated.

These three different responses to interparental conflict may help children address the immediate threats posed by the conflict. However, these same responses may also lead to externalizing or internalizing adjustment problems through a variety of pathways and processes. For example, by definition, negative emotional reactivity is distressing to children, and a prolonged state of such emotions, triggered by prolonged exposure to destructive interparental conflict, or even a cognitive preoccupation with the conflict, can drain children emotionally. As a result, the capacity to draw on emotional resources when dealing with other important developmental challenges is diminished. In addition, certain behavioral responses to interparental conflict might turn into patterns of behavior that generalize to other contexts in which they are not appropriate. For example, Davies and Cummings (1994) made reference to R. E. Emery's (1989) model—on how children who attempt to regulate their parents' conflict may become aggressive or disruptive during marital disputes, and how this behavior might be negatively reinforced. If this family process is repeated, it might result in a more persistent and generalized pattern of child antisocial behavior. Thus, in the long run, children's emotional insecurity in the interparental relationship is expected to confer risk for adjustment difficulties.

Consistent with the assertion that children's emotional insecurity in the interparental relationship leads to child adjustment problems, results from many studies link the individual components from which emotional insecurity in the interparental relationship is inferred—emotional reactivity to conflict, regulation of conflict exposure, and

internal representations of the marital relationship—with children's externalizing and internalizing problems (e.g., Davies & Cummings, 1998; Davies, Forman, Rasi, & Stevens, 2002; Davis, Hops, Alpert, & Sheeber, 1998; Harold & Conger, 1997). Furthermore, individual components of children's emotional security, as well as latent variables constructed from these individual components, have been found to mediate the relation between interparental conflict and child adjustment (Cummings, Schermerhorn, Davies, Goeke-Morey, & Cummings, 2006; Davies et al., 2002; El-Sheikh, Cummings, Kouros, Elmore-Staton, & Buckhalt, 2008; Kouros, Merrilees, & Cummings, 2008; Mann & Gilliom, 2004).

Consistent with EST, different family contextual variables can influence how interparental conflict relates to children's emotional insecurity in the interparental relationship. For example, Kouros, Merrilees, and Cummings (2008) found the link between interparental conflict and children's emotional insecurity to be stronger when fathers reported higher levels of depressive symptoms. Davies and colleagues (2002) showed how several different family variables moderate associations between interparental conflict and emotional insecurity. For example, parenting difficulties and parent-child attachment insecurity led to stronger relations between interparental conflict and children's emotional insecurity in the interparental relationship. Family cohesiveness, in contrast, led to weaker relations.

Another pathway by which children's emotional insecurity in the interparental relationship may lead to child externalizing and internalizing problems is by adversely affecting children's sleep (El-Sheikh, Buckhalt, Cummings, & Keller, 2007). Specifically, children's emotional insecurity in the interparental relationship has been posited to interfere with the quality and duration of children's sleep. When children do not obtain enough high-quality sleep, it negatively influences their day-to-day functioning (Kouros & El-Sheikh, 2015). They are more irritable, have difficulties concentrating, and are not motivated to follow through on tasks and responsibilities, which are all symptoms of different forms of psychopathology (e.g., depressive disorders, oppositional defiant disorder). In families in which there are frequent or prolonged periods of destructive interparental conflict, there may also be prolonged sleep disruptions, contributing to a more general pattern of disrupted behavioral and emotional functioning. Emotional insecurity in the interparental relationship mediates links between destructive interparental conflict and indices of the quality of children's sleep (Kelly & El-Sheikh, 2013). In addition, sleep disruptions mediate links between children's emotional insecurity in the interparental relationship and a variety of child adjustment difficulties (El-Sheikh et al., 2007).

Advances in the Formulation of EST

Davies and Sturge-Apple (2007) make use of concepts from ethology and evolution to refine and extend certain aspects of EST, and they articulate more specific hypotheses regarding components of EST. Specifically, in the original formulation of EST, the three indicators of emotional insecurity (generalized negative emotional reactivity, regulation of conflict exposure, and pessimistic expectations about the implications of the interparental conflict for themselves and their families) were conceptualized as linearly related to one another, with each reflecting the common goal of preserving security in the interparental relationship. In the new formulation, the pattern of response across the three indicators is given much more emphasis than it was in the original account of EST. That is, different profiles of children's emotional security/insecurity to interparental conflict are hypothesized (e.g., secure, mobilizing, dominant, caregiving). These profiles are distinguished from one another by the specific emotions, cognitions, and behaviors included in reactions to conflict. They are also distinguished by their origins (a complex function of current ecological conditions, individual developmental histories, and prior experiences with interparental conflict) and by the types of adjustment problems most likely to emerge as a result of these pattern-based responses. For example, the secure profile is characterized by well-regulated, low-level distress reactions to interparental conflict. Children with this pattern are hypothesized to have confidence in their parents' relationship in a way that maintains family harmony. This pattern is theorized to evolve, in part, from witnessing well-managed parental disputes in the context of cohesive interparental and family relationships. These children are not expected to develop significant adjustment problems as a consequence of witnessing destructive bouts of interparental conflict. Children with the dominant profile, in contrast, would react to interparental conflict with high levels of behavioral distress, loss of control, dysregulation, aggression, low levels of subjective distress, and appraisals of threat. They are theorized to have been exposed to elevated levels of intense, poorly resolved interparental conflict, family disengagement, interparental dissatisfaction, parental dysphoria, avoidant parent-child attachment, and parental physical abuse and neglect. Over time, they would be expected to develop generalized patterns of aggressive, antisocial behavior.

There are a number of additional elaborations as well. To offer several examples, the new formulation provides an evolutionary basis for expecting certain types of interparental conflict to be frightening and harmful to children. Specifically, many evolutionary models suggest that humans are predisposed to respond with fear to stimuli that were significant threats to our ancestors. These stimuli may include angry faces, which are much more likely to be observed during conflict characterized by hostile, angry, and aggressive interchanges than by dysphoric, withdrawn, or indifferent interactions. The ability to recognize fear in others is also likely to have been evolutionarily adaptive, because others' fear responses likely signaled impending danger. Accordingly, observing one parent being fearful of another may be particularly likely to pose a threat to children's emotional security and, over time, their adjustment. The new formulation also emphasizes the primacy of initial, nonconscious, automatic processing of threat cues and affective responses to those cues, followed over time by the development of responses that operate under some cognitive control. Thus, this aspect of the reformulation implies that fearful affect plays a primary role as a cause of cognition, which distinguishes this theory from those positing that children's cognitive appraisals of a particular conflict incident mediate the link between that incident and their emotions. In addition, the new formulation downplays the role of constructive interparental conflict in contributing to children's emotional security.

There is already some empirical support for aspects of this new formulation of EST. Indeed, findings by Davies and Forman (2002) on different profiles in children's immediate responses to interparental conflict helped prompt the reformulation. More recently, Davies and colleagues (2012) found that when destructive and constructive conflict behaviors are considered simultaneously, destructive conflict is associated with children's emotional insecurity but constructive conflict is not, even though it does contribute to future child adjustment.

Specific Emotions Theory

Similar to the cognitive-contextual framework and EST, specific emotions theory (Crockenberg & Langrock, 2001) also holds that the effect of interparental conflict on children depends on children's interpretation of what the conflict means for themselves and their family. However, the focus is on the children's interpretation of how the conflict affects their ability to attain certain goals. Children's goals vis-à-vis interparental conflict can be broad, such as attaining security in the interparental relationship (as in EST), or specific, such as being able to invite a friend over after school. The meaning the conflict has for goal attainment leads children to experience specific emotional reactions to the conflict. For example, when the conflict is perceived to block a goal or make it unattainable, children are theorized to respond with anger. Repeated blocking of goals because of interparental conflict is expected to lead to sadness as well. When the interparental conflict poses a looming but uncertain threat to the children's goals, fear is the consequence. Children can, of course, have multiple goals simultaneously, and they may experience multiple emotions in reaction to any given conflict (e.g., fear over insecurity in the interparental relationship and anger because plans for a family activity are canceled because of the conflict). Over time, the patterns of children's reactions to conflict are thought to be reflected in more generalized patterns of adjustment. Thus, angry reactions translate to a broader pattern of aggressive or externalizing behavior problems, whereas fearful and sad reactions translate to internalizing problems. Recognizing that multiple reactions can occur simultaneously, specific emotions theory posits that the co-occurrence of different emotions influences how each is expressed. For example, when angry reactions to interparental conflict are accompanied by fear, the fear may reduce the likelihood of aggression or increase the likelihood of withdrawal or avoidance, thus setting the stage for the development of internalizing symptoms.

Specific emotions theory hypothesizes a second direct-effects pathway, which involves the same-sex modeling process derived from social cognitive theory. A same-sex modeling hypothesis specifies that children disproportionately attend to and display the behavior of their same-sex parent, and by the age of 5 or 6 years, children have developed gendered scripts that have been incorporated into their personal identities (Levy & Fivush, 1993). Thus, during incidents of interparental conflict, boys are expected to be more likely to attend to their fathers than to their mothers. The opposite is expected of girls. Similarly, to the extent that fathers' and mothers' behavior differs during incidents of conflict, boys' behavior should be more parallel to that of their fathers, whereas girls' behavior should be more parallel to that of their mothers.

Data testing this theory are sparse. However, there is empirical evidence consistent with some of its predictions. For example, specific emotions experienced by boys in response to interparental conflict have been found to interact with the fathers' behavior to predict specific types of adjustment problems (Crockenberg & Langrock, 2001). Specifically, boys' anger in response to interparental conflict interacted with fathers' maritally aggressive behaviors to predict boys' externalizing problems. Similarly, boys'

fear in response to interparental conflict interacted with fathers' maritally aggressive behaviors to predict boys' internalizing problems. In contrast, girls' specific emotions in response to interparental conflict did not interact with fathers' martially aggressive behaviors to predict girls' adjustment problems. In addition, boys' emotions in response to interparental conflict did not interact with mothers' maritally aggressive behaviors to predict boys' adjustment problems. Interestingly, for girls, the associations predicted by this theory failed to emerge, raising questions about its applicability for both boys and girls.

Trauma Theory

Individuals can experience traumatic stress symptoms after experiencing events that pose a significant threat of physical injury, severe harm, or death to an individual or others, and which evoke intense fear. In some circumstances, interparental conflict can be considered a traumatic stressor. Considerable evidence indicates that children exposed to IPV—which by many definitions poses a threat of physical harm to a child's caregiver and thus is frightening to a child—are at elevated risk for developing symptoms of posttraumatic stress (Evans, Davies, & DiLillo, 2008; Graham-Bermann & Levendosky, 1998; Kitzmann, Gaylord, Holt, & Kenny, 2003). Moreover, in many families marked by IPV, the family violence occurs repeatedly. Sustained or repeated exposure to multiple traumatic events, known as complex trauma, is associated with particularly detrimental child outcomes (Cloitre et al., 2009; Margolin & Vickerman, 2007).

A large body of research has outlined ways in which the development and functioning of biological stress-response systems may be disrupted by exposure to significant and/or prolonged stress (De Bellis, 1999; Gunnar & Quevedo, 2007). The hypothalamic-pituitary-adrenal (HPA) axis is a neuroendocrine system that helps govern the organism's response to stress. Exposure to IPV can lead to dysregulated HPA axis functioning, including alterations in cortisol reactivity and diurnal patterns of cortisol release (Davies, Sturge-Apple, Cicchetti, Manning, & Zale, 2009; Saltzman, Holden, & Holahan, 2005; Davies, Sturge-Apple, Cicchetti, & Cummings, 2007). Increased cortisol can result in neuronal damage and in other changes in HPA functioning and secretion of neurohormones that can prompt pruning of receptors for those hormones, thus physically altering the functioning of the entire system. Such alterations compromise the child's physiological responses to stress going forward. The sympathetic nervous system (SNS) is also activated by traumatic events, resulting in increases in the level of circulating catecholamines (e.g., norepinephrine). Such increases not only increase arousal (i.e., the fight-or-flight syndrome) but over time can also result in pruning of receptors that would dampen their effect. Over time, such lasting physical changes in the structure and functioning of the stress-response systems, especially while those systems are still developing, hold serious implications for a child's future abilities to respond adaptively to stress.

There is substantial theory on the roles of particular psychological and social factors in the relation between exposure to a significant stressor and the likelihood of traumatic stress symptoms. Independent of the IPV itself, each child's unique configuration of characteristics shapes how he or she responds to it; these characteristics include the child's genetics, temperament, attachment functioning, existing psychopathology, functioning of the stress-response system, and developmental competencies in multiple domains (i.e., affective, cognitive, behavioral, and social). These both influence and, over time, are influenced by the child's efforts to respond and adapt to the stress and distress that exposure to severe forms of interparental conflict, such as IPV, entails. Meta-analytic findings confirm theoretical propositions that factors subsequent to an episode of IPV exposure also figure heavily in a child's risk of developing posttraumatic stress symptoms (Trickey, Siddaway, Meiser-Stedman, Serpell, & Field, 2012). These include factors specific to the IPV, such as everyday reminders or harbingers of it, its reoccurrence and patterning of occurrence, and the extent to which it may lead to or be associated with other potentially traumatic stressors, such as child maltreatment. They also include the child's processing of the event and its consequences and the child's attributions about his or her own emotions, behavior, and coping during and after the event. In addition, because IPV tends to recur, living under an ever-present threat that violence may erupt may itself be a traumatic stressor (Margolin & Vickerman, 2007).

Indirect-Effects Models

Parenting

Consistent with decades of research on child development and developmental psychopathology, most of the direct-effect theories just reviewed acknowledge that the quality of the parent-child relationship is an important determinant of child adjustment. In these theories, aspects of parenting or the parent-child relationship are presumed to partially mediate the link between interparental conflict and child adjustment problems. Similarly, most family systems theories consider the association between

interparental conflict and child adjustment to be a function of disrupted family processes, including parenting and the parent-child relationship. In this section of the chapter, we briefly review some of the empirical evidence on the relation of interparental conflict to parenting and to parent-child relationship variables. We then describe theory explaining the relation. For simplicity, we use the term *parenting* to refer to the multitude of characteristics, behaviors, and processes considered in this research.

Results of numerous studies show interparental conflict to be associated with both broad dimensions of parenting (e.g., acceptance/rejection) as well as with specific parenting behaviors, ranging from the amount of general conversation that parents engage in with their children to harsh and physically abusive parenting behaviors. In addition, changes in parenting that are associated with interparental conflict can occur quickly, even during or shortly after a conflict incident (seconds, minutes, days). Or they can unfold slowly over time, becoming fully manifest only months later. Experimental and well-controlled longitudinal studies provide evidence of causation: that interparental conflict causes alterations in parenting. For example, Jouriles and Farris (1992) randomly assigned parents to discuss either a highly conflictual or nonconflictual topic for them as a couple. During the discussion, their child was in another room, playing a game that involved making a substantial mess. Immediately after the couples' discussion, one (randomly chosen) parent, who had been instructed to have the child clean up the mess, joined the child in the playroom. Results indicated that the nature of the parents' discussion with one another influenced parent-child interaction during the cleanup task. Specifically, the level of general conversation (parent-child chitchat about matters unrelated to cleaning up the room) was consistently high after the nonconflictual couple interaction. In contrast, it was noticeably lower immediately following the conflictual couple interaction, gradually increasing over the course of the parent-child interaction. In addition, fathers gave more vague and confusing instructions to the child immediately following the conflictual couple interaction.

There is now also a substantial body of research suggesting that parenting mediates the relation between interparental conflict and child adjustment problems. In fact, the results of several studies suggest that when multiple dimensions of parenting are considered, parenting sometimes fully mediates the relation. For example, Fauber, Forehand, Thomas, and Wierson (1990) used data from parents and adolescents to form latent variables of parental psychological control, rejection/withdrawal, and lax control. When these were considered simultaneously, psychological control and rejection/withdrawal fully mediated the link between interparental conflict and child internalizing problems and partially mediated the link between interparental conflict and child externalizing problems. Harold, Fincham, Osborne, and Conger (1997) used children's reports across several measures of parent-child interaction to construct constructs reflecting mother-child and father-child hostility. These constructs fully mediated the link between interparental conflict and child externalizing problems and partially mediated the link between interparental conflict and child internalizing symptoms. Similarly, Gonzales, Pitts, Hill, and Roosa (2000) collected children's reports of parental acceptance and support (similar to the rejection/withdrawal variable of Fauber et al., 1990), inconsistent discipline, and hostile control (similar to the psychological control variable of Fauber et al., 1990, and the hostility measures of Harold et al., 1997). When these parenting variables were considered simultaneously in a mediation model, parental acceptance and support and parental inconsistent discipline fully mediated the link between child reports of interparental conflict and child reports of child adjustment problems. However, the mediation effects were not replicated when using parent reports of child adjustment problems.

A number of explanations have been offered for the link between interparental conflict and parenting. The spillover hypothesis, or some variant thereof, is perhaps the most widely acknowledged process for explaining how interparental conflict affects parenting (see Erel & Burman, 1995; Krishnakumar & Buehler, 2000, for reviews). According to this hypothesis, negative emotions and behavior in the interparental relationship permeate or spill over into the parent-child relationship. For example, overt anger or hostility between parents during a conflictual interaction may spill over into the parent-child relationship, leading to anger and hostility toward the child, including overly harsh and physically aggressive discipline (Appel & Holden, 1998; Jouriles, McDonald, Slep, Heyman, & Garrido, 2008). Patterson (1982) described how interparental conflict alters parents' moods and, consequently, disrupts many parenting behaviors that could contribute to the development of child adjustment problems. These include monitoring children's activities and whereabouts, consistent enforcement of rules, delivery of contingent consequences for child misbehavior, and effective problem solving. Similarly, frustration induced during interparental conflict may contribute to frustration in the parent-child relationship, which manifests itself

as a low tolerance for child misbehavior and the use of power-assertive child management techniques (Gerard, Krishnakumar, & Buehler, 2006). It has also been hypothesized that the preoccupation and emotional fatigue generated by interparental conflict influences the degree to which parents can be warm, supportive, and emotionally available for their children (e.g., Fosco et al., 2007).

The spillover hypothesis is often conceptualized in the context of a micromodel of family interaction (e.g., Jouriles & Farris, 1992; Patterson, 1982). That is, an episode of interparental conflict generates negative affect in the parents, and these emotions influence how the parents interact with their children either shortly after the conflict episode (minutes, hours, or days), or sometimes even during the conflict itself (e.g., when a child intervenes to attempt to stop the conflict). The spillover hypothesis, however, has also been conceptualized to play out over longer periods of time. For example, a variant of the spillover hypothesis is that interparental conflict contributes over time to heightened levels of parenting stress or diminished parental mental health, which then interferes with the parents' capacity to parent optimally (Levendosky & Graham-Bermann, 2001; Levendosky, Huth-Bocks, Shapiro, & Semel, 2003). Consistent with this hypothesis, mothers' mental health symptoms have been found to mediate associations between mothers' experience of IPV during pregnancy and preschoolers' adjustments problems (Flach et al., 2011; Levendosky et al., 2006).

Investigators have also used the spillover hypothesis, or some variation of it, to link interparental conflict to the erosion of the quality of the parent-child relationship (Davies & Sturge-Apple, 2007; Owens & Cox, 1997). For example, as suggested by the spillover hypothesis, the residual distraction and distress from interparental conflict detracts from parents' emotional availability to their children. Over time, the parents' emotional unavailability may diminish the child's sense of the parents as reliable sources of support and comfort. In addition, witnessing a parent's distress, fear, anger, or loss of emotional control may also alter the child's perception of the parent as a source of safety, strength, or protection.

In contrast to the spillover hypothesis, the compensatory hypothesis posits that parents attempt to compensate for negativity in the interparental relationship by investing more heavily in the parent-child relationship. Nevertheless, heavy investment in the parent-child relationship is not always beneficial for children. For example, detrimental effects may emerge if parents view the parent-child relationship as a substitute for the interparental relationship. In such cases, children may be burdened by feelings that they must emotionally support their parents as adult partners typically support one another (Peris, Goeke-Morey, Cummings, & Emery, 2008). Some studies using observational measures of parenting, however, have found associations between interparental conflict and more empathic parenting (Belsky, Youngblade, Rovine, & Volling, 1991; Mahoney, Boggio, & Jouriles, 1996). Similarly, in one qualitative study, 20% of battered women reported that their experiences with violence had some positive effects on their parenting, such as giving them greater empathy for their children (Levendosky, Lynch, & Graham-Bermann, 2000).

Although the spillover and compensatory hypotheses are both employed as explanations of the link between interparental conflict and parenting, testing these hypotheses can be very challenging, partly because the optimal time frame for capturing these processes is not clear from theory or research. In fact, it might be argued that both processes can operate simultaneously within the same family, or even the same parent, at different points in time. In a recent test of the spillover and compensatory hypotheses, Kouros, Papp, Goeke-Morey, and Cummings (2014) had parents independently rate the emotional quality of their relationship with their spouse and with their child each day for 15 days. The authors found that fathers' daily ratings of poor marital quality predicted lower father-child relationship quality on the same day, which is consistent with the spillover hypothesis. In contrast, mothers showed improvement in the quality of the mother-child relationship when marital quality was rated poorly on the previous day, which is consistent with the compensatory hypothesis.

Weakening of Boundaries between Family Subsystems

According to family systems theory, clear boundaries between the parents' relationship with one another (the marital subsystem) and the parents' relationships with their children (the parent-child subsystems) are crucial to healthy family functioning (Kerig, 1995; Minuchin, 1974). Clear boundaries establish roles for family members that are developmentally and socially appropriate and are sensitive and appropriately responsive to the emotional needs of family members. In the absence of clear boundaries, children may be cast in roles that are inappropriate for the developmental level (e.g., the parentified child) and that do not meet their emotional needs. Family systems theorists suggest that interparental conflict weakens boundaries between the marital and parent-child subsystems and, as a consequence, influences the development of child adjustment problems.

Weak boundaries between the marital and parent-child subsystems might be conceptualized as a type of parenting deficit or problem. That is, it might be argued that it is the parents' responsibility to establish and maintain clear boundaries between these two subsystems. Parents blur the boundaries when they draw the children into their interparental conflicts. Examples of this include when one parent engages in behaviors to attempt to recruit children into an alliance or coalition against the other parent. These processes have been given a number of labels in the family systems literature, including triangulation and the formation of cross-generational alliances. Blurring the boundaries between marital and parent-child subsystems might involve circumstances in which one parent talks badly about the other parent to the children or offers special privileges and gifts in an effort to get the child to take the side of a parent. Boundaries are also blurred when parents let their children intervene or involve themselves into their conflicts. Children might try to do this for a variety of reasons. For example, they might blame themselves for their parents' conflicts (especially when the conflict is about them or something they did) and thus feel responsible for stopping such conflicts. Another example is that in violent families, children may feel a need to protect one or both parents from physical harm. Thus, they intervene to prevent the conflict from escalating to a point where a parent becomes injured. Parents might also blur the boundaries between these two family subsystems as part of the aftermath of interparental conflict. Examples include when they turn to their children to provide them with support and comfort; such a process has been labeled as parentification, adultification, and role reversal. Support and comfort might be sought to deal with the troubled marriage or for addressing other life stressors, because the parent does not receive support and comfort from his or her spouse.

There is evidence from prospective research that the blurring of boundaries between the marital and parent-child subsystems contribute to child problems, as well as processes that are likely to lead to child problems. For example, Fosco and Grych (2010) found triangulation related positively to parent-adolescent conflict over time. Buehler, Franck, and Cook (2009) found positive associations between triangulation and adolescent externalizing and internalizing problems, as well as peer rejection.

Coparenting

Another indirect-effects model, which overlaps with parenting and family systems models, emphasizes the construct of coparenting and the extent to which mothers and fathers cooperate and support each other in raising their children. McHale and colleagues (McHale, Kuersten, & Lauretti, 1996) propose two types of coparenting dynamics, overt and covert, both of which can be affected by interparental conflict. Overt coparenting dynamics involve interactions between the parents about the child. Interparental conflict may result in one parent actively interfering with or undermining the other parent's interactions with the child, which may leave the child confused or compelled to defend or choose one parent over the other. Alternatively, when coparenting is disrupted by interparental conflict, one caregiver may withdraw from, reduce the frequency of, or otherwise alter the nature of interactions with the child (McHale et al., 1996; Katz & Gottman, 1996). In contrast, covert coparenting occurs when a parent delivers messages about the other parent while alone with the child (McHale & Ramussen, 1998). Ideally, such messages are positive and reflect a strong parental alliance. Coparenting that has been corrupted by interparental conflict can be seen in interactions in which one parent casts the other in a negative light, attempts to persuade the child to take sides against the other parent, or attempts to win the child's affection at the other parent's expense. Although research is sparse, there is some evidence that overt coparenting processes mediate the link between interparental conflict and child adjustment problems. For example, Katz and Low (2004) found that hostile-withdrawn coparenting behaviors mediate associations between IPV and children's anxiety and depression. Stroud, Meyers, Wilson, and Durbin (2015) found marital functioning to be related to children's internalizing and externalizing problems through reductions in coparenting warmth.

Other Explanations and Considerations

Cox, Paley, and Harter (2001) theorize that through various family and parenting processes, interparental conflict may strain sibling relationships, which contributes to the development of child adjustment problems. For example, elaborating on the family systems theory concepts of triangulation and the formation of cross-generational alliances, it seems plausible that if a child is aligned with one parent against the other, that child is likely to receive preferential treatment from the parent with whom the alliance is formed. Preferential treatment of children can strain sibling relationships and influence how one sibling treats the other. Because sibling interactions provide children opportunities to develop social interaction (e.g., conflict management) and coping skills (E. R. Anderson, Hetherington, Reiss, & Howe, 1994), strained relationships

can influence the development of these skills and thus the development of adjustment problems. Alternatively, interparental conflict may lead to behavior problems in one child, which then contribute to the development of behavior problems of one or more siblings. For example, older siblings typically exert more influence on younger siblings than vice versa (Stoneman & Brody, 1993). If interparental conflict leads to adjustment problems in an older child, that child's problems might then adversely affect younger siblings (Erel, Margolin, & John, 1998). Research on interparental conflict and sibling relationships is sparse, but there is some evidence consistent with the idea that sibling relationships may be an important variable in the link between interparental conflict and child adjustment (Piotrowski, Tailor, & Cormier, 2014; Tailor, Stewart-Tufescu, & Piotrowski, 2015).

Noting the high degree of co-occurrence for violence between intimate adult partners and violence directed at children, Slep and O'Leary (2001) proposed an integrated theoretical framework for family violence, drawing from the largely separate research literatures on risk factors for IPV and risk factors for physical child abuse. Slep and O'Leary highlighted the fact that there is considerable overlap in the risk factors for the perpetration of each of these forms of family violence, including individual-level variables (e.g., growing up with violence in their own family of origin, problems with impulsivity, problems with substance use and abuse, depressive symptoms) as well as an assortment of family- and community-level variables (e.g., economic strain, stressful events, social isolation). The collective presence of these variables is hypothesized to lay the groundwork for an individual to direct violence toward multiple family members—anyone who happens to provoke the high-risk individual. Tests of this integrated theoretical framework indicate that individuals who engage in both IPV and violence directed at children, compared to individuals who engage in only one of these forms of family violence or no violence at all, report higher collective levels of these risk factors (Slep & O'Leary, 2009).

Interparental conflict and IPV have also been associated with dimensions of peer interaction and peer relations. To offer a couple of examples, investigators have found interparental conflict to be positively associated with friendship instability and indirectly related to friendship quality (Schwarz, Stutz, & Ledermann, 2012). IPV has been found to be positively associated with peer victimization and peer bullying (Knous-Westfall, Ehrensaft, MacDonell, & Cohen, 2012). Additional research is necessary to evaluate whether peer relations mediate links between interparental conflict and child adjustment problems.

CHILD ATTRIBUTES AND FAMILY/COMMUNITY FACTORS CONTRIBUTING TO INDIVIDUAL DIFFERENCES

There is considerable variability in children's adjustment within families marked by interparental conflict. For example, even in samples of families characterized by extreme levels of conflict, such as IPV that is frequent and severe enough to prompt a parent (usually the mother) to seek refuge at a domestic violence shelter, there are marked differences in child adjustment. Some of the children develop externalizing problems, others develop internalizing problems or both externalizing and internalizing problems, and still others develop few or no problems (Grych, Jouriles, Swank, McDonald, & Norwood, 2000). This is true not only across children in different families but even among siblings within the same family (Skopp, McDonald, Manke, & Jouriles, 2005).

A developmental psychopathology perspective conceptualizes individual development as the interplay between a changing organism growing up in a changing context (Cicchetti, 1993; Davies & Cicchetti, 2004). This conceptualization implies that the development of child adjustment problems within the context of interparental conflict varies as a function of changes occurring within the child (e.g., maturation), within the interparental relationship, and in the child's family and social environment. In this section of the chapter, we describe how individual attributes of the child might influence the way that interparental conflict adversely affects child adjustment. These attributes include child sex, developmental considerations, immediate behavioral responses to interparental conflict, characteristic coping behaviors and cognitive styles, neurobiological responses to interparental conflict, and genetic influences. We then consider aspects of the broader family and community context that might influence the effect of interparental conflict on child adjustment.

Child Sex

Child sex has received quite a bit of attention in this research literature, in part because early research on the association between marital and child problems suggested that the association was stronger for boys than for girls (Grych & Fincham, 1990; Reid & Crisafulli, 1990). However, continued research, particularly with relatively large and representative community samples (e.g., Jouriles, Bourg, & Farris, 1991), called this conclusion into question, and later meta-analytic reviews failed to support the notion that child sex moderates the association

between interparental conflict and child adjustment problem (Buehler, Anthony, Krishnakumar, & Stone, 1997). In addition, child sex also does not appear to moderate the association between many hypothesized mediators of the link between interparental conflict (e.g., threat and self-blame appraisals, negative affect) and child adjustment problems (Rhoades, 2008). This is not to say that child sex is unimportant for understanding the association between interparental conflict and child adjustment. Rather, it is likely that the role played by child sex is complex, and a clear and consistent pattern of findings has not yet emerged. It is our view that other child and family attributes, some of which may be associated with child sex, are likely to be more promising in understanding the heterogeneity in the association between interparental conflict and child adjustment problems.

Developmental Considerations

A child's developmental level is often acknowledged as important for understanding the link between interparental conflict and child adjustment. Studies thus far, however, have not evaluated how developmental processes influence this link, beyond examining age as a moderator of specific associations. Changes occur in children's competencies across multiple domains (cognitive, emotional, social, physical) in the course of normal development, and these changes are relevant to how children are affected by interparental conflict. To illustrate, next we briefly discuss how normal developmental changes in cognition might be salient to concepts from theories on the link between interparental conflict and child adjustment. We also discuss developmental transition periods that might be important and conclude with a discussion on why greater attention to developmental processes is needed to guide the next generation of theory and research on interparental conflict and child adjustment.

According to Piaget's theory of cognitive development, children rely on their sensory and perceptual abilities to explore their environment and make sense of their world. Infants quickly begin to form schemas—internal representations of people, objects, and events—to organize their experiences. These schemas may be very simple at first but become increasingly sophisticated as the child assimilates new experiences into existing schemas and alters existing schemas to accommodate new experiences. A schema of one's caregiver is one of the earliest to develop; based on their experiences, infants develop an internal working model of their caregiver that allows them to predict how responsive, reliable, and trustworthy she or he is and will be, especially during times of stress.

Several of the direct-effect models reviewed earlier point to the importance of children's schemas about their parents' relationship with one another. For example, both the cognitive-contextual framework and EST posit that children create internal representations of the interparental relationship, which are based on their experiences within the family, including their exposure to interparental conflict. Both theories also hold that children become distressed when they perceive the security or stability of the interparental relationship to be threatened. When sustained or repeated over time, this distress can lead to more pervasive adjustment problems. Based on Piaget's theory on children's cognitive development, it is reasonable to assume that internal representations of the interparental relationship begin to form early in a child's life, but the definition of early—and, by implication, late—is unclear. It is also not clear when key aspects of these internal representations are likely to develop, such as when children begin to view their parents' relationship as something that is supposed to be stable, and when this view itself crystallizes, becoming unwavering over time. It might be argued that this information is key to understanding the ages or developmental stages at which EST and the cognitive-contextual framework become applicable for understanding the association between interparental conflict and child adjustment.

According to the cognitive-contextual framework, children's appraisals about interparental conflict (threat and self-blame appraisals) are key to understanding how the conflict affects children. However, young children lack the cognitive abilities necessary for making sophisticated appraisals and attributions. Before age 7 or so, children typically do not understand that others do not see the world from their vantage point. They may be able to reason deductively but can apply those reasoning skills only to real, concrete scenarios. Thus, they use only concrete characteristics of events to make attributions. At around age 11, when children enter the formal operational stage of cognitive development, they begin to learn to think abstractly and reason about hypothetical problems. It is only then that they become able to form sophisticated attributions and appraisals.

Some have argued that appraisals of interparental conflict are more salient predictors of children's adjustment when children are 10 years of age or older, as compared to younger age groups. For example, in a sample of children who were living with extreme IPV, Jouriles, Spiller, Stephens, McDonald, and Swank (2000) found

that younger children (ages 8–9) made more self-blame attributions than older children (ages 10–12), but the relation of self-blame with externalizing and internalizing problems was stronger for the older age group. In a meta-analytic review, Rhoades (2008) found that children's threat and self-blame appraisals were more strongly associated with their externalizing and internalizing problems after the age of 10. This is not to say, though, that younger children's appraisals of interparental conflict are unimportant or not useful. McDonald and Grych (2006), for example, found that children's self-blame appraisals accounted for the relation between interparental conflict and child internalizing problems in a sample of 7- to 9-year-olds. Ablow, Measelle, Cowan, and Cowan (2009) found that 5-year-olds' self-blame appraisals mediated relations between interparental conflict and child internalizing problems. Taken together, this body of research suggests that children's appraisals of interparental conflict are salient predictors of their adjustment problems, but that more robust and stronger associations are likely to be found in samples of children over the age of about 10.

It is also important to consider normal developmental transition periods, such as the transition to school or the onset of puberty. Jaffee and Poulton (2006) proposed that the relation between mothers' depression and child adjustment should be strongest during transition periods because children are more reliant on their mothers during those periods to help guide them in adapting to a changing situation, and depressed mothers are less able to offer that guidance. This reasoning can be applied to interparental conflict; interparental conflict that drains parents' emotional resources, increases their negative affect, or otherwise diminishes their ability to offer support (as suggested in our review of indirect-effect models) should be most problematic for child development during periods when children most need parental support to help navigate important transitions.

Greater consideration of developmental processes will be important for advancing both theory and research on the topic of interparental conflict and child adjustment. With regard to theory, many of the hypothesized mechanisms linking interparental conflict with child adjustment (e.g., cognitive and emotional abilities) change as a function of development and can differ dramatically across children of different ages. In fact, some of the mechanisms invoked by certain theories likely apply only to children during specific developmental periods. In addition, the way we conceptualize and measure these hypothesized mechanisms needs to be developmentally appropriate. That is, although the underlying mechanisms posited to be important may be the same across development, the *manifestation* of these mechanisms may change over time. Therefore, the measures we use need to be developmentally sensitive to account for this heterotypic continuity in children's development.

Behavioral Responses to Interparental Conflict (Stress)

Several theories of the relation between interparental conflict and child adjustment suggest that children's immediate behavioral responses to conflict are key to understanding how interparental conflict eventually influences child adjustment. More precisely, many of the theories hypothesize that children respond to destructive interparental conflict with distressing emotions or cognitions, which prompt certain behavioral responses. Although there is a wide range of potential behavioral responses, they are often categorized as either involvement or avoidant behaviors (Laumakis, Margolin, & John, 1998; O'Brien, Bahadur, Gee, Balto, & Erber, 1997; Rhoades, 2008; Shelton & Harold, 2008). Involvement behaviors include certain types of antisocial behaviors, such as yelling at the parents or creating a distraction (e.g., fighting with a sibling) to try to get their parents to stop arguing. However, they may also include behaviors that are prosocial in nature, such as attempting to problem-solve with parents or comfort their parents. Common avoidant behaviors include moving to another room or going outside when a conflict erupts. Avoidance has sometimes also been conceptualized to include cognitive avoidance strategies, such as trying not to think about the conflict.

Involving themselves in their parents' conflicts puts children in the midst of what may sometimes be emotionally intense, hostile parental interactions. Contagion theories and related data suggest that children exposed to such situations may take on their parents' angry, aggressive feelings and behaviors themselves (e.g., Cummings & Cummings, 1988; Cummings, Goeke-Morey, & Papp, 2004; Cummings, Iannotti, & Zahn-Waxler, 1985). In addition, some children yell at or argue with a parent to attempt to stop the conflict (Shelton & Harold, 2008), and this aggressive behavior may sometimes succeed in stopping the conflict (Jenkins, Smith, & Graham, 1989). As reviewed earlier under social cognitive theories, this family process in which a child responds to parents' conflict with aggressive behavior and the parents' conflict ceases may reinforce the child's use of aggression, increasing the probability that it will recur and perhaps develop into more generalized aggressive response patterns (Davis, Hops,

Alpert, & Sheeber, 1998; R. E. Emery & Kitzmann, 1995; Patterson, 1982).

Children's involvement in interparental conflict might also lead to or reflect problematic family processes that can have negative consequences for child development. As reviewed earlier, family systems theories suggest that clear boundaries between the marital and child subsystems define appropriate family roles (e.g., who is the parent and who is the child) and predict healthy child functioning (Kerig, 2005; Minuchin, 1974). Children's attempts to get their parents to stop fighting might be conceptualized as a boundary disturbance or breakdown in the family role structure—a form of role reversal. From this perspective, when children attempt to manage their parents' conflicts, they are assuming an adult or parent role within the family. Doing this burdens children with responsibilities well beyond their years, which can be very stressful and lead to negative outcomes (Johnston, Gonzalez, & Campbell, 1987; Kerig, 2005; Peris et al., 2008).

In contrast to involvement in interparental conflict, avoidance behaviors have been theorized to have both positive and negative effects on child adjustment (O'Brien et al., 1995; Shelton & Harold, 2008). For example, successful avoidance shields children from the hostility and coercive and violent tactics sometimes expressed during conflicts or from becoming a target of parental hostility or violence themselves. Because it might be easier for children to modulate their own emotions and thoughts when they physically distance themselves from the conflict, avoidance behaviors may also help children cope with it. Avoidance might also reflect healthy or positive family characteristics. As noted, family systems theorists hypothesize that clear boundaries between the marital and child subsystems predict healthy child functioning (Kerig, 2005; Minuchin, 1974). Avoidance of interparental conflict might thus reflect such clear boundaries.

Children's avoidance of interparental conflict, however, might also lead to negative child outcomes through several different processes. Avoidance of interparental conflict might generalize to other potentially distressing events or interactions. Learning theories suggest that avoidance of interparental conflict might be reinforced if it reduces distressing cognitions and emotions prompted by the conflict. Over time, the relief that comes from avoiding exposure to interparental conflict may lead the child to begin to avoid other life events with the potential to cause distress (Rhoades, 2008). The broader research literature on children's stress and coping is consistent with this idea, suggesting that a disengaged coping pattern, one that includes avoidance, increases risk for internalizing and externalizing child problems (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001).

Avoidance of interparental conflict might also interfere with the development of adaptive skills for managing emotions and cognitions under stress. This hypothesis is consistent with challenge models in the developmental psychopathology literature (Davies & Sturge-Apple, 2007), in which children's exposure to stress, in small doses, is hypothesized to have "steeling" effects, especially if these exposures occur in otherwise supportive contexts. Specifically, exposure to a stressor might inoculate children to subsequent exposures by prompting them to develop effective ways of coping with stress and adversity (Garmezy, Masten, & Tellegen, 1984; Rutter, 1987). As applied to interparental conflict, challenge models suggest that exposure to destructive interparental conflict can help children develop effective skills for dealing with it, as well as for dealing with other difficult, stressful situations. Therefore, avoiding interparental conflict might interfere with the development of those skills.

Basic developmental processes might play a role in predicting children's behavioral responses to interparental conflict. For example, research on the developmental neurobiology of traumatic stress (Pynoos, Steinberg, Ornitz, & Goenjian, 1997) suggests that it is not until approximately age 8 that children begin to actively entertain thoughts of personally addressing or disarming the source of the stress, in contrast to avoiding or escaping it. Similarly, as their cognitive processes develop, children also begin to weigh the benefits and risks of behaviorally responding to their parents' conflict. In mild conflict, the risk to the child of misbehaving or otherwise intervening to derail or stop the conflict may be low, and this strategy therefore may be effective. The risk of intervening in conflict that involves physical aggression is higher; however, children may nonetheless intervene if they perceive the risk of *not* intervening to be even greater. Although young children sometimes intervene in order to stop their parents' fighting, the use of this strategy is expected to be more common among older children (preadolescent or adolescent) (Davies, Myers, & Cummings, 1996; Shelton & Harold, 2007). It is also noteworthy that intervening in interparental conflict is more closely associated with child adjustment problems among older (over 10 years), as compared to younger, children (Rhoades, 2008).

The empirical literature linking involvement in and avoidance of interparental conflict to child adjustment problems is mixed. Most studies have found involvement and avoidance both to be positively associated with child adjustment problems (e.g., Davies, Forman, et al., 2002;

Nicolotti, El-Sheikh, & Whitson, 2003; Shelton & Harold, 2008). However, the opposite has been found, as well, particularly with child avoidance. For example, O'Brien, Margolin, and John (1995) found children's avoidance of interparental conflict to be negatively associated with child anxiety symptoms, and Kerig and colleagues (1998) found girls' avoidance of interparental conflict to be negatively associated with externalizing problems.

Characteristic Coping Behaviors and Cognitive Styles

Related to the section on children's immediate behavioral responses to interparental conflict, some children may have characteristic ways of coping with stressful events, which might moderate associations between interparental conflict and child adjustment problems. In fact, some theorists have conceptualized children's immediate behavioral responses to interparental conflict as coping behaviors (e.g., Kerig, 2001). The few studies that have examined children's coping behaviors as potential moderators of the association between interparental conflict and child adjustment problems have yielded intriguing results. Nicolotti, El-Sheikh, and Whitson (2003), for example, found that a combination of support and active coping (e.g., having other people listen to their feelings about problems; planning or thinking about ways to solve problems) moderated associations between IPV and child adjustment problems. Interestingly, this form of coping served a protective function for girls; higher levels of support and active coping mitigated the association of IPV with depression and self-esteem difficulties. However, this coping style increased the magnitude of these associations for boys. Rogers and Holmbeck (1997) also found the association between IPV and child adjustment problems to be weaker among children who made greater use of social supports. (Sex differences were not examined.)

Other characteristic coping behaviors have also been found to moderate associations between interparental conflict and child adjustment problems. Nicolotti and colleagues (2003) found that greater avoidance coping (e.g., avoiding the problem by physically leaving, staying away from it, or imagining it to be better) is associated with a stronger relation between parental IPV and children's externalizing and internalizing problems and self-esteem difficulties. In contrast, distraction coping (e.g., engaging in physical activity or entertainment activities to avoid thinking about the problem) functioned as a protective variable, weakening the association between IPV and child depressive symptoms. Drawing from the broader literature on child coping may help refine our understanding of how children's responses to interparental conflict can contribute to the development of adjustment problems. For example, children's perceptions of how much control they have over their parents' relationship, and their ability to predict interparental conflict (Compas, 2009)—key factors in understanding why psychological stress is harmful to one's mental health—may be important factors to consider as well.

The broader literature on psychopathology, particularly on depression, suggests that certain cognitive styles or predispositions interact with the occurrence of stressful environmental events to produce depressive symptomatology. For example, models of depression suggest that a negative attributional style (a predisposition to explain stressful or negative events in a particular way) increases risk for depressive symptoms when negative or stressful life events occur (e.g., Metalsky, Joiner, Hardin, & Abramson, 1993). Although research has yielded data consistent with this hypothesis, in one study in which interparental conflict was conceptualized as the stressor (O'Donnell, Moreau, Cardemil, & Pollastri, 2010), a pessimistic attributional style reduced children's risk for depressive symptoms in response to interparental conflict. Although this result was not expected and is somewhat difficult to interpret, it helps illustrate that the integration and application of broad theories on the development of psychopathology might enrich our understanding of the association between interparental conflict and child adjustment problems.

It should also be acknowledged that children's threat and self-blame appraisals of their parents' conflict typically are thought of as mediators of the link between interparental conflict and child adjustment problems, but several investigators have also conceptualized them as moderators. This conceptualization is similar to that described earlier for theories of depression, in which children are proposed to have cognitive predispositions toward interpreting and explaining negative events in a particular manner. With threat and self-blame appraisals, children may have characteristic ways of viewing interparental conflict or conflictual interactions in general (e.g., as potentially escalating and spilling over into other interactions), and this cognitive style might moderate the link between interparental conflict and child adjustment problems. A study by Kerig (1998) found some evidence of this: Children's self-blame and threat appraisals potentiated some of the associations examined between interparental conflict and child adjustment problems. However, others have failed to find such moderation effects (e.g., Grych, Fincham, McDonald, & Jouriles, 2000).

Neurobiological Responses to Interparental Conflict (Stress)

Considering child attributes in general, and biological factors such as children's physiological responses to stress specifically, will likely help explain the multifinality of child outcomes in the context of interparental conflict and offer more precision in delineating pathways to specific child outcomes. Researchers have noted that physiological reactivity, regulation, and recovery in response to stress may modify the type and severity of child adjustment problems that develop in the context of interparental conflict (El-Sheikh & Erath, 2011; Steinberg & Avenevoli, 2000). Biological responses to stress may serve as a vulnerability (i.e., risk) factor to exacerbate relations between interparental conflict and child adjustment, or may serve as a protective factor to buffer children from the negative consequences of exposure to interparental conflict.

Exposure to stress elicits responses from the autonomic nervous system (ANS) and the HPA axis. Children's ANS functioning has more commonly been examined as a moderator of relations between interparental conflict and child adjustment problems, whereas HPA axis functioning (e.g., cortisol reactivity, recovery, or diurnal patterns) has more commonly been tested as a mediator. This is consistent with direct-effect models based on trauma theory (described earlier), which posit that exposure to interparental conflict predicts changes in HPA axis functioning, which in turn is responsible for later adjustment problems (e.g., Davies, Sturge-Apple, & Cicchetti, 2011; Davies, Sturge-Apple, Cicchetti, Manning, & Zale, 2009; Koss et al., 2013; Lucas-Thompson, 2012; see also Repetti, Robles & Reynolds, 2011, for theoretical discussion of risky families and HPA axis functioning). This section focuses on research that documents children's ANS activity as a moderator of relations between interparental conflict and child adjustment.

The ANS is responsible for involuntary functions, such as cardiovascular functioning and respiration, and is involved in the human stress response. El-Sheikh and Erath (2011) outlined five ways that ANS activity may increase risk for, or protect against, children's adjustment problems in the context of family conflict: (1) Baseline levels of ANS activity may affect how ready children are to respond to interparental conflict. In addition, ANS activity may (2) indicate how sensitive children are to the effects of interparental conflict, (3) influence children's emotions, cognitions, and behavior in response to interparental conflict in the short term, (4) influence activity of other stress response systems, like the HPA axis, and (5) change the response of other systems over time so that they become dysregulated.

The ANS is divided into two branches, the parasympathetic nervous system (PNS) and the SNS. Both are considered to be stable, individual difference variables, supporting their role as moderators of relations as opposed to mediators. For example, indicators of PNS (El-Sheikh, 2005; Hinnant, Elmore-Staton, & El-Sheikh, 2011) and SNS (El-Sheikh, 2007; Hinnant et al., 2011) activity have been found to be stable among school-age and early adolescent children over a 2- to 3-year time period. However, ANS functioning in infancy and early childhood may be more malleable and, therefore, less likely to serve as a moderator during those developmental periods (El-Sheikh & Erath, 2011).

The PNS supports resting functions and serves to decrease heart rate, dilate blood vessels, and increase digestive and reproductive efforts. Reduced PNS activity, or vagal withdrawal (also referred to as vagal suppression), is an automatic response to stress. It allows diversion of resources to deal with the stressor, including engaging attention, gathering and processing information, and using appropriate response strategies. Physiologically, reduced PNS activity results in rapid, moderate increases in heart rate. Once the stressor has diminished, PNS activity increases again to return the organism to a resting state. In general, vagal withdrawal is an adaptive response to stress and is related to positive outcomes (Beauchaine, 2001, 2012; Calkins & Keane, 2004; Porges, 2007). Extreme vagal withdrawal, however, or vagal augmentation (increased PNS activity during stress) is considered a maladaptive response to stress and is related to negative physical and mental health outcomes (Beauchaine, 2012; Bornstein & Suess, 2000; Calkins, Graziano, & Keane, 2007).

Respiratory sinus arrhythmia (RSA), which is the rhythmic fluctuation in heart rate during phases of the breathing cycle, is used as a measure of PNS activity. Baseline levels of RSA are used to index vagal tone and RSA change from baseline during stress reflects PNS reactivity. In the context of interparental conflict, research has found that low baseline RSA is a vulnerability factor; children with low levels of baseline RSA have greater internalizing, externalizing, and physical health problems (e.g., Dietrich et al., 2007; El-Sheikh, Harger, & Whitson, 2001; Katz & Gottman, 1995). Decreased RSA activity, indicative of PNS withdrawal, is protective, whereas increased RSA activity (or less withdrawal) has been found to exacerbate the negative relation between interparental conflict and child adjustment problems (El-Sheikh & Whitson, 2006; Katz, 2007; Leary & Katz, 2004). For example, El-Sheikh

and Whitson (2006) found an interaction between vagal withdrawal and marital conflict, such that for girls, vagal withdrawal to a lab stressor was associated with fewer internalizing problems 2 years later in the context of high interparental conflict. Notably, although most research has focused on school-age and older children, G. A. Moore (2010) found that interparental conflict was related to lower baseline RSA and less RSA withdrawal among 6-month-olds during a still-face paradigm. This study, however, did not test RSA and RSA reactivity as a moderator of relations between interparental conflict and infant adjustment.

Activation of the SNS during stress prepares the body for the flight-or-fight response, resulting in increased heart rate, blood pressure, and oxygen flow throughout the body and mobilizing the body to respond to stress. In the short term, SNS activation is adaptive; however, chronic activation may lead to "wear and tear" on the body, resulting in physical and mental health problems. Noninvasive measures of the SNS include skin conductance level (SCL), and pre-ejection period (PEP), which measures the time between heart beat onset and the ejection of blood into the aorta. Changes from baseline in SCL and PEP during stress or a challenge task assess SCL reactivity and PEP reactivity, respectively. Increases in SCL and decreases in PEP (i.e., shorter intervals) as compared to baseline levels reflect greater SNS activity, and are associated with increases in heart rate. In the context of interparental conflict, children who exhibit high SCL reactivity have higher levels of adjustment problems, particularly among girls (El-Sheikh, 2005; El-Sheikh, Keller, & Erath, 2007). Fewer studies have examined PEP as a moderator in the context of interparental conflict. Obradović, Bush, and Boyce (2011) found that children who showed decreased PEP from baseline during a task (indicating increased SNS activity, and referred to as high PEP reactivity in this study) had elevated internalizing problems in the context of high marital conflict as compared to children who showed increases in PEP during a challenge task.

Most of the previous research has examined PNS and SNS functioning as separate moderators, but recent theoretical perspectives advocate examining *interactions* between PNS and SNS functioning (Berntson & Cacioppo, 2004; Del Guidice, Hinnant, Ellis, & El-Sheikh, 2012; El-Sheikh & Erath, 2011). The PNS and SNS do not operate in isolation, and interaction models may better capture children's stress responses. Children's risk for adjustment problems in the context of interparental conflict, therefore, may not rest solely on how one of these systems operates but rather on whether these two systems work in tandem to promote the same directional response.

For example, the adaptive calibration model (Del Guidice, Ellis, & Shirtcliff, 2011) posits four prototypical response patterns to stress, some more adaptive than others. The response patterns are sensitive, buffered, vigilant, and unemotional. Berntson and Cacioppo's (2004) doctrine of autonomic space also proposed four response patterns, which clearly map onto measurements of PNS and SNS cardiac-related activity. These include reciprocal parasympathetic activation (PNS activation, SNS inhibition), reciprocal sympathetic activation (SNS activation, PNS inhibition), coactivation (PNS activation, SNS activation), and coinhibition (PNS inhibition, SNS inhibition). Salomon, Matthews, and Allen (2000) found that reciprocal sympathetic activation is a normative response to stress in children.

In three independent cross-sectional samples, El-Sheikh and colleagues (2009) examined interactions between PNS activity, SNS activity, and interparental conflict in the prediction of children's externalizing behavior problems. The results were consistent across samples and reporters (parents, teachers): Coactivation and coinhibition of the PNS and SNS placed children at increased risk for externalizing problem in the context of marital conflict. In contrast, reciprocal parasympathetic and reciprocal sympathetic activation operated as a protective factor. The results suggested that coordinated actions of the PNS and SNS buffer children from the adverse effects of interparental conflict. In a longitudinal study, El-Sheikh, Keiley, Erath, and Dyer (2013) also found evidence that coinhibition may be a risk factor for poor adjustment. Children who showed coinhibition to a laboratory challenge task had increasing trajectories of depressive symptoms over a 3-year period in the context of interparental conflict. However, they also found that reciprocal parasympathetic activation was related to elevations in depressive symptoms, which is inconsistent with El-Sheikh et al. (2009).

Interactions may occur not only between PNS and SNS functioning but also between baseline and reactivity levels within the same system. For example, Hinnant and El-Sheikh (2009) found that interactions among interparental conflict, baseline level of RSA, and RSA reactivity, such that low baseline levels of RSA in the context of higher RSA suppression strengthened the positive association between marital conflict and internalizing problems 2 years later, whereas low baseline levels of RSA in the context of RSA augmentation (increases in RSA activity) predicted greater externalizing problems 2 years later for children experiencing higher levels of interparental

conflict. In other words, although low basal levels of RSA are related to greater child adjustment problems, RSA regulation (withdrawal/suppression versus augmentation) may buffer children from experiencing problems or further exacerbate child adjustment problems in the context of interparental conflict.

Finally, although HPA axis activity can be conceptualized as a mediator of relations between interparental conflict and child adjustment, there is some evidence that it may interact with PNS reactivity to predict child adjustment problems. Specifically, across two samples, El-Sheikh, Arsiwalla, Hinnant, and Erath (2011) found that children with the lowest levels of anxiety and depression symptoms showed a pattern of higher basal cortisol levels and higher basal RSA. Future research may consider examining interactions between HPA and ANS functioning in the context of interparental conflict in predicting children's adjustment. Alternatively, ANS functioning may alter the mediating role of the HPA axis in the interparental conflict–child adjustment link (i.e., moderated mediation).

The role of children's biological responses to stress as moderators may be more complex than previous research has documented. Whereas the research discussed earlier shows that low basal PNS activity, less PNS withdrawal or PNS augmentation, and higher SNS reactivity are risk factors, exacerbating the risk of child adjustment problems in the context of interparental conflict, recent perspectives in the literature call for research to move beyond diathesis–stress or "dual-risk" models (Belsky & Pluess, 2009; Ellis, Boyce, Belsky, Bakermans-Kranenburg, & Van Ijzendoorn, 2011). Based on developmental-evolutionary models, biological sensitivity to context theory (Boyce & Ellis, 2005; Ellis, Essex, & Boyce, 2005) and differential susceptibility to environmental influences theory (Belsky, 1997; Belsky & Pluess, 2009) propose that the biological factors, including neurobiological factors (e.g., pattern of physiological responding to stress), that place children at risk for adjustment problems in the context of adverse environments are the same factors that allow children to thrive in positive environments. For example, biological sensitivity to context theory would predict that there is a curvilinear relation between heightened ANS functioning (as well as adrenocortical and other stress responses) and interparental conflict in predicting children's adjustment problems. That is, whereas children with increased RSA or SNS reactivity may be at increased risk for adjustment problems in the context of destructive interparental conflict, they may also be more sensitive to the positive effects of secure, stable, and positive interparental relationships. Differential susceptibility to environmental influences theory suggests further that there will be no association between destructive interparental conflict and child adjustment among children who do not have heightened RSA or SNS reactivity.

Genetic Influences

A goal of behavioral genetics research is to tease apart the relative contributions of genetic and environmental influences on behaviors. Recent behavioral genetics studies have focused on these sources of influence in the cascade of effects from interparental conflict through parenting to child adjustment. In an elegantly designed study, Harold and colleagues (2013) found compelling evidence of environmental, rather than genetic, influences for the relation between interparental conflict and hostile parenting and for the mediating role of hostile parenting in the relation between interparental conflict and children's externalizing problems. Moreover, across varying levels of parents' genetic relatedness to their children (i.e., neither parent, mother only, father only, or both parents genetically related to the child), they found the magnitude of the effect of interparental conflict on hostile parenting to be stronger for fathers than for mothers. Finding greater effects of interparental conflict on fathering than mothering converges with findings from other studies on interparental conflict and parenting (e.g., Davies, Sturge-Apple, Woitach, & Cummings, 2009).

In a related study, Harold, Elam, Lewis, Rice, and Thapar (2012) examined links among interparental conflict, hostile parenting, and parent and child antisocial behavior. They found fathers' parenting and fathers' antisocial behavior predicted child antisocial behavior indirectly via fathers' parenting in genetically related and genetically unrelated father-child pairs. For mothers, however, only mothers' antisocial behavior mediated the link between interparental conflict and child antisocial behavior in genetically unrelated mother-child pairs. In genetically related pairs, both mothers' parenting and mothers' antisocial behavior mediated the link. Studies such as this, which consider multiple pathways of influence, will be important for articulating how, and how much, the effect of interparental conflict on child adjustment differs across mothers and fathers.

The design of the Harold et al. (2013) study controlled for the effects of passive genotype-environment correlation (i.e., shared genetic factors underlie and thus influence parent and child behavior) on the links between interparental conflict, parenting, and child adjustment. It did not examine evocative genotype-environment correlations—that is,

whether genetically influenced child behaviors may have evoked particular parenting responses (i.e., commonly referred to as child effects). A study examining whether interparental conflict moderates evocative child effects on parenting found evidence for genetic as well as environmental child evocative effects and also found that those effects are moderated by interparental conflict (Ulbricht et al., 2013). The study employed a large sample that included monozygotic twin pairs; dizygotic twin pairs; sibling pairs from nondivorced families; and sibling, half-sibling, and unrelated sibling pairs from stepfamilies, allowing careful parsing of genetic and environmental effects. Child-based genetic effects, along with shared and nonshared environmental (child) factors were associated with mothers' and fathers' negative parenting, and these effects varied across levels of interparental conflict. Specifically, as marital adjustment declined, evocative child effects on parenting increased, while the role of shared family experiences declined. However, there were some differences in the pattern of specific relations of marital adjustment variables (e.g., global maladjustment, conflict over children) on child-based genetic and child-specific nonshared environmental effects on parenting across mothers and fathers. As interparental conflict increased, fathers' negative parenting was more influenced by nonshared environmental effects whereas mothers' negative parenting was more influenced by their children's genetically mediated characteristics. Assuming the commonly accepted idea of parenting serving to mediate the relation between interparental conflict on child adjustment, findings from this study are consistent with a dynamic process in which both interparental conflict and individual characteristics of the child affect parenting, which in turn affects child adjustment. What this study adds is that child effects on parenting are stronger in families with greater interparental conflict.

In contrast to behavioral genetics research, molecular genetics focuses on understanding effects of particular genes and genetic configurations on behavior. Molecular genetics studies have shed light on several aspects of the link between interparental conflict and child adjustment. For example, Sturge-Apple, Cicchetti, Davies, and Suor (2012) examined whether differential susceptibility to environmental influences (see Belsky, 1997 for details of this theory) might explain variation in the link between interparental conflict and parenting sensitivity. In this study, investigators examined oxytocin receptor (OXTR) and serotonin transporter (5-HTT) genes—both of which have been previously linked (albeit not in consistent ways) to parenting (Bakermans-Kranenburg & van IJzendoorn, 2008; Mileva-Seitz et al., 2011)—as moderators of the relation between interparental conflict and mothers' parenting sensitivity. Results were consistent with differential susceptibility theory. For OXTR rs53576, mothers with the GG genotype showed greater differential maternal sensitivity at different levels of interparental conflict; for the 5-HTT promoter polymorphism, mothers with one or two copies of the short allele demonstrated differential susceptibility for both sensitive and harsh parenting.

In a study examining etiological pathways to two child disorders that often covary (attention-deficit/hyperactivity disorder [ADHD] and oppositional defiant disorder [ODD]), Martel and colleagues (2012) found moderating effects of the 5-HTT promoter polymorphism on the relation between children's self-blame for interparental conflict and symptoms of ODD. Children with the short allele of the 5-HTT promoter polymorphism experienced greater ODD symptomatology regardless of their level of self-blame for interparental conflict, whereas those without the short allele had greater ODD symptomatology when self-blame for interparental conflict was higher.

The studies reviewed in this section serve as examples to help illustrate the complexity and interplay of the biological, psychological, and social processes that govern the ways that family conflict and parenting shape child adjustment, and vice-versa. Research using genetically sensitive designs, such as those described, and careful consideration of the issues raised by these studies, such as genetic and environmental sources of influence, shared versus nonshared environmental influence, the influence of mothers' versus fathers' parenting, the directionality of effects (e.g., child evocative effects), and the precise nature of the effects (e.g., direct, mediated, moderated, and moderated effects consistent with differential susceptibility), can greatly sharpen theory and knowledge on the variability in outcomes among children exposed to interparental conflict.

Interparental Conflict and the Broader Family and Community Context

Children are embedded in their families, which are in turn embedded in a complex network that includes peer groups, neighborhoods, and broader cultural contexts. Cumulative risk models of child psychopathology highlight the potential importance of considering these different contexts when attempting to understand the association between interparental conflict and child adjustment. Specifically, destructive interparental conflict commonly occurs in family contexts in which there are also other types of family problems (e.g., parental psychopathology, parental criminal behavior, economic stressors, etc.). Cumulative risk models suggest that it is the accumulation of family problems, rather than the presence of any single type of

family problem, that is responsible for child adjustment problems. In other words, this perspective suggests that destructive interparental conflict may not be sufficient to produce child adjustment problems, especially if it occurs alone or in isolation from other family problems. However, destructive interparental conflict, in combination with other family problems, is hypothesized to be much more likely to lead to child adjustment problems.

Quite a bit of empirical evidence has amassed that is consistent with certain facets of these cumulative risk models of child adjustment problems, and many of these studies have included interparental conflict as one of the risk factors. For example, Rutter (1979) examined the influence of multiple risk factors for child adjustment problems (e.g., severe marital discord, paternal criminality, maternal mental disorder) and found that the accumulation of risk factors had an exponential association with child adjustment problems. Specifically, the presence of an isolated family stressor did not increase risk for child adjustment problems; in contrast, the presence of two family stressors resulted in a fourfold increase in child adjustment problems, and the presence of four or more family stressors resulted in a tenfold increase in child adjustment problems. Appleyard, Egeland, van Dulmen, and Sroufe (2005) similarly examined the influence of multiple risk factors (e.g., IPV, child maltreatment, low SES) for child adjustment problems, and these investigators found evidence for a linear relation between the number of risk factors present and child adjustment problems, but no evidence for the exponential association.

In this section of the chapter, we focus on documented interactions between interparental conflict and other variables in the prediction of child adjustment problems. That is, we focus on family and community variables that have been found to moderate associations between interparental conflict and child adjustment problems. These variables include direct associations between interparental conflict and child adjustment problems as well as indirect associations involving mediating pathways (moderated mediation). Although we cover variables that have been found to amplify risk for child adjustment problems, we emphasize those that have been found to mitigate risk. We organize this section around three topics: attributes of the family, peer relationships, and community attributes.

Attributes of the Family

A commonly advanced hypothesis is that positive aspects of the parent-child relationship protect children from the adverse effects of interparental conflict. Consistent with this, several investigators have found positive parenting behaviors or a positive parent-child relationship to buffer children from the adverse effects of destructive interparental conflict. Frosch and Mangelsdorf (2001), for example, found that observers reported more child behavior problems when the children's parents exhibited higher levels of interparental conflict and mothers were less warm and supportive in their parenting. However, if mothers were more warm and supportive in their parenting, fewer child behavior problems were reported, even in the presence of higher levels of interparental conflict. Similarly, others have found a positive parent-child relationship to weaken the association between destructive interparental conflict and child adjustment problems (e.g., Davies, Harold, Goeke-Morey, & Cummings, 2002; Kennedy, Bybee, Sullivan, & Greeson, 2010; Skopp, McDonald, Jouriles, & Rosenfield, 2007). In addition to finding that parental warmth and positive parental behaviors (e.g., affection, engagement, positive structuring, and responsiveness) mitigate the association between interparental conflict and a variety of negative child outcomes, Katz and Gottman (1997) found that parental "emotion coaching" (acting as a coach for the child during their child's stressful times and emotional moments—teaching the child to identify and regulate emotions) reduced the magnitude of the association between interparental conflict and child adjustment. Katz, Hunter, and Klowden (2008) replicated this, finding that mothers' emotion coaching reduced the magnitude of the association between IPV and children's odd behavior during a peer provocation.

Several investigators have attempted to examine how parents' conversations with their children about interparental conflict might influence child adjustment problems. McDonald, Jouriles, Rosenfield, and Leahy (2011) examined mothers' responses to children's questions about interparental conflict in a sample of families in which there was a recent incident of IPV. They found that the extent to which mothers' responses addressed the explicit content of their children's questions about interparental conflict was negatively associated with child adjustment problems. This finding is consistent with those reviewed in the preceding paragraph, suggesting that positive aspects of the parent-child relationship may buffer children from the adverse effects of destructive interparental conflict. Gomulak-Cavicchio, Davies, and Cummings (2006) also examined mothers' communications with children about their disputes, but these investigators found that maternal communications highlighting family stability and warmth appeared to magnify the risk posed by interparental conflict. These authors were prudent in their interpretation of this counterintuitive finding, but the finding is not inconsistent with the finding of McDonald et al. That is, it may be that answering the child's specific questions,

rather than offering general comfort or a sense of safety, may help a child better cope with interparental conflict. Collectively, findings on the effects of positive parent-child communications and/or positive parent-child relationships suggest that they are likely to be more complex than a simple buffering or protective hypothesis might suggest.

To offer an example of this complexity, we highlight a finding in a study conducted by Skopp, McDonald, Jouriles, and Rosenfield (2007). In this study, parental warmth toward the child (operationalized by items such as "I comfort my child when he/she seems scared, upset or unsure" and "My child and I hug and/or kiss each other") was examined as a moderator of the association between men's IPV and child externalizing problems. The findings were complex and differed for mothers' and fathers' warmth expressed toward male and female children. However, one of the more interesting findings was that men's IPV related positively to child externalizing problems in families where the men were warmer toward the child. This finding is generally consistent with the finding reported by Gomulak-Cavicchio, Davies, and Cummings (2006), in that a presumably positive parent-child interaction appeared to amplify the risk associated with interparental conflict. It is also consistent with findings in other literatures suggesting that the risk for child conduct problems is amplified when antisocial fathers are highly involved in their children's care (Jaffee, Moffitt, Caspi, & Taylor, 2003) as well as with the social cognitive theory explanation that children are more likely to emulate an adult's behavior when they share a warm bond with that adult (Bandura, 1986). Again, the effects of positive parent-child communications and/or positive parent-child relationships appear to be complex.

Parents' relationships with others in the family may also have an impact on how interparental conflict affects child adjustment, and in equally complex ways. Fosco and Grych (2007) assessed how often parents expressed positive affect toward family members (the specific target of the positive affect was not specified) and found that the association between interparental conflict and child adjustment problems was slightly stronger for families in which the parents expressed greater positive affect. In other words, more frequent expression of parental positive affect in the family appeared to exacerbate rather than buffer against the effect of interparental conflict on child adjustment. Fosco and Grych were appropriately cautious in interpreting this result. Nonetheless, this counterintuitive finding points to the inherent complexity in how family interactions transact with interparental conflict in the prediction of child adjustment problems.

Maternal symptoms of psychopathology have also been found to moderate associations between children's exposure to interparental conflict and child adjustment problems. Specifically, maternal depressive symptoms and psychological distress amplify associations between children's exposure to IPV and child adjustment problems of preschoolers (Martinez-Torteya, Bogat, von Eye, & Levendosky, 2009), school-age children (Levendosky & Graham-Bermann, 2000), and adolescents (Levendosky, Huth-Bocks, & Semel, 2002). Levendosky and colleagues (2002) have offered several hypotheses for children's increased vulnerability to the effects of IPV in the context of maternal depression. These explanations involve other family processes, such as mothers' diminished emotional availability to their children when experiencing both IPV and depression, and children having to take on more of a caregiver role within the family.

High rates of co-occurrence for IPV and physical child abuse (Appel & Holden, 1998; Jouriles et al., 2008) have sparked investigations of the joint effects of these two forms of family violence on child functioning. Although the results of these studies are not entirely consistent, most investigators report evidence for additive effects. That is, both forms of family violence appear to contribute independently to subsequent child adjustment problems (Jouriles, Mueller, Rosenfield, McDonald, & Dodson, 2012; Litrownik, Newton, Hunter, English, & Everson, 2003). Attempts to document multiplicative effects (e.g., show that the presence of child abuse amplifies associations between IPV and child adjustment problems) have generally not been successful (Litrownik et al., 2003).

Peer Relationships

An important task during childhood is the development of beneficial and satisfying peer relationships. Acquiring the ability to develop and maintain meaningful peer relationships is among the most important developmental tasks during middle childhood and adolescence, and peer problems, although not technically a psychological disorder, might rightfully be conceptualized as a type of child adjustment problem. In fact, peer problems are characteristic of a wide range of child psychological disorders. As one might expect from the research reviewed thus far, interparental conflict has consistently been found to be associated with children's problematic peer relationships (e.g., Erel et al., 1998; Gottman & Katz, 1989; McHale et al., 1999; Stocker, Ahmed, & Stall, 1997; Stocker & Youngblade, 1999).

When considering children's peer relationships in the link between interparental conflict and child adjustment

problems, the question becomes whether peer relationships can influence what is arguably a within-family process. Wasserstein and LaGreca (1996) found that support from a close friend moderated the link between interparental conflict and grade-school children's adjustment problems; interparental conflict was associated with child problems only among children who had received low levels of support from a close friend. Rogers and Holmbeck (1997) found that a measure of peer avoidance (interpreted as perceived peer availability) moderated the association between IPV and child adjustment problems, so that children in high-conflict families who reported greater peer availability had fewer adjustment problems than their counterparts in high-conflict families who reported less peer availability. Criss, Pettit, Bates, Dodge, and Lapp (2002) reported a similar moderator effect in a longitudinal study with a sample of younger children (kindergarten to second grade). Specifically, marital conflict was associated with externalizing problems only among children with low levels of peer acceptance.

Community

Families, of course, are nested within the broader context of communities. There has been speculation, but little research, on whether children's exposure to interparental conflict and violence in the family interacts with aspects of the family's community in influencing child development (Cicchetti & Lynch, 1993). On the other hand, the concept of polyvictimization—experiencing multiple types of violence across multiple settings— has begun to attract considerable attention among child victimization researchers (Finkelhor, Ormrod, & Turner, 2007). This is because it is becoming increasingly clear that exposure to multiple types of violence (e.g., violence between the parents, violence within the community, violence at school) is much more likely than exposure to a single, isolated type (Margolin et al., 2009).

In general, research on polyvictimization suggests that children who are exposed to multiple types of violence fare worse than those exposed to a single type of violence. For example, Mrug, Loosier, and Windle (2008) found that cumulative violence exposure across settings (home, school, and community) was a stronger correlate of adolescents' externalizing and internalizing problems than exposure in any single setting. Similarly, Margolin, Vickerman, Oliver, and Gordis (2010) found that an index of children's cumulative violence exposure (including IPV, community violence, and parent-to-youth aggression) was a stronger predictor of youth problems than violence exposure in any single domain. What is less clear is how these different types of violence exposure might interact with one another in predicting child adjustment problems. Investigations of how children's exposure to different types of violence interact with one another often provide no evidence of interaction effects (e.g., Kennedy, Bybee, Sullivan, & Greeson, 2010), or interactive effects that are contrary to expectations. For example, in a prospective study, high levels of community violence exposure mitigated relations between witnessing IPV and adolescents' anxiety, depression, and delinquency (Mrug & Windle, 2010). Possible explanations for this result include the idea that IPV might simply be less salient to (and perceived as a more normal phenomenon for) adolescents whose environments also include community violence.

There are a number of studies on how poverty or low family SES might moderate the association between interparental conflict and child problems. As noted, cumulative stress models of child psychopathology (e.g., Rutter, 1979) suggest that living in poverty might potentiate associations between interparental conflict and child adjustment problems, and findings from early studies were consistent with this hypothesis. For example, Jouriles, Bourg, and Farris (1991) found that marital arguments were more strongly associated with child conduct problems in families of lower, rather than higher, SES. However, more recent research suggests that the joint effects of these two family stressors may not be that clear cut. El-Sheikh and colleagues (2008) examined SES as a moderator of the emotional security theory explanation for the link between interparental conflict and child adjustment problems, and they found no differences based on high or low SES. Yoo and Huang (2012) found that poverty moderated associations between IPV and child adjustment problems, but the magnitude of the association was smaller among impoverished families.

Culture

Many of the associations between specific forms of interparental conflict and child adjustment problems have been documented in different countries and cultural contexts. Similarly, associations between hypothesized mediators of the relation between interparental conflict and child problems have been linked to child problems in different cultural contexts. To offer some concrete examples, the longitudinal association between witnessing parental IPV during childhood or adolescence and being involved in a violent relationship as an adolescent or young adult has been documented in many different samples within the United States (e.g., Amato & McNeal, 1998; Cui, Durtschi, Donnellan, Lorenz, & Conger, 2010; Ehrensaft, Cohen, & Brown, 2003; Ireland & Smith, 2009; Linder & Collins,

2005) as well as in samples in Canada (Wolfe, Wekerle, Scott, Straatman, & Grasley, 2004), New Zealand (Fergusson, Boden, & Horwood, 2006), and the Philippines (Fehringer & Hindin, 2009). Associations between children's appraisals of interparental conflict as threatening and child internalizing problems have been observed in the United States (e.g., Grych et al., 2000), Canada (Kerig, 1998), Wales (Davies, Harold, Goeke-Morey, & Cummings, 2002), and Australia (Dadds, Atkinson, Turner, Blums, & Lendich, 1999). Bradford and colleagues (2003) found evidence for the hypothesis that interparental conflict affects child adjustment indirectly through disruptions to parenting in samples of adolescents from Bangladesh, Bosnia, China, Colombia, India, Germany, Palestine, South Africa, and the United States. Experimental studies of children's immediate responses to conflict between adults have been observed to be similar among United States and Israeli children (Shamir, Cummings, Davies, & Goeke-Morey, 2005) and among children from Welsh families (Davies et al., 2002; Goeke-Morey, Cummings, Harold, & Shelton, 2003). Children's emotional security as a mediator of relations between interparental conflict and child adjustment problems has been documented with families from the United States (e.g., Cummings, Schermerhorn, Davies, Goeke-Morey, & Cummings, 2006) and Wales (Davies et al., 2002). In short, it appears that many of the documented relations between interparental conflict and child adjustment problems are not specific to any particular culture.

What is much less clear is how specific aspects or dimensions of one's culture might influence associations between interparental conflict and child adjustment problems. In general, there is a dearth of theory specific to this topic, with several notable exceptions. For example, McLloyd and colleagues (2002) have discussed the potential importance of extended family networks and have suggested that relations between interparental conflict and child adjustment problems may be weaker among ethnic minorities in the United States because of their extended family networks. Such extended family networks are hypothesized to provide support to family members and presumably buffer children from the negative impact of conflict exposure. Empirical support for this particular hypothesis is mixed, with some researchers finding results that could be interpreted as consistent with this argument (e.g., Tschann, Flores, Pasch, & VanOss Marin, 1999) and others not (e.g., El-Sheikh et al., 2008). Developing sound theoretical explanations for possible differences across cultures and then examining cultural differences in the association between interparental conflict and child adjustment remains an important direction for future research.

TRANSLATIONAL IMPLICATIONS

For many, *translational research* refers to the formation of clinical interventions through the use of scientific knowledge. Applied to the topic of this chapter, translational implications might be conceptualized to refer to the ways in which knowledge about the association between interparental conflict and child adjustment might be used to help promote healthy child development. Of course, one simple answer to this question is preventing children's exposure to destructive interparental conflict. Doing this might involve the deployment of intervention programs targeted at couples with children, such as programs that attempt to develop healthy and effective conflict resolution skills. However, preventing or halting destructive interparental conflict is not always simple or easy. Even the severing of a couple's intimate relationship (divorce, separation) does not always result in children no longer being exposed to destructive interparental conflict. Furthermore, what should be done once children have already been exposed to destructive interparental conflict?

This section starts with a review of empirically supported interventions for children who have been exposed to interparental conflict. We begin with those interventions designed specifically for children exposed to interparental conflict; most of these interventions focus on children who have been exposed to IPV. Next, we review interventions that focus on reducing destructive interparental conflict and interventions that are salient to children's exposure to interparental conflict but that do not focus specifically on children exposed to violence. Our review of interventions is comprehensive, but it is not intended to be exhaustive. We hope that it is illustrative, however, providing readers with an idea of the breadth of interventions pertinent to this topic as well as ideas for further intervention work in this area.

Figure 12.1 summarizes the various mechanisms and pathways by which interparental conflict is believed to influence child adjustment. This diagram summarizes the theory and data reviewed in earlier sections and provides an organizing framework for discussing the translational implications of research on children's exposure to interparental conflict.

Interventions Designed for Children Exposed to IPV

Project Support

Project Support (Jouriles et al., 2001, 2009; McDonald, Jouriles, & Minze, 2011) was originally designed to reduce conduct problems among children, ages 3 to 8 years, who had been exposed to frequent and severe IPV. Conduct

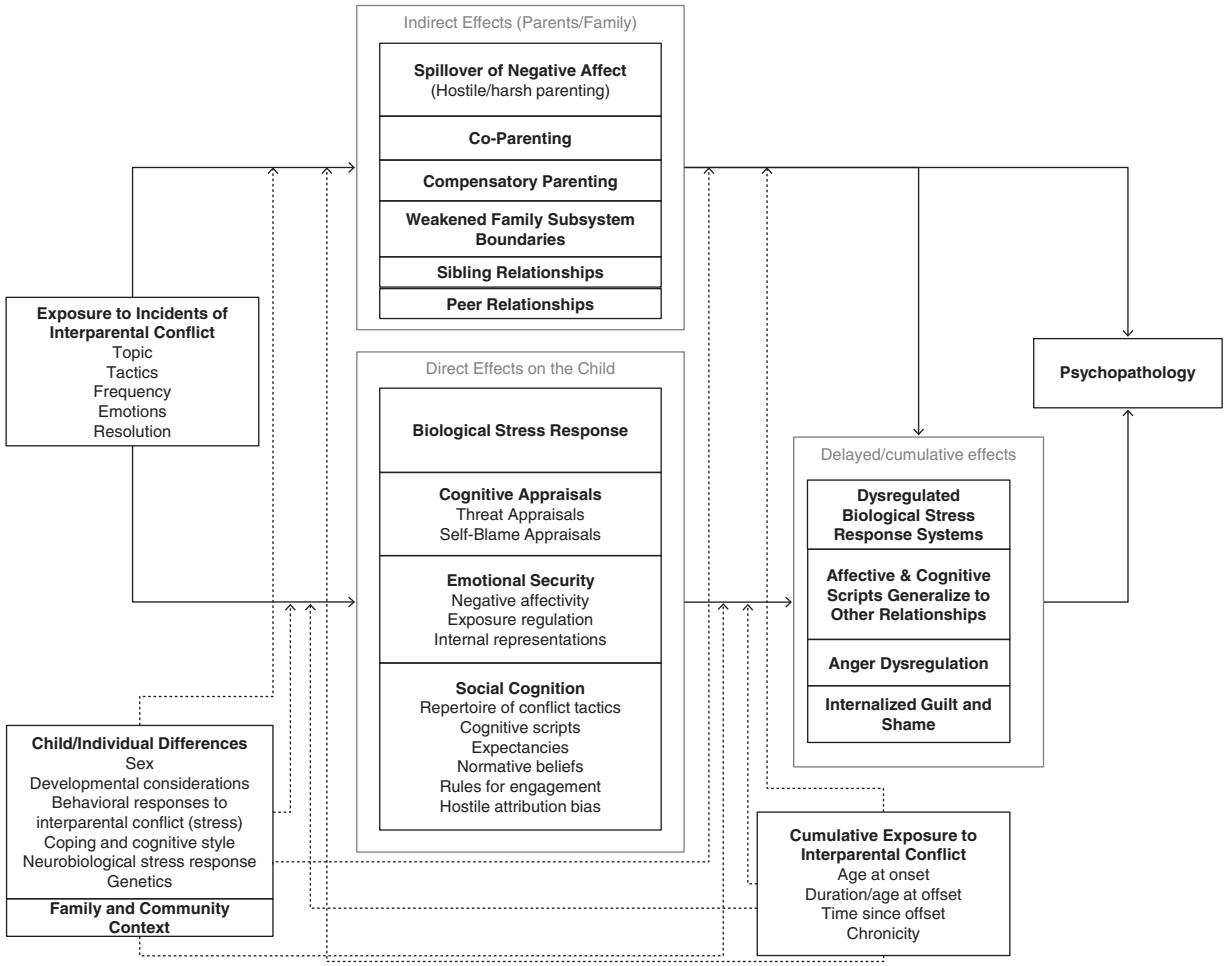


Figure 12.1 Organizational Framework for Mechanisms and Pathways by which Interparental Conflict and Violence are Theorized to Influence Child Adjustment.

problems are frequently observed among children who have been exposed to such violence, and they tend to be fairly stable without intervention. The Project Support intervention is based on social cognitive theory on the development of antisocial behavior, basic research linking interparental conflict to parenting, research on dimensions of parenting that moderate associations between interparental conflict and child adjustment problems, and clinical research evaluating interventions for child conduct problems. It is consistent with principles of developmental psychopathology, which point to the parent-child relationship as a primary source of influence on child development.

Project Support includes two components, the provision of social and instrumental support to the mothers and parent training, which is conceptualized as the principal avenue through which children's conduct problems are ameliorated. The parent training component attempts to improve the quality of the parent-child relationship by teaching and encouraging warm, attentive, and supportive parenting behaviors. It also attempts to reduce children's exposure to hostile and aggressive behavior and to create a more predictable environment for children. Intervention services are delivered in weekly home visits for about 6 months. Two randomized controlled trials of Project Support (Jouriles et al., 2001, 2009; McDonald, Jouriles, & Skopp, 2006) have been conducted with families in which the mothers had recently departed from a domestic violence shelter and had a child who met diagnostic criteria for oppositional defiant disorder or conduct disorder. Families in these studies were randomly assigned to receive Project Support or to a services-as-usual comparison condition.

Results of both trials indicated that Project Support was effective in improving mothers' parenting and reducing children's conduct problems, and results observed at posttreatment were maintained over both studies' follow-up periods (20 months posttreatment in study 1, 12 months in study 2). In both studies, rates of clinical levels of child

conduct problems at the last follow-up assessment were markedly lower in the Project Support condition than those in the services-as-usual condition (Jouriles et al., 2009; McDonald et al., 2006). In addition, mothers in the Project Support condition reported their children to be happier, to have better social relationships, and to have lower levels of internalizing problems relative to children in the comparison condition (McDonald et al., 2006). Mothers were less harsh and more consistent in their parenting, and mothers' parenting was found to mediate the effect of the intervention on children's conduct problems (Jouriles et al., 2009).

Kids' Club

The Kids' Club is a 10-week group program designed to address adjustment problems among 5- to 13-year-old children who have been exposed to IPV (Graham-Bermann, 1992). Grounded in social cognitive theory, the intervention focuses on teaching children about IPV, promoting healthy beliefs and attitudes, reducing anxiety and worry, and improving social skills (Graham-Bermann & Hughes, 2003). Two forms of the intervention were evaluated in a randomized controlled trial (n = 181) with a sample of mothers and their children ages 6 to 12: a group intervention offered only to the children, and one with the child group intervention plus a separate parenting group intervention for mothers. The comparison group received no services. For externalizing problems and attitudes about violence, only the child-plus-mother intervention resulted in positive change. Internalizing problems improved for children in all three groups. However, when clinical levels of internalizing problems were considered, only the intervention conditions reduced internalizing problems to nonclinical levels, with the child-plus-mother condition showing a greater reduction (Graham-Bermann, 2000; Graham-Bermann, Lynch, Banyard, Devoe, & Halabu, 2007). A Preschool Kids' Club, which targets anxiety reduction and conduct problems and which also includes a parenting group for mothers, has also been evaluated, although with somewhat less efficacious outcomes (Basu, Malone, Levendosky, & Dubay, 2009; Graham-Bermann & Halabu, 2004).

Child-Parent Psychotherapy

Child-Parent Psychotherapy (CPP) is an intensive intervention that focuses on improving the mother-child relationship to help children cope with trauma symptoms (Lieberman, Van Horn, & Ippen, 2005). CPP is based in attachment theory, social cognitive theory, and ecological models of therapy. It was designed for preschool-age children and focuses primarily on the mother-child dyad as the vehicle through which to help children exposed to IPV. Goals include promoting affect regulation in both the mother and child, changing maladaptive mother and child behavior as well as mother-child interaction, facilitating developmentally appropriate mother-child interaction, developing a trauma narrative, and developing hope and trust in the parent-child relationship (Lieberman, Ghosh Ippen, & Van Horn, 2006). Lieberman and colleagues (2006) conducted a randomized controlled trial evaluating CPP in comparison to monthly case management plus individual psychotherapy. Participants were 75 children ages 3 to 5 years who had witnessed IPV and their mothers. Families participated in an average of 32 sessions over the course of a 1-year treatment period. Results at posttreatment indicated that trauma symptoms and behavior problems decreased among children in the CPP condition but not among those in the comparison condition (Lieberman, Van Horn, & Ghosh Ippen, 2005). Improvements in behavior problems were maintained at the 6-month follow-up (results for trauma symptoms were not reported in the follow-up evaluation) (Lieberman et al., 2006).

Community Advocacy Program

Sullivan and colleagues developed and evaluated a community advocacy intervention for women who were victims of IPV. The program involved a trained advocate working individually with the women several times a week for 16 weeks to help the family access community resources and support. The intervention had been shown to reduce women's depression and the recurrence of violent victimization and to increase social support (Sullivan & Bybee, 1999). To help the children in violent families, the investigators expanded the intervention to include a support and educational group for children that focused on safety, feelings, and self-respect. They evaluated this expanded intervention in a sample of 80 mothers and their children ages 7 to 11. Of the 9 hours per week that advocates spent with each family, approximately 5 were spent interacting with the children (Sullivan, Bybee, & Allen, 2002). The enhanced program yielded only modest effects on child well-being (Sullivan et al., 2002). Children in both groups experienced a decline in the amount of IPV witnessed, with this decline occurring earlier for children in the intervention condition. Children in both groups also had increased self-competence (self-concept and feelings of self-adequacy) at posttreatment, but by the 4-month follow-up, the self-competence of control-group children had returned to pre-intervention levels. There were no group differences in behavior problems.

Trauma-Focused Cognitive Behavioral Therapy

Trauma-Focused Cognitive Behavioral Therapy (TF-CBT; Cohen, Mannarino, & Deblinger, 2006) has been shown to reduce trauma symptoms in children who have developed posttraumatic stress disorder (PTSD) or symptoms of PTSD in response to potentially traumatizing events (e.g., child abuse). A randomized controlled trial evaluated its efficacy for 140 children ages 7 to 14 who had been exposed to IPV and who had IPV-related symptoms of PTSD (Cohen, Mannarino, & Iyengar, 2011). Children were randomly assigned to either a TF-CBT condition or a child-centered therapy (CCT) condition. Children and their mothers were seen by the same therapist, but in separate sessions, once a week for 8 weeks, with the exception that in two of the TF-CBT sessions, the mother and child were seen together.

TF-CBT provides education about trauma and teaches relaxation skills, affect expression and regulation, and coping skills. It also includes helping children develop a narrative about their IPV experience. In the course of developing the narrative, the therapist can assist children in correcting maladaptive cognitions and in coping with trauma reminders and events as they emerge. Children also share their experiences of IPV with their mother in the joint sessions. In CCT, children and parent direct the content of their sessions; the therapist provides reflection, empathy, emotional support, and encouragement.

Results indicated that TF-CBT was superior to CCT in reducing trauma symptoms, particularly hyperarousal and avoidance symptoms, and anxiety symptoms. TF-CBT did not differ from CCT in reducing the reexperiencing of symptoms, which was not unexpected, given that the children lived in homes in which IPV recurred. Treatment effects were not observed for depression or behavior problems. A review of the collective evidence amassed for the effects of TF-CBT (i.e., not just for IPV-related trauma, but for other types as well, such as trauma related to child abuse) suggests that it appears to be efficacious in reducing trauma symptoms, but its efficacy for behavior problems and depression is less clear (de Arellano et al., 2014).

Mapping to the Organizational Framework and Future Directions

With the exception of Sullivan and colleagues' community advocacy intervention, each of the interventions just reviewed includes a component that targets changes in the parent-child relationship. Although there is some overlap, the theoretical foundation for the intervention varies across the interventions, as do the processes believed to mediate intervention effects. However, the parenting component to each appears more similar than different. Each focuses on improving parenting skills and the affective quality of the parent-child relationship (in particular, improving maternal warmth and parent-child communication). Given the centrality of parents to the development of preschool and young school-age children, a focus on parenting is appropriate, and it may well be that the effects of these interventions are primarily attributable to their influence on parenting. However, the contribution of the other components of the interventions to improving child adjustment remains unclear.

To illustrate, each of the interventions also targets reductions in maternal distress by providing emotional and social support and providing mothers with a safe arena in which to talk about their experience of IPV and how it has affected their lives and their children. However, changes in parenting were found to mediate the effects of Project Support on child behavior problems, whereas reductions in mothers' psychological distress did not. Furthermore, community advocacy, which successfully addressed mothers' emotional distress but which did not include a parenting component, did not have demonstrable effects on child behavior problems. This finding does not imply that additional intervention targets, such as responding to the suffering of mothers who have been victims of IPV, are not necessary or helpful (or simply morally right), but just that doing *only* that is not sufficient to help the children.

Kids' Club, TF-CBT, and the community advocacy program include components targeting the child's immediate and delayed responses to IPV, including social cognitions and appraisals, negative affect, and affect regulation. Kids' Club and TF-CBT also work to help children develop coping skills to reduce the extent to which they are negatively affected by the conflict and IPV. Little is known about the relative efficacy of the parent-focused and child-focused components in those interventions that offer both. Graham-Bermann and colleagues' (2007) comparison of the child-only versus the child-plus-mother Kids' Club and Jouriles, McDonald, and colleagues' (2009) explicit analysis of mediating processes for Project Support reflect the kind of careful approach that is needed to optimize services for families of children exposed to IPV. A reasonable step for researchers would be to evaluate multiple plausible mediating pathways (such as those identified in the figure) simultaneously, from multiple plausible theoretical perspectives, to begin to drill down on the mechanisms that account most strongly for effects of IPV on child adjustment. Similarly, in conducting intervention research, it would be useful also to evaluate multiple

mediating pathways, to help isolate those that account most strongly for intervention effects.

It follows from several theories (e.g., attachment, cognitive-contextual, emotional security, trauma) that enhancing the child's sense of safety and security in the family should positively influence child mental health; however, the mechanisms responsible for this expected outcome differ across the different theories. Similarly, social cognitive theory and trauma theory posit different mechanisms to explain how IPV can lead to externalizing problems in children. Testing these mechanisms together in evaluation research will help clarify both theories and can shed light on how interventions based on these theories achieve their effects. Evaluating multiple mediating processes simultaneously would significantly advance knowledge in this area, and would aid intervention developers. Similarly, evaluating competing hypotheses about mediating processes and outcomes would help illuminate the key pathways by which IPV influences child adjustment. Finally, intervention researchers should attend to the multifinality in outcomes of children exposed to IPV. As much as we need to know what outcomes can be prevented or improved, knowing that an intervention is *not* effective for a problem that occurs commonly among children in violent families can be just as important. As an example, the version of TF-CBT used for the IPV-exposed sample was not found to improve child behavior problems. However, in a different population (sexually abused children), TF-CBT developers found that a 16-week TF-CBT program that did not included a trauma narrative component helped improve parenting as well as child behavior problems (Deblinger, Mannarino, Cohen, Runyon, & Steer, 2011). The authors speculated that omitting the trauma narrative left more time to devote to teaching and practicing the parenting skills, thereby reducing behavior problems. This finding is consistent with what theory and data would suggest. Such efforts bring the field closer to being able to offer flexible and demonstrably effective interventions that can be tailored to meet a child's specific needs and circumstances.

The interventions just reviewed were provided to children recruited from community agencies. The samples varied in the nature and levels of child adjustment problems, and the interventions differed in treatment modality (e.g., group versus dyadic) and duration (e.g., 10 weeks, 6 months, 1 year), yet the interventions were effective in helping the children. Indeed, after intervention, the problems of a sizable number of children were found to have diminished from clinical to normative levels on standard measures of child psychopathology. Thus, although the interventions were seemingly tightly focused in concept (i.e., targeting children "exposed to IPV"), they differ on a number of dimensions. The results from these interventions studies hold important implications for community agencies hoping to offer empirically supported interventions for children and their families. It suggests the need to assess child adjustment broadly and offer interventions that target those problems identified by the assessment. For now, this might mean that if trauma were the predominant problem, CPP or TF-CBT might be appropriate, depending on the child's age. If behavior problems predominate, Project Support or Kids' Club would be appropriate. Because comorbidity is the rule rather than the exception, however, many children in violent families may present with multiple, long-standing adjustment problems, including disrupted biological stress-response systems. Research thus far offers little guidance in this circumstance for prioritizing or organizing intervention approaches. In addition, many social services agencies are not equipped to offer a wide array of interventions, or lengthy interventions, which may be needed for families with severe and complex child adjustment problems. Research that helps to sort out how best to sequence or combine intervention components so that they can efficiently and effectively address multiple targets (such as the research on adaptations of TF-CBT) is needed.

The field of implementation research has helped to underscore the importance of training practitioners to deliver interventions reliably and efficaciously. For psychosocial interventions, such training often involves education, behavioral practice, coaching/supervision until mastery, and follow-up performance monitoring (Fixsen, Naoom, Blase, Friedman, & Wallace, 2005). Such intensive training activities, however, are often beyond the means of most social services agencies (e.g., domestic violence agencies), especially those with high staff turnover rates, such as some child welfare agencies. Although there is pressure from the public policy arena for human services agencies to provide evidence-based programs, there is also pressure, especially for publicly funded agencies, to provide services to as many people as possible. Such pressure may result in dollars being directed away from training and monitoring staff performance toward increasing the numbers of service providers and their caseloads. Such issues slow the uptake of effective intervention programming into the community. Another translational area that is underdeveloped is in the education of service providers. Intervention researchers are commonly embedded in doctoral programs in psychology or related fields, medical schools, or public health programs. However, most

professionals who provide services to children in violent families have a master's degree, often in social work, counseling, or family therapy. Developing training partnerships with those educational pipelines might offer opportunities for building a stronger workforce and expanding its capacity.

Interventions to Reduce Interparental Conflict and Protect Child Well-being

Happy Couples and Happy Kids

Cummings, Faircloth, Mitchell, Cummings, and Schermerhorn (2008) conducted a randomized controlled trial evaluating the effects of Happy Couples and Happy Kids (HC/HK), a 4-week intervention that includes psychoeducation about marital conflict and its effects on children's emotional security in the interparental relationship and coaching in couple communication skills. A booster session was provided 6 and 12 months after the intervention. A community sample of families with a child between 4 and 8 years of age were randomly assigned to one of two forms of HC/HK or to a self-study comparison group. In one of the HC/HK groups, only the parents (the couple) participated; in the other HC/HK group, the child participated in a separate group while the parents were in session. Approximately half of the couples were maritally distressed at the outset of the study. Participants receiving the HC/HK intervention had superior outcomes in comparison to the self-study group, and outcomes did not differ across the two HC/HK conditions. For the HC/HK groups, destructive interparental conflict was reduced, constructive conflict increased (e.g., resolution, support behaviors), and there were improvements in parenting and child adjustment (Child Behavior Checklist total problems scale) at 1-year (Cummings et al., 2008) and 2-year (Faircloth, Schermerhorn, Mitchell, Cummings, & Cummings, 2011) follow-up assessments. Moreover, analyses of the patterns of change over time indicated that improvements in the couples' knowledge and handling of conflicts preceded improvements in marital satisfaction, parenting, and child adjustment outcomes. No changes were observed in the comparison group.

Interventions Salient to Children's Exposure to Interparental Conflict

A number of interventions that were not originally designed to address the issue of children's exposure to interparental conflict have since been found to do so. These include marriage education and parenting interventions as well as various couples' interventions. We turn to these now.

Marriage Education and Parenting Interventions

Over 30 years of research on marriage and relationship education programs attests to their utility in increasing couples' relationship satisfaction and improving the ways that couples manage conflict (Hawkins, Blanchard, Baldwin, & Fawcett, 2008). These effects can be very long-lived (e.g., 10 years; C. P. Cowan, Cowan, & Barry, 2011). There are many marriage and relationship education programs to choose from, several of which have been subjected to sustained and rigorous evaluation. Among these, however, thus far only a few have considered whether children benefit.

Family Foundations is a "transition to parenthood" prevention program for expectant couples. It is designed to enhance coparenting, or the ways that parents work together, coordinate, support one another, and manage conflict about childrearing (Feinberg, Jones, Kan, & Goslin, 2010). The intervention includes education about the kinds of stresses and coparenting conflicts parents might expect after their baby is born and teaches couples communication, problem solving, and conflict-management skills. A sample of 169 couples was randomly assigned to participate in Family Foundations or to a no-treatment control condition. At the 3.5-year follow-up (when children were 3 years old), couples in the Family Foundations condition reported themselves to be less overreactive and less lax with their child, less likely to physically punish their child, and to have lower levels of parenting stress than couples in the comparison group. Family Foundations had positive effects on children's social competence; for families of boys, there were positive effects on couples' relationship quality and children's externalizing problems. There were no intervention effects on child internalizing problems.

Based on knowledge that "the single most powerful predictor of fathers' engagement with their children is the quality of the men's relationship with the child's mother, regardless of whether the couple is married, divorced, separated, or never married," P. A. Cowan, C. P. Cowan, and colleagues (2008, p. 54) developed a novel intervention designed to increase low-income fathers' engagement with their children (P. A. Cowan, C. P. Cowan, Pruett, Pruett, & Wong, 2009). In a randomized controlled trial of 289 families, expectant couples or those whose youngest child was under 7 years old were randomly assigned to one of three conditions: a 16-week, father-only intervention; a 16-week couple intervention; or a 3-hour, single-visit comparison condition. The content of the father-only and

couples group sessions was identical, and included sessions that focused on parenting and on couple issues. However, in-session exercises differed somewhat across the two formats (e.g., in the father-only group, some exercises that required the partner's participation were assigned as homework rather than completed during the session). At the 11-month follow-up, among families in the father-only and couple intervention conditions, fathers' engagement with their children increased, their parenting stress decreased, and fathers reported fewer parental conflicts about discipline. In addition, those in the couples' groups had stable couple relationship satisfaction over the follow-up period. This is in contrast to the comparison condition, where couple adjustment declined over the 11-month follow-up period. Post hoc tests indicated that children's adjustment remained stable in the two intervention conditions but declined in the comparison condition. This study is noteworthy for its focus on low-income, minority families (67% of the sample was Hispanic) and on fathers, in particular.

The Cowans and their colleagues also evaluated an intervention for parents with a child entering preschool (C. P. Cowan et al., 2011). The evaluation was a randomized controlled trial in which 100 families were assigned to a low-dose control condition (i.e., once-per-year consultation with the interviewer team) or to one of two 16-week intervention groups, one which focused on the couple relationship and one on parenting. Each group session included time allotted for presentation and discussion of the curricular material, and a 20- to 30-minute "check-in" period for couples to discuss issues that had arisen since the last session. The difference between the two group formats was how these check-in discussions were managed. In the couples group, the discussion focused on addressing the issues as a couple whereas in the parenting group, the focus was on addressing the issue from a parenting perspective. For example, if there were concerns about child discipline, the discussion in the couples group would center on how the couple could work together to resolve the issue. In the parenting-focused group, the discussion would focus instead on healthy discipline practices. In addition to contrasting these two intervention formats, the investigators examined their effects over a long period of time, conducting follow-up assessments when the children entered fourth grade and when they entered high school, using multimethod assessments of outcomes. Couple relationship satisfaction was stable over the 10-year follow-up period for those in the couples group, whereas it declined for those in the parenting and control groups (although there was a slight advantage for those in the parenting group compared to the control group). Couple communication quality improved through fourth grade for those in the couples group, whereas it was stable for those in the parenting group and declined for those in the control group. However, when the children entered high school, those effects had dissipated. There were also modest positive intervention effects on child adjustment, with child hyperactivity declining in the couples group condition but not in the control condition, and marginally significant findings of a declining trajectory for child aggression in the couples group but an increasing one in the control group. No group differences emerged for anxiety/depression. The results suggest that for primary prevention, a couple-focused program confers long-term protection for couples' and children's adjustment and that the protective effect is superior to those of an intervention focused solely on parenting. This line of research is exemplary in considering both couples and parenting interventions with sensitivity to the clinical setting and in evaluating treatment effects over a lengthy time period.

Couples' Therapy

In addition to increasing relationship satisfaction and reducing conflict generally, behavioral couples therapy has also been found to reduce interparental conflict over children (Gattis, Simpson, & Christensen, 2008). Moreover, in one evaluation of couples therapy that included assessment of child outcomes, improvements in child adjustment were observed during the treatment period; however, they were not maintained over the follow-up period (Gattis et al., 2008).

Couples therapy effects on child adjustment were also examined in a randomized controlled trial of behavioral couples therapy (BCT) plus individual treatment for substance use in a sample of alcohol- and substance-using men involved in an intimate relationship (Kelley & Fals-Stewart, 2002). The study included three groups. All participants received 20 weeks of individual treatment for substance use plus 12 additional weeks of intervention. For the additional 12 weeks, one group received couples therapy; one group received continued individual substance use treatment; and in one group, the couple attended substance abuse education sessions. Although the sample for the study was selected based on alcohol and substance use rather than on couple functioning, the mean level of relationship satisfaction for the couples that participated fell well into the distressed range. All three of the interventions deployed in the study were effective in reducing men's alcohol and substance use (although the couple intervention achieved somewhat greater reductions). However, in addition to its positive effects on alcohol and substance use, BCT also

increased relationship satisfaction, reduced couple conflict and violence, and improved the psychosocial functioning of the children (children ranged from 6 to 16 years of age). Increases in relationship satisfaction and reductions in alcohol and drug use both contributed to the improvements in child adjustment. Specifically, at pretreatment, 50% of children of drug-using men and 32% of children of alcohol-using men exhibited clinical levels of adjustment problems. At the 12-month posttreatment follow-up, these figures were 15% and 5%, respectively. No statistically significant changes in couple relationship satisfaction or child adjustment were observed in either of the two comparison conditions at the 12-month assessment. A later pilot study evaluating treatment for alcohol-abusing men (Lam, Fals-Stewart, & Kelley, 2008) compared BCT to an intervention that included parent skills training plus BCT and to individual treatment for alcohol abuse. Although couples' adjustment was not assessed in this study, parent skills training plus BCT was superior to BCT and the control condition in reducing children's adjustment problems. Careful studies such as this are at the heart of translational science. They help move the field away from interventions that address a single problem in a narrowly defined population and toward the complexities that confront clinicians in the community.

Initial evaluation research (albeit nonexperimental) has found Couples Coping Enhancement Training (CCET), a marital distress prevention program that includes content addressing stress and coping as well as communication and conflict skills, to be effective in improving couples' satisfaction and individual and dyadic coping with stress (e.g., Bodenmann, Pihet, Shantinath, Cina, & Widmer, 2006). To examine its effects in families with children, a sample of 100 couples with a child between the ages of 2 and 12 years, and who were "experiencing their children's upbringing to be demanding" were recruited. Families were assigned to either CCET or a no-treatment control condition, and it was hypothesized that CCET would reduce couples' conflicts about their children. Results indicated that CCET had positive effects on couples' communication and coping; however, effects on conflicts about children did not emerge (Ledermann, Bodenmann, & Cina, 2007).

Parenting Interventions that Reduce Interparental Conflict

Interventions that focus on parenting have also been shown to exert indirect positive effects on parents' marital satisfaction, with those effects mediated by the improvements in the child's adjustment (McEachern et al., 2013). The Family Check-Up program is a parenting intervention designed to address emerging emotional and behavioral problems among toddlers at high risk for those problems. The Family Check-Up program was founded on principles of motivational interviewing and takes a family-oriented approach to defining treatment targets and doses. Results of a randomized controlled trial with a high-risk sample of 731 families with a 2-year-old child indicated that children whose families participated in the Family Check-Up were less likely to have emotional, behavioral, or comorbid problems at age 4 than children in the control group, and the program's effects on child adjustment were mediated by changes in parenting (Connell et al., 2008; Dishion et al., 2008). A subsequent study of a subset of 435 of the original families indicated that reductions in child problems from age 2 to 4 predicted positive change in the parents' relationship satisfaction over the 3-year period from age 2 to 5 (McEachern et al., 2013).

Similar findings emerged in a randomized controlled trial evaluating the effectiveness of the Oregon Parent Management Training intervention in improving marital functioning (Bullard et al., 2010). Over 30 years of rigorous empirical research supports the efficacy of Oregon Parent Management Training in addressing child conduct problems. This evaluation study included newly married couples in which the husband was the stepfather to the wife's biological children, and the target child for the study had five or more conduct problem symptoms. This parenting intervention had positive effects on marital functioning as well as on child adjustment problems, and these were maintained at the 2-year follow-up. Moreover, the effects on marital functioning were mediated by the improvements in children's behavior problems. For families in the no-treatment control condition, marital functioning, parenting practices, and child behavior problems all deteriorated over the follow-up period.

Mapping to the Organizational Framework and Future Directions

Most of the interventions with a couple-oriented component are designed to alter the dynamics of interparental conflict, which may affect downstream changes in family functioning and can have effects on child functioning as well. The idea to offer particular kinds of prevention programs during key transition periods of family development seems wise (It has been advocated for close to two decades; e.g., Cowan & Cowan, 1995). Marriage education programs are already in wide use for couples planning to marry or newly married. Transition-to-parenthood

programs that include a focus on interparental conflict are less common, and transition-to-school (elementary, middle, or high school) programs with interparental conflict and relevant parenting components are scarce outside the realm of empirical research. Such programs could capture families at points when family relational dynamics and the problems they confront are expected to change in important ways, and could provide couples with skills for managing conflict through the transition.

In contrast to prevention programs designed to prevent problems before they emerge or become serious are interventions for families in which problems—whether couple problems, child problems, or both—are already identified. It appears from the brief review earlier that adding a BCT-type couple intervention to treatments that address other problems in the family (e.g., fathers' substance use; fathers' engagement with their children) or address parenting can reduce interparental conflict and improve the interparental relationship as well as child adjustment. At this juncture, although there are decades of research on couples therapy and parent training, it is still unclear when and under what circumstances one of them might suffice to address both parent and child problems. Developmental considerations may also pertain to the selection and timing of intervention. For example, perhaps the timing of couples therapy has implications for its effects on child adjustment. If interparental conflict is addressed before it becomes entrenched or severe, or before it results in child adjustment problems, couples therapy may possibly be sufficient to prevent the onset or progression of child problems. Once the developmental unfolding of child adjustment problems reaches a certain point, however, a parenting intervention may be necessary to ameliorate them. Using the organizational framework as a guide, research that considers such factors can help advance theory and treatment research in this area.

DIRECTIONS FOR FUTURE RESEARCH

Throughout this chapter, we have hinted at gaps in the empirical literature on interparental conflict and child adjustment as well as some of the important questions we believe researchers still need to address. The remainder of this chapter describes broad directions for scholars to consider in advancing knowledge in this area.

Improving Theoretical Integration and Precision

Since the early 1990s, tremendous progress has been made in understanding how and why interparental conflict influences child adjustment. As noted earlier, much of this progress can be attributed to the development of theories specifically accounting for associations between interparental conflict and child adjustment. Investigators have begun to empirically test these theories and have identified a variety of psychological and biological processes that potentially explain associations between interparental conflict and child adjustment.

One direction for future research is to examine more thoroughly how some of these hypothesized processes operate jointly in accounting for child adjustment or, even more precisely, in accounting for the effects of interparental conflict on child adjustment. Although there are some notable exceptions in the literature (e.g., Buehler et al., 2007; Davies et al., 2002), most investigators examine hypothesized mediators central to a single, specific theory. That is, investigators testing the cognitive contextual framework will focus on children appraisals of interparental conflict, whereas investigators testing EST focus on emotional insecurity of the interparental relationship. Of course, it makes sense to limit the focus when initially attempting to establish the efficacy of a theory. However, we believe we are now at a point at which it makes sense to begin to explore the integration of the various theoretical explanations. Investigating hypothesized mediators from different theories in tandem is one way to begin to do this; it seems plausible that several of the hypothesized mediating processes proposed by different theories simultaneously operate to influence child adjustment.

Related to this point, it is important to develop and test theory that considers the complexity of how disparate processes (cognitive, emotional, behavioral, biological) might operate together to influence child adjustment within the context of destructive interparental conflict. A number of plausible hypotheses can be generated and tested about how these different processes operate in tandem. For example, one plausible hypothesis is that multiple processes are important, and they exert additive or interactive effects on child adjustment. It is also plausible that a particular process explains the effects of most, or all, of the others. Furthermore, some processes may have stronger implications for longer-term problems than others. In addition, some processes may have stronger implications during certain developmental periods than others. Other, more complex hypotheses about how these processes operate in tandem can be proposed as well.

It might also be fruitful to consider more thoroughly how destructive interparental conflict operates within the broader family context to influence children's adjustment. Investigators have already begun work in this

area by examining how positive aspects of interparental functioning might contribute to positive child outcomes. Similarly, research is being conducted to examine how child functioning influences interparental conflict and how different family variables interact with destructive interparental conflict in the prediction of child problems. From a broader developmental psychopathology perspective, it will also be important for researchers to consider the transactions with and influences of the larger socio-ecological context in which children live and to gain a better understanding of environmental processes and events that contribute to children's risk and resilience in the face of interparental conflict.

We believe it might also be advantageous to consider how destructive interparental conflict fits within other theories about the development of psychopathology. For example, many theories exist on the development of specific types of psychological disorders or the development of specific dimensions of psychopathology. It would be worthwhile for researchers to glean what is known from empirical tests of some of these theories and attempt to integrate concepts from these areas into research on interparental conflict and child adjustment.

Translating Research into Practice

Interventions for children (and their families) exposed to destructive interparental conflict already exist. Similarly, interventions designed to reduce destructive interparental conflict are fairly widespread, especially within the marital/family therapy literatures. Although rigorous evaluations of interventions in this area are still rare, results from several well-designed studies show that these interventions can be effective in reducing child adjustment problems. It is important to note, however, that while some of these interventions are grounded in theory and research on interparental conflict and child adjustment, others are based only loosely on theory and research in this area. In addition, as with most clinical interventions and prevention programs, there is also considerable room for improvement.

We believe an important direction for future research is to improve what we know about how to help children in families characterized by destructive interparental conflict. One way to do this is to understand more thoroughly how existing interventions work, especially those interventions that have been found to be effective in reducing child problems. For example, are these interventions altering specific processes (within the family and/or child) that might be leading to treatment gains? Are there key processes that need to be altered for children/families to benefit from treatment? There is some evidence that changes in mother-child interaction contribute to treatment gains for children who have been exposed to frequent and severe IPV conflict (e.g., Jouriles et al., 2009), but much more work in this area is necessary. For example, processes (cognitive, emotional, behavioral, biological) that are hypothesized to be key in theories linking interparental conflict with child adjustment problems need to be examined more comprehensively in this intervention research.

In addition, given that it is well established that destructive interparental conflict can lead to child adjustment problems and that effective interventions already exist, it should be a priority to ensure that the empirically supported interventions actually reach the children/families who can benefit from them. To date, most of the interventions reviewed in this chapter have remained largely in the confines of the academic settings in which they were developed. The dissemination and implementation of evidence-based interventions is a scientific field in its own right, but little has been done to formally disseminate interventions in this particular area of research.

CONCLUSION

Substantial progress has been made in establishing a reliable link between interparental conflict and children's development as well as in developing and testing theory on how and why interparental conflict confers risk for child adjustment problems. In addition, progress is being made in translating this basic science into programs to promote higher-quality interparental relationships and optimal child development (in the context of interparental conflict). Yet many questions remain unanswered, especially for the development of a more nuanced understanding of the link between these two aspects of family life. Ultimately, a richer understanding of the processes underlying the relation between interparental conflict and child adjustment, and knowing which children are especially vulnerable (and resilient) to the effects of destructive interparental conflict, will allow for more effective intervention programs aimed at improving children's lives.

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CHAPTER 13

Relational Aggression: A Developmental Psychopathology Perspective

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INTRODUCTION

The development of aggressive behavior patterns has long captured the theoretical and empirical attention of developmental psychopathologists. Although much of this work has focused on physically (e.g., hitting, kicking) or overtly (i.e., physical aggression combined with verbal aggression, such as verbal insults) aggressive behavior,

This chapter is dedicated to the memory and legacy of Dr. Nicki R. Crick, a pioneer in the study of relational aggression. The rich body of theoretical and empirical work covered in this chapter is a testament to the far-reaching influence of Crick's contributions to the field of developmental psychopathology. We thank Alexandra Sullivan, Chelsea Krisanda, Casey Gates, and Lacey Evans for their assistance in compiling references for this chapter. Preparation of this manuscript was facilitated by a grant from the National Science Foundation (0819148) to the first and last authors. Please direct all correspondence to the first author at 2 Colchester Ave., Department of Psychological Science, University of Vermont, Burlington, VT, 05405; dmurrayc@uvm.edu.

in recent years there has been significant interest in the development of relational aggression. Relational aggression, defined as behaviors intended to hurt or harm others using relationships as the vehicle of harm, includes behaviors such as spreading malicious gossip, socially excluding peers, and using the silent treatment (Crick & Grotpeter, 1995). The goal of this chapter is to evaluate the state of knowledge regarding relational aggression two decades after Crick and Grotpeter's (1995) seminal publication on the topic. First, we focus on conceptual challenges in defining relational aggression, normative and atypical developmental trajectories, and theoretical and empirical work regarding gender differences in such conduct. Second, we address potential mechanisms involved in the development of relational aggression, including biobehavioral, cognitive-emotional, and social processes. Third, we consider both positive and negative developmental outcomes associated with involvement in relational aggression. Fourth, we discuss implications of research on relational aggression for both cross-cultural research and interventions. Finally, we consider the significance of a developmental psychopathology perspective for the study of relational aggression as well as the most critical directions for future research in this area.

DEFINING RELATIONAL AGGRESSION

Historical Perspectives

Numerous theoretical models and traditions have guided the study of the development of aggressive behavior (for reviews, see Crick & Zahn-Waxler, 2003; Ostrov & Godleski, 2010). A review of the historical record suggests that eminent scholars such as Gordon W. Allport were examining indirect aggression as early as 1941 (Allport, Bruner, & Jandorf, 1941). In 1961, Arnold H. Buss, in his classic "Psychology of Aggression," noted that:

> From the aggressor's vantage point, the best model of aggression is one that avoids counterattack. Indirect aggression solves the problem by rendering it difficult to identify the aggressor. Indirect aggression may be verbal (spreading nasty gossip) or physical (a man sets fire to his neighbor's home). These examples illustrate the two ways in which aggression can be indirect. Gossip is indirect in that the victim is not present. . . . Damaging a person's possessions is indirect in that the victim is not hurt or injured, but objects associated with and valued by him are destroyed. (p. 8).

Moreover, Buss (1961) cites Eron, Laulicht, and Walder (1956) and their "Rip Van Winkle research team" for the development of a peer rating instrument that includes an assessment of indirect aggression: "Who makes up stories and lies to get other children in trouble?" (p. 269). Much of the early work regarding nonphysical forms of aggression, including indirect aggression, focused on gender differences in such conduct. Norma D. Feshbach (1969) conducted an empirical study of direct and indirect aggression and found that girls displayed significantly higher levels of indirect aggression than did boys. Nearly two decades later, Lagerspetz, Björkqvist, and Peltonen (1988) examined gender differences in aggressive behaviors among 11- and 12-year-old boys and girls in Finland. Using peer reports and individual interviews, these authors identified a 3-factor solution to children's responses to the question "what do they/I do when angry with another boy/girl in the class?" The first factor indicated "what we have called 'indirect means,' and includes circumventory behaviour that exploits social relations among peers to harm the person at whom the anger is directed" (Lagerspetz et al., 1988, p. 409). This factor included 10 items, such as "tells untruth behind back," "says to others: 'Let's not be with him/her,'" "starts being somebody else's friend in revenge," "argues," and "sulks" (p. 409). The second factor focused on "direct means of aggression," and the third factor (two items) included "peaceful means of solving conflicts" (p. 409). It is clear that this conceptualization of indirect aggression was influenced by the writing of Arnold Buss (1961), which was appropriately cited by the authors (p. 404). In 1992, Björkqvist, Lagerspetz, and Kaukiainen further clarified: "Indirect aggression is a type of behaviour in which the perpetrator attempts to inflict pain in such a manner that he or she makes it seem as though there has been no intention to hurt at all. Accordingly, he or she is more likely to avoid counter aggression and, if possible, to remain unidentified" (p. 118). This definition mirrors recent descriptions of passive aggression, which is conceptually distinct from relational forms of aggression (e.g., Nelson, Springer, Nelson, & Bean, 2008). Moreover, unlike relational aggression, indirect aggression is unlikely to occur in young children (Björkqvist et al., 1992).

In 1989, Robert Cairns and colleagues introduced the related term *social aggression*, which they defined as the "manipulation of group acceptance through alienation, ostracism, or character defamation" (Cairns, Cairns, Neckerman, Ferguson, & Gariépy, 1989, p. 323). As originally conceptualized by Cairns and colleagues, social aggression involves the peer *group* and thus may be different from indirect aggression, which may involve either dyadic or group-level transgressions. Moreover, unlike relational aggression, social aggression likely would not

be displayed at younger ages when the importance of the larger peer group and social status is not yet established. In their 6-year longitudinal study examining the growth in aggressive behavior from fourth grade to early adolescence, Cairns and colleagues found that social aggression was highly representative of girls' aggressive behavior during early adolescence.

Building on the concepts of indirect and social aggression, Crick and Grotpeter (1995) identified a relational form of aggression that they argued was relatively common among girls. They cited prior work on indirect and social aggression but suggested that the central element of girls' aggressive behavior patterns was the use of interpersonal relationships to harm others. More specifically, these authors argued that "girls' attempts to harm others would focus on relational issues and would include behaviors intended to significantly damage another child's friendships or feelings of inclusion by the peer group . . . harming others through purposeful manipulation and damage of their peer relationships" (p. 711). Rather than focusing on efforts to avoid detection or retribution, as was often highlighted in theoretical formulations of indirect aggression, Crick and Grotpeter proposed a central role of children's social goals in their selection of aggressive behaviors. From this perspective, girls were expected to engage in relatively high levels of relational aggression because these behaviors reflect the relational issues that are characteristic of female peer groups. This initial study demonstrated that girls were not only more relationally aggressive than school-age boys but that, relative to their nonrelationally aggressive peers, children that engaged in high levels of relational aggression were at increased risk for serious adjustment problems (i.e., greater probability of peer rejection, loneliness, and symptoms of depression).

In 1997, Galen and Underwood expanded on the definition of social aggression. They argued that "the construct of *relational aggression* may not capture all of the forms of aggression evident in girls' peer interactions. Negative facial expressions and gestures and subtle jabs at another's self-esteem may also be important features of girls' aggressive behavior. . . . Social ostracism or relationship manipulation may begin with rolling of eyes, tossing of hair, and turning away from a peer" (p. 590). Accordingly, nonverbal acts beyond the silent treatment (which was included in Crick and Grotpeter's original measure in 1995) were considered to be important behaviors for empirical investigation.

In recent years, research on indirect, relational, and social aggression has flourished, and studies have documented that these constructs provide significant information regarding key developmental processes. However, considerable disagreement persists regarding the degree of overlap among these constructs (see Archer & Coyne, 2005). There are clearly some components of indirect aggression that are not shared by relational aggression. For instance, indirect physical aggression, wherein the identity of the perpetrator is unknown (e.g., placing gum on a peer's chair), has been considered to be an exemplar of indirect aggression (see Goldstein, Tisak, & Boxer, 2002). As these behaviors do not use relationships as the vehicle of harm, however, they would not be considered cases of relational aggression. Additionally, there are some components of social aggression that are not shared by relational aggression (e.g., nonverbal acts such as eye rolling). Methodologically, then, research instruments developed to assess each form of aggression are likely to capture somewhat different behavioral patterns.

Perhaps more important, there are several reasons to expect distinct risk factors, developmental trajectories, and developmental outcomes associated with each of these defined subtypes of aggression. For instance, investment in relational goals, such as the establishment of close interpersonal relationships, may be most strongly associated with the enactment of relational forms of aggression. Developmentally, relational aggression may be observed at earlier ages than either indirect or social aggression (see the section titled "Developmental Manifestations of Relational Aggression"). Moreover, given the central role of damage to interpersonal relationships in relational forms of aggression, interdependent cultural contexts may be particularly relevant to the developmental outcomes associated with relational forms of aggression (see Kawabata, Crick, & Hamaguchi, 2010). Thus, despite the conceptual overlap among these subtypes of aggression, we believe that it is critically important for researchers to be precise in their use of terminology, to adopt terms and associated methods that are theoretically based, and to maintain the fidelity of the methodology of the original instrument developers.

Forms and Functions of Aggression

Although all aggressive behaviors involve actions intended to hurt, harm, or injure another person, developmental scholars have made distinctions between forms (i.e., the whats) and functions (i.e., the whys) of aggressive behaviors (e.g., Little, Jones, Henrich, & Hawley, 2003; Prinstein & Cillessen, 2003). Researchers have identified a number of distinct forms of aggression, including physical, relational, verbal, nonverbal, and electronic aggression.

However, in the last two decades, the most common delineation in developmental psychopathology research has been between physical and nonphysical forms of aggression, with relational aggression being a key construct in most of these studies (e.g., Burnette & Reppucci, 2009; Crick, 1995; Kliewer, Dibble, Goodman, & Sullivan, 2012; Preddy & Fite, 2012).

Physical aggression is defined as acts intended to hurt others via physical force or the threat of physical force (Crick & Grotpeter, 1995). Classic examples of physical aggression include behaviors such as hitting, pinching, kicking, biting, and taking objects (Crick & Grotpeter, 1995). In contrast, relational aggression is defined as behaviors that damage or threaten to damage close relationships to hurt, harm, or injure another person (Crick & Grotpeter, 1995). Relational aggression may be manifested in different ways during different developmental periods (see "Developmental Manifestations of Relational Aggression" section), but it includes both direct and indirect behaviors and may be displayed verbally or nonverbally (Nelson, Springer, et al., 2008). Prototypical examples of direct relational aggression include telling someone that they are not invited to a party (exclusion) or placing one's hand on a chair so another child cannot sit down. Indirect relational aggression includes gossip and rumor spreading. Physical and relational aggression have emerged as unique factors in several studies (e.g., Crick & Grotpeter, 1995), are theorized to be associated with different social goals (Crick & Grotpeter, 1995), and have been found to be associated with different risk factors and developmental outcomes (see Crick, Ostrov, & Kawabata, 2007; Ostrov & Godleski, 2010).

Scholars have also distinguished between the functions of aggression. Although various terms are used within the psychological sciences, the two functions of aggression are typically referred to as proactive aggression (i.e., also known as instrumental, premeditated, or cold-blooded) and reactive aggression (i.e., also known as hostile, impulsive, or hot-blooded; Vitaro, Gendreau, Tremblay, & Oligny, 1998). Proactive aggression is defined as goal-directed aggressive behavior; in contrast, reactive aggression is concurrently displayed in response to a real or perceived threat and is often motivated by hostility or anger (Vitaro et al., 1998). Despite some overlap in the display of these functions, evidence indicates that these subtypes of aggression are distinct factors (e.g., Poulin & Boivin, 2000). Moreover, proactive and reactive aggression have different theoretical underpinnings (i.e., social learning theory for proactive aggression and the frustration-aggression hypothesis for reactive aggression; Bandura, 1973; Berkowitz, 1962). Accordingly, unique developmental precursors and social-psychological adjustment outcomes are related to proactive and reactive functions of aggression (for a meta-analysis, see Card & Little, 2006).

Despite the tradition in psychological research of examining forms and functions of aggression separately, more recent research has taken into account both forms and functions of aggression. There are two main methodological approaches to examining forms *and* functions of aggression. The first uses a two-dimensional combination approach in which the two forms (i.e., physical and relational) and the two functions (i.e., proactive and reactive) are crossed, yielding four subtypes of aggression: proactive physical, reactive physical, proactive relational, and reactive relational (e.g., Ostrov & Crick, 2007; Prinstein & Cillessen, 2003). This approach is purported to be ecologically valid (Underwood, 2003), and research adopting this method has demonstrated unique correlates of subtypes of aggression in early childhood (e.g., Ostrov, Murray-Close, Godleski, & Hart, 2013), middle childhood (e.g., Mathieson & Crick, 2010), adolescence (e.g., Prinstein & Cillessen, 2003), and emerging adulthood (e.g., Bailey & Ostrov, 2008).

However, the two-dimensional combination approach is plagued by high levels of statistical overlap between proactive and reactive physical aggression as well as proactive and reactive relational aggression. For this reason, Little and colleagues introduced a structural equation modeling method to disentangle form and function by creating statistically pure form and function latent variables (Little et al., 2003). Several studies have now successfully used this approach with child and adolescent samples (e.g., Fite, Stauffacher, Ostrov, & Colder, 2008; Fite, Stoppelbein, Greening, & Gaertner, 2009; Murray-Close & Ostrov, 2009; see a related approach in Sijtsema, Ojanen, et al., 2010), and these models have revealed unique predictors and outcomes associated with the pure constructs. For example, in keeping with theory, hostility was associated with pure reactive, physical, and relational aggression but not with proactive aggression (Little et al., 2003).

Other researchers, however, have suggested that functions reflect differences in severity, rather than type, of aggression (Marsee et al., 2014; Stickle, Marini, & Thomas, 2012). For instance, using person-centered analyses, Marsee and colleagues (2014) identified three groups of relationally aggressive adolescent girls in two samples (voluntary residential and involuntarily detained): nonaggressive, reactive relationally aggressive, and combined proactive/reactive relationally aggressive. Consistent with a severity (rather than typology) model, some evidence indicated that the combined group exhibited the most

severe adjustment difficulties. Interestingly, these three groups emerged for girls but not for boys. The findings suggest that proactive relational aggression is unlikely to occur in the absence of reactive relational aggression and that girls who exhibit proactive relational aggression may be exhibiting aggressive behaviors that are more severe in nature. Future research is needed to examine the unique and shared developmental pathways that these forms and functions denote for individuals in various contexts.

DEVELOPMENTAL CHANGE IN RELATIONAL AGGRESSION

Mean Changes in Relational Aggression

Evidence indicates that relational aggression emerges quite early in development; in fact, observational studies have documented these behaviors in children as young as 30 months old (Crick, Ostrov, Burr, et al., 2006). Moreover, relational aggression has been reported among the elderly in assisted living facilities (Trompetter, Scholte, & Westerhof, 2011), suggesting that these behaviors may occur with some frequency across the life span. However, a significant question for developmental psychopathologists is whether the frequency of relational aggression changes across development. As Underwood, Galen, and Paquette (2001) discussed, there has been considerable debate in the field regarding whether social and relational aggression are common, normative social behaviors or whether such conduct reflects a relatively atypical and maladaptive behavior pattern. As these researchers pointed out, the answer to this question may depend on the developmental period under consideration, highlighting the need for work identifying typical developmental trajectories of relational aggression.

A number of theorists have argued that there will be important developmental differences in the use of relational aggression as a result of cognitive, social, and biological changes. In early theoretical discussions of this issue, Björkqvist et al. (1992) suggested that aggression is a relatively normative behavior, but as young children are limited by their social and cognitive skills, they must rely on unsophisticated forms of aggression, such as physical aggression (see also Lagerspetz & Björkqvist, 1994). As children get older and their social and cognitive abilities improve, however, they are hypothesized to replace these physically aggressive behaviors with more covert forms of aggression, such as indirect aggression (Lagerspetz & Björkqvist, 1994). The successful use of relationally aggressive behaviors, such as spreading a rumor about a peer, may require relatively advanced social-cognitive skills (e.g., theory of mind abilities) and verbal abilities (e.g., Bonica, Arnold, Fisher, Zeljo, & Yershova, 2003).

In fact, findings from several past studies indicate that indirect and relational forms of aggression are related to heightened social-cognitive abilities broadly defined (Andreou, 2006; Kaukiainen et al., 1999; for review, see Sutton, Smith, & Swettenham, 1999). Relational aggression in preschoolers has been found to be related to expressive and receptive language abilities (Bonica et al., 2003; Hawley, 2003b; although see Côté, Vaillancourt, Barker, Nagin, & Tremblay, 2007; Estrem, 2005; Kikas, Peets, Tropp, & Hinn, 2009), deception skills (Ostrov, 2006; Ostrov, Ries, Stauffacher, Godleski, & Mullins, 2008), theory of mind (Renouf et al., 2010), and, in females, moral maturity (Hawley, 2003b). In addition, although somewhat sophisticated relationally aggressive acts (e.g., secret spreading) have been documented in children as young as 3 years of age, the identity of the perpetrator is known and the behaviors are based on the here and now rather than events in the past (Ostrov, Woods, Jansen, Casas, & Crick, 2004). Taken together, these findings suggest that advances in social-cognitive skills across development may at times promote relationally aggressive behavior; however, it is important to note that improved skills in these areas may be most likely to predict aggressive conduct in subsets of youth who exhibit impairments in other cognitive abilities (see Crick & Dodge, 1999).

Significant social changes during childhood and adolescence may also lead to increased use of relational forms of aggression. Because relational aggression targets relationships as the vehicle of harm, these behaviors may be most effective in the context of established social networks (Archer & Coyne, 2005) and close, intimate friendships (e.g., Murray-Close, Ostrov, & Crick, 2007), both of which become more common during adolescence (e.g., Berndt, 1996). In recent years, theorists have argued that relational aggression may be an effective strategy to establish and maintain high status in the peer group, particularly during adolescence (Cillessen & Mayeux, 2004; see the "Developmental Outcomes: Potential Positive Correlates" section). As youth approach adolescence, they increasingly prioritize high peer status over other domains (LaFontana & Cillessen, 2010); thus, relational aggression may be perceived as a particularly important tool during this developmental period. Additionally, as children's concerns about the social repercussions of behaviors increase, they may be inclined to select aggressive strategies that are less likely to lead to negative social sanctions, such as social or

relational aggression (e.g., Karriker-Jaffe, Foshee, Ennett, & Suchindran, 2008).

Finally, some researchers have argued that biological changes related to puberty may predict increases in relationally aggressive conduct (e.g., Kistner et al., 2010). Puberty is accompanied by a host of physical changes, including increases in reproductive hormones, such as testosterone. Reproductive hormones, in turn, may facilitate aggressive behaviors in the context of competition for mates (Archer, 2006). Although little work has examined the role of reproductive hormones in relationally aggressive behaviors, Sánchez-Martín et al. (2011) provided initial evidence that testosterone was positively associated with relational aggression in 9-year-old males and females. Pubertal changes may also facilitate relational aggression because they lead to competition for access to sexual partners; in fact, several researchers have argued that relational aggression may be used as a strategy to derogate sexual rivals (Kistner et al., 2010; Pellegrini & Long, 2003; White, Gallup, & Gallup, 2010). Consistent with this perspective, dating popularity is associated with relational aggression, particularly among girls (Pellegrini & Long, 2003), and in one study, earlier age of first intercourse was related to heightened self-reported indirect aggression (White et al., 2010). Finally, early puberty may function as a transitional stressor that promotes aggressive conduct; for instance, Susman et al. (2007) found that early puberty was associated with higher relational aggression in girls. Similarly, Hemphill et al. (2010) found that pubertal stage was positively associated with social aggression among younger, but not older, adolescents.

Consistent with the perspective that cognitive, social, and biological changes across early and middle childhood promote relational forms of aggression, an emerging body of work indicates that relational aggression becomes increasingly common as youth approach adolescence (e.g., Karriker-Jaffe et al., 2013), particularly among girls (Kawabata, Tseng, Murray-Close, & Crick, 2012; Kistner et al., 2010; Murray-Close et al., 2007). For instance, Murray-Close et al. (2007) reported that, among girls only, relational aggression increased in frequency over the course of one calendar year during late elementary school. In their person-centered analyses of trajectories of indirect aggression from ages 2 to 8, Côté et al. (2007) found that most youth exhibited low, stable levels of indirect aggression. However, a subset of youth evidenced increases in their indirect aggression across the course of the study, and girls outnumbered boys in this trajectory group. Interestingly, some of these children also exhibited a pattern of decreasing physical aggression, providing partial support for the hypothesis that youth will replace their physically aggressive behaviors with relational or indirect aggression as their cognitive and social skills mature (see also J. L. Miller, Vaillancourt, & Boyle, 2009; although see Vaillancourt, Brendgen, Boivin, & Tremblay, 2003).

However, not all researchers have documented increases in relational aggression during childhood and early adolescence. For instance, Spieker et al. (2012) reported that girls exhibited fairly stable levels of relational aggression from third to sixth grade, whereas boys exhibited declines in their involvement in such conduct. Additionally, Underwood et al. (2009) found that social aggression decreased in frequency from third to seventh grade, and person-centered analyses indicated that the sample was characterized by one group of children who displayed stable and low levels of social aggression and another group that initially engaged in relatively high levels of social aggression but exhibited decreases in such conduct across the study.

One potential explanation regarding these mixed findings is that relational aggression becomes increasingly common as youth approach preadolescence but then declines in frequency following the transition to adolescence (Karriker-Jaffe et al., 2008). In fact, at least some of the cognitive, social, and biological processes hypothesized to underlie increases in the use of relational aggression are likely to have stabilized or waned by late adolescence. For instance, the social changes thought to promote increased involvement in relational aggression (e.g., heightened focus on peers and social status) may become less common as friendships become more autonomous in nature (Karriker-Jaffe et al., 2008). Similarly, as youth get older, biological transitions, such as puberty, may be less stressful and thus may be less likely to predict increased risk for engagement in relational aggression (Hemphill et al., 2010).

Although most work on developmental trajectories of relational aggression has focused on early and middle childhood, some preliminary evidence indicates that relational aggression becomes somewhat less common in later adolescence. For instance, Cleverley, Szatmari, Vaillancourt, Boyle, and Lipman (2012) reported that most youth exhibited decreases in their engagement in indirect aggression across adolescence; however, a small subset of participants maintained fairly high levels of such conduct across the course of the study. Moreover, this group of youth contained approximately equal numbers of males and females. Karriker-Jaffe et al. (2008) reported that social aggression exhibited curvilinear change across adolescence, with a peak around 14 years of age (see also Karriker-Jaffe et al., 2013). Hemphill et al. (2012) found that levels of relational aggression decreased from

grades 9 to 11 in a sample of Australian adolescents. Taken together, then, preliminary evidence suggests that relational aggression may increase in frequency from early childhood to early adolescence, peak in early to midadolescence, and then subsequently decline in frequency. Future prospective longitudinal studies are needed to confirm these developmental changes.

Developmental Manifestations of Relational Aggression

The focus on mean change in overall levels of relational aggression, however, may obscure more fine-grained developmental differences in the manifestation of relationally aggressive behaviors. For instance, Crick et al. (2007) argued that relational aggression in young children may most often be direct and easily observable (e.g., threatening to end a friendship; turning away from a peer to indicate exclusion; secret spreading in front of the victim). As children mature, however, they may become more sophisticated in their use of relational aggression; for instance, youth may be more likely to engage in indirect relationally aggressive behaviors or behaviors that involve third parties (e.g., rumor spreading; Crick et al., 2007). In fact, although sophisticated relationally aggressive behaviors have been observed in preschool children, these displays tend to be direct and easily observable by the targets (Ostrov et al., 2004; Fanger, Frankel, & Hazen, 2012). Longitudinal studies that explore developmental changes in the use of distinct relationally aggressive behaviors (e.g., threats of friendship withdrawal; spreading malicious gossip; social exclusion) may significantly advance our understanding of the developmental consequences of relational aggression. It is possible, for instance, that unsophisticated relationally aggressive behaviors (e.g., direct verbal threats to end a friendship) may be more strongly associated with maladjustment as compared to more covert behaviors (e.g., spreading gossip or engaging in exclusionary behaviors with a cover story; Fanger et al., 2012), particularly when enacted in developmental periods when such unsophisticated conduct is relatively atypical. Similarly, verbal and nonverbal relationally aggressive behaviors may have distinct implications for adjustment (see Blake, Kim, & Lease, 2011, for a recent application of this idea to social aggression).

In addition, the contexts that elicit relational aggression may change across development. In young children, relational aggression is more likely to occur in sibling relationships than in friendships; however, over time, youth increasingly use these behaviors against friends (Stauffacher & DeHart, 2006), and, by middle childhood, friendships are an important context for the use of relational aggression (Crick & Grotpeter, 1996). With the emergence of romantic relationships in adolescence, youth may begin to use relational aggression against romantic partners (Linder, Crick, & Collins, 2002). In fact, some evidence indicates that in young adulthood, relational aggression more frequently occurs in the context of romantic relationships than in friendships, perhaps because these relationships become particularly salient during this developmental period (Goldstein, 2011; although see Goldstein & Tisak, 2004). Moreover, youth may target others' romantic relationships as a means of social manipulation or control (e.g., stealing a friend's boyfriend; Crick et al., 2007). However, much of the research regarding relational aggression has focused on the use of these behaviors in same-sex peer groups, and most measures fail to assess the relational context of aggression (Goldstein & Tisak, 2004). An important question for future research is whether there is continuity across relationships (e.g., friends, romantic relationships) in the use of relational aggression. Longitudinal studies may provide important insights regarding the potential transfer of relationally aggressive behaviors across developmental contexts (e.g., from sibling relationships to friendships; Stauffacher & DeHart, 2006).

Developmental Challenges in Assessment

A number of assessment techniques are available for the measurement of relational aggression across developmental periods, including systematic observational procedures in the classroom and on the playground (e.g., McNeilly-Choque, Hart, Robinson, Nelson, & Olson, 1996; Ostrov & Keating, 2004), semistructured observations (Ostrov et al., 2004), observational ratings (Murray-Close & Ostrov, 2009), peer nomination techniques (Crick & Grotpeter, 1995; McNeilly-Choque et al., 1996), teacher reports (Crick, 1996; McNeilly-Choque et al., 1996), structured interviews (Tackett & Ostrov, 2010), parent reports (Casas et al., 2006; Ostrov & Bishop, 2008), and self-reports (Little et al., 2003; Murray-Close, Ostrov, Nelson, Crick, & Coccaro, 2010). Details regarding methods for measuring relational aggression have been discussed elsewhere (Crick et al., 2007); however, two methodological challenges to the assessment of relational aggression merit comment because they have significant implications for the study of developmental change in relational aggression.

First, there is currently a lack of clarity in the literature regarding items that assess relational, rather than social or indirect, aggression. As discussed, there is considerable conceptual overlap between these forms of aggression (Archer & Coyne, 2005), and it is not uncommon for

researchers to use measures developed to assess relational aggression (or slight adaptations of these measures) in studies of indirect or social aggression. Given the similarities among social, indirect, and relational aggression (Archer & Coyne, 2005), this approach is understandable and in many circumstances may not have important implications for study findings. However, distinctions between these behaviors may be important for some critical developmental questions. For instance, the transition to indirect aggressive behaviors hypothesized to occur as youth get older (Björkqvist et al., 1992; Crick et al., 2007) underscores the possibility that developmental differences in aggressive behavior may partially depend on the subtype of aggression being assessed. More specifically, relational aggression may be more prevalent than indirect aggression among young children because relationally aggressive behaviors are often very direct (e.g., covering one's ears to ignore a peer). Additionally, the processes that underlie developmental increases in relational aggression may differ from those that give rise to increases in social or indirect aggression. For instance, as damage to relationships is the defining feature of relational forms of aggression, these behaviors may be most strongly tied to increases in close and intimate relationships (see Murray-Close et al., 2007) and most predictive of adjustment problems related to impairment in close relationships.

We believe that it will be important for researchers to develop instruments that can better distinguish between these related, but conceptually distinct, subtypes of nonphysical aggression. In an example of efforts in this area, Nelson, Springer, et al. (2008) developed a coding scheme to identify subtypes of aggression in emerging adults' descriptions of peer-based mean behaviors. This scheme, including direct and indirect relational aggression, ignoring, gestural nonverbal aggression, and passive aggression, could be adapted to assess subtypes of aggressive behavior in youth. Results from this study documented important differences in emerging adults' engagement in these behaviors and highlighted how measures that are nuanced and theoretically based may help elucidate the processes underlying the development of relational aggression.

Second, efforts to characterize developmental change in relational aggression, as well as research on developmental differences in the correlates of relational aggression, are limited by methodological differences in the assessment of relational aggression across developmental periods. Naturalistic systematic observations have primarily been used with preschool-age children (e.g., Ostrov & Keating, 2004), likely because the heightened reactivity to traditional observation techniques often displayed among older children serves as a threat to the validity of the measures. Additionally, teacher reports may be more valid for use during early and middle childhood, as compared to adolescence, because relational aggression may be relatively direct, unsophisticated, and easily observed by onlookers (Crick et al., 2007). During adolescence, in contrast, parents and teachers may not be privy to many instances of relational aggression. Given the covert nature of relationally aggressive behaviors, Crick et al. (2007) suggest that peer nomination procedures are likely the most valid assessments of such conduct during late childhood and adolescence, although self-report measures of relational aggression are common and are meaningfully associated with outcomes (e.g., Little et al., 2003).

The differences in the techniques that are most developmentally appropriate (and most commonly employed) across age groups create challenges for developmental psychopathology researchers. Specifically, true developmental change in relational aggression (and the correlates of such conduct) may be obscured by different assessment techniques and/or changes in the validity of a particular approach across development. For instance, declines in parent-reported relational aggression may reflect true developmental change in such conduct or may instead reflect improvements in adolescents' abilities at concealing these behaviors from their parents. A critical direction for future research, then, is the continued development and refinement of methods for assessing relational forms of aggression across developmental periods.

AGGRESSION AND GENDER

Theoretical Perspectives Regarding Aggressive Girls

Research on relational aggression challenged the longstanding assumption in the field of developmental psychopathology that aggression was highly atypical in females during childhood. In one highly influential theoretical account of aggression in females, Keenan and Shaw (1997) suggested that norms against aggression in girls, and accompanying socialization experiences, led females to shift from predominantly externalizing to internalizing problems across development. Additionally, girls' earlier maturation was argued to serve as a buffer against the emergence of problem behaviors such as aggression (Keenan & Shaw, 1997). Although several researchers suggested that girls may engage in aggressive behaviors during adolescence (e.g., Moffitt & Caspi, 2001; Silverthorn & Frick, 1999), there was a consensus among most developmental theorists that such conduct was quite rare among females during

childhood. Empirical support from decades of aggression research bolstered these arguments; for instance, Maccoby and Jacklin (1974) argued that gender differences in aggression were one of the rare true gender differences.

In their seminal publication on the topic of relational aggression, however, Crick and Grotpeter (1995) argued that the common assumption among developmental psychopathology researchers that girls did not exhibit significant difficulties such as aggression during childhood, termed the *benign childhood* hypothesis (Crick & Zahn-Waxler, 2003), was incorrect. Instead, Crick and colleagues suggested that these apparent gender differences resulted from a failure to assess aggressive behaviors that were salient for females, such as relational aggression. Theoretically, relational aggression was expected to be more common than physical aggression among females for several reasons. First, girls were hypothesized to employ relationally aggressive behaviors because such behaviors are consistent with the focus on interpersonal relationships and social functioning typical in female peer groups (e.g., Crick & Grotpeter, 1995; Crick & Zahn-Waxler, 2003). Socialization against physical aggression from significant others, such as parents and peers, was also posited to reduce girls' reliance on physical aggression and promote the use of more socially acceptable and covert forms of aggression, such as relational aggression (Crick et al., 2007). Björkqvist et al. (1992) suggested that the relatively advanced cognitive maturation among girls, hypothesized by others to buffer girls from engagement in aggressive conduct (Silverthorn & Frick, 1999), may actually facilitate the use of more sophisticated aggressive behaviors, such as indirect aggression. Furthermore, girls' lower physical strength was argued to limit their capacity to effectively use physical forms of aggression, increasing the appeal of more indirect approaches (Björkqvist, 1994).

Gender Differences in Relational Aggression

Despite these theoretical claims, however, research findings regarding gender differences in relational aggression have been mixed. Findings from several early studies on relational aggression provided evidence that girls were more likely than boys to engage in such conduct from preschool through childhood (see Crick et al., 2007, for review). However, Card, Stucky, Sawalani, and Little (2008) provided meta-analytic findings indicating that although gender differences in indirect aggression favoring girls were statistically significant, they were too small to be meaningful. Nonetheless, the study of relational aggression remains critical in research efforts to understand aggressive behavior problems in girls. Females are relatively unlikely to engage in physical forms of aggression, and there appears to be greater overlap between physical and indirect aggression in males compared to females (Card et al., 2008). These findings suggest that aggressive boys may frequently employ both physical and indirect aggression, whereas aggressive girls may preferentially select indirect or relational forms of aggression; that is, the modal type of aggression (i.e., within-group gender difference) is relational rather than physical among girls (e.g., Ostrov, Kamper, Hart, Godleski, & Blakely-McClure, 2014; Putallaz et al., 2007; see also Ostrov & Godleski, 2010). In fact, findings from recent person-centered analyses indicate that across several populations (i.e., community, voluntary residential treatment, and involuntary detained), adolescent girls are more likely than boys to be classified as highly relationally, but not physically, aggressive (Marsee et al., 2014). As a result, studies that do not assess relational, indirect, or social forms of aggression may fail to identify the vast majority of aggressive females.

Additionally, several researchers have emphasized the importance of moving beyond a focus on mean-level differences in relational aggression to instead explore gender differences in developmental trajectories, mechanisms, and outcomes associated with such conduct (e.g., Ostrov & Godleski, 2010; Spieker et al., 2012; Underwood, 2003). In fact, several of the developmental processes thought to promote engagement in relational aggression (e.g., increases in intimacy in close friendships; pubertal changes) may differ between males and females, potentially leading to meaningful gender differences in trajectories of relational aggression over time (e.g., Kistner et al., 2010; Murray-Close et al., 2007). For instance, gender differences in pubertal timing may result in a relatively early increase in relational aggression among girls during the transition to adolescence (Kistner et al., 2010). Card et al. (2008) failed to find meta-analytic evidence that gender differences in indirect aggression differed across developmental periods; however, measurement differences across these periods may have obscured gender differences in true developmental change (Card et al., 2008), highlighting the need for longitudinal research in this area.

In fact, some longitudinal research has provided preliminary evidence for distinct patterns of developmental change in relational aggression in males versus females. For instance, several studies have reported that girls were more likely than boys to exhibit increases in relational aggression (or to maintain relatively high levels of such conduct) as they approached adolescence (Kawabata et al., 2012; Kistner et al., 2010; Murray-Close et al., 2007; Spieker

et al., 2012). However, other studies have failed to find gender differences (Cleverley et al., 2012; Karrifer-Jaffe et al., 2008; Underwood et al., 2009). Clearly, additional research exploring gender differences in longitudinal change in relational aggression, with attention on the methods used to assess such conduct, is needed.

It will also be important for researchers to consider the question of gender differences across relational contexts and across subtypes of relationally aggressive conduct. In fact, some evidence indicates that relational aggression is more common than physical aggression in girls', but not boys', friendships (Crick & Nelson, 2002). Goldstein (2011) reported that although young adults did not differ in their use of relational aggression against friends, females were more likely than males to engage in such conduct in the context of romantic relationships (for additional research regarding gender differences in romantic relational aggression, see Goldstein, Chesir-Teran, & McFaul, 2008; Linder et al., 2002). These preliminary findings suggest that across developmental periods, gender differences may exist in some (e.g., romantic relationships) but not other (e.g., friendships) relational contexts.

In addition, research in this area may benefit from a more fine-grained analysis of the types of relationally aggressive behaviors used against relationship partners. For instance, Nelson, Springer, et al. (2008) found that college students reported that males most often engaged in direct physical aggression (e.g., hitting), particularly against other males. In contrast, participants reported that females frequently engaged in indirect relational aggression (e.g., gossip) against both males and females and in direct relational aggression (e.g., guilt trips) against males. These findings suggest that gender differences in relational aggression may depend on the gender of the target as well as whether the relational aggression is direct or indirect in nature. Future work is necessary to elucidate whether gender differences exist across relational contexts (e.g., friendships, romantic relationships) and relationally aggressive behaviors (e.g., indirect, direct). It will also be important to assess whether the magnitude of these gender differences changes across development.

RISK FACTORS: BIOBEHAVIORAL PROCESSES

Genetic Risk

Developmental psychopathologists have highlighted the need for interdisciplinary research, including neurobiological, neuropsychological, and psychophysiological approaches, in the study of the development of maladaptive behavior patterns for decades (e.g., Cicchetti, 1993). Several biobehavioral perspectives regarding the development of relational aggression have emerged in recent years, including studies of genetic risk for involvement in relationally aggressive behaviors. Using a quantitative genetic design, Brendgen et al. (2005) examined the relative genetic and environmental contributions to physical and social aggression in a sample of 6-year-old twin pairs. Findings indicated that social aggression was only weakly related to genetic factors (20% of the variance for teacher-reported social aggression; 23% of the variance for peer-reported social aggression) and was associated with both shared and nonshared environmental influences. These findings contrasted with the results for physical aggression, which indicated substantial heritability (63% of the variance for teacher-reported physical aggression; 54% of the variance for peer-reported physical aggression) and virtually no influence of shared environmental factors. Interestingly, although the genetic influence on social aggression was relatively low, it overlapped with genetic risk for physical aggression, suggesting similar genetic etiological factors for both forms of aggression (Brendgen et al., 2005). In contrast, the nonshared environmental risk factors for physical versus social aggression appeared to be relatively distinct.

In their study of 6- to 18-year-old twins, Tackett, Waldman, and Lahey (2009) reported relatively high estimates of genetic influence on a latent variable including mother- and self-reported relational aggression (63% of the variance). However, as in the work of Brendgen et al. (2005), shared environmental risk emerged; the authors suggested that relational aggression may be more susceptible than physical aggression to parent and shared peer group influences (Tackett et al., 2009), highlighting the important role of environmental factors in the emergence of such conduct. The role of the shared environment in the development of relational aggression has not always been replicated in genetic studies, however. In a follow-up study using a subsample of participants from Brendgen et al. (2005) when youth were 7 years old, Brendgen et al. (2008) failed to find evidence for shared environmental influences on a composite of teacher- and peer-reported social aggression. Tackett et al. suggested that distinct informants may account for some of the mixed findings in this area and highlighted the need for greater empirical attention to measurement of relational aggression in behavior genetic designs.

Behavioral genetics studies provide significant insight regarding potential etiological factors involved in the development of relationally aggressive conduct. However,

a number of significant questions remain. For instance, emerging molecular genetic studies have documented specific candidate genes in the development of antisocial behavior, particularly in the context of environmental risk (e.g., Kim-Cohen et al., 2006). Given evidence of similar genetic risk for both forms of aggression in quantitative genetic designs (Brendgen et al., 2005), researchers should extend this work to molecular genetic studies to explore whether similar genetic polymorphisms are related to physical and relational forms of aggression. It will also be essential to evaluate whether similar environmental stressors are involved in gene-environment (G×E) interactions in the development of physical versus relational aggression. Brendgen et al. (2008) reported a G×E interaction in the association between friends' physical aggression and participants' own involvement in such conduct; a parallel interaction was not found in participants' social aggression. These findings highlight the possibility that distinct environmental stressors may interact with genetic risk in predicting relationally aggressive behaviors, as compared to more traditionally studied forms of aggression (e.g., physical aggression). Finally, genetically informed, longitudinal designs are necessary to evaluate the extent to which genetic factors contribute to stability and change in relational aggression over time and whether the patterns of these contributions are similar for physical and relational forms of aggression (see Neiderhiser, Reiss, & Hetherington, 1996, for an application to antisocial behavior).

Psychophysiological Stress Systems

In addition to genetic risk, researchers have recently begun to examine the role of individual differences in functioning of psychophysiological stress systems, including the autonomic nervous system (ANS; see Murray-Close, 2013a), in the development of relational aggression. The ANS is comprised of two distinct branches, the sympathetic nervous system (SNS), which coordinates the body's fight-or-flight responses to stress, and the parasympathetic nervous system (PNS), which reflects rest-and-digest functions. In several theoretical formulations, low SNS arousal is hypothesized to serve as a risk factor for the development of aggressive conduct. According to fearlessness theory, low SNS activity reflects temperamental fearlessness (Ortiz & Raine, 2004), which in turn may interfere with the efficacy of socialization against aggressive behavior. Fearless youth may be relatively unresponsive to punishment and unconcerned about potential negative repercussions of engaging in aggressive conduct (e.g., retaliation from victims). From a stimulation-seeking perspective, low SNS is experienced as an aversive physiological state; thus, youth may engage in aggressive behaviors in an effort to increase their arousal to more comfortable levels (Sijtsema, Veenstra, et al., 2010). However, some researchers have argued that heightened, rather than blunted, SNS arousal is a risk factor for aggressive conduct, particularly when SNS overarousal occurs following aversive or threatening events (e.g., Hubbard et al., 2002). From this perspective, exaggerated SNS reactivity to negative events is hypothesized to reflect dysregulated emotional reactions to stress (e.g., anger), thus increasing risk for aggressive responses (see Murray-Close, 2013a). Indices of PNS functioning, in contrast, are argued to reflect biological differences in regulatory abilities, such that high resting PNS arousal, and greater PNS withdrawal following challenge, portend greater emotional and attention regulation capacities (Calkins & Keane, 2004; Porges, 2007). This greater self-regulation, in turn, is expected to facilitate the inhibition of aggressive impulses.

To date, the vast majority of research regarding the association between ANS arousal and aggression has focused on physical forms of aggressive behavior (see Murray-Close, 2013a, for review). However, an emerging body of research explores the association between ANS arousal and relational forms of aggression, with some work documenting distinct correlates of relational, as compared to physical, aggression (Murray-Close & Crick, 2007). Some of this research has provided evidence that exaggerated stress reactivity is related to increased risk for relational aggression. In early work in this area, for instance, Murray-Close and Crick (2007) found that heightened systolic blood pressure reactivity was associated with relational aggression in girls but not boys. More recently, in a sample of female emerging adults, Murray-Close (2011) found that heightened SNS reactivity to stress was associated with relational aggression against romantic partners, particularly among women who also exhibited additional risk factors for aggression (e.g., hostile attribution bias for romantic relational provocations). However, consistent with fearlessness and/or stimulation-seeking theories, other research has documented blunted SNS arousal among relationally aggressive youth. For instance, Sijtsema, Shoulberg, and Murray-Close (2011) reported that blunted SNS reactivity was associated with relational aggression in a sample of female children and adolescents. In a study with preschoolers, Gower and Crick (2011) found that low resting heart rate and blood pressure were associated with elevated

levels of relational aggression; in some analyses, findings emerged primarily in youth who also exhibited poor effortful control. Although more limited, some studies have also documented associations between PNS withdrawal and relational aggression, although the direction of effects has varied across studies (e.g., Murray-Close, 2011; Sijtsema et al., 2011).

Preliminary research regarding the association between relational aggression and neuroendocrine indices of stress, such as cortisol, has also provided support for the notion that underarousal of stress systems serves as a risk factor for relationally aggressive conduct. Cortisol, a hormone released by the adrenal cortex in response to stressful experiences, exhibits a diurnal rhythm with a peak in cortisol levels 30 minutes after waking followed by gradual decrease throughout the day. Murray-Close, Han, Cicchetti, Crick, and Rogosch (2008) found that relational aggression was associated with low morning cortisol and blunted change in cortisol across the day. However, findings are preliminary, and some researchers have failed to find associations between cortisol and indirect aggression (e.g., Vaillancourt & Suderani, 2011).

The mixed findings regarding the associations between both ANS and neuroendocrine stress systems and relational aggression highlight the possibility that both heightened and blunted stress arousal may predict elevated levels of relational aggression, depending on additional moderating factors. For instance, the physiological stress profiles associated with relational aggression may vary for males versus females (Murray-Close et al., 2014; see Murray-Close, 2013a, for review). Effects may also depend on the presence of additional risk factors (e.g., relational victimization; Murray-Close, 2011; Murray-Close et al., 2014; see also Murray-Close, Holland, & Roisman, 2012) or whether the aggression is proactive (i.e., planful, unemotional, and goal-directed) or reactive (i.e., emotional, retaliatory) in function. In fact, Murray-Close and Rellini (2012) recently reported that blunted ANS reactivity to stress was associated with proactive relational aggression whereas exaggerated ANS reactivity was associated with reactive relational aggression; however, findings emerged only among women with a history of sexual abuse. Interestingly, the moderating role of contextual risk has varied across studies, with some research indicating that physiological arousal is more strongly related to relational aggression among youth without high levels of contextual risk (e.g., without a history of abuse; Murray-Close et al., 2008; see the "Multilevel Perspectives" section for a discussion of potential explanations regarding these differing findings). A relatively understudied moderator in research regarding the association between relational aggression and physiological reactivity is the type of task used to elicit stress reactivity; in fact, Murray-Close and colleagues (2014) recently documented that girls' perpetration of relational aggression was at times associated with distinct profiles of reactivity to relational (e.g., experiences of exclusion) versus instrumental (e.g., property damage) peer stressors. It will be essential for future research to consider moderators of the association between stress physiology and relational aggression, with particular attention to the processes thought to underlie these associations.

Additional Biological Factors

Several potential biological risk factors for relational aggression should be incorporated in future research in this area. For instance, despite the large body of research documenting associations between androgens such as testosterone and physically aggressive behavior (Archer, Graham-Kevan, & Davies, 2005), limited research has examined whether androgens are implicated in relational aggression. In preliminary research in this area, testosterone was positively associated with relational aggression in a sample of 9-year-old children, once effects of gender were controlled (Sánchez-Martín et al., 2011). Coyne, Manning, Ringer, and Bailey (2007) found that low right-left ratios of the length of the index finger to ring finger, thought to reflect greater exposure to prenatal androgens, were related to indirect aggression in a sample of women. Taken together, these results highlight the possibility of both organizational and activational effects of androgens in the development of relational aggression.

Emerging research has also documented associations between event-related potentials and relational aggression, perhaps reflecting attentional deficits among aggressors (Godleski, Ostrov, Houston, & Schlienz, 2010). Additional psychophysiological indices thought to reflect motivational and emotional processes, such as startle and electroencephalography, have been found to be related to physical aggression (e.g., Peterson, Shackman, & Harmon-Jones, 2008; Verona & Kilmer, 2007). It will be important for researchers to extend this work to include relational forms of aggression, particularly in research areas that have documented gender differences in the prediction of physically aggressive conduct (e.g., Verona & Kilmer, 2007).

Finally, researchers should incorporate social affective neuroscience perspectives to explore the neural

mechanisms underlying relationally aggressive behaviors, including investigating whether neuroscience models of physical aggression (e.g., Davidson, Putnam, & Larson, 2000) can be applied to relational forms of such conduct. In one recent functional magnetic resonance imaging study with adolescent girls, experiences of relational victimization were related to decreased activity in brain regions associated with executive functioning when viewing peer faces with varying affective expressions (Baird, Silver, & Veague, 2010). However, to our knowledge, researchers have not yet examined the neural activation patterns associated with the perpetration of relational aggression using functional magnetic resonance imaging methods, despite the central role ascribed to emotional processes in such conduct (see the "Emotion and Emotion Regulation" section). Given the hypothesized importance of reactivity to relational stressors among relationally aggressive youth (Crick, Grotpeter, & Bigbee, 2002), these studies may benefit from incorporating procedures that can assess neural activation patterns associated with social exclusion (e.g., Eisenberger, Lieberman, & Williams, 2003).

RISK FACTORS: COGNITIVE AND EMOTIONAL PROCESSES

The Crick and Dodge (1994) Reformulated Social Information Processing Model of Children's Adjustment

It has been over two decades since Crick and Dodge (1994) published their seminal review and reformulation of the social information processing (SIP) model of children's adjustment (originally proposed by Dodge, 1986). This review provided clear evidence that unique tendencies in processing cues from the social world could help explain behavioral differences between children. In particular, the accumulated evidence strongly indicated that heightened levels of physical (or overt) aggression were consistently associated with processing biases and deficits at every step of the model. Experimental and intervention designs have been particularly effective in demonstrating a causal role of these SIP mechanisms in children's engagement in aggressive acts. The proposition of the model (see Figure 13.1 for a representation) is that children come to process social cues in a consistent, automated fashion

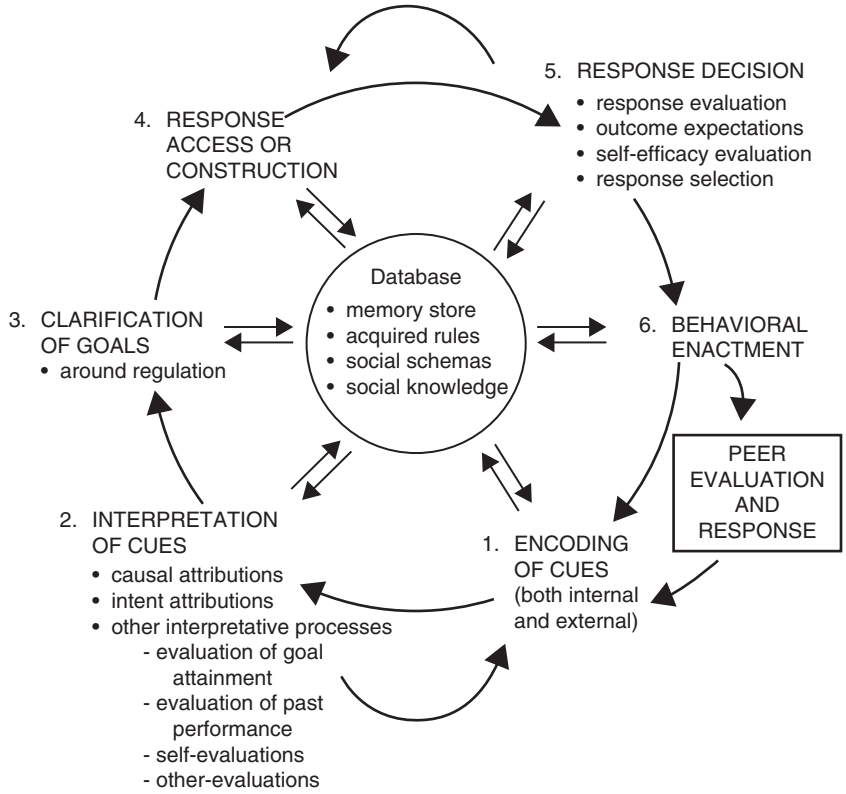


Figure 13.1 The Reformulated Social Information Processing Model. *Source:* Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin, 115*, 74–101. Copyright © 1994 by the American Psychological Association. Reprinted with permission.

which can predispose them to aggressive action against others (whether warranted or not). The steps of the reformulated model, leading up to behavioral enactment (step 6), include (1) encoding of external and internal cues, (2) mental representation and interpretation of those cues, (3) clarification or selection of a social goal, in the context of current interpretation, (4) access or construction of potential responses, and (5) response decision (which response seems most appropriate, given current interpretation and social goals). Prior experience (in the database) provides context for current processing.

During the first two steps of this model, individual differences in children's processing are evident as they selectively attend to cues, which are then subject to interpretation. Aggressive children are more likely to attend to cues consistent with negative expectations of the intent of others (based on prior experiences and associated social schemata; Dodge & Tomlin, 1987). The aggressive child's enhanced attention to cues which may be perceived as hostile (Gouze, 1987) facilitates interpretation of those cues in a biased manner. In particular, aggressive children tend to have a hostile attributional bias (HAB), in which they are more likely to perceive hostile intent, even when cues are ambiguous and therefore do not lend themselves to such an interpretation (Crick & Dodge, 1994). This relationship between HAB and social adjustment tends to be quite robust across studies, at least in regard to physical aggression (Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002); in effect, aggression serves as a defense against perceived provocation.

At step 3, children select a goal or desired outcome for the current situation. These goals may either enhance or detract from optimal relationship functioning (Slaby & Guerra, 1988). In this regard, aggressive children are more likely to embrace goals that damage relationships (e.g., revenge or instrumentality of aggression) as they navigate social interactions, consistent with their tendency to perceive hostile cues from others. At step 4, children are hypothesized to access possible responses from memory or to construct novel responses in unfamiliar social situations. The number of responses, their order, and the tenor of each individual response may be informative in the evaluation of the child's processing at this step. The response repertoires of aggressive children are characterized by more aggressive and less prosocial approaches (Quiggle, Garber, Panak, & Dodge, 1992).

Finally, at steps 5 and 6, the potential responses are evaluated and the most appropriate response selected for behavioral enactment. Aggressive children tend to evaluate aggressive responses more positively and are less likely to believe that competent responses will be effective in dealing with peers (Quiggle et al., 1992). These evaluations appear to be particularly relevant to engagement in proactive aggression (Crick & Dodge, 1996). Finally, at step 6, the behavior is displayed. Importantly, consistent with the model, the manner in which peers respond to this behavior will impact subsequent encoding and processing of cues. That is, children that enact an aggressive behavior will often experience retaliation from peers, which may confirm their prior intent attributions and allow for faster automated processing in similar social situations in the future (Crick & Dodge, 1994).

Gender, Subtypes of Aggression, and Hostile Attribution Bias

At the time of the Crick and Dodge (1994) review of SIP research, physical and verbal aggression had been the focus of prior work, largely because constructs such as indirect and relational aggression were just beginning to capture the attention of developmental scientists. There was promise evident, however, in the application of the SIP model to relational aggression. For instance, Crick (1995) hypothesized that relationally aggressive children, like their physically aggressive counterparts, would also exhibit HAB. However, Crick argued that relational disputes (e.g., provocations with a relational tone, such as being left out) would be particularly provocative for relationally aggressive children, especially girls, because these youth view such behavior as highly distressing and disruptive to their interpersonal goals. In contrast, Crick argued that boys would find instrumental disputes (provocations involving physical dominance, territory, and material objects) to be most distressing and thus would react with physical aggression. This hypothesis raised the possibility that HAB may be context-specific; that is, relational scenarios were not expected to be provocative to physically aggressive children, and instrumental scenarios were not expected to be provocative to relationally aggressive children.

In the first two studies that assessed the validity of these hypotheses (Crick, 1995; Crick et al., 2002), results generally aligned with expectations. Peer-nominated relational aggression corresponded with higher levels of children's self-reported relational HAB and emotional distress. Girls were also more likely than boys to feel such distress. Several recent studies have provided additional support for Crick's (1995) initial hypotheses. For instance, Gentile, Coyne, and Walsh (2011) found instrumental HAB mediated the association between fall media violence exposure and spring physical aggression, particularly for boys. In addition, relational HAB mediated the relation between fall

media violence exposure and spring relational aggression, and this effect was stronger for girls. With a sample of preadolescents, Yeung and Leadbeater (2007) found that relational HAB was associated with relational aggression concurrently as well as over time. Moreover, HAB for relational provocations partially mediated the association between relational victimization and concurrent relational aggression, though only at Time 1 (see also Ostrov, Hart, Kamper, & Godleski, 2011; Ostrov & Godleski, 2013). In a sample of adults, Murray-Close et al. (2010) found that HAB for relational provocations and feelings of distress were associated with relational aggression against romantic partners, controlling for relational aggression against peers.

However, others have reported findings that do not confirm the expected conceptual specificity linking subtypes of aggression to forms of HAB. Godleski and Ostrov (2010) explored temporal associations between HAB and aggression, using data from the National Institute of Child Health and Human Development Study of Early Child Care and Youth Development (NICHD SECCYD). In longitudinal analyses, third-grade aggression, gender, and relational and instrumental HABs (composites based on yearly assessments from third to fifth grade) were entered as predictors of sixth-grade subtypes of aggression. When controlling for earlier aggression and gender, instrumental HAB rather than relational HAB predicted later relational aggression and physical aggression. When temporal order was reversed (third-grade aggression predicting the HAB composites), both relational and physical aggression were associated with relational and instrumental HABs. Taken together, then, the findings suggested a more generalized association between aggression and HAB. Additional studies have failed to find any association between HAB for relational provocations and relational aggression. For example, Crain, Finch, and Foster (2005) reported that relational HAB showed no connection with relational aggression in one sample of girls, and, in the second female sample, HAB for relational provocations was associated with *lower* levels of relational aggression.

In an effort to further validate the Crick hypothetical scenarios for measuring HAB, Nelson, Mitchell, and Yang (2008) utilized confirmatory factor analysis to test whether responses to the different provocation contexts (instrumental and relational) could be statistically distinguished and whether all of Crick's original scenarios would appropriately load with the expected latent factor (two additional items were included in data collection as backup). Results showed that 9 of 10 Crick scenarios loaded on the appropriate factor; one relational provocation was replaced. The resulting instrumental HAB factor was related to physical aggression for boys, but children's relational HAB was not associated with relational aggression. In addition, the authors reported that for three of the five relational provocations, the majority of children in the study (58%–70%) responded with HAB. Accordingly, most relational scenarios were highly provocative and did not appear to elicit HAB from a relationally aggressive minority alone.

Moderators and Methodological Issues in the Hostile Attribution Bias-Aggression Connection

These mixed findings highlight the possibility that there may be important moderators of the association between HAB and relational aggression. For example, Mathieson and colleagues (2011) recently examined moderators suggested by Crick's relational vulnerability model. They found relational HAB to predict relational aggression only for girls who experienced high levels of relational victimization by peers and also reported high emotional distress in reaction to Crick's relational provocation scenarios. This study has clear empirical and clinical implications, suggesting that relational factors may cluster together to increase risk for engagement in relational aggression, particularly among girls.

In addition, proactive and reactive functions of relational aggression might be differentially associated with HAB. Prior research regarding physical aggression suggests that HAB is more strongly associated with reactive rather than proactive functions (Crick & Dodge, 1996). Although limited research has been conducted in the area of relational aggression, preliminary findings support the suggestion that HAB for relational provocations may be more strongly associated with reactive than proactive functions of relational aggression. For instance, Bailey and Ostrov (2008) found that reactive physical aggression corresponded uniquely with instrumental HAB, whereas reactive relational aggression was uniquely associated with relational HAB. In a study with adults, Murray-Close et al. (2010) reported that HAB for relational provocations was uniquely associated with reactive but not proactive relational aggression.

In addition to moderators, the mixed findings may be partly due to methodological, analytical, and sample differences that limit the direct comparison of findings. For instance, Crain et al. (2005) assessed HAB in response to ambiguous situations in friendships rather than the mix of peer and friend situations captured in Crick's original measure. Additionally, their hypothetical situations focused on female characters only. Given Crick's (1995) suggestion that the link between HAB and aggression

may be context-specific, these findings underscore the possibility that HAB may be more strongly associated with relational aggression in some contexts (e.g., in the larger peer group) than others (e.g., in close friendships). In physical aggression research, intent attributions have been assessed in many different ways (e.g., hypothetical scenarios, videotaped scenarios with actors), and effect sizes vary across these methodologies (Orobio de Castro et al., 2002). Relational provocation assessments have predominantly focused on hypothetical scenarios, so there is much work yet to be done to incorporate and compare results of different methodologies. The studies have also varied in that some incorporated a categorical approach to defining aggression (i.e., using cutoffs to establish extreme groups for aggression; e.g., Crick, 1995; Crick et al., 2002) whereas others have utilized a dimensional approach (i.e., using continuous aggression scores; e.g., Crain et al., 2005; Nelson, Mitchell, et al., 2008). Only Godleski and Ostrov (2010) have compared the utility of a categorical and a dimensional approach with the same sample.

Research is also needed to assess whether these processes might differ across samples. Preliminary research examining the association between HAB and relational aggression in clinical populations has provided mixed results. MacBrayer, Milich, and Hundley (2003), for example, found that children with a disruptive behavior disorder (attention-deficit/hyperactivity disorder [ADHD], oppositional defiant disorder, bipolar) were more likely to exhibit HABs of both types. In contrast, Mikami, Lee, Hinshaw, and Mullin (2008) did not find girls with ADHD to have higher HAB scores. Moreover, connections between SIP and aggression were actually stronger for comparison girls than for girls with ADHD. Relational provocation scenarios may also be more or less provocative across different gender, cultural, and age groups, which may in turn enhance or weaken the strength of the association between HAB and aggression.

Social Information Processing and Relational Aggression: Beyond Hostile Attribution Bias

Although the majority of research regarding SIP processes and relational aggression has focused on HAB, several studies have also considered other steps in the SIP model as well as the presence of latent knowledge structures in the database (which informs each step of the model). For example, Arsenault and Foster (2012) recently examined how attention and memory processes might be biased in aggressive children, leading to difficulties at step 1 of the SIP model—encoding of cues. Children saw videos of unambiguous overtly and relationally aggressive provocations. During the videos, a red light would flash near the video screen, and the child had to press the space bar at that time. Reaction times were measured to assess children's latencies as an index of attention. Children's accuracy of recall to video content was also assessed. Results showed that relational aggression was associated with attention shifting and free recall for the relationally aggressive provocations, even after controlling for overt aggression. Relationally aggressive children, therefore, were particularly fixated on relationally aggressive events shown on the videotape.

Crick and Werner (1998) examined response decision, the fifth step of the model, in the prediction of relational and physical (overt) aggression in third- to sixth-grade children. Children responded to hypothetical provocation scenarios (both relational and instrumental) in which the harmful intent of the provocateur was clear. They rated the appropriateness of physically aggressive, relationally aggressive, and prosocial responses to the provocation. Results showed that physically aggressive boys and girls positively evaluated physically aggressive responses to instrumental conflicts. In contrast, relationally aggressive children were not more likely to positively evaluate relationally aggressive responses to relational provocations. Contrary to expectations, physically aggressive girls saw physically aggressive responses more positively in the context of a relational provocation. Moreover, relationally aggressive boys favored relationally aggressive responses to instrumental provocation. Gender differences showed that boys were more positive about physically aggressive responses, and girls favored relationally aggressive responses. Some of these results are consistent with the original conceptualization of Crick (1995), whereas others differ.

Finally, several studies have shown that normative beliefs about the appropriateness of aggression are related to engagement in relational aggression, potentially because these beliefs enhance selection of aggressive responses at step 5 of Crick and Dodge's (1994) model. For instance, Poteat, Kimmel, and Wilchins (2011) found that beliefs regarding the appropriateness and effectiveness of violence were associated with bullying, physical fighting, and relational aggression for both male and female adolescents (see also Leff et al., 2014). Goldstein and Tisak (2010) found that adolescents viewed gossip and physical aggression as very wrong, but social exclusion was considered somewhat acceptable. Moreover, the more acceptable study participants presumed physical aggression or gossip to be, the more likely they were to admit engaging in physical aggression and relational aggression, respectively (no findings

emerged for social exclusion). Werner and Hill (2010) assessed whether children's individual normative beliefs and classroom-level norms favoring relational aggression would predict increased engagement in such conduct over the course of one year. Results showed that approval of relational aggression increased with the transition to middle school. Moreover, increases in relational aggression were predicted by individual norms favoring relational aggression and a peer group context highly supportive of relational aggression.

Toward an Integrated Gender-Linked Model of Aggression

Recently an integrated model for understanding gender differences in the development of physical and relational aggression in early and middle childhood was proposed by Ostrov and Godleski (2010). This model, depicted in Figure 13.2, posited a new framework that expanded on the existing social-cognitive and gender schema models and specifically integrated the SIP model of children's adjustment (Crick & Dodge, 1994) with the Schematic-Processing Model of Sex Role Stereotyping (Martin & Halverson, 1981). The model begins with the traditional six steps of the SIP model. However, Ostrov and Godleski proposed that the gender schematic processing model can be fully incorporated in the SIP model via the database and that these gendered processing patterns influence each of the traditional six SIP steps.

At step 1 of the SIP model, Ostrov and Godleski (2010) argued that past gender-relevant peer experiences, stored as memories, would be accessed during ambiguous provocation situations when encoding cues. Gender schemas were argued to influence the interpretation of cues at step 2 and the clarification of goals at step 3. At step 4, when generating possible responses to the provocation, behavioral responses that are most consistent with children's gender identity, self-construal, and past experiences (i.e., influenced by various socialization agents and the individual's history of adaptation) are more likely to be activated and accessible. Next, the authors proposed that

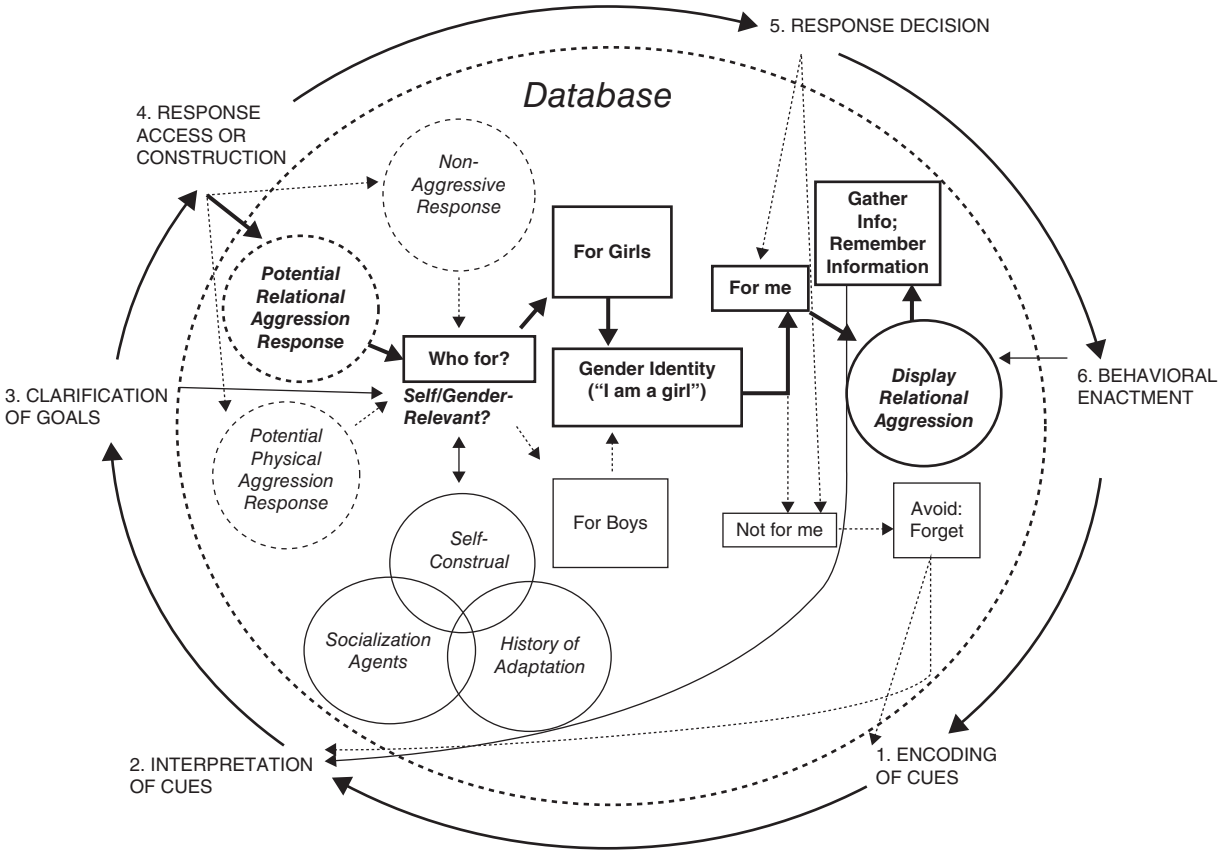


Figure 13.2 Gender-Linked Model of Aggression Subtypes. *Source:* Ostrov, J. M., & Godleski, S. A. (2010). Toward an integrated gender-linked model of aggression subtypes in early and middle childhood. *Psychological Review, 117*, 233–242. Copyright © 2010 by the American Psychological Association. Reprinted with permission.

youth will be probabilistically more likely to engage in aggressive behaviors that they consider self-relevant and typical of their gender. Finally, after enacting an aggressive behavior, youth will be more prone to remember such conduct when it is deemed gender- and self-relevant than when the behavior is inconsistent with their gender- and self-schemas.

This gender-linked model of aggression posits several predictions. For example, this model suggests within-group gender differences and preferences. That is, children are theorized to prefer to use gender-consistent aggressive behaviors and avoid the display of gender-inconsistent aggressive acts. From this perspective, the critical question regarding gender differences in relational aggression is not whether girls are more relationally aggressive than boys. Instead, this model posits that girls will more frequently select relationally aggressive behaviors than physically aggressive behaviors whereas boys will more frequently select physically aggressive behaviors than relationally aggressive behaviors. In fact, this prediction has been supported in prior research with a sample of preschoolers (Ostrov et al., 2014) and a large sample of ethnically diverse girls and boys in middle childhood (Putallaz et al., 2007).

This model also predicts that gender will serve as an important moderator of associations between aggression and future social-psychological adjustment problems. This gender-linked model of aggression subtypes argues that because girls are more sensitive to close interpersonal relationships and base their aggressive reactions on interpersonally related social cognitions (e.g., HAB for relational provocations), they will exhibit more negative adjustment outcomes when they display and receive relational aggression from their peers (Ostrov & Godleski, 2010). Using the NICHD SECCYD, Spieker et al. (2012) found some support for this hypothesis. Specifically, initial levels of relational aggression predicted adolescent self-reports of depression for girls but not boys. In another study, relational aggression was significantly and uniquely associated with future relational victimization among preschool girls but not among preschool boys (Ostrov, 2008). Overall, this model suggests that the field should move toward more sophisticated questions that address causal mechanisms and developmental trajectories to more appropriately understand the role of gender in the development of aggression among children.

Emotion and Emotion Regulation

A significant body of research has highlighted the important role of emotions in the development of aggressive behaviors. Frick and Morris (2004) identified two temperamental pathways to aggressive conduct, each characterized by a distinct set of underlying emotion processes. In the first pathway, dysregulated negative emotional experiences, particularly with respect to anger and frustration, promote antisocial and aggressive behavior. From this perspective, angry reactions to peer stress may increase the likelihood that a child will respond to real or perceived provocation with aggressive conduct. Exaggerated negative emotional responses to stress may also interfere with the development of the social-cognitive and social skills necessary to inhibit aggressive behaviors. In fact, emotion regulation deficits and emotion-related processes have been implicated as potential contributors and mediators in numerous models of the development of aggression (e.g., Shields & Cicchetti, 1998).

Emerging research has documented an important role of negative emotionality and/or poor regulation of negative affect in relationally aggressive conduct. For instance, Ostrov et al. (2013) recently reported that anger was associated with increases in relational aggression in a sample of preschool children followed across 4 months. In work with child and adolescent samples, relational aggression has been found to be related to negative affect and neuroticism (Tackett, Kushner, Herzhoff, Smack, & Reardon, 2014), angry responses to provocation (Marsee & Frick, 2007), the inability to tolerate frustration and anger (Little et al., 2003; Musher-Eizenman et al., 2004), affective lability (Tackett et al., 2014), elevated levels of hostility (Little et al., 2003), ineffective coping (including the tendency to be overwhelmed by emotions; Tackett et al., 2014), and poor ability to manage emotions during stress (Gower et al., 2014). Indices of anger and hostility are also associated with relational aggression against romantic partners in adulthood (Murray-Close et al., 2010), suggesting that these emotional processes may be important in the emergence of relational aggression across relational contexts. More general emotion regulation capacities, such as the ability to express emotion appropriately, have not always been found to predict relational aggression (e.g., Ostrov et al., 2013), potentially highlighting the significance of emotional regulation capacities specifically related to anger or frustration.

In the second pathway to aggression identified by Frick and Morris (2004), relatively low levels of emotional arousal may serve as a risk factor for aggressive conduct. For this pathway, a failure to experience normative levels of fear is hypothesized to interfere with experiences of guilt and anxiety regarding transgressions; as a result, socialization efforts against aggression may be relatively

ineffective among these youth. In fact, a large body of research suggests that low levels of fear, guilt, and empathy are risk factors for aggressive or antisocial conduct. For instance, psychopathy, a personality profile including impaired affective (e.g., unemotional style) and interpersonal (e.g., manipulativeness) processes, is related to severe antisocial conduct (Frick & Morris, 2004). In recent years, researchers have documented that emotional processes consistent with psychopathy (e.g., cold affect) are associated with indirect aggression (Coyne & Thomas, 2008; Czar, Dahlen, Bullock, & Nicholson, 2011) and romantic relational aggression (Coyne, Nelson, Graham-Kevan, Keister, & Grant, 2010; Czar et al., 2011) in college student samples. Although psychopathy is multifaceted and includes factors beyond emotional functioning, some evidence indicates that primary psychopathy (i.e., cold affect and social manipulativeness) is more strongly related to indirect aggression than secondary psychopathy (i.e., criminal tendencies, erratic lifestyle, impulsivity; Coyne & Thomas, 2008; Vaillancourt & Sunderani, 2011). Moreover, indirect and relational forms of aggression are specifically associated with the coldheartedness factor of psychopathy (Warren & Clarbour, 2009) and are related to low levels of empathy (Smits, Doumen, Luyckx, Duriez, & Goossens, 2011). Taken together, these findings suggest that low emotional arousal may play an important role in relational forms of aggression during early adulthood.

Researchers have also reported relatively low levels of emotional arousal in relationally aggressive children and adolescents. In early research in this area, Kaukiainen et al. (1999) found that low empathy was related to heightened levels of indirect aggression in a sample of adolescents. More recently, Tackett and colleagues (2014) documented that a lack of empathy was associated with relational aggression in a large sample of adolescents. Similarly, MacEvoy and Leff (2012) reported that lower levels of sympathy for victimized peers were associated with more relational aggression in a predominantly African American sample of third to fifth graders. Longitudinal work highlights the potential role of emotional underarousal in the emergence of relational aggression; for instance, Batanova and Loukas (2011) found that empathic concern was related to decreases in relational aggression in middle school students followed across 1 calendar year.

In related work, several researchers have documented that callous-unemotional (CU) traits, characterized by low levels of guilt and empathy, are associated with relational aggression (e.g., Lau & Marsee, 2013). For instance, Marsee and Frick (2007) reported that CU traits were positively associated with proactive relational aggression in a sample of incarcerated female adolescents. Similarly, Kerig and Stellwagen (2010) found that CU traits were positively correlated with relational aggression during early adolescence, although this effect did not persist once impulsivity was controlled. In a study with Japanese children and adolescents, Onishi, Kawabata, Kurokawa, and Yoshida (2012) reported that individuals who experienced feelings of guilt for engaging in relational aggression were less likely to choose to participate in such conduct in response to a series of hypothetical scenarios. Overall, then, findings across developmental periods have provided support for a relatively unemotional pathway to relational aggression.

Several factors may moderate the association between emotional processes and relational aggression. For instance, as reactive functions of aggression reflect dysregulated emotional reactions to stress or provocation, a propensity to experience anger and frustration may be more strongly related to reactive, as compared to proactive, functions of relational aggression (see Frick & Morris, 2004). In fact, in one study with adults, hostility and anger were more strongly associated with reactive as compared to proactive relational aggression (Murray-Close et al., 2010). Additionally, Marsee and Frick (2007) reported that anger to provocation was uniquely associated with reactive, but not proactive, functions of relational aggression in a sample of adjudicated female adolescents (although see Ostrov et al., 2013). In contrast, a failure to experience fear, empathy, and guilt may lower inhibitions against the use of aggression for instrumental purposes (i.e., proactive aggression). Consistent with this suggestion, Marsee and Frick (2007) found that CU traits were more strongly related to proactive relational aggression than reactive relational aggression. Some researchers have also provided evidence that emotional processes are more strongly associated with relational forms of aggression in females than in males; for instance, Marsee, Silverthorn, and Frick (2005) found that CU traits were positively correlated with relational aggression in female, but not male, fifth to ninth graders. However, findings regarding gender differences have been mixed; in fact, some studies have failed to find evidence of gender differences (Czar et al., 2011), and others have reported that emotional processes are more strongly associated with relational aggression in males than in females (e.g. Loudin, Loukas, & Robinson, 2003). Additional research is necessary to explore the conditions under which distinct emotional processes translate into relationally aggressive conduct.

RISK FACTORS: SOCIAL PROCESSES

Parenting and Attachment

Developmental psychopathologists have considered multiple social risk factors in the development of relationally aggressive conduct, including familial processes such as parenting and attachment. In a recent meta-analytic review of research in this area, Kawabata, Alink, Tseng, van IJzendoorn, and Crick (2011) identified four clusters of parenting that may play an important role in the development of relational forms of aggression: psychological control, negative/harsh (coercive), uninvolved (permissive), and positive parenting. A comprehensive discussion of the parenting factors associated with relational aggression is beyond the scope of this chapter and available elsewhere (e.g., Kawabata et al., 2011); however, we review some of the main theoretical and empirical findings in this area. Importantly, many of the studies described next have considered both mother and father influences as well as the potential role of child gender. Although the vast majority of studies concern the relational aggression construct, a handful of studies feature indirect or social aggression.

Psychological Control

Many of the early studies of the role of parenting behaviors in the development of relational aggression are based on the supposition of social learning theory that parents influence their children's social behaviors via modeling (Kawabata et al., 2011). From this theoretical perspective, studies explored whether relational aggression in children might mirror parental strategies like psychological control (e.g., threats of love withdrawal; see Nelson & Crick, 2002, for details). In one of the first studies in this area, Hart, Nelson, Robinson, Olsen, and McNeilly-Choque (1998) reported that relational aggression was not associated with a small set of psychological control items in a sample of Russian preschoolers. However, when the full complement of psychological control items in this data set were considered dimensionally, a number of important associations emerged (Nelson, Yang, Coyne, Olsen, & Hart, 2013). Casas et al. (2006) also documented the utility of a dimensional approach to psychological control in predicting early childhood relational aggression with a U.S. sample. In an interesting extension of this work, Nelson, Hart, Yang, Olsen, and Jin (2006) explored how combined and differential parenting by mothers and fathers predicted relational aggression in a sample of Chinese preschoolers. A latent sum and difference structural equation model showed that combined psychological control (i.e., cumulative engagement in psychological control by mothers and fathers) was associated with heightened levels of relational aggression in girls. Interestingly, the extent to which fathers engaged in higher levels of psychological control was also positively associated with relational aggression in girls. In contrast, psychological control was not related to relational aggression in boys. These gender differences mirror findings reported by Nelson and Crick (2002) indicating that paternal psychological control predicted relational aggression in daughters in a sample of third graders.

Associations between psychological control and relational aggression have emerged in studies across developmental periods. For instance, Gaertner and colleagues (2010) reported that psychological control predicted relational aggression among a group of children ages 9 to 12 years. In a Belgian sample of 8- to 10-year-old children, Kuppens, Grietens, Onghena, and Michiels (2009a) found support for the specialized associations between parental control and child relational aggression proposed by Nelson and Crick (2002). Specifically, parental psychological control was associated with child relational, but not physical, aggression. Soenens, Vansteenkiste, Goossens, Duriez, and Niemiec (2008) also demonstrated with a Belgian adolescent sample that parental psychological control (by fathers or mothers) predicted increased adolescent relational aggression. Some evidence indicates that parental psychological control predicts relationally aggressive behavior across relational contexts (e.g., in dating relationships, Leadbeater, Banister, Ellis, & Yeung, 2008; in sibling relationships, Campione-Barr, Lindell, Greer, & Rose, 2014). Kawabata and colleagues (2011) provided meta-analytic evidence that paternal, but not maternal, psychological control was positively associated with relational aggression. In their more recent meta-analysis, Kuppens, Laurent, Heyvaert, and Onghena (2013) reported a positive yet weak association between parental psychological control and child relational aggression. Taken together, findings are consistent with the hypothesis that parental psychological control contributes to child relational aggression, although some evidence suggests that effects more often emerge in the context of paternal, rather than maternal, behaviors.

Negative/Harsh (Coercive) Parenting

According to social learning theory, negative or harsh parenting practices may teach children that aversive and aggressive behaviors, including relational aggression, are an effective strategy to get one's own way (Nelson & Crick, 2002). From this perspective, modeling of negative parent behaviors may lead children to engage in novel aggressive behavioral patterns (e.g., parent hostility may incite child

relational aggression; Kawabata et al., 2011). Negative parenting behavior may also interfere with the establishment of secure attachment relationships, ultimately increasing risk for involvement in relational aggression. Researchers have explored a variety of types of negative parenting behaviors, including parent-child conflict, coercion, inconsistent discipline, parental negativity, and child maltreatment (see Kawabata et al., 2011).

Findings from several studies suggest that negative parenting is associated with children's engagement in relational aggression during early childhood. In early research testing these hypotheses, Hart et al. (1998) reported that maternal physical/verbal coercion was positively associated with relational aggression in a sample of Russian preschool children. More recently, Ostrov and Bishop (2008) assessed whether general indicators of parent-child conflict were associated with teacher ratings or observations of preschool aggression. Results showed that, for both teacher ratings and observations, conflict uniquely predicted relational aggression above and beyond physical aggression and gender. Although findings are mixed (A. Russell, Hart, Robinson, & Olsen, 2003; Sandstrom, 2007), some researchers have also provided evidence indicating that authoritarian parenting is associated with relational aggression (e.g., Casas et al., 2006). Similarly, McNamara, Selig, and Hawley (2010) documented that mothers who provided little warmth and autonomy support, in combination with highly restrictive control, had young children who were more (relationally) aggressive.

Similar findings have emerged in older children. For instance, Nelson and Crick (2002) found that maternal coercive control predicted relational aggression in third-grade children. Brown, Arnold, Dobbs, and Doctoroff (2007) videotaped mother-child interactions and coded for parental overreactivity (harsh/coercive) and negative maternal affect in a sample 5- to 8-year-old children who were predominantly European American or Puerto Rican. Among the European American participants, negative affect and overreactivity predicted heightened levels of relational aggression. In the multivariate context, negative affect proved more important than other parenting variables. However, no significant associations emerged among the Puerto Rican dyads (n = 18). Replication with larger samples is necessary to determine whether Puerto Rican children react differently to parenting than European American children.

Although limited research has examined the role of child maltreatment in the development of relational aggression, preliminary findings suggest that more severe instances of negative parenting, such as abuse, may portend risk for relational aggression. Specifically, Cullerton-Sen et al. (2008) found that a documented history of child maltreatment was associated with elevated levels of relational aggression among youth ages 6 to 12 years. Interestingly, child maltreatment was associated with relational aggression for girls only, and findings primarily emerged in the context of sexual abuse. In a study with adults, a history of abuse was associated with heightened levels of reactive and romantic relational aggression (Murray-Close et al., 2010). These results highlight the potential role of severe forms of negative parenting, such as abuse, in the development of relational aggression.

Several studies have also examined the association between early negative parenting and trajectories of indirect or social aggression. For example, Browne, Odueyungbo, Thabane, Byrne, and Smart (2010) found that hostile-ineffective parenting, wherein parents demonstrate annoyance, antagonism, and mood-dependent behavior, increased the risk of a child's development of indirect aggression over the course of 6 years. Vaillancourt, Miller, Fagbemi, Côté, and Tremblay (2007) examined predictors of different developmental trajectories of indirect aggression in children from age 2 to age 10. They identified two groups: increasing users (35%) and stable low users (65%). For boys only, parental inconsistency (lack of follow-through) at age 2 predicted an increased likelihood of belonging to the increasing group. Using the same data set, Côté et al. (2007) assessed the joint development of physical and indirect aggression from age 2 to age 8. Results showed that hostile parenting at age 2 predicted high levels of both physical and indirect aggression over time. Underwood et al. (2009) examined six different developmental trajectories for social and physical aggression, following children from age 9 to age 13. Maternal authoritarian parenting predicted children's membership in the high increaser group. Meta-analytic findings further underscore the important role of negative parenting in the development of relational aggression: Kawabata and colleagues (2011) reported that both maternal and paternal negative parenting were positively associated with relational aggression.

Uninvolved (Permissive) Parenting

Theorists have also hypothesized that permissive parenting may be associated with elevated levels of child relational aggression; from this perspective, parents may fail to intervene when their children are aggressive, thereby reinforcing these undesirable behaviors (Casas et al., 2006). Consistent with this hypothesis, Casas et al. (2006) found that permissive parenting styles were associated with child relational

aggression. Similarly, Leadbeater et al. (2008) reported that low levels of parental monitoring were associated with greater use of relational aggression in the context of dating relationships among 12- to 18-year-old adolescents. In Underwood and colleagues' (2009) examination of joint developmental trajectories of social and physical aggression across age 9 to age 13, maternal permissive parenting predicted children's membership in the high increaser and medium increaser groups. Some evidence suggests that permissive parenting behaviors may be more strongly associated with relational aggression in girls as compared to boys. For instance, Sandstrom (2007) reported that maternal permissiveness was positively associated with relational aggression in 9- to 11-year-old girls but was unrelated to such conduct in boys. In observational work in this area, Brown et al. (2007) documented that videotaped mother-child interactions characterized by laxness were positively associated with relational aggression for girls but negatively associated for boys. However, meta-analytic findings do not suggest gender moderation; instead, findings indicate that both maternal and paternal permissiveness are positively associated with relational aggression in both boys and girls (Kawabata et al., 2011).

Positive Parenting

Researchers have hypothesized that positive parenting, including secure attachment relationships, authoritative parenting styles, and positive affect, may reduce children's risk for involvement in relational aggression (Kawabata et al., 2011). In early international research in this area, Hart et al. (1998) reported that paternal responsiveness (an authoritative dimension) was most predictive of Russian preschoolers' relational aggression, even when controlling for other parenting dimensions (although see Casas et al., 2006). Casas et al. (2006) were the first to assess whether attachment security was related to relational aggression in a preschool sample (see Michiels, Grietens, Onghena, & Kuppens, 2008, for a theoretical synopsis regarding attachment). They found the association to be specific to gendered dyads. Whereas relationally aggressive girls were less likely to have a secure attachment with their mother, relationally aggressive boys were less likely to have a secure attachment with their father.

Other positive parenting behaviors have also been shown to predict reduced risk for involvement in relationally aggressive conduct. For instance, Brown et al. (2007) reported that more positive affect observed in mother-child dyadic interactions was associated with less relational aggression. In addition, parent-child bonding has been found to predict lower levels of social aggression (Karriker-Jaffe et al., 2013). Browne et al. (2010) reported that parental consistency (parental follow-through with discipline and requests) and positive interaction (parental praise/amount of quality time with child) acted as buffers against the development of indirect aggression over the course of 6 years. Similarly, Vaillancourt et al. (2007) found that more positive parent-child interactions at age 2 reduced the likelihood that boys would exhibit increasing trajectories of indirect aggression from age 2 to age 10. Finally, parental control, including consistent rules and monitoring, have been associated with lower levels of social aggression (Karriker-Jaffe, Foshee, Ennett, & Suchindran, 2013). Meta-analytic findings have confirmed the important role of positive maternal and paternal parenting behaviors in child involvement in relational aggression (Kawabata et al., 2011).

Directions for Future Research

Despite the burgeoning literature regarding parenting correlates of relational aggression, several critical questions remain. First, it will be important for researchers to examine the mechanisms that link parenting practices to child relational aggression; for instance, aversive parenting may enhance a child's HAB (Nelson & Coyne, 2009), which may in turn be linked to relational aggression. In addition, positive parenting may promote adaptive child behaviors, such as disclosure (e.g., not keeping secrets from one's parents), that prevent relationally aggressive conduct. In fact, higher levels of relational aggression have been reported among youth who engage in lower levels of disclosure (Gaertner et al., 2010) and higher levels of concealment (Leavitt, Nelson, Coyne, & Hart, 2013) in their interactions with their parents. Moreover, child disclosure may serve as a stronger predictor of adolescent antisocial conduct than parental monitoring (Criss et al., 2015). It may also be useful for researchers to examine interactions among parenting behaviors; in fact, in one study, the combination of high parental solicitation and psychological control predicted increased engagement in child relational aggression (Gaertner et al., 2010). Moreover, the majority of studies of parenting and relational aggression either make use of concurrent data or, if they are longitudinal, do not attempt to ascertain reciprocal effects between parenting and child aggression. This limitation is significant, given evidence of evocative gene-environment correlations in behaviors such as aggression (Brendgen, 2012). In one of the only studies to assess bidirectional associations over time, Kuppens, Grietens, Onghena, and Michiels (2009c) used a cross-lagged panel design (three measurement points at 1-year intervals) with a middle-childhood sample. Parents

and children reported on parental psychological control, and child aggression was reported by parents, peers, and teachers. Reciprocal effects emerged for mother-child dyads, whereas father-child dyads were best characterized by unidirectional parent effects, at least when parents reported on both psychological control as well as aggression.

Future research may also benefit from greater attention to cultural differences in associations between parenting behaviors and relational aggression. Some evidence suggests that cultural factors may influence the degree to which parents adopt psychologically controlling behavior. Using longitudinal data collected in seventh grade and ninth grade, Shuster, Li, and Shi (2012) found that, controlling for Time 1 physical and relational aggression, maternal endorsement of the cultural value of social harmony predicted less engagement in parental psychological control, which in turn was associated with Time 2 relational aggression. These findings highlight the potential role of cultural values in parenting practices and, ultimately, children's engagement in relational forms of aggression.

Parental Beliefs and Expectations

Although most research regarding the association between parenting and child relational aggression has focused on parenting behaviors, a few studies have also highlighted the important role of parent expectations in children's aggressive behavior. Murray, Haynie, Howard, Cheng, and Simons-Morton (2010) conducted a unique study with African American sixth graders living in an urban community plagued with violence. Over the course of 3 months, they assessed how initial parental expectations and practices predicted overt and relational aggression at school. Multivariate analyses demonstrated that parental expectations that their child would engage in peaceful solutions to conflict (a) buffered against overt aggression when parental support and responsiveness was relatively low and (b) buffered against both overt and relational aggression in the context of high psychological control by parents.

Several studies have examined maternal beliefs about relational aggression and how these beliefs translate into discipline responses, child beliefs, and child behavior. For instance, in a study of parents of preschoolers, Werner, Senich, and Przepyszny (2006) found that, relative to physical aggression, mothers reported they would be less upset, angry, and sad in response to their child's engagement in relational aggression. Accordingly, relational aggression was also perceived as less deserving of parental intervention. However, mothers who said that they would intervene by helping their child understand that he or she had violated a social or moral convention had children who were less relationally aggressive. Similarly, Werner and Grant (2009) found that mothers perceived relational aggression as more normative and acceptable than physical aggression and their children to be less responsible for their engagement in such behavior. Children's perceptions of relational aggression tended to correspond with those of their mothers. The more mothers considered relational aggression to be problematic, however, the more they reported they would use sternness and disapproval in response to their daughters' relational aggression. Daughters of more stern mothers were in turn more likely to be prosocial and better accepted by peers (these associations did not emerge for boys). Although preliminary, findings from these studies highlight the critical need for research regarding the role of parental views of aggression in the development of child relational aggression.

Interparental Conflict

Prior research has indicated that marital conflict is related to childhood adjustment difficulties, including physical aggression, particularly when child exposure to conflict is high (Cummings, 1994). A number of potential mechanisms could explain this association. From a social learning perspective, children may model interparental aggression, believing it is acceptable behavior. Parents may inappropriately interpret the intentions of one another (e.g., demonstrate HAB), and the child may adopt similar thinking in interpreting his or her own social experiences and thereby act more aggressively. Depending on each child's individual coping style, interparental conflict may also generate background anger, a stressor that heightens arousal in children and potentially elicits aggression in some children (Cummings, 1987). Finally, marital conflict may undermine parenting and the parent-child relationship, thereby leading to more child aggression.

Few studies have assessed whether marital conflict is related to the development of relational aggression. In one notable exception, Hart and colleagues (1998) assessed overt marital conflict (e.g., verbal hostility, quarreling, and physical abuse) and marital exclusion (e.g., avoiding, ignoring, and withdrawing affection) in their Russian preschooler study. Results showed that overt marital conflict, but not marital exclusion, was positively associated with relational aggression among boys but not among girls. Other work, however, has documented effects for girls. Specifically, Underwood, Beron, Gentsch, Galperin, and Risser (2008)

examined interparental conflict strategies (stonewalling, triangulation, verbal aggression, and physical aggression) in the prediction of children's social aggression. Notably, the interparental conflict strategies were collectively modeled in structural equation modeling as one latent construct (negative conflict strategies). Results showed that only the maternal negative conflict strategies predicted social aggression, and findings emerged for daughters but not for sons. More recently, Karriker-Jaffe et al. (2013) reported that family conflict was positively associated with social aggression for both boys and girls, although analysis of trajectories of social aggression indicated that compared to boys from high-conflict families, girls from high-conflict families exhibited higher initial levels of social aggression (at age 11) and a more gradual decline in these behaviors across adolescence.

Although preliminary, these findings highlight the potential role of marital relationships and interactions in child relational aggression. Future research in this area may be enhanced by more careful definitions of interparental relational aggression, such as the distinction between direct and indirect forms of relational aggression. Consistent with this idea, Carroll and colleagues (2010) developed a measure reflecting two subtypes of marital relational aggression: social sabotage (indirect) and love withdrawal (direct). Study results showed that wives were more likely to be relationally aggressive than husbands, and such tactics were concurrently associated with lower marital quality and higher marital instability. The next step is to determine whether these forms of marital relational aggression are uniquely predictive of relational aggression in children. Given that children are not likely to witness social sabotage or some forms of love withdrawal, the negative impact may occur via mechanisms other than direct observation of these subtle behaviors, such as impaired parenting or witnessing co-occurring overt marital conflict. Future studies must attend to the specific processes that link interparental conflict and child relational aggression, such as parenting behaviors. For instance, Li, Putallaz, and Su (2011) have assessed how interparental conflict styles may indirectly predict child overt and relational aggression via coercive or psychological control. Using a sample in Beijing, China, they found that fathers' overt interparental conflict was associated with boys' aggression, and this relation was mediated by paternal coercive control. Maternal covert conflict was positively related to boys' aggression, and this association was mediated by maternal psychological control. Given evidence of differences in effects based on both parent and child gender (e.g., Li et al., 2011), future work in this area should also carefully evaluate the role of gender in the processes linking interparental conflict and child relational aggression.

Sibling Relationships

By middle childhood, time spent with siblings tends to outweigh other relationships (McHale & Crouter, 1996); thus, there is good reason to suppose that siblings may substantially affect each other's involvement in relationally aggressive conduct. Sibling relationships differ significantly from peer acquaintances or friendships in ways that may promote the development of relational aggression. For instance, the greater intimacy of family relationships allows siblings access to a great deal of private and potentially damaging information about each other (precisely the type of information that would lend itself to relational aggression). Additionally, as sibling relationships are involuntary, siblings must learn to deal with each other's eccentricities, potentially leading to relatively high levels of conflict. Sibling interactions may also be influenced by the nature of marital or parent-child relationships, reflecting the systemic workings of a family. As briefly noted earlier, evidence indicates that preschoolers engage in more relational aggression with siblings than with friends. Following these children and their siblings from age 4 to age 8, Stauffacher and DeHart (2006) observed that by the time the target child was 8 years old, sibling and friend dyads no longer differed in their levels of relational aggression. Specifically, over the 4-year period, friend dyads increased in their relational aggression, whereas the same behavior between siblings declined.

Several factors, including child gender and age, may influence the frequency and type of relational aggression used against siblings. With respect to frequency, Campione-Barr et al. (2014) found that, within the context of sibling dyads, younger siblings were more often the target of sibling relational aggression than older siblings. With respect to type of relational aggression, Stauffacher and DeHart (2005) found that girls with younger siblings tended to use nonverbal (ignoring) strategies with siblings, whereas girls with older siblings tended to focus on more verbal strategies. Boys, in contrast, preferred verbal forms of relational aggression, regardless of the age of the sibling. Understandably, sibling relational aggression is tied to other aspects of the sibling relationship. In particular, relational aggression is more likely if there is less emotional support and more negativity between siblings, regardless of the gendered nature of the dyad (same versus opposite sex) or the age of siblings (Updegraff, Thayer, Whiteman, Denning, & McHale, 2005).

Ostrov, Crick, and Stauffacher (2006) suggested that use of relational aggression in the context of sibling relationships may provide a training ground for younger siblings to learn aggressive behavioral strategies; from this perspective, youth may model their older siblings' relational aggression and thus may be at increased risk for engaging in these behaviors in the peer context. These authors observed both siblings of a given dyad in the same preschool environment (the younger sibling enrolled 1 to 2 years later). Observations showed that older sisters were more relationally aggressive than older brothers. Older siblings were also more aggressive than younger siblings with same-sex peers. Consistent with expectations, older siblings' relational aggression toward peers was predictive of the same behavior in younger siblings (this was also found for peer-directed physical aggression).

Only two studies have considered how parent-child dynamics may be connected to sibling relational aggression (Campione-Barr et al., 2014; Updegraff et al., 2005). In the first, Updegraff and colleagues (2005) reported that when parents provided less emotional support to their children, sibling relational aggression increased. Less time with fathers also predicted higher levels of sibling relational aggression. Interestingly, parents who intervened in sibling conflict with authoritarian practices (e.g., punishments) tended to have children, particularly daughters, who engaged in relational aggression. In the second study, Campione-Barr et al. (2014) found that maternal psychological control predicted heightened use of sibling relational aggression in a sample of adolescents. Although the findings from these studies may suggest that inadequate parenting contributes to sibling relational aggression, another possibility is that parents are reacting to aggressive siblings with less warmth and involvement and greater psychological control. Finally, differential treatment of siblings by parents is relevant: Children report less sibling relational aggression when parents are perceived to be evenhanded (Updegraff et al., 2005). However, work in this area is still in its infancy, and additional research is needed to identify the developmental precursors and outcomes associated with use of relational aggression in the sibling context.

Peer Relationships

Much of the extant relational aggression research has focused on these behaviors in the context of the peer group, and several peer processes have been identified that may serve as risk factors in the development of relational aggression. More specifically, researchers have suggested that peer status, peer victimization, and quality of close dyadic relationships may all contribute to the emergence of relational forms of aggression.

Peer Status

One of the most robust correlates of relational aggression across developmental periods is low peer status, including low preference (e.g., Crick & Grotpeter, 1995), and its associated components of high rejection (i.e., frequently being identified by peers as disliked) and low acceptance (i.e., rarely being identified by peers as liked). Most researchers in this area have proposed that engagement in relational aggression leads to poor peer status (see the "Developmental Outcomes: Maladaptive Correlates" section); however, the vast majority of this work has been cross-sectional in nature, and there is reason to expect that low status in the peer group may also precede the use of relationally aggressive behaviors. One influential causal model of the relation between low preference and aggression suggests that low preference leads to a constrained pool of potential partners comprised primarily of peers who also have impaired social skills (Bierman, 2004). This smaller peer group likely contributes to the behavioral homophily (associating with other similar peers) often observed among aggressive children (Parker, Rubin, Price, & DeRosier, 1995). Perhaps more important, this process contributes to a negative spiral whereby rejected children become more and more socially incompetent relative to their well-accepted peers, promoting higher levels of both physical and relational aggression over time (Bierman, 2004).

Recent research has documented both homophily and socialization of relational aggression in peer groups (Sijtsema, Ojanen, et al., 2010), suggesting that this may be a plausible mechanism involved in the development of relational aggression. In fact, although evidence is mixed (e.g., Orue & Calvete, 2011; Ostrov et al., 2013; Tseng, Banny, Kawabata, Crick, & Gau, 2013), several researchers have found that indices of low preference are longitudinally associated with future relational aggression. For instance, Zimmer-Gembeck, Crick, and Geiger (2005) reported that low social preference predicted increases in relational aggression across 3 years, although in this study, effects were significant only for boys. In addition, Werner and Crick (2004) reported that rejection by peers predicted elevated levels of relational aggression one year later in a sample of elementary school children. Murray-Close and Crick (2006) also found that increases in peer rejection over time were dynamically associated with increases in relationally aggressive behaviors.

However, other researchers have suggested that *high* peer status may serve as a social risk factor for the development of relationally aggressive conduct. Foundational to much of this research is the distinction between perceived popularity (based on most and least popular nominations by peers) and preference. Perceived popularity is an indicator of children's social status and impact whereas preference is an indicator of children's likability (Parkhurst & Hopmeyer, 1998). Perceived popular youth benefit from possessing what is described as "the expressive equipment of popularity": physical attractiveness, athleticism, and evidence of significant material wealth (Lease, Kennedy, & Axelrod, 2002, p. 87; see also Rosen & Underwood, 2010). In short, these youth have superficial traits that make them well positioned for popularity.

Some researchers have argued that perceived popular children employ relationally aggressive behavior in efforts to maintain their high social status and power (Sandstrom & Cillessen, 2006). Consistent with this hypothesis, findings from several studies indicate that high levels of perceived popularity are related to increases in relational aggression over time (Rose, Swenson, & Waller, 2004; Tseng et al., 2013), particularly among girls (Cillessen & Mayeux, 2004). Interestingly, some evidence suggests that a curvilinear effect best represents the association between popularity and relational aggression, such that elevated engagement in relational aggression is evident in youth with both high and low levels of popularity (Prinstein & Cillessen, 2003). Moreover, although the majority of research suggests that indices of low preference serve as a risk factor for relational aggression, findings are mixed. For instance, some work indicates that *high* social acceptance is related to increases in relational aggression over time among youth (Tseng et al., 2013), especially girls (Orue & Calvete, 2011; see also Kuppens, Grietens, et al., 2009b). However, it is possible that positive associations between preference and the development of relational aggression are an artifact of the overlap between preference and popularity. Consistent with this notion, Prinstein and Cillessen (2003) found that when both popularity and preference were included in one model, social preference was related to decreases in relational aggression over time among girls (see Adams, Bartlett, & Bukowski, 2010, for evidence that social dominance may serve as a suppressor variable in the association between low preference and heightened relational aggression). These findings suggest that relationally aggressive behaviors may be more strongly linked to high peer status when measures focus on perceived popularity as compared to preference.

These results also raise the possibility that low and high peer status may promote relational aggression for different reasons; specifically, low preference or unpopular youth may use relational aggression to deal with negative experiences in the peer group, whereas popular children may engage in relational aggression because their high social status provides them with social power for the effective use of these behaviors (see Kuppens, Grietens, et al., 2009b) and because peers fail to censure them when they engage in such conduct (Rose, Swenson, & Waller, 2004). These findings also suggest that researchers interested in investigating the role of peer status in the development of relational aggression should include multiple facets of status, including preference and popularity, so that the unique role of each can be assessed (e.g., Bowker, Ostrov, & Raja, 2012).

There are several important directions for future research regarding the processes underlying the association between peer status and the development of relational aggression. First, it will be important for researchers to assess the extent to which relations between peer status and relational aggression are incidental such that they reflect the action of third variables (see Rubin, Bukowski, & Parker, 2006). For example, depressive symptoms may function as a third variable that promotes both rejection by peers as well as aggressive behavior (e.g., Agoston & Rudolph, 2013). As another example, relational aggression may be associated with poor functioning in the peer group as a result of its overlap with other problematic behaviors, such as physical aggression. In fact, in one study, the relation between relational aggression and lower acceptance became nonsignificant when overt aggression was controlled (Smith, Rose, & Schwartz-Mette, 2009). However, some research indicates that peer rejection longitudinally predicts relational aggression, even when controlling for physical aggression (Murray-Close & Crick, 2006), suggesting that negative peer relationships may be uniquely associated with relational aggression. It will also be important to examine potential third variables in the relation between high peer status and relational aggression; for instance, positive child characteristics, such as social skills, may promote both positive peer outcomes (e.g., acceptance, popularity) as well as relational aggression (Orue & Calvete, 2011).

Second, future research should test transactional models (Sameroff & MacKenzie, 2003) of the relations between social status and relational aggression. Transactional views of development suggest bidirectional and mutually influencing correlations between key variables that in combination may best explain a developmental pathway. From this perspective, peer status may interact

with child characteristics to promote involvement in relational aggression. For example, it is possible that peer rejection in conjunction with maladaptive social information-processing patterns (e.g., HAB; see the "Risk Factors: Cognitive and Emotional Processes" section) better predicts relational aggression than either of these factors individually (see the "Moderation Models" section). Given evidence of gender differences in the association between peer status and later relational aggression (e.g., Cillessen & Mayeux, 2004), it will also be important for future research to evaluate the extent to which peer status differentially predicts relational aggression in boys versus girls. Recent cognitive models of relational aggression (see the "Toward an Integrated Gender-Linked Model of Aggression" section) highlight the important role of gender schemas in children's aggression; from this perspective, peer status may most strongly predict relational aggression in girls because youth select aggressive behavior patterns that are consistent with their gender schemas.

Several additional moderators of the association between relational aggression and popularity merit empirical attention. For instance, a relatively egalitarian classroom status hierarchy may promote relationally aggressive strategies among higher-status youth because it increases their need to defend their desirable social positions (Zwaan, Dijkstra, & Veenstra, 2013). Additionally, Mayeux and Cillessen (2008) found that perceived popular adolescents who also knew they were popular exhibited the highest concurrent levels of peer-reported aggression (relational aggression for girls and overt aggression for boys). Awareness of high status may provide license for aggressive behavior or alternatively attune the adolescent to the need to fight to maintain status. Finally, given the theoretical processes proposed to underlie relations between peer status and later relationally aggressive conduct, researchers should examine whether associations depend on whether the aggression is proactive versus reactive in function. Insofar as rejected youth use relational aggression to cope with negative peer experiences, they may be more likely to engage in reactive relational aggression. In contrast, if popular youth use relational aggression to maintain their high social status, they may be particularly likely to engage in proactive relational aggression. Consistent with this suggestion, in one study, proactive relational aggression was positively associated with popularity but not preference (Prinstein & Cillessen, 2003). However, reactive relational aggression was positively related to both popularity and preference (Prinstein & Cillessen, 2003), perhaps because high-status youth used relational aggression to defend challenges to their coveted social positions. Longitudinal research is necessary to further explore how peer status relates to the development of proactive and reactive functions of relational aggression.

Victimization

Relational aggression and victimization have been found to be moderately correlated at all points in development (e.g., Crick et al., 2001), and evidence indicates that a subset of relational perpetrators are also victims (Gros, Gros, & Simms, 2010). Engaging in relational aggression may lead to tit-for-tat responses whereby the relational aggressor may also become a victim (see the "Developmental Outcomes: Maladaptive Correlates" section). However, it is also plausible that victimization serves to elicit relationally aggressive responses over time (e.g., Ostrov, 2010; Ostrov & Godleski, 2013). In fact, when asked how they respond to experiences of victimization, middle school and high school students commonly identified aggressive strategies (Waasdorp & Bradshaw, 2011). Researchers have proposed several mechanisms whereby experiences of peer victimization may promote aggressive behavior. Victimized youth may engage in aggression in an effort to retaliate against their tormentor or to prevent future victimization experiences (Yeung & Leadbeater, 2007). The experience of being a frequent target of relational victimization may result in feelings of isolation, loneliness, and low self-esteem (Gomes, Davis, Baker, & Servonsky, 2009). These adjustment difficulties may lead relational victims to lash out at their tormentors in a fashion similar to what they have experienced. Some evidence also suggests that experiences of relational victimization are associated with heightened HAB for relational provocations (Hoglund & Leadbeater, 2007; Yeung & Leadbeater, 2007), which in turn has been found to predict involvement in relational aggression in some studies (see the "Risk Factors: Cognitive and Emotional Processes" section). Additionally, similar to their rejected peers, victimized youth may have a limited pool of social interaction partners, thus reducing opportunities for learning positive social behaviors (Hanish & Guerra, 2002).

Several researchers have provided evidence consistent with the suggestion that peer relational victimization predicts increased relationally aggressive conduct. Sullivan, Farrell, and Kliewer (2006) reported that relational victimization was associated with heightened levels of concurrent relational aggression in a sample of predominantly African-American eighth graders; interestingly, although effects emerged for both boys and girls, associations were stronger for boys. Longitudinal work has provided evidence that experiences of relational victimization may promote

relationally aggressive conduct over time. For instance, Yeung and Leadbeater (2007) reported that relational victimization was related to preadolescents' engagement in relational aggression 5 months later. Sugimura and Rudolph (2012) found that relational victimization in second grade was associated with engagement in relational aggression in third grade. Finally, using data from the NICHD SECCYD, Ostrov and Godleski (2013) reported that relational victimization in third grade was associated with relational aggression in sixth grade.

An important question is whether the experience of any type of peer maltreatment predicts increased levels of relationally aggressive conduct or whether there is specificity between the type of victimization and children's behavioral responses. Theoretically, there is reason to expect that experiences of relational victimization will be particularly likely to elicit relationally aggressive responses. For instance, Yeung and Leadbeter (2007) suggested that relational victimization may be more likely than other forms of victimization to promote HAB for relational provocations and thus relationally aggressive behaviors. It is also possible that youth learn to engage in aggressive behaviors by modeling their tormentors' conduct (Ostrov, 2010). Consistent with these suggestions, Ostrov (2010) reported that teacher-reported relational victimization predicted increases in observed relational, but not physical, aggression across the school year in a sample of preschoolers. In contrast, physical victimization predicted increases in physical aggression in this study. However, several of the theoretical processes proposed to underlie the association between victimization and aggression (e.g., using aggression to prevent future victimization; Yeung & Leadbeater, 2007) suggest that youth may use relational aggression in response to a variety of peer victimization experiences; thus, it will be important for future research to evaluate the relative influence of distinct subtypes of peer maltreatment in the development of relationally aggressive conduct.

Preliminary research has tested some of the theoretical mechanisms proposed to account for the association between relational victimization and relationally aggressive conduct. For instance, Ostrov et al. (2011) provided evidence supporting a social processes model in which the desire for exclusivity with close friends and HAB for relational provocations mediated the association between relational victimization and relational aggression in a sample of female emerging adults. Similarly, Yeung and Leadbeater (2007) found that HAB for relational provocations partially mediated the association between relational victimization and concurrent relational aggression in a sample of preadolescents. However, significant mediation did not emerge in longitudinal analyses. Some researchers have further suggested that victimization may serve as a mechanism linking peer rejection and relational aggression. For instance, Adams et al. (2010) found that victimization by peers (a composite including both physical and relational forms of victimization) mediated the relation between low peer liking and relational aggression in fifth- and sixth-grade males and females. Moderation effects were also documented, such that peer dislike predicted relational aggression only among youth who were highly victimized.

There are several directions for future work on the relation between peer victimization and the development of relationally aggressive conduct. First, researchers may benefit from evaluating the role of chronicity and severity of victimization in the development of relational aggression. In fact, preliminary evidence indicates that chronic victimization may be particularly likely to elicit relationally aggressive behaviors. Specifically, Rudolph, Troop-Gordon, Hessel, and Schmidt (2011) found that levels of victimization (a composite of both physical and relational victimization) in second grade and increases in these experiences into fifth grade predicted heightened relational aggression in fifth grade (controlling for second-grade relational aggression). Interestingly, this association was stronger among girls than boys. These gender differences support the suggestion that girls who are targeted by negative treatment by peers may be particularly likely to select relationally aggressive responses because such conduct is consistent with their gender schemas (see the "Toward an Integrated Gender-Linked Model of Aggression" section). In regard to severity, it is possible that even infrequent episodes of relational victimization may elicit relationally aggressive responses if the victimization is very severe in nature. Moreover, given evidence that aggression and victimization by parents and siblings may also influence children's behaviors within the peer group (Casas et al., 2006; Stauffacher & DeHart, 2005), future research should consider the role of victimization across multiple contexts.

Relational Aggression in Friendship Groups and Dyadic Contexts

To date, the majority of research examining peer risk factors for the development of relational aggression has focused on processes occurring in the larger peer context (e.g., peer status; peer victimization). However, as relational aggression involves the manipulation of and damage to interpersonal relationships, it is likely that such conduct

often emerges in the context of close, dyadic relationships (Grotpeter & Crick, 1996) and friendship groups (e.g., Espelage, Holt, & Henkel, 2003; Low, Polanin, & Espelage, 2013). In fact, relational aggression occurs in romantic relationships (Casas & Albers, 2014; Linder et al., 2002) and close friendships (Grotpeter & Crick, 1996) with some frequency. Youth with mutual antipathy relationships (i.e., enemy relationships in which both members of the dyad report disliking the other peer) also engage in heightened levels of relational aggression, perhaps in part because they use these behaviors to harm their disliked peers (Murray-Close & Crick, 2006). Thus, it is essential for researchers to understand the friendship group and dyadic processes that may contribute to the emergence of relationally aggressive conduct.

Several researchers have suggested that the qualities and characteristics of close friends, such as their aggressive behavior and social status, may play an important role in the development of children's and adolescents' relationally aggressive conduct. In fact, one important mechanism argued to underlie the development of aggressive behavior problems is socialization by close friends in the context of friendship networks (Espelage et al., 2003; Sijtsema, Ojanen, et al., 2010). More specifically, researchers have documented that aggressive youth choose friends who are also highly aggressive (i.e., selection), and, over time, these youth exert mutual social influence on each other's aggression (i.e., socialization; see Espelage et al., 2003). From this perspective, a salient social risk factor for the development of relational aggression may be time spent with relationally aggressive friends. Moreover, relationally aggressive youth may be particularly likely to experience this risk factor because they select friends who are similar to themselves.

In fact, researchers have provided evidence of both selection and socialization processes in relationally aggressive youths' friendship groups. For instance, Sijtsema, Ojanen, and colleagues (2010) found that relationally aggressive adolescents were more likely to become friends with relationally aggressive peers across one calendar year. Several potential mechanisms may underlie these selection effects. For instance, relationally aggressive individuals may be viewed by their peers as undesirable social partners, and, as a result, their opportunities for friendships may be constrained to other aggressive peers (Parker et al., 1995). However, at least some relationally aggressive individuals appear to be socially attractive (Hawley, Little, & Card, 2007), and children may actively choose friends who are similar to themselves, given the salient role of similarity in interpersonal attraction (Simon, Aikins, & Prinstein, 2008). Interestingly, popularity may be the primary driver of friendship formation and aggression similarity a by-product of the association with popular friends (Dijkstra, Berger, & Lindenberg, 2011).

An emerging body of research also provides support for the notion that youth are influenced by their friends' engagement in relational aggression. In one study, nonaggressive third-grade girls who were best friends with relationally aggressive girls became significantly more relationally aggressive themselves a year later (Werner & Crick, 2004). More recently, Sijtsema, Ojanen, et al. (2010) used social network analysis to document that young adolescents adopted relationally aggressive behavior patterns from friends, and findings persisted even when controlling for friendship selection effects. Similarly, Low and colleagues (2013) reported that sixth and seventh graders who were members of social networks that engaged in high levels of relational aggression exhibited increases in their own perpetration of such behavior across the course of one calendar year. Moreover, some evidence indicates that socialization processes may be more powerful in the development of relational forms of aggression than in physical aggression or physical fighting (Espelage et al., 2003; Low et al., 2013; Sijtsema, Ojanen, et al., 2010), underscoring the important role of friend and social network socialization in these behaviors.

Researchers have identified several moderators of socialization processes in the development of relational aggression. For instance, some evidence indicates that socialization of relational aggression in friendship groups is especially likely when the child is not powerful or socially central; specifically, Lansford and colleagues (2009) found that in girls' cliques, peripheral group members were more likely than more central group members to engage in levels of indirect aggression consonant with the indirect aggression of the group leader. Socialization processes may also be most pronounced for youth who are already aggressive; consistent with this suggestion, Simon et al. (2008) reported that only sixth to eighth graders who were highly relationally aggressive and in romantic relationships with relationally aggressive partners exhibited increased involvement in such conduct over time.

Several studies have also provided evidence indicating that friends' social status or social centrality may be associated with youth's relationally aggressive conduct. For instance, Peters, Cillessen, Riksen-Walraven, and Haselager (2010) found that girls with popular best friends were more likely to engage in relationally aggressive behavior. The authors suggest that popular friends may form a coalition and engage in relational aggression against others

in an effort to gain or maintain high status. However, other research has highlighted the role of friendships with low-status peers in the development of relational aggression. More specifically, Neal and Cappella (2012) have shown that relationally aggressive children tend to have high social network centrality (in terms of the number of relationships), but only if these relationships are with poorly connected peers. Therefore, children's relational aggression is enhanced when they are connected to many peers who are dependent on them for social resources. These authors suggest that relational aggression may be particularly effective when used against friends who do not have alternative options for obtaining relational benefits such as social support and companionship. Taken together, findings raise the possibility that having low-status friends promotes relational aggression against these same friends, whereas having high-status friends promotes the use of relational aggression against other members of the peer group.

Some evidence also suggests that relationship qualities may play a role in the development of relational aggression. Specifically, relative to nonaggressive youth, relationally aggressive children's friendships are characterized by high levels of intimacy (closeness and self-disclosure), conflict, betrayal, relational aggression within the relationship, and exclusivity (Cillessen, Jiang, West, & Laszkowski, 2005; Crick, Murray-Close, Marks, & Mohajeri-Nelson, 2009; Grotpeter & Crick, 1996). This particular cluster of relationship qualities is problematic because it suggests that children with relationally aggressive friends are divulging highly personal information and secrets, either elicited by the relationally aggressive friend or by choice, and that this information can be used against them when relationship problems arise. Although most work in this area has been cross-sectional, results from one longitudinal study indicate that increases in intimate disclosure by a friend are associated with increases in relational aggression for girls only (Murray-Close et al., 2007). These findings are provocative because they suggest that some friendship characteristics that are frequently viewed as positive (e.g., intimacy) may at times facilitate the use of relational aggression.

Media Exposure

The association between violent media exposure consumption and physically aggressive behavior has been thoroughly reviewed in the literature (see Anderson & Bushman, 2001; Anderson et al., 2010). Numerous theoretical models help to explain how exposure to aggressive media models can increase the likelihood of aggressive behavior over time (e.g., general aggression model [GAM], Carnagey & Anderson, 2003; script theory, Huesmann, 1986). The theoretically predicted links between exposure to violent media or aggressive content and aggressive behavior in children/adolescents are robust across types of methodology (i.e., longitudinal and cross-sectional studies; experimental and correlational studies) and cultures (see Anderson & Bushman, 2002). These effects have also been successfully extended to the investigation of nonphysical forms of aggression (i.e., relational and indirect aggression) in several studies (e.g., Archer & Coyne, 2005; Coyne et al., 2008; Gentile, Mathieson, & Crick, 2011). For example, Gentile, Coyne, et al. (2011) recently documented that school-aged children's exposure to media violence early in the academic year was associated with higher relational aggression (as well as physical and verbal aggression and low levels of prosocial behavior) later in the school year. Media exposure is also related to use of relational aggression in the context of romantic relationships; in one study, Coyne et al. (2011) found that exposure to relational aggression in the media was associated with romantic relational aggression for both young adult men and women.

There is also interesting evidence for what is referred to as the crossover effect (see Coyne, Archer, & Eslea, 2004; Coyne et al., 2008) in which viewing one type of media violence (e.g., physical) can lead to other types of aggression (e.g., relational) among viewers. For example, in a well-known longitudinal study, Huesmann, Moise-Titus, Podolski, and Eron (2003) found that girls who viewed physical violence on television as children engaged in more indirect aggression as adults. Ostrov, Gentile, and Crick (2006) documented a similar process among young preschool-age children. The GAM (see Carnagey & Anderson, 2003) predicts that media violence does not just influence aggression via social learning and modeling; rather, the exposure increases aggressive affect, arousal, and cognitive scripts (Ostrov, Gentile, & Mullins, 2013). Scripts or cognitive knowledge structures provide heuristics for how to act in given situations (Huesmann, 1986). Long-term exposure to aggressive media models can lead to aggressive behavior scripts and schemas as well as desensitization to aggressive or violent episodes (Carnagey & Anderson, 2003; Smith & Donnerstein, 1998). Viewing large amounts of relationally aggressive media may be associated with beliefs about the acceptability of relational aggression. A recent study showed that school-age children who viewed relationally aggressive television and movie models exhibited greater subsequent approval of relational

aggression (i.e., normative beliefs about the acceptability of relational aggression) if they also had parents who did not actively mediate or discuss and scaffold the programming during the exposure (Linder & Werner, 2012). Finally, one recent experimental study documented that exposure to television clips depicting relational aggression was associated with HAB for ambiguous relational (but not instrumental) provocation scenarios (Martins, 2013); thus, HAB may serve as a cognitive mechanism linking aggressive media exposure and relational aggression.

Recent work has also demonstrated how exposure to other forms of media content, including educational programming, may serve as a risk factor for relational aggression. For example, Ostrov et al. (2013) showed that exposure to educational media was associated with increases in parent-reported, teacher-reported, and observed relational aggression in a 3- to 5-year-old sample. These effects persisted over more than a 2-year period (Ostrov et al., 2013). The authors believed that children are modeling the aggressive behavior that is often shown as part of a friendship problem in these social-emotional-based programs. That is, although these programs are designed to ultimately teach social skills to children, young children may fail to connect the lesson or moral that is contained at the end of the 15- or 30-minute program with the aggressive behavior shown near the beginning (Ostrov, Gentile, et al., 2006; Ostrov et al., 2013). Thus, even shows that are deemed developmentally appropriate may place children at risk for learning and, ultimately, displaying relational aggression. Future research is needed to examine the role of active parental mediation versus other more passive coviewing parental approaches in these prospective links (see Linder & Werner, 2012).

DEVELOPMENTAL OUTCOMES: MALADAPTIVE CORRELATES

A significant question regarding the development of relational aggression is whether these behaviors are typical and normative, or whether they portend risk for the development of psychopathology (e.g., Underwood et al., 2001). Consistent with the suggestion that relational aggression is problematic and reflects developmental risk, an extensive literature has demonstrated that such conduct is associated with maladaptive correlates both concurrently and over time. Although relational aggression occasionally is conceptualized as the outcome of other adjustment problems (e.g., Ostrov, 2010; Zimmer-Gembeck et al., 2005) or psychiatric disorders (e.g., Belden, Gaffrey, & Luby, 2012), it is more frequently hypothesized to serve as a precursor or risk factor for psychopathology across development. Prior reviews (see Crick & Zahn-Waxler, 2003; Zahn-Waxler, Crick, Shirtcliff, & Woods, 2006) have demonstrated the theoretical and empirical support for prospective links between relational aggression and maladaptive outcomes. The review in this chapter provides a discussion of some of the most well-documented correlates of relational aggression, with particular attention to recent literature.

Internalizing Problems

A number of theorists have suggested that engagement in relational aggression will promote the developmental of internalizing symptoms, including depressive symptoms, anxiety, withdrawn behavior, and somatic complaints. Relational aggression may serve as a risk factor for internalizing problems because these behaviors interfere with successful negotiation of key developmental tasks, such as the establishment of positive peer relationships (e.g., Kamper & Ostrov, 2013; Murray-Close et al., 2007). In addition, relational aggression may be experienced as interpersonally stressful for both perpetrators and victims and may reflect maladaptive beliefs about the self and relationships; these factors, in turn, are often conceptualized as developmental vulnerabilities for depression (e.g., Rudolph et al., 2000). In fact, studies spanning developmental periods have documented positive associations between relational aggression and internalizing problems (e.g., Fite, Stoppelbein, Greening, & Preddy, 2011). Importantly, several of these studies controlled for levels of physical aggression (e.g., Crick, Casas, & Mosher, 1997), indicating that relational aggression may provide unique information regarding these adjustment difficulties. In fact, Underwood, Beron, and Rosen (2011) recently found that high trajectories of social, but not physical, aggression across third through seventh grades were uniquely related to internalizing problems at age 14. Additional longitudinal work suggests that relational aggression serves as a risk factor for the development of internalizing problems. For example, relational aggression has been found to predict increases in internalizing symptoms over time for school-age children (Crick, Ostrov, & Werner, 2006). Moreover, relational aggression and internalizing problems have been found to track together in a dynamic fashion over time during early adolescence (Murray-Close et al., 2007), and some evidence indicates that these associations emerge across cultural contexts (e.g., in Chinese culture; Kawabata

et al., 2012). Finally, in a longitudinal study of youth in early adolescence, peer-reported relational aggression was associated with increases in depressive-anxious symptoms (Ellis, Crooks, & Wolfe, 2009). In an effort to isolate the specific internalizing outcomes associated with relational aggression, researchers have also examined relations with narrow-band symptoms of depression and anxiety. In an early investigation in this area, Crick and Grotpeter (1995) demonstrated that relationally aggressive school-age children (i.e., 1 standard deviation above the sample mean) exhibited higher levels of depressive symptoms (as indexed by the Child Depression Inventory) than their nonaggressive peers. Consistent with the hypothesized role of stress in the emergence of internalizing pathology among relational aggressors, in one recent study, relational aggression predicted heightened levels of depressive symptoms only among youth who frequently ruminated about peer stressors (e.g., being targeted by peer aggression; Mathieson, Klimes-Dougan, & Crick, 2014). Interestingly, some evidence suggests that the association between relational aggression and depressive symptoms is stronger for girls than for boys. For instance, Crick et al. (1997) reported that relational aggression was uniquely (i.e., controlling for physical aggression) associated with depressed affect for girls, but not boys, during early childhood. In one of the largest longitudinal studies on the topic to date, Spieker et al. (2012) documented that relational aggression during middle childhood was associated with more depressive symptoms at age 15, but only for girls (although see Underwood et al., 2011). These gender differences may reflect the important role of interpersonal stress in the development of depressive symptoms for girls (see Ostrov & Godleski, 2010).

Past research has also examined associations between relational aggression and symptoms of anxiety. Anxious youth may use relational aggression to divert negative peer attention to others (Marsee, Weems, & Taylor, 2008) or in response to perceived negative evaluations (Gros et al., 2010). In fact, in a psychiatric inpatient sample of 4- to 12-year-olds, relational aggression was associated with heightened levels of anxiety (Becker, Luebbe, Stoppelbein, Greening, & Fite, 2012). In another study, reactive relational aggression predicted increased levels of anxiety in a sample of 6- to 17-year-olds (Marsee et al., 2008). Studies in emerging adulthood have also documented positive associations between relational aggression and multiple types of anxiety (Gros et al., 2010), including social anxiety (Storch, Bagner, Geffken, & Baumeister, 2004). Given the suggestion that relational aggression may be used as a strategy to deal with anxiety (e.g., Marsee et al., 2008), future longitudinal work is necessary to explore the direction of effects between relational aggression and symptoms of anxiety. Moreover, since similar underlying processes (e.g., dysregulated emotional responses) may portend risk for both anxiety and relationally aggressive conduct (Marsee et al., 2008), it will be important for future research to examine whether symptoms of anxiety and relational aggression share common developmental pathways.

Externalizing Problems

Relational aggression may be related to indices of externalizing pathology for several reasons (Crick & Zahn-Waxler, 2003). On one hand, several researchers have hypothesized that relational aggression will serve as a risk factor for the development of externalizing symptoms, including attention problems, conduct disorder symptoms, and oppositional defiant disorder symptoms (e.g., Crick, Ostrov, & Werner, 2006; Prinstein, Boergers, & Vernberg, 2001). From this perspective, engagement in relational aggression may place youth on a developmental trajectory toward adjustment problems, perhaps in part because such conduct interferes with successful functioning across a variety of domains (e.g., peer relationships; internalizing problems; see Crick, Ostrov, & Werner, 2006). For instance, relationally aggressive youth may select into friendships with similarly aggressive peers; in turn, these peers may socialize youth to increasingly engage in negative behaviors (Sijtsema, Ojanen, et al., 2010). Alternatively, it has been posited that relational aggression is part of a broader antisocial behavior or externalizing construct (see Burt, Donnellan, & Tackett, 2012; Tackett & Ostrov, 2010; Tackett et al., 2009) and serves as a marker of conduct and other externalizing problems (e.g., Tiet, Wasserman, Loeber, McReynolds, & Miller, 2001). From this perspective, relational aggression may be associated with other indices of externalizing symptomatology because they are related manifestations of a similar underlying pathology.

In fact, an emerging body of research indicates that relational aggression is positively associated with various indices of externalizing symptoms. For instance, relational aggression has been found to be related to heightened hyperactivity-impulsivity in early childhood (Ostrov & Godleski, 2009) and symptoms of ADHD in middle childhood (Tseng et al., 2012). The links between relational aggression and ADHD symptoms appear robust and have been documented in several cultures (e.g., a Taiwanese sample; Tseng et al., 2012) and in normative as well as clinical samples (e.g., an inpatient psychiatric

sample; Becker et al., 2012; although see Belden et al., 2012). For instance, Zalecki and Hinshaw (2004) reported that relational aggression was most prevalent among girls (ages 6 to 12) attending a summer camp who were diagnosed as having ADHD-combined subtype, rather than ADHD-inattentive subtype, or nondiagnosed comparison girls. Relational aggression is also associated with other forms of externalizing pathology; for instance, in a study with adults, relational aggression was elevated among individuals with intermittent explosive disorder (Murray-Close et al., 2010).

Developmental psychopathologists have also documented unique associations between relational aggression and conduct problems. Findings from the NICHD SECCYD indicated that relational aggression during middle childhood predicted heightened delinquency and risky behavior (Spieker et al., 2012). Relational aggression was also moderately associated with symptoms of oppositional defiant disorder and conduct disorder in a study of 9- to 17-year-old girls and boys (Keenan, Coyne, & Lahey, 2008). Some evidence indicates that relational aggression serves as a risk factor for later conduct problems; in one study, relational aggression among school-age children was uniquely related to future delinquency over time, controlling for physical aggression (Crick, Ostrov, & Werner, 2006). Several researchers have documented gender differences in these relations; for instance, Prinstein and colleagues (2001) found that relational aggression was associated with externalizing symptoms, but only for girls. However, others have reported stronger associations for boys; for instance, although Spieker et al. (2012) reported that relational aggression was related to risky behavior for both boys and girls, the strength of the association was stronger for boys.

Despite these interesting findings, future work is needed to better understand whether relational aggression places youth on a developmental trajectory toward externalizing symptoms and/or whether relational aggression is best conceptualized as a marker or indicator of externalizing difficulties. In their confirmatory factor analyses of disruptive behavior in a large, representative community sample of girls, Loeber and colleagues (2009) found that relational aggression consistently emerged as a unique factor (i.e., along with oppositional behavior/conduct problems, inattention, hyperactivity impulsivity) with both parent and teacher ratings. These findings suggest that despite overlap in constructs, relational aggression is distinct from existing measures of conduct problems.

However, the question remains regarding whether relational aggression is best conceptualized as a subset of antisocial or externalizing behavior problems. Burt et al. (2012) reported that social aggression was uniquely associated with known predictors and correlates of antisocial behavior, suggesting that such conduct may reflect a distinct subtype of antisocial conduct. Moreover, although externalizing problems are often conceptualized as developmental outcomes of relational aggression, effects are likely bidirectional in nature; in fact, Belden et al. (2012) reported that youth with preschool-onset disruptive disorders were more than five times as likely to be identified as relational aggressors 2 years later. Similarly, a 4.5-year follow-up of Zalecki and Hinshaw's (2004) summer camp study revealed that multiple informants rated girls with ADHD to have higher relational aggression scores relative to comparison girls, with moderate to large effect sizes (Mikami et al., 2008). One potential interpretation of these bidirectional associations is that relational aggression is a behavioral manifestation of underlying externalizing pathology or antisocial conduct (see Burt et al., 2012); in effect, engagement in externalizing behaviors may encourage conceptually related behaviors, such as relational aggression. We echo other calls to continue to examine how relational aggression findings are similar or different from those of "pathological externalizing behaviors" (Tackett et al., 2009, p. 731).

Peer Problems

Several researchers have argued that relational aggression will increase risk for peer problems and other social concerns (e.g., Preddy & Fite, 2012), which may in turn interfere with the successful negotiation of stage-salient developmental tasks in middle childhood and adolescence (Sroufe, Egeland, & Carlson, 1999). Scholars have posited that because children view relationally aggressive behavior as harmful and distressing (Crick, Bigbee, & Howes, 1996), victims and other peers may dislike aggressors. Crick and Grotpeter (1995) were the first to show that relationally aggressive children (1 standard deviation above the sample mean) were more rejected by their peers than nonaggressive children. Crick et al. (1997) also revealed positive associations between peer-reported relational aggression and peer-reported peer rejection when controlling for physical aggression. Crick, Ostrov, Burr, et al. (2006) documented that observations of relational aggression predicted future teacher-reported peer rejection, addressing potential concerns of shared method variance in earlier work in the area. Additionally, Tseng and colleagues (2013) reported that relational aggression was associated with increases in peer rejection across the fifth grade in a sample of

Taiwanese youth. Studies examining subtypes of relational aggression have found that proactive relational aggression is uniquely associated with decreases in peer rejection and relational victimization over time, whereas reactive relational aggression is uniquely associated with increases in peer rejection and relational victimization over time (Ostrov et al., 2013, 2014). Collectively, these findings highlight the possibility that some functions of relational aggression may be used to achieve positive status in the peer group (see the "Developmental Outcomes: Potential Positive Correlates" section).

Peer rejection resulting from relational aggression may further compromise perpetrators' ability to form high-quality peer relationships, ultimately leading to feelings of loneliness and psychological distress (Ostrov & Godleski, 2013) or resulting in victimization by peers (Ostrov, 2008). In fact, past work has shown that relational aggression is associated with feelings of loneliness (Soensens, Vansteenkiste, Goossens, Duriez, & Niemiec, 2008). Additionally, consistent with a sequential social process model, Ostrov (2008) found that relational aggression was associated with peer rejection, which, in turn, placed young children at risk for future relational victimization. Testing a similar model using data from the NICHD SECCYD, Ostrov and Godleski (2013) provided evidence for an indirect social process model such that the direct link between relational aggression in third grade and relational victimization in sixth grade was mediated by loneliness in fifth grade. These findings highlight the relatively complex mechanisms linking relational aggression and negative peer outcomes.

To date, the majority of research regarding how relational aggression relates to problems with peers has focused on difficulties within the larger peer group (e.g., rejection or victimization). Fewer studies have been conducted that examine the implications of relationally aggressive behaviors for adjustment in the context of close friendships and romantic relationships. However, the consequences of relational aggression may differ across relational contexts; in fact, Goldstein and Tisak (2004) reported that adolescents' and young adults' expectations regarding the outcomes of relational aggression (e.g., whether the relationship partner would want to continue the relationship if he or she used relational aggression; likelihood of retaliation) differed by relational context. Additionally, Murray-Close et al. (2010) reported that risk factors for relational aggression (e.g., HAB for relational provocations, anger) were positively associated with romantic relational aggression, even when controlling for peer-based relational aggression, raising the possibility that individuals who engage in relational aggression across relational contexts may be at particularly high risk for the development of psychopathology. Moreover, there is good reason to believe that relationally aggressive behaviors in close relationships will be particularly harmful as such conduct violates the common expectation of trust and intimacy (see Goldstein & Tisak, 2004).

In fact, several researchers have found that relational aggression is associated with difficulties in dyadic relationships with peers. Interestingly, evidence indicates that relationally aggressive youth often do have close, dyadic friendships. For instance, Rys and Bear (1997) found that relationally aggressive children were just as likely to have a friend as their nonaggressive peers (see also Burr, Ostrov, Jansen, Cullerton-Sen, & Crick, 2005; although see Johnson & Foster, 2005). However, although relationally aggressive youth often have close friends, these negative social behaviors may lead to poor-quality relationships over time. In fact, relationally aggressive youth are more likely than their nonaggressive peers to exhibit difficulties within friendships, including high levels of jealousy and a tendency to use relational aggression against close friends (Grotpeter & Crick, 1996). Banny, Heilbron, Ames, and Prinstein (2011) provided longitudinal evidence that relationally aggressive talk in the context of a friendship interaction (e.g., gossip about others) was associated with increases in negative relationship quality across 6 months. Similarly, Kamper and Ostrov (2013) found that the perpetration of relational aggression in the fifth grade predicted lower friendship quality 1 year later, even when controlling for engagement in physical aggression. Romantic relational aggression is also associated with negative relationship qualities. For instance, Linder et al. (2002) reported that the use of relational aggression against romantic partners was positively associated with feelings of frustration, ambivalence, jealousy, and anxious clinging and negatively associated with trust in the relationship. Interestingly, this study also found evidence of cross-contextual continuity, indicating that poor relationships with peers and parents may play an important role in the development and maintenance of relational aggression in romantic relationships (Linder et al., 2002).

Taken together, then, evidence indicates that relational aggression is associated with impaired peer functioning, at both the dyadic and the peer group levels. However, several factors may be important to consider in research regarding relational aggression and peer outcomes. For instance, findings may differ by gender; in fact, a study in middle childhood found that physical aggression was predictive of social problems for boys, whereas relational aggression

was predictive of social problems for girls (Preddy & Fite, 2012). In a recent longitudinal study, relational aggression predicted increases in relational victimization over the course of 8 months in adolescent girls but not boys (Zimmer-Gembeck & Duffy, 2014). Crick et al. (2009) suggested that relational aggression may be more strongly related to poor peer outcomes for girls because these behaviors disrupt the interpersonal goals central to female peer groups. There may also be cultural differences in the strength of the association between relational aggression and negative peer outcomes. Peer problems such as peer rejection have been documented in youth who engage in high levels of relational aggression in numerous cultures (e.g., a large sample of Italian preschoolers; Nelson, Robinson, Hart, Albano, & Marshall, 2010). However, relational aggression may be especially disruptive to peer functioning in some cultures; for instance, relational aggression may interfere with the social expectations typical of collectivistic cultures (Kawabata et al., 2012) and thus may be more strongly related to rejection by peers in this context (see the "Cultural Perspectives" section). Associations between relational aggression and peer outcomes may also be moderated by individual differences in functioning in other domains; for example, past research has shown that relational aggression was associated with conflictual friendships (a marker of negative friendship quality) for children who were rejected by their peers but not for those who were perceived as popular (Rose, Swenson, & Carlson, 2004). In another study, relationally aggressive girls with high levels of sensitivity to relational threats (e.g., rejection sensitivity, fear of negative evaluation, and intimacy avoidance) were at particularly high risk for concurrent and future relational victimization (Zimmer-Gembeck & Duffy, 2014). Importantly, although impaired peer functioning is often conceptualized as an outcome of relationally aggressive behavior, it is likely that associations are bidirectional in nature (see the "Risk Factors: Social Processes" section).

Substance Use and Abuse

Relational aggression may place youth on trajectories toward risky behaviors such as substance use (e.g., Kamper & Ostrov, 2013; Spieker et al., 2012). In fact, emerging research findings have documented positive associations between relational aggression and substance use (e.g., Burt et al., 2012; Storch et al., 2004). For instance, self-reported relational aggression has been significantly correlated with self-reported cigarette use, alcohol use, marijuana use, and advanced alcohol use in a typically developing sample of eighth graders (Sullivan et al., 2006). Some researchers have documented gender differences in these associations; after controlling for initial levels of physical aggression and baseline drug use, Skara et al. (2008) found that relational aggression predicted cigarette use and marijuana use for females but not for males (see also Burt et al., 2012). Relational aggression within the context of romantic relationships has also been shown to be associated with alcohol and drug use (Bagner, Storch, & Preston, 2007).

Several peer processes may underlie the relation between relational aggression and substance use problems. For example, relationally aggressive youth may increasingly associate with aggressive and delinquent peers (e.g., Sijtsema, Ojanen, et al., 2010; Werner & Crick, 2004), resulting in socialization toward delinquent acts, such as early substance use and abuse. Moreover, peer difficulties resulting from relational aggression (e.g., rejection, victimization) may promote substance use. That is, relational aggressors may engage in substance use as a maladaptive coping mechanism to deal with their peer difficulties, including being targeted by peer victimization (see Sullivan et al., 2006). Kamper and Ostrov (2013) recently documented that negative friendship quality mediated the longitudinal association between childhood relational aggression and adolescent risky behaviors, including substance use. Future research is needed to further delineate the specific developmental mechanisms underlying substance use among relationally aggressive youth, with particular attention to the role of peer difficulties, such as victimization and poor friendship quality.

Personality Pathology

In recent years, several associations between relational aggression and dimensions of personality pathology have been posited and tested (see Cicchetti & Crick, 2009; Tackett & Ostrov, 2010). Although relational aggression has been shown to be associated with several forms of personality pathology including antisocial personality disorder symptoms (e.g., Ostrov & Houston, 2008; Werner & Crick, 1999), the focus of this review is on borderline personality disorder (BPD) features, narcissism, and psychopathy.

With respect to symptoms of borderline pathology, Geiger and Crick (2001) conducted a content analysis of the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorder*s (*DSM-IV*) criteria for diagnosis of personality disorders, and five childhood indicators of BPD were identified. These included: (1) hostile/paranoid view of the world; (2) intense, unstable, inappropriate affect; (3) overly enmeshed and close relationships; (4) impulsivity;

and (5) lack of a coherent sense of self. Difficulties within close interpersonal relationships, chronic anger, impulsivity, and a hostile worldview (i.e., HAB) are some of the core features that are shared by both relational aggression and BPD (Crick, Murray-Close, & Woods, 2005; Ostrov et al., 2011). From this perspective, stable behavioral patterns in childhood, including engagement in relational aggression, may reflect risk for the development of borderline symptoms (Crick et al., 2005).

Consistent with this hypothesis, Crick and colleagues (2005) provided evidence indicating that relational aggression may be a unique developmental precursor to and predictor of borderline personality features in children. Subsequent research has supported a conceptual model in which relational aggression is a developmental antecedent of BPD features (e.g., Ostrov & Houston, 2008; Stepp, Pilkonis, Hipwell, Loeber, & Stouthamer-Loeber, 2010). For instance, Vaillancourt et al. (2014) recently reported that relational aggression at age 12 predicted higher levels of borderline symptoms at age 14. Research has further documented prospective associations between social aggression and BPD features (Underwood et al., 2011). Werner and Crick (1999) were the first to empirically document that relational aggression was associated with heightened BPD features in emerging adults. In recent years, this association has been replicated several times (e.g., Ostrov & Houston, 2008; Ostrov et al., 2011), although Burnette and Reppucci (2009) failed to find an association between relational aggression and borderline symptoms in a sample of incarcerated adolescent girls. In one recent longitudinal study of the association between forms of aggression and borderline pathology in a Russian sample, preschool aggression was not associated with later borderline features. However, among males and females, borderline features were concurrently associated with both physical and relational aggression in adolescence (Nelson, Coyne, Swanson, Hart, & Olsen, 2014).

Narcissistic personality traits may also be associated with relational forms of aggression. Narcissistic individuals by definition have an enhanced sense of self and status relative to peers; moreover, these individuals desire power and control over others and often exploit and manipulate their peers (Barry, Grafeman, Adler, & Pickard, 2007). This goal for social dominance over peers may promote the use of aggression among individuals with narcissistic traits (Barry et al., 2007). In addition, narcissistic youth may engage in aggression when their inflated self-views are threatened (Bukowski, Schwartzman, Santo, Bagwell, & Adams, 2009). Consistent with these hypotheses, several researchers have reported positive associations between relational forms of aggression and trait narcissism (Burt et al., 2012; Golmaryami & Barry, 2010; Lau & Marsee, 2013; Ojanen, Findley, & Fuller, 2012) and in particular with maladaptive subtypes of narcissism (i.e., entitlement, exhibitionism, and exploitativeness; Barry, Pickard, & Ansel, 2009). Associations between narcissistic traits and relational aggression have also been documented in non-Western cultures (e.g., Japan; Onishi et al., 2012). Moreover, although a large body of work has documented heightened levels of physical forms of aggression among individuals with narcissistic traits, Bukowski et al. (2009) reported that narcissism was more strongly related to relational than physical forms of aggression.

Finally, psychopathy, a maladaptive personality disorder that includes traits such as lack of remorse, superficial charm, blunted or shallow affect, manipulation of others, and egocentricity (J. D. Miller & Lynam, 2003), has been found to be associated with relational forms of aggression. As discussed in the section titled "Risk Factors: Cognitive and Emotional Processes," impaired emotional responses may be a mechanism linking psychopathic traits and relationally aggressive conduct. Initial studies showed links between the two-factor model (i.e., impulsive antisociality and fearless dominance) and relational aggression (e.g., Ostrov & Houston, 2008; Schmeelk, Sylvers, & Lilienfeld, 2008; Warren & Clarbour, 2009; cf. J. D. Miller & Lynam, 2003). Regardless of the methodological approach, robust associations have been documented between relational aggression (or indirect aggression, Coyne & Thomas, 2008; Vaillancourt & Sunderani, 2011) and measures of psychopathy or CU traits, even after controlling for the variance associated with physical aggression (e.g., Czar et al., 2011; Ostrov & Houston, 2008; Schmeelk et al., 2008). These links have been found with regard to both peer and romantic relational aggression (Coyne et al., 2010; Czar et al., 2011).

There are several important directions for future research regarding the association between relational aggression and personality pathology. For instance, some evidence has emerged indicating that distinct personality traits may interact in the prediction of relational aggression (e.g., narcissism and CU traits or measures of psychopathy; Kerig & Stellwagen, 2010). Additionally, personality pathology (e.g., borderline pathology; narcissistic traits) may be more strongly associated with relational aggression in females than in males (Banny, Tseng, Murray-Close, Pitula, & Crick, 2014; Marsee et al., 2005). In fact, in one recent longitudinal study, the indirect effect linking relational aggression at age 10 with borderline symptoms at age 14 via relational aggression at age 12 was significant

for girls only; these findings suggest that stable levels of relational aggression may be a stronger risk factor for borderline pathology in females as compared to males (Vaillancourt et al., 2014). Relations between forms of aggression and personality pathology may also differ depending on the function of the aggression (see Banny et al., 2014; Crapanzano, Frick, & Terranova, 2010; Ostrov & Houston, 2008). In one study, proactive but not reactive relational aggression significantly and uniquely predicted CU traits in a sample of adolescent detained girls (Marsee & Frick, 2007). Other work has highlighted mechanisms that might underlie the association between personality traits and relational aggression; for instance, some evidence indicates that the direct association between narcissism and relational aggression is mediated by Machiavellianism (i.e., a tendency to manipulate others and to exploit them for one's own goals; Kerig & Stellwagen, 2010). These findings highlight the need for additional longitudinal research exploring associations between personality pathology and relational aggression, with a particular emphasis on underlying mechanisms and moderating factors.

Finally, relational aggression may be conceptualized as both a predictor (e.g., Marsee & Frick, 2007) as well as an outcome (e.g., Onishi et al., 2012) of personality pathology. For instance, Bukowski et al. (2009) argued that narcissistic youth may use relational aggression to defend their inflated self-views. Narcissistic traits may also serve as a risk factor for involvement in relational aggression because they interfere with appropriate emotional responses regarding aggression (e.g., guilt; Onishi et al., 2012). Banny and colleagues (2014) posited that core features of borderline pathology, such as affective instability, may lead to the use of relational aggression; consistent with this suggestion, these authors reported that borderline features were longitudinally associated with increased relational aggression in girls. Some evidence also emerged for the alternative direction of effects, such that earlier relational aggression was associated with the development of borderline pathology; however, whereas reactive relational aggression was marginally associated with increases in borderline features over time, proactive relational aggression was related to *decreases* in these symptoms (Banny et al., 2014). As with studies of externalizing behavior problems, it will be important for future research to evaluate the extent to which relational aggression can be conceptualized as a behavioral manifestation of personality pathology. Such work would help clarify the mechanisms underlying the likely dynamic bidirectional associations between relational aggression and personality pathology across development.

DEVELOPMENTAL OUTCOMES: POTENTIAL POSITIVE CORRELATES

In considering correlates of relational aggression or similar constructs (indirect or social), one of the most intriguing and controversial foci is the assessment of what may be viewed as positive correlates. In particular, studies have sought to determine whether relational aggression may prove to be a useful tool in securing significant social status (termed *hierarchy ascension*; Hawley et al., 2007). Traditionally, aggression has been considered to align with peer difficulties such as rejection, which may in turn provoke a host of negative outcomes including more aggressive behavior (see the "Developmental Outcomes: Maladaptive Correlates" section). For example, Murray-Close and Ostrov (2009) found that children who were socially excluded tended to react to the stress of their situation by becoming more relationally aggressive over time. However, in recent years, the idea that relational aggression is uniformly related to maladaptive outcomes has been challenged on both theoretical and empirical grounds. Researchers have instead argued that some aggressive youth exhibit social competence as well as high aggression, and they hold enviable social status positions in the peer group (i.e., are considered popular, socially central, and socially dominant).

Evidence of this co-occurrence of aggressive behavior and positive positions in the peer group is apparent in early studies of physical aggression and dominance relations among children (Strayer & Strayer, 1978). The research has rapidly expanded over the past decade to include relational (social, indirect) aggression and to consider how these correlations might vary by child gender. Importantly, aggression itself does not predict status so much as how effectively the child makes use of it to achieve social goals (Prinstein & Cillessen, 2003; Walcott, Upton, Bolen, & Brown, 2008), suggesting that relational aggression may be most likely to translate into popularity among youth who combine these negative behaviors with high social skills or prosocial behavior. In fact, Puckett, Aikins, and Cillessen (2008) found that perceived popularity was associated with social self-efficacy, leadership, cooperation, and peer sociability, highlighting the importance of positive social skills in establishing a position of high status in the peer group. Notably, there is considerable overlap between membership in the perceived popular category and the controversial sociometric status group (Prinstein & Cillessen, 2003). Controversial-status children are frequently selected by peers for both liked and disliked peer nomination items,, and studies of this group point

to their high levels of aggression as well. For example, controversial preschool children are just as aggressive as their rejected counterparts, but engagement in average levels of sociability buffers against full-scale rejection by peers, both in the United States (Nelson, Robinson, & Hart, 2005) and in Italy (Nelson et al., 2010). These findings suggest that youth who exhibit a mix of aggressive and socially competent behaviors may not experience significant problems in the peer group and, in some cases, may actually benefit from high-status positions. Moreover, many children already appear to be proficient at this mix of behavior by preschool (Nelson et al., 2005).

A related perspective draws from evolutionary theory, highlighting the role of aggression in securing access to important resources and promoting one's own self-interest (Hawley, 2003a; Hawley, Little, & Card, 2008). Specifically, Hawley (2003a) has proposed that some youth are bistrategic controllers, opting for a combination of prosocial and coercive control tactics in their bid to control resources. For these youth, significant social intelligence and savvy appear to be central to effective engagement in relational aggression (Andreou, 2006). This group is similar to perceived popular or controversial youth in that relational aggression is combined with positive social behaviors and is used effectively to gain access to social resources (e.g., a socially central position in the peer group; Hawley, 2003a; Hawley et al., 2008).

An impressive number of studies have documented the positive association between relational aggression and high social status. Particularly influential are the studies that have assessed the interplay of these factors over the course of time. Cillessen and Mayeux (2004) have shown that as children move into adolescence, relational aggression becomes increasingly associated with high perceived popularity but low social preference. Relational aggression and perceived popularity are particularly connected for girls. Accordingly, there are ample reinforcements (social benefits) for those who become proficient in their use of relational aggression in the peer group. Rose, Swenson, and Waller (2004) additionally found that for older girls, the positive relations between relational aggression and perceived popularity were bidirectional in nature. Many of these connections appear to be relevant not only for Caucasian U.S. children but also for ethnic minorities (Waasdorp, Baker, Paskewich, & Leff, 2013). Similar associations are found in a number of samples outside of the United States and Canada, including Greek (Andreou, 2006), Belgian (Kuppens, Grietens, Onghena, Michiels, & Subramanian, 2008) and Italian (Nelson et al., 2010) samples. However, there are findings which indicate cultural differences as well (see the "Cultural Perspectives" section), perhaps reflecting cultural variability in the tolerance of aggressive behavior.

Relational aggression appears to promote high status across several relational contexts; for instance, Pellegrini and Long (2003) established that, in middle school, relational aggression is connected to dating popularity, particularly among girls. Being relationally aggressive does not appear to hamper friendship formation for popular aggressive youth either. Friends tend to be similar in their levels of aggression and popularity, creating further insularity from real-world consequences of their aggression toward others (Rose, Swenson, & Carlson, 2004; Peters et al., 2010). The friendships of bistrategic controllers are characterized by positive qualities, such as high intimacy and fun, although they also tend to include high levels of conflict (including overt and relational aggression; Hawley et al., 2007). Some longitudinal evidence also indicates that relational aggression is associated with increases in positive friendship qualities across time, although effects for negative relationship qualities were observed as well (Banny et al., 2011). Banny and colleagues (2011) suggested that relationally aggressive behaviors are one way that youth may establish feelings of closeness, intimacy, and alliance among close friends. As peer censure and difficulties are one of the primary mechanisms thought to account for associations between relational aggression and poor adjustment outcomes (e.g., depressive symptoms; see the "Developmental Outcomes*:* Maladaptive Correlates" section), popular relationally aggressive youth may not exhibit many of the problems typically associated with such conduct. Consistent with this suggestion, Rose and Swenson (2009) found that perceived popularity buffered relationally aggressive youth from internalizing problems.

Leadbeater, Boone, Sangster, and Mathieson (2006) have cautioned against the impression, however, that aggressive yet popular youth do not pay a price for their hostility toward others since aggression tends to invite retaliation and stress in peer relationships. Based on her work with students in middle childhood, sociologist Donna Eder (1985) described a "cycle of popularity" whereby views of popular girls moved from being positive to very negative (see the "Developmental Outcomes: Maladaptive Correlates" section). Underwood (2004) also noted that popular girls consistently struggle with a balancing act. They want to avoid a reputation for meanness, and nonverbal forms of social aggression (glares, eye rolls, and the silent treatment) may seem the least toxic approach to aggressively defending their status. The irony is that, in doing so, they engage in behaviors that may earn them the

reputation of being stuck up, a label they dread (Merten, 1997). What drives the desire for social dominance may also be problematic. Ojanen et al. (2012) provided evidence that narcissistic personality is associated with dominance goals, which are in turn predictive of relational and physical aggression.

More important, there is evidence of long-term dysfunction for many popular youth. Perceived popularity predicts increases in general externalizing problems over the course of several years (Sandstrom & Cillessen, 2006), which could place popular youth on a trajectory ill-suited for successful relationships beyond the peer group. Indeed, Sandstrom and Cillessen (2010) have demonstrated how levels of perceived popularity in high school may interact with engagement in relational aggression to predict how students will fare in their emerging-adulthood years. In particular, greater high school popularity predicted more engagement in risk behaviors post–high school, even after controlling for prior risk behaviors. Boys who were not popular but were highly relationally aggressive in high school had pronounced adjustment problems after high school. For girls, being highly relationally aggressive in high school was associated with less post–high school depression but higher workplace victimization. Additional longitudinal study is needed to fully understand the long-term consequences of being aggressive yet popular.

There are several important directions for future research on the association between relational aggression and positive peer outcomes. For instance, researchers should consider whether contextual factors, such as classroom dynamics, moderate the extent to which relationally aggressive youth are able to garner positive peer regard. In one recent study, Moore, Shoulberg, and Murray-Close (2012) reported that relationally aggressive girls were more likely to be popular, and less likely to be rejected, if their teachers liked them. Popularity with teachers may also enhance these children's ability to aggress with relative impunity, as teachers may not look for or see aggressive behavior as readily in children they generally consider to be socially competent (see Hawley, 2003b). The association between relational aggression and high status may also depend on additional classroom factors, such as levels of status hierarchy (Garandeau, Ahn, & Rodkin, 2011).

Additionally, as relational aggression is often conceptualized as a strategy that youth use to achieve status and power with peers, it will be important for researchers to examine whether individual differences in social status motivations (e.g., desires to be well liked or popular in the peer group) are associated with relationally aggressive conduct. In fact, Li and Wright (2014) found that self-reported popularity goals predicted higher levels of self-reported, but not peer-reported, relational aggression in a sample of middle schoolers. Dawes and Xi (2014) found that self-reported popularity goals were associated with higher levels of peer-reported social aggression among popular, but not unpopular, middle schoolers. The authors suggested that popular youth who endorse popularity goals may have the social resources necessary to effectively use social aggression. Other researchers have also documented the important role of actual peer status in the association between popularity goals and relational aggression; for instance, Shoulberg, Sijtsema, and Murray-Close (2011) found that having a reputation for valuing popularity was generally predictive of girls' engagement in relational aggression. The association was strongest, however, for two groups of girls who valued popularity: (a) popular girls who exhibited blunted physiological reactivity to social exclusion and (b) unpopular girls (wannabes) who demonstrated heightened physiological reactivity to exclusion. The lower stress reactivity of popular girls may allow them to pivot quickly and use relational aggression to achieve or maintain status. In contrast, the reactivity of unpopular girls may lead to aggressive responses to any perceived social slight, which further compounds their popularity problems.

Future research may also benefit from considering whether some manifestations of relational aggression are more strongly associated with positive outcomes than others. Research suggests that popular yet aggressive children adopt a wide range of aggressive behaviors in their bids for social dominance. In the context of social aggression, these children may employ both verbal and nonverbal expressions of relational manipulation. Glares of contempt, rolling of the eyes to signal disgust, and the silent treatment are nonverbal forms of social exclusion that can exert tremendous influence (Underwood, 2004). The verbal/nonverbal distinction is a useful one; when controlling for both overt and verbal social aggression, nonverbal social aggression uniquely accounts for variance in children's social status (Blake et al., 2011). Fanger et al. (2012) investigated various types of exclusionary behavior among preschoolers and argued, however, that not all types may be considered aggressive. For example, a child may seek to keep high-quality interactions going with certain peers by not allowing others to interrupt the flow. Many of the exclusionary behaviors exhibited by preschoolers are relatively indirect (subtle) in nature or focused on simply ignoring a play overture. Better-accepted preschoolers, in particular, frequently employ these forms of exclusionary behavior, and they may not hold hostile intent

toward the peers they exclude. These findings highlight the importance of research assessing whether distinct relationally aggressive behaviors have differential associations with positive outcomes, such as popularity (see the "Developmental Manifestations of Relational Aggression" section). Additional research is clearly necessary to explore the significant heterogeneity among relationally aggressive children, including the fact that some youth appear to suffer from rejection whereas others exhibit significant social status benefits as a result of their aggressive conduct.

CULTURAL PERSPECTIVES

Studies of relational aggression and similar constructs (e.g., indirect and social aggression) have been conducted across a number of diverse cultures. Similar to the study of physical aggression, a major impetus of this research is to gauge cross-cultural similarity or difference in the quantity, quality, and meaning of relationally manipulative behaviors. This work has provided significant insight into the development of relational aggression in context and has highlighted both challenges and opportunities for relational aggression researchers. More specifically, cross-cultural research underscores the need to develop culturally sensitive tools for assessing relational aggression, to consider the contextual processes that might encourage engagement in relational aggression, and to investigate potentially distinct predictors and developmental outcomes associated with relationally aggressive conduct.

A significant challenge in cross-cultural research is the development of measures that are appropriate for use across cultural contexts. In many of the existing studies of relational aggression conducted outside of the United States and Canada (the source of the majority of relational aggression research to date), existing measures are translated for use in other languages, and their psychometric properties are assessed (e.g., Kawabata et al., 2012; Lansford et al., 2012). The standard procedure of forward- and back-translation helps to ensure the linguistic and conceptual equivalence of the measures across the languages of interest. In regard to these goals, measures of relational aggression developed in Western countries appear to work rather well in diverse cultures. For instance, teacher-report measures developed in the United States exhibited high internal consistency when administered to a sample in China (e.g., Kawabata et al., 2012). Researchers have also documented configural invariance (similarity of factor structures) in measures of physical and relational aggression across cultures, suggesting that relational aggression is distinct from physical aggression and that similar behaviors (e.g., exclusion) underlie relational aggression in diverse settings (e.g., Lansford et al., 2012).

Although an emerging body of research suggests that Western measures can be translated and used effectively in other cultures, such an approach may obscure the unique manifestations of relational aggression that may exist across cultures. In fact, some researchers have argued that relational aggression may be expressed in distinct ways in different cultures; for instance, subtle relationally aggressive behaviors (e.g., threatening to tell teachers bad things about a peer) may be more typical in collectivistic than in individualistic societies (e.g., Kawabata et al., 2012). Thus, extant measures may need to be adapted to best capture the various types of relationally aggressive behaviors that are most common in distinct cultural contexts. Culturally unique manifestations of relational aggression may not lend themselves to cross-cultural comparison; however, they may play a significant role in children's adjustment. Accordingly, observational or qualitative studies of aggression may provide significant insight regarding culturally sensitive approaches to assessing relational aggression.

A significant body of research has examined relational aggression in countries other than the United States and Canada. For instance, relational aggression and/or victimization have been successfully measured in studies conducted with youth in Colombia (Velásquez, Santo, Saldarriaga, López, & Bukowksi, 2010), Italy (Nelson et al., 2010; Tomada & Schneider, 1997), China (e.g., Li et al., 2011; Nelson et al., 2006), Russia (Hart et al., 1998), Indonesia (French, Jansen, & Pidada, 2002), Japan (e.g., Kawabata et al., 2012), Greece (Andreou, 2006), Belgium (Kuppens et al., 2008), India (Bowker et al., 2012), and Australia (e.g., Hemphill et al., 2010; Pronk & Zimmer-Gembeck, 2010). Studies of indirect aggression have also included samples from diverse countries, such as the United Kingdom (Coyne, Archer, & Eslea, 2006), Germany (Möller & Krahé, 2009), Australia (Owens, Shute, & Slee, 2000), Finland (Österman et al., 1994, 1998), Poland (Österman et al., 1994, 1998), Israel (Österman et al., 1998), and Italy (Österman et al., 1998). These studies, with participants ranging in age from preschool to adolescence, have documented that relational aggression occurs with some frequency across a wide span of cultural settings.

Moreover, evidence indicates that youth spontaneously identify relationally aggressive behaviors as common in peer interactions in varied cultural contexts. For example, French et al. (2002) conducted a study in which U.S. and Indonesian children were asked to describe disliked peers, and coders documented their references to

physical, verbal, and relational aggression. Findings showed that youth in both countries frequency cited relationship manipulation (e.g., ignoring peers), social ostracism, and rumor-spreading as behaviors that elicited their dislike. Moreover, girls in both countries were more likely than boys to identify relationally aggressive behaviors in their descriptions. These findings suggest that relational aggression is a common behavior across two cultures that otherwise differ considerably in regard to gender roles, attitudes toward aggression, and along the individualism/collectivism dimension.

A critical question is whether relational aggression is uniquely tied to cultural elements, such as a society's place on the collectivism/individualism continuum. Of significant import, therefore, are studies of relational or indirect aggression that directly compare data from diverse cultures. Österman and colleagues (1994) hypothesized that children will select aggressive behaviors based on their risks versus benefits. It is likely that both the normative nature of aggression subtypes and the likelihood that youth will be punished for engaging in these behaviors vary significantly across cultural contexts; as a result, cultural differences in the benefit-to-risk ratio are expected. For instance, given the focus on interpersonal harmony in collectivistic cultures, relational aggression may be less tolerated and thus less common in these contexts (e.g., Forbes, Zhang, Doroszewicz, & Haas, 2009). Consistent with this suggestion, Forbes et al. (2009) documented that engagement in indirect aggression was more common in individualistic (United States) as compared to collectivistic societies (China) or hybrid societies with elements of both individualism and collectivism (Poland). Similarly, Österman et al. (1994) compared levels of physical, verbal, and indirect aggression for children in Finland (Finnish or Swedish), the United States (Chicago, IL: African American or Caucasian), and Warsaw, Poland. Results revealed significant differences in the frequency of aggressive behavior across countries, such that youth in the United States were especially aggressive.

As with gender differences (see the "Toward an Integrated Gender-Linked Model of Aggression" section), however, it may be especially important for cross-cultural researchers to compare cultural differences in within-group preferences for relationally versus physically aggressive behaviors. For instance, collectivistic cultures may discourage the use of all types of aggression because they interfere with harmonious group functioning; however, when youth from collectivistic societies are aggressive, they may be particularly likely to adopt relationally aggressive rather than physically aggressive behavioral strategies (see Kawabata et al., 2012). Recently, Lansford and colleagues (2012) examined this possibility in their comparison of levels of relational aggression versus physical aggression in nine different countries. Results indicated that children reported being more relationally than physically aggressive in China, India, and Thailand. In contrast, Jordanian and Kenyan children reported more engagement in physical than relational aggression. In the remaining four countries (Colombia, Philippines, Sweden, and the United States), there was no significant difference in levels of engagement in these forms of aggression. These findings hint at distinct cultural norms for aggression and underscore the importance of considering cultural differences in within-group preferences for relational versus physical aggression, in addition to potential cross-cultural differences in mean levels of relational aggression.

Evidence from several studies also highlights meaningful differences in the use of relational aggression *within* countries, perhaps reflecting distinct subcultural values and experiences. For instance, Li, Wang, Wang, and Shi (2010) demonstrated that individual differences in endorsement of collectivism or individualism were predictive of Chinese adolescents' engagement in overt and relational aggression. As expected, Chinese adolescents who endorsed more individualism were more aggressive than their collectivism-minded peers. Religious subcultures might also promote moral emotion and thereby reduce youth involvement in aggression. Consistent with this possibility, Landau, Björkqvist, Lagerspetz, Österman, and Gideon (2002) reported that levels of direct and indirect aggression were higher among secular as compared to religious Israeli children and adolescents. Taken together, findings underscore the need for research that examines subcultural variations in the development of relational aggression. Differences in socioeconomic status (SES), urban/rural environment, and religious and familial value systems may all provide significant insights in this regard.

Cultural identity may also serve a protective function against the development of relational aggression. Although cultures may vary in their prescriptions for mature social behavior, a positive sense of identification with ancestral culture may provide an important psychological foundation for psychosocial maturity. As a result, cultural identification may promote a more tolerant and less aggressive atmosphere among children and adolescents. Consistent with this suggestion, Flanagan and colleagues (2011) found that aboriginal Naskapi youth in Quebec, Canada, who exhibited a strong cultural identity with their native culture, exhibited less engagement in both relational and physical forms of aggression. In addition,

Belgrave et al. (2004) conducted a cultural intervention for African-American girls called the Sisters of Nia, in which relevant cultural values and beliefs (tied to ethnic identity, gender roles, and relational orientation) were strengthened. Findings indicated that the intervention was successful in increasing awareness and adoption of these values and beliefs; moreover, participants in the intervention exhibited marginally lower levels of relational aggression postintervention than those in the comparison group.

A critical question for cross-cultural research is whether the developmental outcomes associated with relational aggression differ across cultural contexts. This perspective highlights the importance of the goodness of fit between cultural norms and engagement in relational aggression. For example, relational aggression may prove more disruptive in collectivist cultures, which may in turn decrease the likelihood that such conduct will garner positive peer regard and increase the risk of poor adjustment outcomes among aggressors. Consistent with this possibility, Butovskaya, Timentschik, and Burkova (2007) found no connection between popularity and verbal, physical, or indirect aggression (based on peer ratings) among Russian adolescents. Moreover, Tseng and colleagues (2013) reported that relational aggression was related to decreases in perceived popularity across the fifth grade among Taiwanese youth. Similarly, Bowker et al. (2012) found that relational aggression was negatively associated with perceived popularity (after accounting for overt aggression) for a sample of adolescents in India. In contrast, overt aggression was related to heightened levels of perceived popularity. These findings suggest that, in India, overt aggression may be the more attractive and socially acceptable way to assert dominance. Additionally, research by Kawabata and colleagues (2010) documented that relational aggression was more strongly associated with symptoms of depression in a Japanese sample than in a contrasting U.S. sample. These findings are consistent with the notion that the stress associated with engagement in relational aggression may be greater in collectivistic, as compared to individualistic, cultures. More generally, findings suggest that children in collectivistic societies may not view relational aggression as favorably as children in individualistic societies; as such, these behaviors may be particularly likely to result in poor developmental outcomes in these contexts. Interestingly, recent research in the United States has documented that relational aggression is more strongly associated with internalizing pathology among Asian American, as compared to European American, youth (Kawabata & Crick, 2013), underscoring the importance of exploring differences in outcomes across racial and ethnic groups within as well as across countries.

In summary, a growing body of research has highlighted the salience of relational and indirect aggression across cultural settings. However, additional research is clearly needed to investigate cultural differences in the prevalence of and the developmental outcomes associated with relationally aggressive conduct. It will also be important for future research to explore cultural differences in the manifestation of relational aggression and to develop culturally sensitive tools for assessing these behavioral patterns. Such knowledge will be crucial for researchers developing interventions to reduce relational aggression across cultural contexts. We also anticipate that culturally universal elements will continue to emerge in much of this work. For example, harsh and manipulative parenting may be expected to predict relational aggression across cultural settings (e.g., Nelson et al., 2006). Accordingly, a cultural emphasis need not detract from important commonalities that may be pursued to enhance the lives of children in diverse contexts.

RELATIONAL AGGRESSION INTERVENTIONS

Since the first publication using the term *relational aggression* (Crick & Grotpeter, 1995), a robust body of research has emerged indicating that both relational aggressors and relational victims are at risk for a number of adjustment difficulties (e.g., peer rejection, internalizing problems, externalizing problems; see the "Developmental Outcomes: Maladaptive Correlates" section). As such, there has been substantial interest among researchers and other professionals in the development of interventions to reduce relational aggression. As others have noted, programs that have been designed to address physical aggression may not be easily adapted for use with relational aggression (Ostrov et al., 2009; Zahn-Waxler et al., 2006), highlighting the need for interventions that specifically target relationally aggressive conduct. An exhaustive review of relational aggression interventions by Leff and colleagues (2010) yielded 21 separate interventions with a focus on relational aggression or related constructs (i.e., indirect aggression, social aggression, social exclusion). Although this total may seem high for an area of research that has systematically been around for only two decades, only 9 of the 21 programs meet the criteria for establishing efficacy as outlined by the Society for Prevention Research (see Flay et al., 2005). However, preliminary findings indicate that several of these programs hold significant promise

in efforts to reduce children's involvement in relational aggression (for a review, see Leff et al., 2010).

A review of the various programs that have been developed to date is beyond the scope of this chapter; however, a brief overview of exemplar interventions targeting relational aggression at different points in development can be illuminating in terms of both program structure and efficacy findings. Although very few interventions have been developed for the early childhood years, the Early Childhood Friendship Project has shown a great deal of promise (Ostrov et al., 2009). The program is a classroom-based intervention that is designed to reduce relational aggression and relational victimization. The initial intervention (Ostrov et al., 2009) was a 6-week program using observational assessments of relational aggression and victimization in nine randomized intervention classrooms and nine control classrooms. Each week, a different lesson was introduced and reinforced throughout the week. Two of the six lessons focused on relational themes (i.e., relational aggression and relational inclusion). In this study, classrooms were the unit of analysis, and researchers found that effect sizes indicated that the intervention classrooms tended to have greater reductions in both relational aggression and relational victimization.

A second illustrative intervention, the Walk away, Ignore, Talk it out, Seek help (WITS) program, was created by Leadbeater, Hoglund, and Woods (2003) and was initially conducted with children in grades K–3. This program focuses specifically on relational victimization and adopts an ecological approach including parents, siblings, and local police in addition to the school-based component. The core of the program utilizes a literacy-based approach that can be readily incorporated into the existing curriculum and lesson plans. For instance, one component of this intervention involves reading books with lessons on social behaviors to participants and then providing them with the opportunity to discuss the story and complete activity sheets. Some evidence supports the efficacy of the WITS intervention; for instance, researchers have found that relational victimization decreased in all of the program schools and in the low-poverty control schools but increased in the high-poverty control schools. The program has since been expanded through sixth grade, also with encouraging results (Hoglund, Hosan, & Leadbeater, 2012; Woods, Coyle, Hoglund, & Leadbeater, 2007).

The Friend to Friend program (Leff et al., 2009) uses a social information-processing approach to target relational aggression among third- through fifth-grade girls in an urban setting. The inner-city context, in addition to the participatory action research framework and its cultural sensitivities, is a particular strength of this program. The program utilizes a social-cognitive retraining model consistent with the Crick and Dodge (1994) reformulated social information-processing model. Specifically, it was designed to help relationally aggressive girls explore and practice the identification of feelings and signs of physiological arousal, calming strategies, interpreting intentions of others, and generating and evaluating alternative behaviors to enact. Empirical evaluations of the efficacy of this program indicated that relationally aggressive girls, randomized to the program, had large decreases in teacher-reported relational aggression (Leff et al., 2009). Findings underscore the promise of interventions informed by social information-processing theory in reducing relational aggression.

Finally, one recent intervention targeting bullying in Finnish schools, the KiVa program (Kärnä et al., 2011), was developed to address the potential social status benefits of aggressive behavior. More specifically, KiVa builds on the idea that interventions can successfully reduce levels of aggressive behavior by changing the reactions of peers to bullying behaviors (Kärnä et al., 2011). For instance, if bystanders defend victims rather than reinforce displays of aggression, aggressive behavior may no longer serve as a mechanism for youth to gain social power and status. One of the primary components of the KiVa program focuses on helping youth develop skills to support victims of bullying. Recent research highlights the efficacy of the KiVa program in reducing aggressive behavior across developmental periods (e.g., Kärnä et al., 2011), although some evidence indicates that the program is more robustly efficacious in younger as compared to older samples (Kärnä et al., 2013). Importantly, preliminary evidence supports the notion that this program is effective at reducing relational forms of aggression, such as social exclusion, though effect sizes tend to be smaller for these forms of aggression than for physical aggression (Salmivalli, Kärnä, & Poskiparta, 2011).

Despite promising findings in this area, research regarding relational aggression interventions is still in its infancy, and several important directions for future research remain. Leff and colleagues' (2010) review of extant relational aggression interventions indicates that the majority of the programs to date have been designed and evaluated for late elementary and/or early middle school children. This is surprising from a developmental standpoint, given that it is likely easier to change behaviors before they become an ingrained part of children's behavioral repertoires. Additionally, the vast majority of these interventions were conducted in a school or after-school setting, highlighting the need for intervention programs that target

maladaptive family processes that may contribute to the development of relational aggression (see the "Risk Factors: Social Processes" section). Interestingly, very few of the programs to date have been directed toward relational victims (Leff et al., 2010). Although it is likely that decreases in relational aggression will also benefit the targets of these behaviors, separate programs may be needed to ameliorate the difficulties encountered by victimized youth. Additionally, research is needed to explore whether different intervention programs are most efficacious across different points in development, for males versus females, or for youth in different cultural settings.

DEVELOPMENTAL PSYCHOPATHOLOGY PERSPECTIVES

Developmental Tasks

A developmental psychopathology perspective advances our understanding of relational aggression in several important ways. First, developmental psychopathologists emphasize the importance of the successful negotiation of key developmental tasks in the emergence of disorder (Cicchetti, 1993). From this perspective, many of the risk factors for relationally aggressive conduct reflect a failure to master salient developmental tasks. As an example, the ability to manage negative emotional reactions increases throughout childhood, and a failure to develop these skills is associated with maladaptive behavioral and emotional patterns (Izard, Youngstrom, Fine, Mostow, & Trentacosta, 2006). Similarly, establishing positive relationships with peers, including garnering acceptance from the peer group, is a key developmental task during middle childhood (Masten & Coatsworth, 1998). As these examples illustrate, both child characteristics (e.g., emotional processes, accurate attributions of others' behaviors) and social risk factors (e.g., peer rejection) for relational aggression can be conceptualized as deviations from typical developmental pathways that reflect a failure to master salient developmental tasks.

A developmental psychopathology framework also highlights the possibility that distinct risk factors for relational aggression may emerge across developmental periods. As key tasks differ across developmental stages (Masten & Coatsworth, 1998), it is possible that the factors that are most strongly associated with relational aggression change throughout development. A failure to inhibit angry reactions to frustration, for instance, may be most strongly associated with relational aggression during developmental periods in which mastery of these capacities is salient (e.g., early childhood). In contrast, a failure to establish positive relationships with peers may be most strongly associated with relational aggression when relationships with peers are especially important (e.g., middle childhood and adolescence). However, successful negotiation of key tasks in any given developmental period provides the foundation for later achievements (e.g., the ability to regulate angry reactions likely facilitates the establishment of positive peer relationships; see Cicchetti, 1993); thus, it is critical to understand how the risk factors for relational aggression work together across development to promote maladaptive behavior patterns.

A developmental tasks perspective may also provide significant insight regarding the association between relational aggression and maladaptive outcomes. Masten and Coatsworth (1998) argued that engaging in rule-governed conduct, including inhibiting aggressive impulses, is a key developmental task of middle childhood; however, empirical work regarding normative developmental change in relational aggression highlights the possibility that some involvement in relational aggression may be fairly common during middle childhood and early adolescence. In these developmental contexts, low levels of relational aggression may not portend adjustment difficulties (see Underwood et al., 2011, for an application of this idea to social aggression). In contrast, frequent and high-intensity displays of such conduct may reflect a failure to master this key developmental task and may in part emerge as a result of earlier developmental failures (e.g., an inability to develop appropriate emotion regulation capacities; see Underwood et al., 2011). Thus, a developmental tasks perspective may help researchers identify patterns of relationally aggressive behaviors (e.g., high intensity, frequent, and resulting from dysregulated reactions to stress) that signify particularly high levels of risk for poor adjustment outcomes.

Multilevel Perspectives

Consistent with the suggestion by developmental psychopathologists that multilevel perspectives are critical to understanding maladaptive behavior patterns (e.g., Cicchetti, 1993), the development of relational forms of aggression appears to reflect processes ranging from genetic factors to socialization experiences. In recent years, theorists have begun to propose mediation and moderation models that integrate these distinct risk factors.

Mediation Models

The mechanisms involved in the development of relationally aggressive behavior may occur across multiple

levels of analysis, and several lines of research suggest that biological risk factors influence relational aggression via alterations in cognitive, emotional, and social functioning. For instance, researchers have highlighted the need to consider endophenotypes, including psychophysiological and cognitive patterns, in evaluating the processes that link genetic risk with developmental outcomes (Brendgen, 2012). Similarly, cognitive and emotional processes may help explain the association between psychophysiological risk and engagement in relationally aggressive conduct. In fact, several theoretical perspectives suggest that physiological stress arousal is related to aggression because it reflects emotional experiences of anger, fear, or anxiety (see Murray-Close, 2013a). Physiological arousal may also lead to aggression by interfering with accurate cognitive processing of threat or provocation. In fact, Williams, Lochman, Phillips, and Barry (2003) found that increases in heart rate following threat were associated with increases in HAB. These results are consistent with the suggestion that exaggerated negative emotional responses to stress lead to social-cognitive impairments that promote involvement in aggressive behavior (Frick & Morris, 2004).

Biological factors, including genetic and physiological risk, may also lead to increases in relationally aggressive conduct because they alter children's social environments. In fact, theorists have suggested several processes whereby children's genetic makeup affects the social environments that they encounter (Brendgen, 2012). For instance, genetically influenced traits may lead children to actively select specific environments (i.e., active gene-environment correlations) and/or to elicit distinct reactions from others (i.e., evocative gene-environment correlations) that in turn increase their risk for involvement in relationally aggressive conduct (Brendgen, 2012). As an example, a child who has genetic risk for emotion dysregulation may be more likely to choose aggressive friends and to elicit rejection from peers; these social experiences, in turn, have been found to increase risk for relationally aggressive conduct (see the "Risk Factors: Social Processes" section). Similarly, a tendency to experience exaggerated physiological arousal during peer conflict situations may make youth easy targets of peer victimization (Murray-Close, 2013b), a social stressor that has been found to increase aggressive responses (see the "Risk Factors: Social Processes" section).

Mechanisms of influence across multiple levels of analysis are likely bidirectional in nature; thus, alterations in genetic and physiological processes may also serve as mediators of the association between social experiences and relationally aggressive behavior. For instance, exposure to peer victimization may modify gene expression through epigenetic processes, thus increasing risk for social behaviors such as aggression (Brendgen, 2012). Similarly, an emerging body of research has documented that victimization by peers is associated with alterations in stress physiology (see Murray-Close, 2013a, for review); these findings highlight the possibility that negative peer treatment may lead to physiological profiles that in turn promote relationally aggressive conduct. Social-cognitive risk factors for aggression, such as HAB, may also help explain why social experiences such as peer victimization and media exposure are related to elevated levels of aggressive conduct (e.g., Gentile, Coyne, et al., 2011; Hoglund & Leadbeater, 2007; Ostrov et al., 2011). Mediation models across levels of analysis may further help elucidate the mechanisms that link relational aggression with negative developmental outcomes, such as peer victimization (e.g., Ostrov, 2008; Ostrov & Godleski, 2013) and psychopathology (Kamper & Ostrov, 2013).

Although preliminary, these findings highlight the critical need for multilevel, transactional research examining the processes linking risk factors to involvement in relationally aggressive conduct. Recent statistical advances, including developmental cascades models, allow for longitudinal tests of how functioning in one area can spill over into other domains of functioning (Masten et al., 2005). Developmental cascades approaches that span multilevel domains of functioning (see Cox, Mills-Koonce, Propper, & Gariépy, 2010) may be especially useful in enhancing our understanding of the longitudinal processes involved in the development of relational aggression.

Moderation Models

Multilevel perspectives regarding the development of relational aggression also highlight the possibility that risk factors may interact across levels of analysis in the prediction of relationally aggressive conduct. In fact, a large body of research regarding aggression has emphasized a diathesis–stress model of aggression, whereby an underlying trait or vulnerability is activated through exposure to environmental stressors. Although most work in this area has focused on physical forms of aggression, several recent findings highlight the potential role of diathesis–stress processes in the development of relational forms of aggression. For instance, Mathieson et al. (2011) reported that girls with cognitive (i.e., HAB) and emotional (i.e., emotional reactivity to provocation) vulnerability for relational aggression were most likely to engage in such conduct when they were exposed to social risk (i.e., relational victimization by peers). Diathesis–stress models have also been employed in the study of physiological risk for relational

aggression. For instance, Murray-Close and Rellini (2012) found that physiological risk was associated with relational aggression only among women with a history of sexual abuse, a contextual factor that has been found to predict relational forms of aggression in previous research (Cullerton-Sen et al., 2008). Similarly, Murray-Close (2011) found that physiological risk was most strongly associated with romantic relational aggression among women who also exhibited cognitive (i.e., HAB) and social (i.e., relational victimization) vulnerabilities for such conduct.

It will be important for future research to examine the diathesis–stress model in the context of genetic risk factors for relational aggression. In fact, G×E interactions highlight how genetic vulnerabilities may result in aggressive behavior only when they interact with environmental stressors, such as maltreatment by parents or peers (Brendgen, 2012). To date, little research has explored gene-environment interactions in the development of relational aggression. In preliminary research in this area, Brendgen et al. (2008) found that genetic risk interacted with friends' aggressive behavior in the prediction of physical, but not social, forms of aggression. The authors suggest that children may be likely to emulate social aggression from friends, regardless of genetic vulnerability, given the relatively low costs (e.g., low likelihood of adult intervention) and potential benefits (e.g., high social status) associated with social aggression (Brendgen et al., 2008). However, it will be important for future research to further explore diathesis–stress models regarding genetic vulnerabilities for relational aggression. Such work may benefit from adopting molecular genetic designs and investigating candidate genes implicated in the development of physical aggression and antisocial behaviors (see Brendgen, 2012). It will also be important for this work to focus on the unique social stressors that may activate genetic risk for relational aggression; for instance, environmental pathogens that are uniquely associated with the development of relational aggression (e.g., parental psychological control; see the "Risk Factors: Social Processes" section) may be particularly important to explore in studies of G×E interactions.

In contrast to diathesis–stress models of relational aggression, some researchers have proposed that biological vulnerabilities may be most likely to translate into aggressive or antisocial behavior in the context of *benign* environmental contexts (e.g., high SES). More specifically, the social push hypothesis suggests that adverse environments may overwhelm biological risk for aggression; in these contexts, social risk factors may be the strongest predictors of such conduct. In contrast, genetic and physiological differences may exert a stronger effect on aggressive behavior in social contexts that do not promote aggression. This perspective is similar to the discussion of suppression effects in genetic studies, in which some environmental factors reduce the role of genetic influences on behavior (Brendgen, 2012). Although several studies have provided support for the social push perspective in the development of physical aggression and antisocial behavior (see Raine, 2002, for a review), there is less support for this model in the development of relational forms of aggression. One exception is a study documenting that blunted morning cortisol and flattened change in cortisol across the day were more strongly associated with relational aggression in nonmaltreated, as compared to maltreated, youth (Murray-Close et al., 2008). It is important to note that both maltreated and nonmaltreated participants in this study experienced significant social risk (e.g., low income), highlighting the possibility that severe environmental contexts (e.g., abuse) may be more likely than moderate stressors (e.g., peer victimization) to overwhelm biological factors in the development of relational aggression.

In recent years, researchers have proposed that individuals differ in their susceptibility to environmental influence, such that those who exhibit heightened physiological reactivity to stress, are more malleable or plastic, for better or worse (Boyce & Ellis, 2005). This theoretical approach is an outgrowth of the diathesis–stress model but extends the idea to argue that the very same individuals who are most negatively affected by adverse environmental input will also benefit most from supportive contexts (Ellis et al., 2011). Thus, individual differences in biological processes that have been proposed as risk factors for aggression (e.g., high physiological stress reactivity) may in fact reflect the organism's ability both to prepare for challenges in the face of adversity as well as to benefit from the resources available in supportive contexts (Boyce & Ellis, 2005). This hypothesis suggests that it will be important for studies to include assessments of positive social contexts (e.g., relational inclusion) to examine whether biological factors that serve as risk factors for relational aggression in adverse contexts portend beneficial outcomes in supportive contexts.

Equifinality and Multifinality

Developmental psychopathologists have also highlighted the importance of examining pathways to maladaptive behavior patterns (Cicchetti & Rogosch, 1996; Egeland,

Pianta, & Ogawa, 1996; Sroufe, 1997). The concept of *equifinality* suggests that a particular outcome may be achieved via a number of distinct pathways (Cicchetti & Rogosch, 1996). This notion highlights the possibility that there may be multiple trajectories, each with a different set of risk factors, to relational aggression. As discussed, researchers have documented two distinct physiological profiles associated with relational aggression; on one hand, some evidence indicates that low-stress reactivity, hypothesized to reflect temperamental fearlessness, predicts heightened involvement in relationally aggressive conduct (e.g., Sijtsema et al., 2011). On the other hand, findings from other studies suggest that relational aggression is related to physiological overarousal in response to negative experiences with peers, perhaps because this pattern reflects angry reactions to peer conflict (Murray-Close & Crick, 2007). The concept of equifinality underscores the possibility that both suggestions may be correct; in effect, blunted and exaggerated physiological reactivity in response to peer stress may promote phenotypically similar displays of relational aggression via distinct trajectories (see Frick & Morris, 2004, for a discussion of these pathways in the development of physical aggression). An important task for researchers in this area, then, is to identify the underlying processes as well as the moderating factors that channel youth into each pathway. For example, heightened physiological reactivity may promote relational aggression when it occurs in individuals who are frequently exposed to contextual factors that elicit stress reactions (e.g., victimization) and who interpret these stressful events as intentional and hostile (e.g., exhibit HAB; Murray-Close, 2011). In contrast, blunted physiological reactivity may promote relational aggression among individuals with relatively low levels of HAB (Murray-Close, 2011).

The related concept of *multifinality*, which suggests that a single etiological factor can result in multiple developmental outcomes (Cicchetti & Rogosch, 1996), may also inform the study of relational aggression in several ways. First, researchers frequently argue that relational and physical forms of aggression are both manifestations of externalizing behaviors (Crick & Zahn-Waxler, 2003; Tackett et al., 2009). From this perspective, similar underlying vulnerabilities or traits may promote both forms of aggression, with specific manifestations depending on factors such as the gender, age, or social goals of the aggressor (Burt et al., 2012; Crick & Zahn-Waxler, 2003; Lagerspetz & Björkqvist, 1994). In fact, some studies have demonstrated overlapping genetic (Brendgen et al., 2005), social (e.g., maltreatment; Cullerton-Sen et al., 2008), and personality (Burt et al., 2012) risk factors for physical and relational aggression. In future work in this area, it will be particularly important to identify moderating factors (e.g., gender; see Cullerton-Sen et al., 2008, for an example) that can help explain the circumstances or contexts in which a shared risk factor results in the manifestation of relationally, rather than physically, aggressive behaviors. Additionally, as some studies have found unique risk factors for physical versus relational forms of aggression (e.g., Godleski et al., 2010; Sijtsema et al., 2011), theoretical and empirical work must also consider distinct developmental pathways toward such conduct. In effect, it may not always be appropriate to use theory and past research on physical aggression to justify predictions regarding relational aggression.

The concept of multifinality also highlights the possibility that behavioral displays of relational aggression may be related to distinct sets of developmental outcomes. As reviewed earlier, a large body of research indicates that youth who engage in relational aggression are at risk for social, psychological, and behavioral maladjustment. However, there has been considerable debate regarding whether relational aggression may at times serve adaptive functions, such as allowing youth to establish dominant and high-status positions within the peer group (e.g., Hawley et al., 2007). In fact, an emerging body of research indicates that some relationally aggressive youth enjoy relatively high levels of social power or prominence with peers, depending on factors such as their gender, age, and prosocial behavior (Cillessen & Mayeux, 2004; Hawley, 2003a; Hawley et al., 2007). These findings are consistent with the concept of multifinality and suggest that the meaning of relationally aggressive conduct may be different for youth depending on where they fall on a constellation of other traits. Moreover, findings highlight the potential utility of person-centered approaches in identifying profiles of relationally aggressive youth who experience negative versus positive developmental outcomes (see Hawley et al., 2007, 2008). An important extension of this work will be to assess the relative dispersion of outcomes (i.e., multifinality) associated with relational aggression as compared to other facets of externalizing pathology or antisocial behavior (see Egeland et al., 1996, for a comparison of dispersion for early internalizing and externalizing pathology).

FUTURE DIRECTIONS

Antisocial behavior is one of the most well-researched topics in developmental psychopathology, and the inclusion of relational aggression in this work has dramatically altered our understanding of aggressive behavior problems

in youth. Since Crick and Grotpeter's (1995) seminal publication on the topic of relational aggression two decades ago, several important directions for future research have emerged.

Understanding How Relational Aggression Relates to Antisocial Behaviors

Critical questions remain regarding the overlap between forms of aggressive behavior. For instance, although social, indirect, and relational forms of aggression are conceptually similar, we do not believe that these terms are interchangeable (see the "Defining Relational Aggression" section). There may be theoretically meaningful differences in the etiology and outcomes associated with each subtype of behavior; relational aggression, for example, may be particularly likely to occur during early childhood and may be more strongly tied to close, intimate friendships and other close relationship systems. Researchers also should explore relational bullying, defined as repeated perpetration of relationally aggressive acts in the context of a relationship characterized by a power imbalance (e.g., the target is physically smaller or less popular than the aggressor; Gladden, Vivolo-Kantor, Hamburger, & Lumpkin, 2014; Terranova, Morris, & Boxer, 2008). Researchers have yet to evaluate the extent to which relational aggression and relational bullying are theoretically and empirically distinct. It will be particularly important to isolate effects that are specific to relational bullying versus more general acts of relational aggression. For example, much work on relational aggression in the context of close friendships likely does not address relational bullying. In contexts that may include both relational aggression and relational bullying (e.g., classroom peer relationships), it is unclear whether relational bullying is associated with more problematic outcomes than relational aggression. Moreover, initial studies suggest that relational aggression exhibits significant overlap with electronic forms of aggression (Werner, Bumpus, & Rock, 2010), with some longitudinal evidence indicating that relational aggression precedes electronic aggression (e.g., Hemphill et al., 2012; Werner et al., 2010). A critical question for future research is whether relational and electronic aggression are distinct or whether they are analogous behaviors manifested in different formats (i.e., face to face versus using electronic media; see Wright & Li, 2013).

Future research must also evaluate the degree to which relational aggression is best conceptualized and assessed as a distinct behavior versus a manifestation of antisocial behavior and externalizing pathology (e.g., Burt et al., 2012; Crick & Zahn-Waxler, 2003; Tackett, Daoud, De Bolle, & Burt, 2013). Researchers often integrate measures of relational aggression into instruments assessing a broader range of aggressive or antisocial conduct, a practice that is supported by evidence indicating that relational aggression: (1) is highly correlated with other aggressive behaviors (e.g., physical aggression; Card et al., 2008); (2) significantly loads on a single antisocial behavior factor with physical aggression and rule-breaking behaviors (Tackett et al., 2013); and (3) exhibits similar correlations with personality factors as other facets of antisocial conduct (Tackett et al., 2013). Nevertheless, as reviewed in this chapter, some evidence suggests that relational and physical aggression have unique developmental precursors and outcomes. These findings underscore the critical need for empirical tests of whether the developmental trajectories associated with relational aggression are similar to (or distinct from) trajectories of other indices of antisocial conduct, such as physical aggression.

We believe that a top priority for the next decade of research on relational aggression should be to improve the conceptual clarity in the field regarding how relational aggression relates to various facets of antisocial behavior. To this end, we have several suggestions for future work in this area. First, it is especially important for future researchers to adopt the terminology that was originally intended for the measures used (e.g., relational aggression versus relational bullying versus indirect aggression). Second, researchers must examine the empirical overlap across measures (and across items within measures) to test the extent to which these constructs are similar versus distinct. One practical implication of this recommendation is that researchers must include multiple items assessing each subtype of behavior rather than integrating single items of relational aggression into broader assessments of antisocial conduct. New studies should be developed with the aim of testing the shared and distinct causes and correlates of relational aggression versus other forms of aggression and antisocial behavior; incorporating multiple facets of antisocial behavior in these studies will be essential to understanding the processes of equifinality and multifinality (see Egeland et al., 1996). Moreover, researchers should evaluate the extent to which interventions exhibit specificity in reducing different behaviors (e.g., physical aggression, relational aggression, relational bullying, and electronic aggression). This work will have critical implications for applied efforts to reduce aggressive and antisocial conduct. For instance, given emerging research highlighting the unique risk factors for relational aggression, it may be necessary to develop

additional interventions that specifically target relational aggression because methods and approaches developed for physical aggression or other antisocial behaviors may not be efficacious.

Moving Beyond "Mean Girls"

In early research, relational aggression was often conceptualized as a behavior primarily enacted by child and adolescent girls (see Crick & Grotpeter, 1995). This has led to the popular notion that relational aggression is a problem of *mean girls*. Consistent with this perspective, the inclusion of relational forms of aggression is essential to research on the aggressive behavior patterns of girls, both because physical aggression is uncommon among girls and because the overlap between these two forms of aggression appears to be lower for girls than for boys. Thus, when girls are aggressive, they tend to engage in relational, but not physical, forms of aggression. A failure to include measures of relational aggression will lead researchers to overlook the vast majority of aggressive females.

At the same time, mounting evidence has highlighted the need for research to expand beyond these circumscribed gender and age boundaries. For instance, relational aggression is not only perpetrated by females; evidence indicates that males engage in these behaviors with some frequency. Moreover, the vast majority of research on relational aggression has concentrated on these behaviors during early childhood through adolescence. This narrow focus has likely emerged from the persistent view that relational aggression is problem of adolescence, a perspective that has been allowed to thrive in the absence of good estimates of the incidence of relational aggression across developmental periods. Nonetheless, as relational aggression is theorized to promote social power and resource control in groups (e.g., Hawley, 2003a), such conduct may emerge with some frequency in adult contexts, such as the workplace. For instance, relational aggression may be used to climb the corporate ladder or to denigrate career competitors. Despite these possibilities, we know little about the use of relational aggression in dyadic (e.g., close friendships and romantic relationships) and group-based relational contexts (e.g., the workplace) during adulthood.

As researchers expand the study of relational aggression beyond mean girls, we have several recommendations regarding the most critical research priorities. First, we need epidemiological studies regarding the prevalence of relational aggression in males and females across developmental periods. Second, researchers should examine the use of relational aggression in adulthood (particularly beyond the college years); such work has the potential to provide important insights into adult adjustment and inform interventions aimed at improving group dynamics (e.g., workplace productivity) and functioning in close relationships (e.g., marital harmony). Third, researchers should conduct longitudinal studies of the long-term impact of continuity in relationally aggressive behavior. Studies that assess trajectories of relational aggression (see Cleverley et al., 2012, for an excellent example) have the potential to identify why some individuals desist from such conduct as well as inform the debate regarding the developmental outcomes of relational aggression. In fact, some of the costs and benefits of relational aggression may emerge during the adult years (see Sandstrom & Cillessen, 2010). Finally, it is critical for researchers to continue to explore the role of gender in the correlates of relational aggression as the meaning and consequences of such conduct may be gender-linked (see Ostrov & Godleski, 2010).

Developing New Methods and Research Designs to Study Relational Aggression

We believe that an essential direction for the next generation of relational aggression research is the inclusion of novel measures and research designs. For instance, few approaches beyond behavioral observations allow researchers to capture relationally aggressive behaviors in vivo. Techniques that allow researchers to study relational aggression while it is emerging, including potential factors that precipitate these behaviors as well as their immediate outcomes, would provide researchers with a more fine-grained understanding of the transactional processes underlying such conduct. It is particularly important for researchers to move beyond trait-based conceptualizations of relationally aggressive behavior and associated outcomes (e.g., reactively relationally aggressive youth tend to be victimized) to examine the dynamics of specific interactions using the time scale in which these processes are most likely to occur (e.g., a peer provokes the child, the child responds with reactive relational aggression, the peer then ignores the child, etc.; see Orobio de Castro, Thomaes, & Reijntjes, 2015). Such approaches would provide a rigorous test of the transactional processes theorized to underlie relational aggression and would allow researchers to link long-term developmental change with short-term exchanges (see van Geert & Steenbeek, 2005).

It is also critical for researchers to adopt methodological approaches that can test the causal pathways hypothesized to underlie relational aggression (see Orobio de Castro et al., 2015, for a discussion of integrating experimental

designs into peer relationships research). To date, the vast majority of work in this area is correlational and cross-sectional in nature; the incorporation of experimental designs promises to further clarify the mechanisms associated with relational aggression. Hypothesized developmental precursors of relational aggression that can be manipulated, such as exposure to aggressive media, should be examined in the context of experimental research designs (e.g., Coyne et al., 2008). Evaluation of the effects of interventions may also provide insight into the causes of relational aggression, particularly in contexts where ethical constraints prohibit random assignment to experimental conditions (e.g., child maltreatment). Finally, factors that cannot be directly manipulated (e.g., culture, genes, gender) can be included in experimental designs as moderators. Long-term longitudinal designs that incorporate rigorous controls of earlier functioning (e.g., developmental cascades; Masten et al., 2005) should also be employed to better clarify directional associations between relational aggression and putative risk factors and outcomes.

We believe that researchers should increasingly incorporate person-centered analyses (e.g., latent profile analysis, latent class growth analysis) to identify heterogeneity among relationally aggressive youth. For instance, emerging evidence indicates that there may be distinct subgroups of relational aggressors: Some perpetrators appear to enjoy social power and status (e.g., popularity) whereas others suffer poor social outcomes (e.g., rejection). The inclusion of person-centered analyses may help clarify distinct pathways to relational aggression (equifinality) and the differing developmental outcomes related to such conduct (multifinalty; see Cicchetti & Rogosch, 1996). Further, this research could be integrated into intervention work: Interventions for popular relational aggressors may need to identify ways to replace the social status benefits of aggression in a manner that facilitates youth buy-in (Leff, Waasdorp & Crick, 2010). Interventions with low-status youth, in contrast, may be most efficacious when they promote social skill development.

Culture and Context

Extant research has highlighted the critical role of context in the development of relational aggression. It is essential for future researchers to broaden this focus to encompass a wider range of relational and cultural contexts, including relationship types (e.g., friendships, siblings), countries, SES, urban/rural environments, school contexts, and religious and familial value systems. In fact, although there are an impressive number of studies of relational aggression in countries other than the United States, explorations of how these behaviors differ across multiple countries or across diverse populations within a single country are still relatively rare. We believe that a top priority for this work should be the adoption of multilevel perspectives that investigate interactions and bidirectional associations across various levels of analysis (i.e., from genes/cells to communities). Importantly, studies of contextual effects should move beyond a singular focus on differences in the *frequency* of relational aggression to consider differences in the *meaning* of such conduct across these contexts (Kawabata et al., 2010). For example, it is crucial to investigate whether pathways to relational aggression and associated developmental outcomes vary as a function of distinct contexts (see Kawabata et al., 2010, for an example).

It is also important for researchers to investigate the mechanisms hypothesized to link contexts to relationally aggressive behavior (i.e., mediation models). As an example, some work has documented SES differences in the use of relational (or indirect) aggression, although the direction of effects has varied across studies (e.g., Bonica et al., 2003; Vaillancourt et al., 2007). In an effort to understand the processes that lead to these differences, it is necessary to integrate factors that may be related to SES and that have been implicated in the development of relational aggression (e.g., parenting behaviors, family stress and conflict; see the "Risk Factors: Social Processes" section). These approaches may also inform our understanding of within-group differences in relational aggression; for instance, there is likely substantial heterogeneity in parenting behaviors within SES backgrounds, and these differences may in turn have important implications for children's involvement in relational aggression.

In sum, we believe that there are several critical future directions that have the potential to advance the study of relational aggression in new and exciting directions. As we embark on the next generation of relational aggression research, it will be crucial to engage in significant theory building and to ground new research studies in theory. Additionally, given the clear need for direct replication in psychological research (see Pashler & Harris, 2012), new approaches to the study of relational aggression should be augmented with studies developed to replicate early relational aggression findings.

CONCLUSION

Research on relational aggression has burgeoned in recent years, and this work has significantly altered the ways in which aggressive and antisocial behaviors

are conceptualized both in research and in practice. Theoretically, the construct of relational aggression has forced developmental psychopathologists to reconsider the long-standing assumption that girls do not exhibit significant behavioral problems prior to adolescence. Moreover, this work has challenged parents, teachers, and clinicians to seriously consider the developmental ramifications of relational aggression. Despite these significant advances, critical questions remain. For instance, why are some relationally aggressive children highly rejected, whereas others hold coveted positions in the peer group? When is relational aggression a normative behavior, and when does it serve as an index of risk for poor developmental outcomes? How can parents, teachers, and clinicians intervene with perpetrators and victims of relational aggression? We believe that the theoretical, methodological, and data-analytic advances in the field of developmental psychopathology hold great promise in helping researchers address these and other significant questions regarding the etiology and developmental outcomes of relational aggression.

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CHAPTER 14

Culture, Peer Relationships, and Developmental Psychopathology

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The role of culture in human development is one of the major issues in sociology, anthropology, psychology, and clinical science. Research findings have indicated considerable variations in children's and adolescents' behaviors, emotions, and cognitions across cultures. Cultural norms and values are involved in development through various processes, such as facilitation and suppression of specific behaviors (Weisz, Weiss, Suwanlert, & Chaiyasit, 2006). Culture also provides a frame of reference for social judgments of behaviors and thus ascribes meanings to the behaviors (X. Chen & French, 2008). Therefore, whether a behavior is viewed as adaptive or maladaptive depends on cultural context (e.g., García Coll, Akerman, & Cicchetti, 2000; Kleinman, 1980). Moreover, how adaptive and maladaptive behaviors develop in a society or community is determined, in part, by cultural factors.

Developmental theorists and researchers have traditionally been interested in the socialization role of adults, especially parents and educators, in transmitting cultural values to the young generation (e.g., Goodnow, 1997; LeVine et al., 1994; Vygotsky, 1978). However, the processes of cultural influence on development, particularly in socioemotional areas, are more complicated and more comprehensive than the transmission of the cultural system from senior members of the society. Many cultural norms and values, such as self-control, that serve to promote positive interpersonal interactions and group functioning do not have inherent benefit per se and thus may not be readily appreciated by children. Moreover, adult influence becomes more distal as children develop greater independence with age and as children engage in more activities

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outside the home and classroom. Thus, cultural norms and values that are endorsed in peer groups, which may or may not be compatible with the adults' cultural system, become increasingly important in guiding children's and adolescents' behaviors.

X. Chen (2012) and X. Chen and colleagues (e.g., X. Chen & French, 2008) argued that cultural influence on individual development involves peer interactions and relationships. According to this view, while peer interactions and relationships contribute to children's and adolescents' adaptive and maladaptive development, culture affects the processes of peer interactions and features of peer relationships.

The significance of peer interactions and relationships for social, behavioral, and cognitive development has long been well recognized in the literature (e.g., Hartup, 1992; Piaget, 1932; Rubin, Bukowski, & Parker, 2006). Peer interactions provide opportunities for children to learn social and problem-solving skills, such as negotiation and cooperation, from one another (e.g., Hartup, 1992). The experience of peer interactions helps children understand standards for appropriate behaviors in different settings. Moreover, social affiliations established through interaction are a main source of feelings of security and belonging, which in turn constitute a basis for the development of psychological well-being (e.g., Sullivan, 1953). Thus, achieving and maintaining appropriate behaviors and establishing desirable relationships in the peer context are major developmental tasks in childhood and adolescence (Masten & Tellegen, 2012; Rubin, Bukowski, & Bowker, 2015). Failure to behave competently in peer interactions, obtain acceptance in the peer group, or form constructive relationships and networks is a significant indication of developmental psychopathology and may have enduring and cascading effects on children's adjustment in broad areas (Masten & Cicchetti, 2010; Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006). Consistent with these arguments, empirical results have indicated that peer interactions and relationships are associated with various developmental outcomes (Coplan, Prakash, O'Neil, & Armer, 2004; Dodge, Greenberg, & Malone, 2008; Rubin, Bukowski, et al., 2006; Ladd & Troop-Gordon, 2003).

Peer interactions and relationships are shaped, however, by cultural conventions, norms, and values in the society (X. Chen & French, 2008; Edwards, de Guzman, Brown, & Kumru, 2006). According to Hinde (1987), different levels of social experiences are embedded within the cultural system. Similarly, Schneider, Smith, Poisson, and Kwan (1997) pointed out that culture may affect many aspects of peer interactions and relationships. Indeed, cross-cultural research has indicated that cultural beliefs and practices, particularly those pertaining to socialization and developmental goals, affect the nature, function, and features of peer interactions and relationships such as friendships and social networks in children and adolescents (e.g., DeRosier & Kupersmidt, 1991; Farver, Kim, & Lee, 1995; French, Pidada, & Victor, 2005). For example, cultural norms and values may serve as a basis for the interpretation of particular behaviors and for the judgment of the appropriateness of these behaviors in peer interactions. The social interpretation and evaluation in turn regulate the processes of peer interactions and the formation of dyadic and group relationships. In addition, the role of culture is reflected in how it affects the relations between peer experiences and adjustment outcomes.

In this chapter, we focus on how culture is involved in children's peer interactions and relationships and the implications of peer interactions and relationships for the development of social, behavioral, and psychological problems. We first discuss some conceptual issues in the study of culture, peer relationships, and developmental psychopathology. Then we review research on the prevalence of major social behaviors and problems in peer interactions and relationships among children across cultures. Next, we discuss culturally directed social attitudes and responses (e.g., parental attitudes, peer evaluations and regulations) toward specific behaviors within the peer context. In our discussion, we pay particular attention to how macro-level social and cultural conditions and their changes, through directing the social interaction processes, determine the functional meanings of behaviors and promote or undermine their development. Then we focus on the developmental outcomes of peer experiences in different cultures. The chapter concludes with a discussion of general issues, implications, and future directions in the study of culture, peer relationships, and developmental psychopathology.

THEORETICAL PERSPECTIVES ON CULTURE, PEER RELATIONSHIPS, AND ADAPTIVE AND MALADAPTIVE DEVELOPMENT

Two major theories of culture and human development are the socioecological theory (Bronfenbrenner & Morris, 2006) and the sociocultural theory (M. Cole, 1996; Rogoff, 2003; Vygotsky, 1978). According to both theories, culture affects socialization beliefs and practices, which in turn contribute to developmental outcomes in various areas. In addition to these broadband theories, a cultural anthropological perspective (Benedict, 1934) focuses on how culture

affects the judgment of behaviors in different societies. These theoretical perspectives have guided research on culture and normal and abnormal development for the past 50 years. X. Chen (2012) and X. Chen and French (2008) recently proposed a contextual-developmental perspective focusing on peer interaction as a context for cultural influence on socioemotional development. This perspective emphasizes the role of the social evaluation and regulation processes in peer interaction in facilitating the links between culture and development.

The Role of Culture in Development: Traditional Perspectives

According to the socioecological theory (Bronfenbrenner & Morris, 2006), the cultural beliefs and practices that are endorsed within a society or community, as a part of the socioecological environment, play an important role in children's socioemotional and cognitive development. In the early version of the theory (e.g., Bronfenbrenner, 1979), culture was considered a distal influence in the outmost layer of the environment in which the child did not directly participate. In more recent conceptualizations, however, cultural factors have been integrated with proximal socialization forces such as the community and family (Tietjen, 2006). Culture influences human development through organizing various social settings and activities. From the socioecological perspective, providing desirable cultural conditions is critical for promoting adaptive development and for preventing developmental problems, although it is unclear what specific cultural aspects or processes may lead to normal and abnormal outcomes. Largely consistent with the socioecological perspective, Super and Harkness (1986) proposed a developmental niche model, which focuses on three main interacting subsystems: the physical and social settings; the historically constituted customs and practices of child care and child rearing; and the psychology of the caretakers, particularly parental ethnotheories shared with the community. Culture may affect human development through these subsystems. According to Super and Harkness, deprived or disadvantaged settings, disorganized child-rearing practices, and inappropriate socialization beliefs are the main risk factors in psychopathological development.

The sociocultural theory focuses on the internalization of cultural systems, such as language and symbols, from the interpersonal level to the intrapersonal level (Vygotsky, 1978). Participation in social and cultural practices may exert a significant influence on the process and pattern of human development. Changes in sociocultural structures and associated social practices may lead to the reorganization of mental systems and the formation of new psychological functions (Luria, 1976). For example, the transformation of traditional rural villages to communities with more complex and planned social activities may produce new forms of knowledge and ways of thinking. Consistent with the sociocultural perspective, cross-cultural studies (e.g., Beach, 1995; Luria, 1976; Rogoff, 2003; Scribner & Cole, 1981) have shown that, relative to their counterparts who participated in formal education or urbanized activities, children and adults in villages in Africa, Asia, and Central and South America who lived traditional lifestyles tended to display more concrete practical or graphic-functional thinking and context-specific calculation or visual representation that were constrained by the physical features of the circumstances. The mental processes of individuals in these societies became more decontextualized, sophisticated, and logical as they engaged in more commercial activities and formal school learning (Luria, 1976; Vygotsky, 1978).

A long-held perspective in psychopathology, proposed mainly by Benedict (1934) and Mead (1928), stresses cultural relativity in the judgment of normal and abnormal behaviors. According to this perspective, normality is defined by culture because a behavior viewed as abnormal in one culture may be viewed as normal in another. In all societies, there are substantial individual variations on behaviors and personality characteristics. However, different societies may place different values on specific behaviors and characteristics and define specific ranges of these behaviors and characteristics as normal or desired. Normality represents a segment of human functioning that is approved within a culture, and abnormality is the term for the segment that is incompatible with the norm in the society.

Thus, normal behaviors and characteristics are the ones that are considered within the limits of the society; those beyond the limits are viewed as problematic. Accordingly, individuals who display culturally acceptable and desirable behaviors are likely to receive social approval and prestige and to obtain social status within the society or the community. In contrast, individuals who display behaviors not in agreement with the ones selected in that society or community are regarded as abnormal, even though these behaviors are valued in other cultures. As indicated by Benedict (1973), "We must face the fact that even our normality is man-made, and is of our own seeking" (p. 76). During the process of socialization, culture serves to facilitate the development of valued behaviors and suppress those behaviors considered abnormal and

unacceptable. Benedict argued that most individuals are plastic to the molding force of the society into which they are born. Consequently, the vast majority of the individuals in any group are socialized to fit with the cultural expectations (p. 74).

Benedict's relativist perspective is not necessarily incompatible with the universalist view that mental or psychological disorders have universal core symptoms although cultures may vary on the presentations and perceptions of the disorders. The universalist view asserts that the underlying psychopathological problems are the same, but the manifestation of the problems and the threshold of what is judged as problematic may differ across cultures (e.g., Bird, 2002; Roberts & Roberts, 2007). For example, it has been reported that the rates of attention-deficit/hyperactivity disorder in Hong Kong are double those reported in some Western countries (T. Ho, Leung, Luk, & Taylor, 1996). According to both Benedict's (1934) and the universalist views, the different rates may be due to the threshold effect. Since Asian cultures value the suppression of emotions such as anger and disruptive behaviors, parents and mental health practitioners may have a lower threshold for the judgment of hyperactive behavior, which increases the likelihood of reporting hyperactive behaviors (Canino & Alegría, 2008). Indeed, compared to American clinicians, when they judged the same vignettes, Chinese and Indonesian clinicians gave significantly higher scores for hyperactive behavior (Mann, Ideda, Mueller, & Takahashi, 1992).

A more thorough relativist view (e.g., Kleinman & Kleinman, 1991; Weisz et al., 2006) claims that culture affects the manifestation and judgment of a specific behavior as well as the development of the behavior per se. Cultural conditions shape the occurrence, magnitude, duration, and form of the behavior and social responses to the behavior. Thus, a symptom or syndrome may be observed in some cultures but not in others. Social and cultural factors can be important determinants of behavioral and psychological problems.

Between the universalist and relativist views, many researchers and practitioners believe that whereas problems derived from neural pathology (e.g. autism, schizophrenia) may be universal, more common problems are likely to be affected by social and cultural circumstances (García Coll et al., 2000; Rutter & Nikapota, 2002; also see Canino & Alegría, 2008). How a specific behavior or problem occurs and is viewed in a society and how culture plays a role may depend on the nature of the behavior or problem. Our discussion of culture and developmental psychopathology in the next sections focuses mainly on relatively common behaviors, such as aggression, defiance, shyness, and social anxiety, although there is evidence indicating biological foundations for the development of these behaviors (e.g., Fox, Henderson, Marshall, Nichols, & Ghera, 2005).

Researchers in the field of developmental psychopathology have recently noticed that distinct functions observed in cultural and ethnic minority populations, such as Asian and Latino children in the United States, may represent strengths, rather than deficits as traditionally viewed, in their adaptation to the environment (e.g., García Coll et al., 2000; X. Chen & Tse, 2008). Thus, largely consistent with the relativist perspective, it has been argued that psychopathological issues, such as risk, mental illness, resilience, and protective factors, should be examined with particular cultural standards for minority groups (García Coll et al., 2000). According to Cicchetti and Toth (2009), to fully comprehend the complexities in the experiences of psychopathology, it is necessary to investigate biological, psychological, and social aspects of normal and abnormal development at multiple levels of analysis. The analysis at the cultural level may provide useful information about how different aspects of development are associated with, and facilitate and constrain, each other in specific contexts. Research on culture and developmental psychopathology not only helps us understand the broad, dynamic processes underlying individual adjustment and maladjustment but also informs the diagnosis and treatment of problems.

Culture, Peer Relationships, and Adaptive and Maladaptive Development: The Contextual-Developmental Perspective

The contextual-developmental perspective, developed by X. Chen (2012) and X. Chen and French (2008) and based mainly on the socioecological and sociocultural theories (Bronfenbrenner & Morris, 2006; Vygotsky, 1978), emphasizes the links between cultural values and children's socioemotional functioning and the role of the social interactions in mediating the links. This perspective focuses on two fundamental dimensions of socioemotional functioning: social initiative and self-control. *Social initiative* is concerned with the tendency to spontaneously initiate and maintain social participation, especially in stressful settings. Whereas some children may readily engage in interactions in potentially challenging situations, others may experience internal anxiety and fear, leading to exhibition of low levels of social initiative (Asendorpf, 1990). The display of shy-inhibited and withdrawn behaviors is a major indication of low social initiative. *Self-control* represents the regulatory ability to modulate behavioral and emotional reactivity to maintain appropriate

behavior in social activities. The dimension of control, indicated often by the display of compliant-cooperative and defiant-aggressive behaviors, is concerned with fitting in with others and, more broadly, achieving interpersonal harmony and group well-being.

Different cultures may value social initiative and norm-based behavioral control in children and adolescents to different extents. In Western self-oriented or individualistic cultures, where acquiring autonomy and assertive skills is an important socialization goal, social initiative is viewed as a major index of competence; the display of inhibited or restrained behavior is often considered immature and incompetent (X. Chen et al., 1998). Self-regulation and control, in general, are perceived as necessary for adaptive functioning. However, individuals are encouraged to learn how to maintain a balance between the needs of the self and those of others. Consequently, behavioral control is less appreciated and endorsed, especially when it conflicts with the attainment of individual goals (Triandis, 1990). In group-oriented cultures, social initiative may not be highly emphasized because it may not have evident effects on the harmony of the group. To maintain group harmony, however, individuals need to restrain personal desires to address the interests of others, and thus self-control is more strongly emphasized (X. Chen, Rubin, et al., 2003; D. Y. E. Ho, 1986). The lack of control is viewed as highly unacceptable. Cultural values of social initiative and self-control may affect adults' and children's attitudes toward specific aspects of socioemotional functioning, including aggression-defiance (high social initiative and low control), shyness-inhibition (low social initiative and adequate control to constrain behavioral and emotional reactivity to self), sociable-cooperative behaviors (active social initiative with effective control), and affective disturbances such as depression and loneliness (low social initiative and low control).

According to the contextual-developmental perspective, social evaluation and response processes play a significant role in maintaining the links between culture and human development. During interactions, adults and peers evaluate children's behaviors according to cultural norms and values that are endorsed in the community. Moreover, adults and peers across cultures may respond differently to specific behaviors and express different attitudes toward children who display these behaviors. To acquire acceptance and approval in the group, children need to understand social standards and expectations and to adjust their behaviors according to the standards and expectations. Thus, social evaluations and responses, particularly in peer context, serve to regulate children's behaviors and their development (X. Chen, 2012).

Whether and to what extent children can regulate their behaviors or behavioral styles according to culturally directed social evaluations is associated with adjustment outcomes. Children whose behaviors are incompatible with group expectations are likely to receive negative feedback from others, which creates a pressure on children to alter their behaviors. In antisocial or other socially deviant groups, the social interaction processes may promote individual deviant behaviors, which may lead to problems in the larger social environment, especially in the long run. Relative to other members in the group, children who are able to resist the peer pressure may be more resilient to maladaptive group socialization. In prosocial groups, however, peer evaluations and responses in interactions serve to facilitate the development of socially constructive behaviors and characteristics. Children who can regulate their behaviors to improve their social relationships with others may increase their opportunities to learn from others and gain emotional support and other benefits, which reduce the likelihood of developing social, cognitive, and psychological problems. However, children who fail to do so may obtain increasingly unfavorable experience in interactions, which may elicit frustration, anger, and other negative emotions. These negative emotional reactions may lead to further externalizing problems, such as aggression, if directed toward others; internalizing problems, such as loneliness and depression, if directed toward the self, or both.

By focusing on peer interaction processes, the contextual-developmental perspective emphasizes the active role of children in socialization and development. The active role of children may be reflected in their sensitivity and response to social influence. With age, the active role of children becomes increasingly evident through their participation in adopting existing cultures and constructing new cultures for social interactions (Corsaro & Nelson, 2003). As argued by Tamis-LeMonda et al. (2008), the construction of new cultures may be most likely to take place in social activities of children with different backgrounds. Migration and communication across nations during globalization have created a changing context with diverse values for children and adolescents in most societies. As a result, exposure to different beliefs and lifestyles has become a part of the youth experience. The cultural systems that youth develop through incorporating different, and perhaps complementary, values and behavioral norms provide guidance for them to engage in mutual

evaluations in interaction and to maintain their behaviors according to cultural norms.

SOCIOEMOTIONAL FUNCTIONING AND PROBLEMS IN PEER SETTINGS ACROSS CULTURES

In general, behaviors that are formed on the basis of high social initiative and high self-control, such as cooperative and prosocial behavior, are regarded as appropriate and desirable in most societies (e.g., Eisenberg, Fabes, & Spinrad, 2006), although the extent to which they are valued may vary across cultures. Behaviors formed on the basis of low levels of social initiative, self-control, or both and categorized as internalizing and externalizing are typically viewed as maladaptive and abnormal in Western cultures (Achenbach, 2008; Cicchetti, 2006) but not necessarily in other cultures. The cultural values of these behaviors play a major role in determining how they are exhibited, particularly in social situations.

A number of studies have been conducted to examine cross-cultural similarities and differences in the display of children's behaviors and problems. Most of the studies, however, have relied on parental ratings or self-reports, which suffer from methodological problems, such as judgmental biases, response style biases, and reference group biases (e.g., Schneider, French, & Chen, 2006). The methodological weaknesses and problems have led to inconsistencies and confusions of the results. Nevertheless, some patterns have emerged from cross-cultural studies of children in Asian, Latino, European, and North American societies. For example, studies based on parental reports (e.g., Gartstein et al., 2006) indicated that children in some Asian cultures were less emotionally expressive than children in European and North American cultures in early childhood. These results are consistent with what has been found in observational studies conducted by Camras and her colleagues (Camras et al., 1998; Camras, Chen, Bakeman, Norris, & Cain, 2006) in East Asian and European American infants. The cross-cultural differences in the early years are interesting because they may indicate the developmental origins of socioemotional functioning and problems among children in specific societies.

Shyness-Inhibition, Social Anxiety, and Loneliness

Researchers have observed that children display different reactions to stressful or challenging situations (e.g., Asendorpf, 1991; Fox et al., 2005; Kagan, 1997; Stevenson-Hinde, Shouldice, & Chicot, 2011). Whereas some children are relaxed and display relatively little distress, others tend to be vigilant, anxious, and wary. The term *behavioral inhibition* has been used to characterize individual differences in children's reactions to novel social and nonsocial situations (García Coll, Kagan, & Reznick, 1984; Schmidt & Buss, 2010). Whereas inhibition in infants is assessed mainly in terms of their latency to approach novel objects or nonsocial stimuli, research on inhibition in older children often focuses on their reluctance to interact spontaneously with unfamiliar adults or peers (e.g., Asendorpf, 1991). Inhibition of approach to unfamiliar peer situations is typically characterized by onlooker, unoccupied, and other anxious behaviors (e.g., watching others playing without joining in, whining, nail biting) (e.g., Asendorpf, 1991; Rubin, Coplan, Fox, & Calkins, 1995).

From a different perspective, researchers who study shyness as a personality trait, especially in adults, focus on feelings of self-consciousness and anxiety in social interactions (e.g., Cheek & Buss, 1981). Asendorpf (1991) characterized shyness as deriving from an internal conflict of approach and avoidance motivations in social settings. Shy children are interested in social interactions, but this approach motivation is hindered by fear and wariness. Shyness and inhibition both seem to tap individual reactivity to challenging situations, with the former focusing on the anxious response to social novelty and the latter focusing on the dispositional characteristic to be fearful when encountering unfamiliar social or nonsocial situations (Coplan & Armer, 2007; Rubin, Coplan, & Bowker, 2009; Schmidt & Buss, 2010).

Considering the conceptual and empirical overlap between shyness and inhibition and their similar behavioral manifestations, X. Chen and French (2008) used the term *shyness-inhibition* to refer to children's wary and anxious reactivity to stressful or challenging social situations. Shyness-inhibition is similar to reticence, anxious solitude, shyness-sensitivity, and some other constructs that researchers use to describe behaviors that indicate internal fearfulness in social settings (e.g., Coplan & Armer, 2007; Gazelle & Ladd, 2003). However, it is different from those constructs representing social withdrawal, such as unsociability or social disinterest due to the lack of desire to interact with others (e.g., "would rather be alone") (Coplan & Armer, 2007). Distinction between shyness-inhibition and unsociability or social disinterest is important in cross-cultural research because they may be valued differently in different cultures. For example, in Western individualistic societies, relative to shyness-inhibition, unsociability that is driven by preference for solitude may be viewed as more normal because it is sometimes

considered indicative of personal choice and conducive to performance on constructive tasks and emotional health (e.g., Burger, 1995; Coplan et al., 2004; Leary, Herbst, & McCrary, 2003). In contrast, in some group-oriented cultures, shyness-inhibition may be viewed as acceptable or even desirable, but unsociability is regarded as anticollective and abnormal, a risk factor in development (Casiglia, Lo Coco, & Zappulla, 1998; X. Chen, Wang, & Cao, 2011; Valdivia, Schneider, Chavez, & Chen, 2005).

A major aspect of socioemotional functioning that largely overlaps with shyness-inhibition is social anxiety. The construct of social anxiety taps fear, concern, and worry about negative social evaluations and distress in familiar and unfamiliar social situations (American Psychiatric Association, 1994). Whereas shyness-inhibition is mainly concerned with behavioral manifestations of internal conflict or fearful feelings, social anxiety focuses on emotional aspects of individual reactions to challenging social situations. Shyness-inhibition has traditionally been conceptualized from temperament or personality and peer relationship perspectives, whereas the experience of social anxiety is often discussed in the framework of psychopathology. In addition, researchers use various methods, including observations, peer evaluations, and self-reports, in the assessment of shy-inhibited behavior, but research on the emotional experience of social anxiety relies mostly on self-reports and clinical assessments. Nevertheless, the literature has indicated robust links between shyness-inhibition and social anxiety in children and adolescents, both having considerable implications for peer interactions and relationships (e.g., Rubin et al., 2009; West & Newman, 2007).

As another peer-relevant aspect of socioemotional functioning, loneliness is associated with both shyness-inhibition and social anxiety (e.g., Rotenberg & Hymel, 1999; Rubin et al., 2009). Loneliness typically refers to the subjective experience of dissatisfaction with one's social-relational life and related emotional reactions of sadness and emptiness (e.g., Asher & Paquette, 2003). Research indicates that children as young as preschool age report loneliness and social dissatisfaction, and loneliness in childhood is associated with unpleasant feelings and perceptions of unfulfilled relational needs such as lack of companionship and support (e.g., Cassidy & Asher, 1992; Coplan, Closson, & Arbeau, 2007). Moreover, like shyness-inhibition and social anxiety, feelings of loneliness are stable over time and may predict adjustment problems, such as depression, suicide, and psychosomatic problems (e.g., Aanes, Mittelmark, & Ketland, 2010; Qualter, Brown, Munn, & Rotenberg, 2010).

Shyness-Inhibition Across Cultures

One of the primary issues in cross-cultural research is whether children in different societies engage in different levels or types of social interactions (e.g., Whiting & Edwards 1988). Edwards (2000), for example, found that children in relatively close and rural societies (e.g., Kenya and India) had significantly lower scores on overall social engagement than children in more open and urban societies (e.g., Okinawa and the United States) where peer interactions were encouraged. Researchers also found that, compared with their North American counterparts, children in many non-Western rural societies, such as Bedouin Arab, Kenya, Maya, Mexico, and India (Ariel & Sever, 1980; Edwards, 2000; Farver & Howes, 1993; Gaskins, 2006), tended to be less expressive of their personal styles in peer interactions and engaged in little sociodramatic activities that required control of social-evaluative anxiety. These later results are particularly interesting because the lack of self-expression and assertiveness in social interactions is closely related to shyness-inhibition.

Researchers consistently found that East Asian children were more shy-inhibited than North American children in social settings (e.g., X. Chen, 2010; Farver & Howes, 1988). In a study of play behavior in Korean preschools in the United States, for example, Farver, Kim, and Lee (1995) found that, compared with European American children, Korean American children displayed more shy behaviors. Moreover, Korean children's play included less self-expressive themes and Korean children used less self-assertive communicative strategies (Farver & Shin, 1997). Similarly, Rubin, Hemphill, et al. (2006) found that Korean and Chinese children exhibited higher inhibition and anxiety than Australian, Canadian, and Italian children in the laboratory situation, with the former displaying more vigilant and reactive behaviors such as staying closer to their mothers and being reluctant to explore in free play sessions or in interactions with a stranger. When the child was asked by the experimenter to touch a scary toy robot, the mean latency to touch the toy was 18.97 and 13.97 seconds in Korean and Chinese children but was 7.74, 7.70, and 7.74 seconds in Australian, Canadian, and Italian children. The percentage of children who did not touch the toy in the whole period was 52.2% and 44.4% in Korea and China but 17.3%, 23.4%, and 28.8% in Australia, Canada, and Italy, respectively.

X. Chen and Tse (2008, 2011) examined social behaviors in peer context of Chinese Canadian and European Canadian children. The participants included first-generation immigrant Chinese, Canadian-born Chinese, and European (primarily third or later generations) Canadian

children in multiple public elementary schools in Canada. Data on shyness-sensitivity were obtained from peer evaluations (e.g., "Someone who is very shy," "Someone whose feelings get hurt easily"). The results first indicated that both immigrant and Canadian-born Chinese children, particularly girls, had higher scores than European Canadian children on shyness. Moreover, for the Chinese immigrant group, English-language proficiency and length of residence in Canada were negatively associated with shyness, suggesting that children who were more exposed to Western values tended to display less shy-sensitive behaviors in peer interactions.

Consistent with X. Chen and Tse's findings (2011), Paulhus, Duncan, and Yik (2002) found that a higher rate of Asian Canadian college students (68%) self-reported being shy than did their European Canadian counterparts (44%). Among the Asian students, the rate of shyness declined with increasing length of residence in Canada, although the rate among Asian Canadians (58%) remained higher than that among European Canadians (42%) for those who were born and raised in Canada. In addition, Paulhus et al. (2002) found that, based on observations, Asian Canadian students were less active in classroom participation (e.g., asking and answering questions, providing opinions) than European Canadian students were.

A similar pattern of relations between acculturation and shyness was found in a study that Gudiño and Lau (2010) conducted with Hispanic American children. In this study, the researchers examined associations between parental cultural orientation and children's shyness. Results indicated that parental level of acculturation to American culture was negatively associated with child and parent reports of children's shyness; parents who reported less familiarity with and affinity for American culture reported more shy behavior in their children, and their children also self-reported more shy behavior. Gudiño and Lau (2010) suggested that the extent to which Hispanic parents adopted American values and attitudes might play a role in changing their children's shy behavior.

Social Anxiety Across Cultures

Similar to the findings on shyness-inhibition, results from a variety of cross-cultural projects indicate that Asian youth report higher levels of social anxiety than their Western counterparts (e.g., Dong, Yang, & Ollendick, 1994; Lau, Fung, Wang, & Kang, 2009; Okazaki, 1997). Austin and Chorpita (2004), for example, examined social phobia and anxiety among five ethnic groups of children in Hawaii and found that Chinese Americans, Filipino Americans, Japanese Americans, and native Hawaiians had higher scores on anxiety than European Americans. It has been argued that the emphasis of interdependence and group harmony in East Asian cultures may encourage children to be sensitive to others' opinions and evaluations, which in turn increases their vulnerability to social evaluative concerns (L. Y. Ho & Lau, 2011). It has also been suggested that strict rules designed to ensure group harmony in East Asian societies may evoke self-consciousness and social anxiety due to the fear of negative consequences when rules are violated (Schreier et al., 2010).

In a cross-cultural experimental study, Norasakkunkit and Kalick (2009) primed Japanese and U.S. college students to access an independent mode of thought by instructing them to write down as many examples as they could think of that they could remember from their personal experiences representing this situation: "I enjoy being unique and different from others in many respects." Then the students completed measures of social anxiety and fear of social evaluation (i.e., apprehension about other's evaluation, distress over their negative evaluation and the expectation that others would evaluate one negatively). It was found that the Japanese students scored significantly higher than the Americans on anxiety and fear of social evaluation, indicating that the Japanese students were more reactive to challenging social situations and more emotionally distressed than their American counterparts. Moreover, independent priming caused a decrease in social anxiety and fear. The results suggest that individual cultural self-construals of independence are directly and causally linked to negative emotional reactivity to stressful social situations.

Lau et al. (2009) examined whether concerns about interpersonal attunement such as face loss explained the differences between Asian and European American adolescents on social anxiety. Face loss concerns make one highly attentive and sensitive to the expectations of others and motivated to prevent negative evaluations by others. Consistent with the hypothesis, the researchers found that compared with European Americans, Asian Americans had higher scores on face loss concerns and social anxiety. Moreover, face loss concerns mediated, or accounted for a significant amount of, ethnic differences in social anxiety.

Increasing research has been conducted on social anxiety in Latino youth, but the findings are largely mixed. Whereas some studies showed that Latino and European American youth differed on social anxiety (e.g., Pina & Siverman, 2004), others failed to find significant differences (e.g., Schreier et al., 2010). When cultural or ethnic differences were found, Latino children and adolescents tended to display higher levels of social anxiety (e.g., Gudiño &

Lau, 2010; Pina & Siverman, 2004; Varela et al., 2004). Polo and Lopez (2009) found that compared with U.S.-born Mexican American youth, immigrant Mexican American youth reported significantly higher social anxiety, indicating that cultural values and acculturation might affect adolescents' social anxiety. Different arguments have been made about social anxiety in Latino youth. On one hand, it is suggested that as in many East Asian societies, collectivistic values of social connectedness and interdependence are emphasized in Latino societies, which may enhance children's sensitivity to social evaluations and vulnerability to social anxiety (Polo & Lopez, 2009). On the other hand, Schreier et al. (2010) argued that whereas collectivistic values in East Asia may increase self-consciousness and social-evaluative concerns, which in turn increase social anxiety, the emphasis on social harmony in Latino societies does not necessarily lead to heightened social anxiety. Latino cultures value sociability and avoidance of rejecting others, which may reduce anxious behavior in stressful social situations. In other words, people in Latino cultures are expected to be likable, fun, easygoing, and talkative in interactions. The socialization experience and the social context in Latino cultures may evoke lower levels of social anxiety than those in East Asian cultures. Therefore, the broad system of individualism-collectivism or independence-interdependence may not fully characterize cultural conditions for individual socioemotional functioning.

Finally, researchers have found mixed results about social anxiety among African-American children and adolescents. Whereas some researchers found that African Americans had a higher prevalence of social anxiety and phobia than European Americans (e.g., Neal & Turner, 1991), others did not find differences (e.g., Ferrell, Beidel, & Turner, 2004). Moreover, it was reported (e.g., Compton, Nelson, & March, 2000; Himle et al., 2009) that relative to their European American counterparts, African-American children and adolescents had lower levels of social anxiety although they might be more likely to experience other types of mental problems, such as posttraumatic stress disorder. The theoretical rationale for group differences between African-American youth and their counterparts in other ethnic groups is unclear. Thus, further research is needed to clarify the issue.

Loneliness Across Cultures

It has been argued that in societies and communities where group orientations are highly valued, children are likely to develop feelings of group belonging and interpersonal connectedness (e.g., Medora, Woodward, & Larson, 1987; Mijuskovic, 1992; Triandis, 1990). Socialization for individuality and endorsement of personal pursuits in social interaction in contemporary Western society may promote feelings of social alienation and loneliness (Mijuskovic, 1992). The cultural emphasis on individual achievement, competitiveness, and independence may lead to a decline in interpersonal contacts and group activities. Although members of the young generation in Western nations, particularly North America, are surrounded by many people, they may form relatively few intimate relationships with others, which may contribute to the experience of loneliness and social isolation (Rokach, 2007).

X. Chen, He, et al. (2004), however, suggested that, in a context that emphasizes interpersonal interdependence and communality, the threshold for feelings of loneliness may be relatively low; unfulfilled expectations for social connection or group affiliation may result in salient negative emotional responses. This context may make children and adolescents particularly sensitive to social difficulties and vulnerable to feelings of loneliness. In other words, in a society where group affiliation and connectedness are encouraged, even if the context can protect children from being alone, it may not protect children from feeling lonely. In self-oriented societies that encourage autonomy, assertiveness, and positive self-regard, children may be more resilient to social and psychological stress and distress because the emphasis on independent skills and self-confidence during socialization helps them develop competence in managing adverse socioemotional experiences.

There is evidence supporting the traditional view on the link between individualistic values and loneliness. In several cross-cultural studies, Rokach and colleagues (e.g., Rokach, 2007) assessed loneliness in Canadian, Portuguese, and Czech youth. The results indicated that Canadian youth reported substantially higher scores than the other two groups on the indicators of loneliness such as unfulfilling intimate relationships and significant separation (e.g., "I often felt I didn't fit in," "Breakdown of intimate relationship," "Separate from my friends for a long period of time"). Triandis, Bontempo, Villareal, Asai, and Lucca (1988) found that, in both the United States and Puerto Rico, higher scores on individualism were correlated with greater loneliness among college students, although no group differences were found in the mean loneliness scores.

Yet findings supporting X. Chen, He, et al.'s argument (2004) have also been reported in several studies. Birman and Taylor-Ritzler (2007), for example, examined acculturation and loneliness of Russian adolescents in

public middle and high schools who immigrated to the United States from the former Soviet Union. The acculturation measure included subscales of identity (e.g., "I consider myself American/I consider myself Russian") and behavioral acculturation (e.g., "how much do you eat Russian/American food"). The results indicated that acculturation to American cultures contributed negatively to the prediction of feelings of loneliness, whereas the weak relations between acculturation to Russian culture were mediated by family relationships. The results suggested that when immigrant adolescents became more individualistic in their values and behaviors, they experienced lower levels of loneliness.

In a multicultural comparison, X. Chen, He, et al. (2004) found no significant differences on loneliness among children in Brazil, Canada, China, and Italy. The mean scores were similar to those in American children. In a recent within-cultural study of Chinese children, however, X. Chen, Wang, Li, and Liu (2014) found that as urban areas of China became a more competitive, market-oriented society over the past two decades, children reported lower levels of loneliness. Specifically, the researchers collected data on loneliness from multiple groups of elementary school children in China, including three urban cohorts (1992, 1998, and 2002) in Shanghai, an urban group in 2005 in Beijing, and a rural group in 2007 in a northern region of China near Beijing. The time points represented different phases of the social transformation in urban China, and the groups across the regions (2002 Shanghai and 2005 Beijing groups and 2007 rural group) mainly represented urban-rural context. It was found that children in the 1992 and 1998 Shanghai groups had higher scores on loneliness than those in the 2002 Shanghai and 2005 Beijing groups. Moreover, relative to their urban counterparts in 2002 and 2005, rural children in 2007 reported higher loneliness. Thus, the dramatic social change toward urbanization and modernization was associated with a decrease in children's loneliness.

Aggressive, Violent, and Other Externalizing Behaviors

Cross-cultural differences in children's aggression and other externalizing behaviors have been shown in a number of studies using different methods, including observations, adult reports, peer reports, and self-reports, and narrative assessments. In general, cultures that value competitiveness and the pursuit of personal goals seem to allow for more aggressive and coercive behavior, whereas cultures that emphasize group harmony and personal control tend to inhibit aggressive behavior.

Cross-Cultural Differences in Aggressive and Violent Behaviors

Research results indicate that children in some Asian countries, such as China, Korea, and Thailand, in Australia, and in some European nations, such as Sweden and the Netherlands, tend to exhibit less aggressive behavior than North American children (e.g., Bergeron & Schneider, 2005; Russell, Hart, Robinson, & Olsen, 2003; Weisz et al., 1988). Zahn-Waxler, Friedman, Cole, Mizuta, and Hiruma (1996) found that Japanese children showed less anger and aggression than U.S. children in their responses to hypothetical situations involving conflict. P. M. Cole, Tamang, and Shrestha (2006) found that Brahman children were more likely to endorse aggressive behaviors than Tamang children in Nepal. Brahman children reacted to difficult social situations, such as peer conflict, with anger and other negative emotions more often than Tamang children.

To obtain an in-depth understanding of cross-cultural differences in aggression, Farver, Welles-Nystrom, Frosch, Wimbarti, and Hoppe-Graff (1997) examined preschool children's narrative stories involving aggression in the United States, Sweden, Germany, and Indonesia. The children were asked to tell stories with two different toy sets that facilitated imaginative play. The first set of toys suggested neutral themes, such as family figures (mother, father, children), a car, and other pieces related to culturally appropriate themes; the second set of toys suggested aggressive play themes, including police figures, motorcycles, and handcuffs. Children were told to play with the toys in any way they wished and at the same time tell the researcher what they were doing with the toys. Children's stories were coded according to words related to aggression, such as *guns*, *kill*, *shoot*, *punch*, and *hit*, and sounds made when characters in the story harmed themselves or another figure (e.g., Ouch! Pow! Bang! Crash!). Story contents were also coded for the description of the behaviors of the characters, such as engaging in physical aggression with the intent to harm, destroy, or protect self.

It was found that in stories with both neutral and aggressive toys, American children had higher scores on aggressive themes and words, physical aggression, and mastery of situations with aggression than did German, Swedish, and Indonesian children. The narratives of Indonesian children contained less aggressive figures and more features of mastering situations without aggression. For example, the proportions of aggressive words in narratives with neutral toys were .41, .26, .01, and .11 for American, German, Swedish, and Indonesian boys and .10, .01, .02, and .03 for American, German, Swedish, and

Indonesian girls. The proportions of content involving mastering situations with aggression in stories with neutral toys were .13, .01, .01, and .03 for American, German, Swedish, and Indonesian boys and .09, .00, .01, and .00 for American, German, Swedish, and Indonesian girls. In contrast, the proportions of content involving mastering situations without aggression in stories with neutral toys were .10, .03, .04, and .20 for American, German, Swedish, and Indonesian boys and .15, .08, .01, and .32 for American, German, Swedish, and Indonesian girls. The results for stories with aggressive toys were similar for the groups. Moreover, the cultural differences based on narratives were consistent with those based on teacher ratings of children's aggressive behavior in the classroom peer interaction context (see Farver et al., 1997).

According to Farver et al. (1997), the contrasts between the American and Indonesian children's narratives reflect different norms for conflict resolution and different levels of intolerance of aggressive behavior. The self-orientation in the American society may increase the tolerance of aggressive behavior. In conflict situations, American children are socialized to be assertive in reaction to physical assault, insult, or attack on possessions. In contrast, Indonesian society values behavioral attributes that promote group harmony, deference to authority, emotional restraint, and cooperation. To maintain social harmony, children in Indonesia are taught to view community members as *paguyban* (family). Within *paguyban*, individuals are interdependent and can collectively discipline children for misbehavior, such as being impolite, disruptive, or aggressive, through guilt, shame, and other means. Children are socialized to avoid conflicts with others and to solve problems through negotiation rather than aggression.

Cross-cultural differences in aggressive and antisocial behaviors between southeast Asian and North American children appear more evident in adolescence. Greenberger, Chen, Beam, Whang, and Dong (2000) investigated self-reported misconduct in samples of senior high school students (mean ages = 16–17 years) in Los Angeles, the United States, Tianjin, China, and Seoul, Korea. It was found that U.S. adolescents had higher scores than Korean adolescents, who in turn had higher scores than Chinese adolescents on externalizing behaviors including risk taking and physical aggression toward others. The proportion of U.S. adolescents who engaged in various aggressive acts was twice that of Korean, Chinese, or both (e.g., 52%, 18%, and 11% engaged in "hitting or threatening to hit someone" in the United States, Korea, and China, respectively). Moreover, U.S. adolescents reported more aggressive behaviors among family members, friends, and school peers than did either of the two Asian groups. Korean adolescents reported more aggressive behaviors among family members, friends, and school peers than did Chinese adolescents. The results might be due to the fact that Korean youth had experienced more substantial and long-term social and cultural changes than Chinese youth and that Korean youth were exposed to more Western individualistic values and lifestyles than did Chinese youth (Greenberger et al., 2000).

In the literature (e.g., Eisenberg, Zhou, Liew, Champion, & Pidada, 2006), self-regulation or self-control is considered a major developmental antecedent of aggressive, disruptive, and antisocial behaviors. Research has shown that children across cultures differ on regulatory or control behavior (e.g., Gartstein et al., 2006; D. Y. E. Ho, 1986). For example, Chinese and East Asian children are often rated by their mothers as higher in self-control than U.S. and other Western children, and the differences tend to increase with age (Gartstein et al., 2006). X. Chen, Rubin, et al. (2003) found that Chinese toddlers maintained their compliant behaviors without adult intervention during a clean-up session, indicating committed and internalized control, more often than Canadian toddlers. Oh and Lewis (2008) also found that Chinese and Korean preschool-age children performed more competently than their U.S. counterparts on executive function tasks that are related to the activity of the prefrontal cortex of the brain.

In a study of attention and behavioral control, Brewis, Schmidt, and Casas (2003) observed that Mexican school-age children displayed more inattentive and impulsive behaviors than American children. Gartstein, Slobodskaya, and Kinsht (2003) found that Russian infants exhibited lower levels of regulatory functioning than U.S. infants. Interestingly, Gartstein, Peleg, Young, and Slobodskaya (2009) recently reported that, compared to their counterparts in the United States, Russian infants in Israel showed a higher level of regulation and their parents described them as requiring shorter time to recover from distress. The authors argued that the differences might be due to the fact that, in Israel, coping with stress was an inherent part of everyday life, which made effective regulation, including recovery from distress, critical to adjustment in the environment. The study also found that for the Russian immigrants in Israel, greater parental involvement in the Israeli (host) culture was related to higher levels of infants' duration of orienting/persistence of attention, an index of regulatory capacity.

X. Chen and Tse (2008) conducted a study of social behaviors in samples of Canadian-born school-age children with Chinese and European backgrounds using a peer

evaluation measure. The results indicated that compared with European Canadian children, Chinese Canadian children were viewed by their peers in Chinese, European, and other ethnic (e.g., non-Chinese Asian, Latinos) groups as less aggressive (e.g., "Gets into a lot of fights," "Picks on other kids"). According to Chen and Tse (2008), Chinese children are often required by their parents to learn skills to control their impulsive and disruptive acts from an early age. The early socialization experience has an enduring impact on children's behaviors in the peer context. Thus, Chinese Canadian children engage in less aggressive behavior and consequently experience fewer problems in peer relationships than their counterparts in some other ethnic groups.

In a series of studies with Latino adolescents, Smokowski and colleagues (e.g., Smokowski & Bacallao, 2006; Smokowski, Buchanan, & Bacallao, 2009) examined relations between acculturation and social, behavioral, and psychological adjustment. The studies revealed that the length of residence in the United States, involvement in Latino cultural activities, and the maintenance of Latino cultural values were negatively associated with aggression, whereas involvement in European American cultures was not meaningfully associated with social behaviors or any adjustment outcomes. Thus, Latino adolescents who maintained stronger connections with their culture of origin were less likely to engage in aggressive behavior. Like Chinese and perhaps other collectivistic cultures, the Latino culture might have deterrent effects on the development of aggression.

Cultural Values and Aggressive and Violent Behaviors

Findings from empirical work suggest that children and adolescents in more traditional and rural societies tend to display less aggressive, violent, and antisocial behaviors (e.g., Smokowski et al., 2009; Weenink, 2011). To understand how specific cultural aspects facilitate or hinder the development of aggressive and violent behaviors, researchers have investigated relations between cultural norms and values, particularly those regarding interpersonal and group harmony, and aggression at the individual and societal levels.

In a study of relations between values and violent behavior in Jewish and Arab high schools in Israel, Knafo, Daniel, and Khoury-Kassabri (2008) focused on several values that were believed to be relevant to adolescent social behaviors including (1) power, defined as aspiration for social status through gaining control of resources and dominance over people, (2) conformity, which refers to controlling actions that may violate social expectations and norms, and (3) universality, which is concerned with the understanding, appreciation, and tolerance of the welfare of all people. The analysis revealed that values of power were positively associated with the display of violent behavior, whereas values of conformity and universalism were negatively associated with the display of violence. Moreover, the associations between adolescent values and their violent behavior were stronger in ecologically risky environments, such as schools with high levels of violence, than in nonrisky environments. Knafo et al. (2008) argued that in environments where violent behavior is more common, social pressure against violence is likely to be lower. Consequently, the individual values of adolescents are more influential in directing their behavior.

Bergeron and Schneider (2005) analyzed relations between cultural values and aggressive behavior at the national level. The authors coded cultural values of a series of nations in Asia, South America, Europe, and the United States according to the Hofstede (1994) and S. H. Schwartz (2009) systems and examined how the values were associated with aggression. The results first indicated that societies characterized as more individualistic had higher aggression scores. Aggression was lower among individuals in collectivistic societies in which a higher value was placed on the needs of the group over those of the individual. Aggression was also lower in societies with higher levels of egalitarian commitment and moral discipline. In addition, aggression was positively associated with values of mastery (mastering and controlling the environment as primary goals) and negatively associated with values of hierarchy (maintaining status and social order) and conservation (conformity to social standards). The results of this study suggest that children and adolescents in societies that emphasize the pursuit of personal needs and desires, controlling the environments using power, are more likely to display aggressive behavior than those in societies that place a high value on group harmony, social order, responsibility, and compliance with social standards.

In Latino societies, a particular value orientation, familism, has been documented to be associated with low aggressive and violent behavior in children and adolescents. *Familism* refers to respect for family members, loyalty to the family, pride of the family, and emotional support among family members. Smokowski and Bacallao (2006) found that low familism and high parent-child conflict were salient risk factors that contributed to externalizing behaviors including aggression and violence. In contrast, high familism, such as family support and parental involvement in children's social and school lives, helped

adolescents cope with stress and frustration and control their behaviors. Familism accounted for a significant amount of variance in the relations between acculturation and aggression. Germán, Gonzales, and Dumka (2009) found that the values of familism endorsed by Latino adolescents and their parents were negatively associated with externalizing behaviors in schools. Moreover, familism moderated the relations between affiliation with deviant peers and behavioral problems; the relations were significantly weaker for adolescents who valued families than for adolescents who did not. Similarly, Lim, Stormshak, and Falkenstein (2011) found that identification with one's culture of origin attenuated the links between deviant peer association and substance use among Cambodian and Vietnamese youth in the United States.

Peer Conflict and Conflict Resolution

Peer conflict, defined as overt behavioral opposition (C. U. Shantz, 1987), is different from aggression and other externalizing disorders. Although conflict can lead to aggression, it is often displayed as verbal disagreement and resolved quickly without adult intervention (Perry, Perry, & Kennedy, 1992; C. U. Shantz, 1987).

Various features of the environment may affect children's behaviors in peer conflict situations. For instance, ecological conditions, such as resource availability, may be directly associated with the frequency and nature of conflict in peer interactions (Hartup, French, Laursen, Johnston, & Ogawa, 1993). More important, cultural norms and ideals for interpersonal relationships guide the way children address and respond to conflict. Cultural beliefs, such as those concerning references for direct versus indirect resolution strategies and the role of adults in resolving children's conflict, may be directly associated with children's behaviors in the development and resolution of peer conflict (Killen & Sueyoshi, 1995). Researchers have often used the framework of individualism and collectivism to explain cultural differences in children's peer conflict. It is theorized that low assertiveness and high cooperativeness are favored by those in collectivistic cultures when dealing with conflict as a way to maintain interpersonal harmony, whereas high assertiveness and low cooperativeness are favored by those in individualistic cultures, as they promote the achievement of personal goals (Elsayed-Ekhouly & Buda, 1996; J. L. Holt & DeVore, 2005). Although the broad framework may be useful for understanding the results of conflict studies conducted in some societies, it has been criticized widely for its overcategorization of complicated cultures and neglect of considerable within-culture variations in children's conflict experiences (e.g., French, 2011).

Research on the strategies by which children manage conflict may be more relevant to understanding the cross-cultural differences of peer conflict prevalence, given that the display of peer conflict depends on the strategies that children take to engage or promote the conflict or, conversely, to prevent or minimize its occurrence. In an ethnographic study among 3- to 6-year-old children from Bologna, Italy, Corsaro and Rizzo (1990) observed peer interactions in which children questioned or challenged others' opinions. The researchers found that children often added emphasis to their claims and dramatized their positions, a form that was also exhibited by adults in discussion. This particular manner of discourse during conflict engagement was thought to be even more important than resolving the conflict itself (Corsaro & Rizzo, 1990). In another ethnographic study, Goodwin (1982) recorded conversations during play activities among 4- to 14-year-old African-American boys from West Philadelphia. It was found that the boys engaged in argumentative discourse that offered proofs for their positions in ways that established and maintained positions of relative power within peer relationships. While often thought of as disorderly behaviors, researchers have suggested that these types of argumentative exchanges allow children to develop deductive reasoning within a social context. Moreover, during the exchanges, children recognize the opinions of others and demonstrate interdependence with others, which in turn affirms a sense of community. Interestingly, the demonstration of independence or position within a social hierarchy by exerting one's opinion may foster greater interdependence in cultures that are considered relatively collectivistic (Bologna, Italy) and in the African American community in West Philadelphia. Such overt displays of conflict likely appear more frequently in cultural groups that are open to conflict than in those that tend to minimize it.

Haar and Krahe (1999) compared German and Indonesian adolescents on their preferred strategies for resolving hypothetical conflicts with parents, peers, and teachers. Indonesians were more likely to select a submissive solution than a confrontational solution (Haar & Krahe, 1999). Similarly, French and colleagues (French, Riansari, Pidada, Nelwan, & Buhrmester, 2001; French, Pidada, Denoma, McDonald, & Lawton, 2005) found that relative to Western children, Indonesian children were more likely to disengage from conflict. Specifically, through interviews with U.S. and Indonesian 9- to 11-year-olds about conflicts with peers, the researchers found that conflicts

were quickly settled without the use of aggression for both groups. However, Indonesian children, compared to U.S. children, tended to report disengagement as a strategy for dealing with conflict. Some Indonesian children referenced *musuhan* (acting as enemies), a strategy involving avoidance of the person they disagreed with and reengagement once they no longer felt the emotions from the conflict. In Western cultures, whereas negotiation and compromise are preferred methods for resolving conflict, disengagement typically is viewed as reflecting passivity (Iskandar, Laursen, Finkelstein, & Fredrickson, 1995; Laursen, Finkelstein, & Townsend-Betts, 2001). In contrast, passivity appears to be not only acceptable but also preferable among Indonesian children. The Indonesian value for maintaining interpersonal harmony is closely aligned with the collectivistic orientation, which may explain the avoidance of outward manifestations of contention (Magus-Suseno, 1997); overt exhibitions of disagreement can be a disruption to the social harmony and hierarchy (Geertz, 1961).

Chinese children tend to use similar strategies to avoid conflict (Xu, Farver, Chang, Yu, & Zhang, 2006), which may be related to the fact that Chinese children experience less conflict than North American children (Benjamin, Schneider, Greenman, & Hum, 2001; Navon & Ramsey, 1989; Orlick, Zhou, & Partington, 1990). In a study designed to elicit potential conflict, French et al. (2011) presented groups of four 7-year-old children with one toy in a laboratory setting. Whereas in 46% of the Canadian groups one or two children emerged as a leader to invoke a rule that would structure their play with the toy, this occurred for 78% of the Chinese groups. The authors attributed this hierarchical approach to common conflict management scripts as reflecting community mediation systems in the Chinese society, where community members rely on a mediator, an authority who intervenes in conflict situations and keeps order within the group (Wall & Blum, 1991). Another comparative study showed that 8- and 9-year-old Taiwanese children reported significantly less conflict in their friendships than their Canadian counterparts (Benjamin et al., 2001). Moreover, Taiwanese children tended to agree more than Canadian children on the prevalence rate of conflict in their relationships. The prospect of conflict might be particularly salient to the Taiwanese children, leading to their greater tendency to agree on the presence of conflict. The lower rates of conflict in Taiwanese and the higher tendency to be aware of conflict are consistent with the Confucian model of conflict resolution, which emphasizes the importance of tolerance and forgiveness (Wall & Blum, 1991).

Gender roles may be involved in cultural effects on conflict management. In an ethnographic study, Kyratzis and Guo (2001) observed verbal strategies to diffuse conflict during play among 5-year-old children in the United States and China. In same-sex group interactions, U.S. girls were more likely to reframe the play to avoid conflict, but Chinese girls and U.S. boys tended to be directive. Chinese girls invoked third-party censures ("What for do you scold others as pigs?") and rhetorical mocking questions. Both Chinese girls and U.S. boys used commands ("Give it to me") and even threats. Finally, Chinese boys used a combination of direct and indirect strategies, including reasoned argument. The authors argued that the assertiveness of Chinese girls in conflict management likely reflected women's increased social status and influence in informal settings in contemporary China. The authors also tentatively proposed the notion that Chinese girls might take their social groups for granted and thus did not make great effort to maintain group relationships, given the generally high interdependence in the society.

It has been argued that children in individualistic cultures tend to assert self-interest behaviors during conflict episodes (Markus & Lin, 1998). Western children are socialized from early childhood with principles involving possession of property or space, and they utilize the scripts that invoke sharing or turn taking during conflict (Dunn & Munn, 1987; Ross, 1996). These principles are derived from Western cultural ideals for personal ownership and are reinforced by parents when children engage in peer conflict (Ross, 1996). Nevertheless, variations exist among children within Western nations (Markus & Lin, 1998). Schneider, Fonzi, Tomada, and Tani (2000) observed dyads of 8- and 9-year-olds from central Italy and Canadian children participating in structured tasks designed to simulate everyday situations of potential conflict. In discussing how they would share a single chocolate egg with a toy inside, Italian youngsters made fewer proposals but were still able to achieve a greater discrepancy between initial and final negotiating positions. The authors concluded that Italian children were more efficient than Canadian children at avoiding and resolving conflicts between friends. Italian children were more likely than Canadian children to avoid and resolve conflicts by adherence for the rules of the game that were described prior to their participation in the game.

Medina et al. (2001) examined preschool children in the Netherlands and Andalusia in conflict situations and found that Dutch children were more assertive and imposed their personal views during conflicts more often than Andalusian children. Moreover, conflict arose among Andalusian

children due to issues of control regarding play activity conditions or personal opinions (e.g., who should play Sleeping Beauty or Snow White), with concerns often involved in the coordination of communality of a social group. In contrast, the conflicts among Dutch children were largely due to the control of objects or space (e.g., who should be the one to play with the blocks). The authors suggested that the coordination of play within a group among the Andalusian children might be more characteristic of a collectivistic society, whereas competition for objects or space might reflect the value of autonomy and individuality among the Dutch. These findings were consistent with previous observations where conflict focused less on object disputes in Japanese preschool children than in U.S. preschool children (Killen & Sueyoshi, 1995).

Bullying and Victimization

As a type of peer conflict, bullying is described as aggressive behavior or intentional harm carried out repeatedly over time in an interpersonal relationship characterized by an imbalance of power (Olweus, 1993). Prevalence rates of bullying among school-age children vary by country. In a self-report survey across 25 predominantly Western countries assessing involvement in bullying as a bully, victim, or both bully and victim (bully-victim), Nansel, Craig, Overpeck, Saluja, and Ruan (2004) found that Sweden and Wales had the lowest rates of bullies while Denmark had the highest prevalence, at 20%. Sweden had the lowest rates of victims and bully-victims, both at 1%, while Lithuania had the highest rate of victims and bully-victims, at 20%. In a 28-country comparison of mostly Western countries on the prevalence of victims stratified by sex, Due and colleagues (2005) found that Sweden showed the lowest rate, at 5.1% for girls and 6.3% for boys. Lithuanian had the highest prevalence rate with 38.2% of girls and 41.4% of boys as victims. Eslea and colleagues (2004) found in a study conducted in seven countries, including Asian countries, that 5.2% of children in Ireland were classified as victims compared to 25.6% of Italian children from Florence. The percentage of bullies was lowest in Chinese children (2%) and highest in Spanish children (16.9%). Finally, only 0.8% of English children were considered bully-victims compared to 19.6% of Spanish children.

A number of factors may be related to the cross-cultural differences in bullying rates. First, it is possible that the understanding of bullying in the culture may affect self-reports of involvement in bullying incidents. Certain terms, such as *prepotenza* in Italian, refer to not just physical, verbal, and social-exclusionary bullying but also to even-handed fighting, which may result in the overestimation of bullying (Smith et al., 2002). In Japan, *ijime* refers to bullying that aims to cause emotional (e.g., humiliation) rather than physical suffering, with the bully being part of a dominant peer group (Nesdale & Naito, 2005). In a culture where high value is placed on group membership, such ostracism may have severe consequences. Relatedly, specific behaviors that children display in bullying situations may differ across cultures, which is likely to influence cross-cultural comparisons. Dussich and Maekoya (2007), for example, found that Japanese victims reported slandering and shunning as the most common bully behaviors, whereas name-calling and slandering were the most common in South America and in the United States. The use of physical methods in bullying was much more common in the United States than in Japan and South America. High values of group harmony in East Asian and South American cultures appear to make physical aggression less acceptable than slander, which may be reflected in cross-cultural differences in the presence of different forms, and perhaps overall prevalence, of bullying behaviors.

Peer Involvement, Isolation, and Friendship Exclusivity

Social and cultural circumstances are related to the extent to which group integration or development of specific peer relationships, such as friendships, is encouraged (Hinde, 1987; Sharabany, 2006). In rural villages, such as Yucatan Mayan villages, children mostly interact with age-mates within extended family networks of siblings and cousins, leaving few opportunities to form relationships with nonkin (Gaskins, 2006). Sharabany and Wiseman (1993) found that the main feature of peer relationships among children in kibbutz communities in Israel is group involvement rather than dyadic friendships. In most contemporary societies, schools congregate large numbers of same-age children and provide opportunities for children to develop relationships with each other. Nevertheless, cultural expectations and norms concerning social affiliation and connectedness may shape the structural and functional features of peer relationships and individual experiences within the relationships, such as intimacy and exclusivity.

Studies conducted with school-age children in most societies show that relatively small proportions of children and adolescents, ranging from 5% to 30%, do not have mutual friends or group networks (e.g., Attili, Vermigli, & Schneider, 1997; Cairns & Cairns, 1994; X. Chen, Chang, & He, 2003; French, Jansen, Riansari, & Setiono, 2003; Kiesner, Poulin, & Nicotra, 2003; Kindermann, McCollom, &

Gibson, 1995; Liu & Chen, 2003; Salmivalli, Huttunen, & Lagerspetz, 1997). In general, more boys than girls are friendless, and boys' friendships are less stable over time (e.g., Benenson, Apostoleris, & Parnass, 1997; Schneider, Fonzi, Tani, & Giovanna, 1997). However, boys are more likely than girls to belong to groups, and boys' groups tend to be larger than girls' groups (e.g., Benenson et al., 1997; Dekovic, Engels, Shirai, De Kort, & Anker, 2002; Salmivalli et al., 1997).

Peer groups are often homogeneous on social-behavioral characteristics. It was found that in North America, group members were similar on the exhibition of deviant behaviors, such as aggression, smoking, drinking, and drug use (e.g., Cairns & Cairns, 1994; Urberg, Degirmencioglu, & Pilgrim, 1997). Brown (1990) identified a variety of adolescent peer groups, including those labeled as jocks, brains, populars, greasers, partyers, druggies, nerds, loners, and burnouts (e.g., Brown, 1990). Salmivalli et al. (1997) found that children in Finland who behaved in similar or complementary roles in bullying situations (bullies, assistants/reinforcers, victims, defenders, and outsiders) tended to form group networks. X. Chen and colleagues (Chen, Chang, & He, 2003; Liu & Chen, 2003) found that peer networks in Chinese children were organized based on prosocial orientation, aggression, and learning problems. Taken together, research results suggest that children and adolescents may hang around together and develop relationships and groups on the basis of social, behavioral, and other attributes that are significant in the culture.

Different arguments have been made about culture and intimacy in peer relationships. Intimacy is defined as mutual receptiveness, harmonious communication, and a shared sense of identity in relationships (Shwalb et al., 2010). Triandis et al. (1988) argued that peer relationships in collectivistic cultures are more intimate than those in individualistic cultures. Sharabany (2006), however, suggested that dyadic relationships, such as friendships, are typically characterized as low in intimacy in collectivistic societies because of the availability of other sources of emotional support, reduced exclusivity, and the threat of exclusive dyadic relationships to the cohesiveness of the larger group. Supporting Triandis et al.'s argument (1988), French, Lee, and Pidada (2006) found that South Korean children and adolescents formed highly intimate peer relationships. Moreover, intimate friendships in Korean youth were represented by high exclusivity and clear and strong boundaries between close friends and nonfriends. Youth in central and southern Italy reported more close and intimate friendships than did Canadian youth (Schneider et al., 1997; Schneider, et al., 2000). Friendships among Italian children, particularly among girls, were more stable and remained intact more than did those among Canadian children. Scharf and Hertz-Lazarowitz (2003) found that Arab elementary school students rated their peer groups as more intimate than did Jewish students, a finding that was believed to be congruent with the fact that Arab society was more collectivistic than Jewish society. In addition, Latino and Black adolescents in the United States reported their friendships as more intimate and closer than did their counterparts with a European or other cultural background (Gonzalez, Moreno, & Schneider, 2004; Way, 2006).

Cross-cultural findings about adolescent peer relationships in some other studies seemed to support Sharabany's argument (2006), however. For example, adolescents in Indonesian, Israeli kibbutz, and rural Arab societies reported lower intimacy in their friendships than their North American counterparts (e.g., French, Pidada, et al., 2005, 2006; Sharabany, 2006). Jay (1969) indicated that relative to American youth, Indonesian youth were less likely to develop close friendships because they focused more on integration into peer networks and the larger community. Beit-Hallahmi, Sharabany, Dana-Engelstein, Rabin, and Regev (1982) also indicated that people in Israeli kibbutzim, communities that shared property and responsibilities, preferred a large number of friends with superficial connections to a few close friends. Consistently, the results of a study conducted by Sharabany and Wiseman (1997) showed that children raised in the kibbutz were less intimate with their best friends on several aspects of intimacy compared with city children. Although kibbutz children indicated doing more activities with their best friends, they were less open and communicative with them and reported less trust and exclusiveness in the relationships than city children.

Although researchers have discussed the features, such as intimacy and exclusivity, of peer relationships using the collectivism-individualism framework, as it is commonly done in other areas, the framework may be too broad to explain some results. For example, although intimacy and exclusivity appear to be important in the friendships of children in Korea (French et al., 2006) and Cuba (González el al., 2004), two countries that are considered collectivistic, children in Indonesia, a country that is considered more collectivistic than many Western countries, do not differ with U.S. children on friendship intimacy (French, Pidada, et al., 2005), and peer relationships of Indonesian children are largely inclusive rather than exclusive.

In summary, empirical research has revealed cross-cultural and within-cultural ethnic variations in major

aspects of children's socioemotional functioning, including shyness and social anxiety, reactivity to stressful situations, aggressive and antisocial behaviors, and peer conflict and bullying, and peer involvement and isolation. Cultural values, such as individualism, autonomy, conformity, and familism, may account for the cultural variations in children's behaviors and relationships. To understand the relations between culture and children's behaviors and problems, it is important to explore how culturally directed socialization and social interaction processes play a role in development and, more specifically, how cultural values serve as a frame of reference for judging and evaluating children's behaviors.

CULTURE AND PARENTAL ATTITUDES

People in different societies may hold different attitudes toward specific behaviors. Parental attitudes, particularly those related to child rearing, are a part of the society's general cultural belief system and at the same time guide parental behaviors in parent-child interactions. Research on parental child-rearing attitudes and practices is important for our understanding of the psychopathological nature of children's behaviors in cultural settings.

Parental Attitudes Toward Shyness-Inhibition and Social Anxiety

Studies of relations between parental attitudes and children's shyness-inhibition and social anxiety have shown that compared with parents in other societies, in general, parents in Western societies are less accepting of children who display higher levels of inhibition and social anxiety (e.g., Muris & Merckelbach, 1998; Rapee, 1997). Lieb et al. (2000) found that children's social phobia was associated with parental rejection. Comparing clinic-referred anxiety-disordered children with normal children on maternal behaviors, Hudson and Rapee (2001) noticed that mothers of anxious children were less accepting during mother-child interactions than mothers of nonanxious children. Dumas, LaFreniere, and Serketich (1995) identified anxious and nonanxious preschool children based on teacher ratings and compared maternal behaviors in the two groups during a mother-child problem-solving task. The results indicated that mothers of anxious children displayed more negative and rejecting behaviors. Similarly, Rubin and Mills (1992) found that parents of socially anxious and withdrawn children were more concerned of their children's behavior and used more negative parenting such as power assertion and punishment.

X. Chen and colleagues (1998) investigated the relations between maternal attitudes and toddlers' reactivity to novel social situations in Canada and China. The results showed that toddlers' reactivity was positively associated with mothers' negative child-rearing attitudes, such as punishment orientation and rejection, in Canada. However, the pattern was the opposite in China: child reactivity was positively associated with maternal warm and accepting attitudes and negatively associated with maternal rejection. Positive parental attitudes toward anxious and reactive behavior in children and adolescents have also been found in China. X. Chen, Rubin, and Li (1997) found that shyness-anxiety in school-age children was associated with maternal acceptance. In a separate study with Chinese children, X. Chen, Dong, and Zhou (1997) found that shyness was negatively associated with paternal rejection and power assertion in both boys and girls and with maternal negative attitudes in girls. J. Kim, Rapee, Oh, and Moon (2008) investigated relations between several types of social withdrawal and social support among Australian and South Korean adolescents. The results showed that the patterns of relations between unsociability or social disinterest, isolation by peers, and withdrawal due to depressed mood, on one hand, and parental attitudes, on the other, were similar in the two samples. However, similar to the findings in Chinese and Canadian children (e.g., X. Chen et al., 1998), shyness or social anxiety was positively associated with parental support and positive parent-child relationships in Korean adolescents but not in Australian adolescents.

Relatively positive parental attitudes toward shy-anxious behavior have been found in Latino youth. Varela, Sanchez-Sosa, Biggs, and Luis (2009) examined relations between parental acceptance and control and children's anxiety in samples of Latin American, European American, and Mexican children. The results first indicated that Latin American and Mexican children had higher scores on anxiety than European children, which was consistent with some previous findings (e.g., Gudiño & Lau, 2010; Pina & Siverman, 2004). More important, the analyses revealed group differences in the relations between parenting and children's anxiety; whereas maternal acceptance was generally not related to anxiety in Mexican children, the relation was significant and positive in Latin American and European American children, with the magnitude of the relation greater in Latin American than European American children. Paternal control, which tapped power assertion in parenting, was positively associated with child anxiety in the European American group but negatively associated with child anxiety in the Latin American group.

The results indicated that the attitudes of Latino parents toward their children's anxious behavior appeared to be more supportive and accepting than those of European American parents. An interesting finding of the study was that the relations between parenting and child anxiety in the Mexican group appeared different from those in the other two groups. Further investigation is needed to clarify this issue.

Parental Attitudes Toward Aggression, Anger, and Self-Regulation

There is evidence that parents in different cultures may react differently to children's behaviors, such as aggression and defiance, that involve self-control, which may have implications for developmental psychopathology. Compared with Canadian parents, for example, Chinese parents tend to expect their children to maintain a higher level of behavioral control (X. Chen, Rubin, et al., 2003; D. Y. E. Ho, 1986). The greater emphasis of Chinese parents on behavioral control is related to the traditional values of *li* (propriety)—a set of rules for actions—that are used to encourage children to promote innate virtues (D. Y. E. Ho, 1986). Consequently, Chinese parents tend to express more negative attitudes than Western parents toward children who display defiant and disruptive behaviors.

Keller et al. (2004) found cross-cultural differences in parental attitudes toward children's self-regulation rural Cameroonian Nso, Costa Rica, and Greece. In the study, rural Cameroonian Nso toddlers displayed more regulated behaviors than Costa Rican toddlers, who in turn had higher regulation scores than Greek toddlers, as indicated by their compliance with maternal requests and prohibitions. Consistent with the differences in toddler behaviors, Cameroonian Nso mothers were higher than Costa Rican mothers, who were higher than middle-class Greek mothers, on body contact and body stimulation, which was believed to indicate a proximal parenting style that facilitates child obedience and regulation. According to Keller et al. (2004), whereas behavioral control may be viewed as interfering and undermining the child's autonomy in Western individualistic cultures, behavioral control and compliance are viewed as a duty, reflecting competence, in group-oriented cultural contexts.

P. M. Cole et al. (2006) studied caregivers' attitudes and reactions to children's anger and undercontrolled behavior in two different villages in Nepal: Brahmans and Tamangs. Brahmans are high-caste Hindus who value hierarchy and dominance, whereas Tamangs place higher value on social equality, compassion, modesty, and nonviolence. Consistent with the cultural orientations, it was found that most responses of Tamang caregivers involved rebuking the angry child, whereas responses of Brahman caregivers often involved supporting the angry child to feel better. The results suggested that Tamang parents were more likely than Brahman parents to send the message to children that the display of anger and undercontrol was unacceptable.

Hackett and Hackett (1993) examined attitudes toward various behaviors through interviews with Gujarati and English parents of 4- to 7 year-old children in Manchester, England. The Gujarati community, members of which arrived from India and East Africa during 1970s, consisted of three largely endogamous groups based on Hinduism and the Gujarati language. The researchers found that Gujarati parents were less tolerant of their children's aggressive behavior than English parents. In response to a hypothetical situation in which their child was hit by a peer in school playground, 19% of Gujarati parents and 51% English parents said that they would tell their children to retaliate. Sixty percent of Gujarati parents compared with 12% of English parents would disapprove if their child hit back, and 39% of Gujarati parents had told their children to stand up for themselves physically in such situation, as opposed to 62% of English parents.

According to parental reports, when their child had a fight with a peer, 51% of Gujarati parents and 20% of English parents would stop such fights immediately and punish their children, whereas 6% of Gujarati parents and 51% of English parents would ignore the fight and allow it to subside. Moreover, 43% of Gujarati parents and 29% of English parents said they would arbitrate and try to find out who started the fight. If a peer grabbed a toy from their child when playing outside, 33% of Gujarati parents and 16% of English parents said they would expect their child to come and tell them, and 5% of Gujarati parents and 51% of English parents expected their child to get the toy back by force.

Several studies revealed that relations between parental attitudes and practices and aggressive behavior were different toward African-American and European American children (e.g., Hill & Bush, 2001). Deater-Deckard, Dodge, Bates, and Pettit (1996) assessed harsh parenting, such as physical punishment, using interviews, hypothetical vignettes, and questionnaires and analyzed its relations with aggressive and externalizing behaviors in African-American and European American children. The results indicated that harsh or negative parenting was positively associated with aggression in European American children but not in African-American children. Similarly, Hill and Bush (2001) found that ethnicity moderated the relations between parenting styles and strategies and children's behaviors. Parental hostile control was positively associated with externalizing behaviors including aggression in

both African-American and European American children, but the associations were considerably weaker in African American than in European American children. The researchers attempted to explain the results in terms of cultural meanings (e.g., normality) of harsh or controlling parenting in African-American and European American communities. From a different perspective, however, the results may also reflect different parental attitudes toward children's aggressive behavior.

Parental Attitudes Toward Peer Conflict

Relative to the literature on parental attitudes toward shyness-anxiety, aggression, and self-control, far less information is available about parental attitudes toward peer conflict. Ross and colleagues (1990) analyzed maternal responses to toddlers' peer conflicts and found that mothers intervened frequently and often sided against their own child. The results might be biased because mothers' responses were observed in the presence of the other child's mother. In this study, the ethnicity or cultural background of the sample was not reported. In a study on Colombian parents of third- to eighth-grade children, Chaux (2005) found that parents were actively involved in 14% of the conflicts of their children. Parental involvement in peer conflict comprised mainly of helping children to settle the conflict by repressive means (e.g., threatening or sanctioning those involved children in order to settle) or by becoming a surrogate, thereby supporting one side.

Cultural beliefs and norms about conflict in general may play a role in shaping parental attitudes toward and involvement in peer conflict. For example, Italian adults view peer conflict as a more normative interpersonal experience compared to adults in England, Hong Kong, or Japan (Argyle, Henderson, Bond, Iizuka, & Contarello, 1986). Italian adults engage in lively debates, which may expose children to conversations about conflict situations and socialize them to see different perspectives. Indeed, Italian children are often required to engage in lively debates themselves (Corsaro, 1988). Thus, parental attitudes about interpersonal conflict are expressed in their child-rearing practices that promote children's ability to negotiate on their own in peer conflict situations.

Parental Attitudes Toward Bullying and Victimization

To our knowledge, few cross-cultural comparisons have been conducted to directly examine parental attitudes toward bullying and victimization. However, existing related studies seem to show that parents across cultures vary in their attitudes toward children's bullying. In a survey study of parental attitudes in a sample of over 1000 English primary schoolchildren, Eslea and Smith (2000) found that parents generally expressed sympathy toward victims of bullying and were supportive of antibullying intervention. A large number of parents also endorsed unsympathetic responses, such as encouraging children to stand up for themselves or hit back. Studies assessing children's perceptions of parental beliefs regarding fighting suggest that such perceptions are relevant to children's actual behavior. For example, Orpinas, Murray, and Kelder (1999) measured family influences on fighting among middle school students from an ethnically diverse urban school, with the majority of students being Hispanic. Students' reports of parent-child relationships, parental monitoring, and parental support of fighting were found to be strongly associated with their fighting behaviors. In a study of parents' attitudes toward fighting in an ethnically diverse middle school sample comprised mostly of European American and African-American children, Malek, Chang, and Davis (1998) found that 30% students believed their parents would want them to fight if confronted or insulted, with this belief more prominent among students from lower-income schools. Similarly, in a study with middle school students from predominantly low-income African-American neighborhoods, Cotten and colleagues (1994) found that families' attitudes toward violence were positively correlated with the students' attitudes toward violence.

In a study with mostly high-risk African-American youth admitted to a hospital emergency department for assault-related injuries, Solomon, Bradshaw, Wright, and Cheng (2008) found that beliefs about fighting were prevalent, with 62% parents reporting "anyone who won't fight is going to be picked on even more." Moreover, 78% of youth and 47% parents agreed with the statement "If a student hits me first, my family would want me to hit them back." According to Sawyer, Bradshaw, and O'Brennan (2008), being victimized often stigmatizes African-American youth. This belief, along with the cultural emphasis for males in Western societies to be tough, may explain the high prevalence of retaliatory behavior in this sample.

Finally, parental attitudes and responses toward victimization may differ across cultural or ethnic groups. In a study with 1,495 parents of elementary, middle, and high school students (78.9% identified as White), for example, Waasdorp, Bradshaw, and Jeffrey (2011) found that parents of non-White youth were less likely to report talking with their victimized child. The authors suggested that these ethnic minority parents might believe that the school should address such problems.

Although the literature on parent attitudes toward bullying and victimization is limited, taken together, the

existing studies suggest that parental attitudes are likely to be shaped by cultural norms, which may contribute to differences in ways in which children are socialized in their bullying and victimization experiences. Further cross-cultural research on parental attitudes in this area will be useful for designing culturally effective antibullying programs in school and community settings.

Parental Attitudes Toward Peer Involvement

Parental attitudes toward children's involvement in peer relationships, such as friendship and peer groups, may also reflect specific cultural features in a society. Young and Ferguson (1981) conducted a longitudinal study through interviews comparing Italian children from Palermo and those who had immigrated to Rome and the United States. The researchers found that Palermo parents were more likely than parents from Rome and the United States to display displeasure for children spending free time with friends rather than being at home. Consistent with this finding, researchers have found that parents in Italy tend to be more restrictive of their children's autonomy and peer activities than parents in North America (e.g., Lambert, Hamers, & Frasure-Smith, 1979). It has been suggested that the encouragement of identification with the family among Italians may be accompanied by ambivalence toward extrafamilial peer relationships (Argyle et al., 1986; Attili, 1997).

In a study in four communities in Oslo (Norway), Lincoln, Nebraska (United States), Ankara (Turkey), and Seoul (South Korea), Aukrust and colleagues (2003) examined the parental perceptions and attitudes about their children's friends and peer groups. Although parents in all groups generally believed that close peer relationships were important for their children, parents in some countries seemed to place greater value on peer relationships than those in other countries. Oslo parents highly valued the stability of children's friendships and believed small class sizes and continuity of classroom composition to be helpful for children to maintain stable friendships. In contrast, Lincoln parents were less concerned about the preservation of friendship groups but were instead more concerned about their children's comfort with their teacher and their classroom experience. Seoul parents tended to emphasize academic success and, at the same time, highly regarded their children's sense of belonging with their peers. Finally, Ankara parents tended to believe that their children had difficulties maintaining friendships, perhaps due to the large class sizes in Ankara schools. Thus, parental beliefs and attitudes about children's peer relationships may be related to the organization of socialization settings and practices.

In summary, parental attitudes and associated socialization practices, to a great extent, are indicative of cultural values and requirements of the society. Inquiry into culturally relevant parental attitudes and behaviors, especially in parent-child interactions, is likely to shed light on the role of sociocultural conditions in the development of social-behavioral and psychological problems.

CULTURE, PEER EVALUATION, AND THE REGULATORY FUNCTION OF PEER INTERACTIONS

Peer interactions become an increasingly important socialization context for individual development from childhood to adolescence. During interactions, children interpret and evaluate each other's behaviors and express their attitudes about the behaviors. Swords, Hennessy, and Heary (2011), for example, found that girls appeared to be more accepting than boys of others who displayed behavioral and emotional problems. More important, when children believed that the target child was more responsible for his or her conditions, they were less accepting of the child. Perceived responsibility was a significant predictor of acceptance, especially when the target child was a boy. Nevertheless, like adults' attitudes, peer evaluations of, and responses to, children's behaviors are consistent with the guidance of cultural norms and values that are endorsed in the society, community, and group.

Peer Evaluations

Peer evaluations include understanding, interpretation, and judgment of the behavior that a child displays. Based on the social-cognitive processing of the information, peers may generate and express their responses to the child, which form their attitudes toward the behavior. Cultural norms and values that are adopted in the peer group provide a framework of reference for social evaluations in peer interactions.

Peer Evaluations of Shyness-Inhibition, Social Anxiety, and Unsociability

To investigate cultural differences in peer evaluations, X. Chen and colleagues conducted several studies concerning shy and anxious behavior and peer interactions and relationships in Canadian and Chinese children. In an observational study of peer interactions among

4-year-olds, for example, Chen, DeSouza, Chen, and Wang (2006) found different peer attitudes toward children who displayed shy and reticent behaviors in China and Canada. When shy children in Canada displayed a behavior to initiate social interaction, peers were likely to make negative responses, such as overt refusal, disagreement, and intentional ignoring of the initiation. However, peers tended to respond in a more positive manner in China by showing support and approval and by controlling their negative actions. The results indicated that passive and anxious behaviors that shy children displayed were regarded by peers as incompetent and deviant in Canada but appropriate or even desirable in China, indicating courteousness and a signal of looking for social engagement. In addition, whereas peers were more likely to make forceful and negative voluntary initiations (e.g., verbal teasing) to shy than nonshy children in Canada, peers made similar voluntary initiations to shy and nonshy children in China. Therefore, in their interactions with children who display shy-reticent behaviors, peers are generally unfriendly and unreceptive in Canada but more supportive and cooperative in China.

Cultural norms and values are also reflected in peer attitudes, such as acceptance and rejection. Research findings have shown that shy children seem to experience fewer problems in peer acceptance in societies where assertiveness and self-expression are not highly valued or encouraged. Eisenberg, Pidada, and Liew (2001), for example, found that shyness in Indonesian school-age children was negatively associated with peer nominations of dislike. Chen and colleagues found that shyness was associated with peer rejection in Canada but with peer acceptance in China in the early 1990s when the impact of the massive social and economic reforms in the country was still not evident on individual attitudes and behaviors (e.g., Chen, Rubin, & Sun, 1992). As urban China is changing toward an increasingly competitive market-oriented society with the introduction of more individualistic cultural ideologies, children's shyness is associated with more negative peer attitudes. By the early part of the twenty-first century, as the country became deeply immersed in a market economy, shy children, unlike their counterparts in the early 1990s, were clearly rejected by peers (X. Chen, Cen, Li, & He, 2005; Chen et al., 2011). Interestingly, shyness was positively associated with both peer acceptance and peer rejection in the late 1990s, which seemed to indicate ambivalent attitudes of peers toward shy-inhibited children during a transitional period characterized by mixed traditional Chinese and new Western values.

Heinrichs et al. (2006) studied perceived cultural norms and their relations to social anxiety among youth in multiple societies. The results indicated that youth in collectivistic countries, including Japan, Korea, and Spain, reported higher levels of social anxiety and greater fear of blushing than did youth in individualistic countries, including Australia, Canada, Germany, the Netherlands, and the United States. Moreover, youth in collectivistic, especially East Asian, countries were more accepting of socially reticent behaviors than youth in individualistic countries. High levels of social anxiety and fear of blushing symptoms appeared to be associated with the greater acceptance of reticent behavior at both individual and cultural levels. Heinrichs et al. (2006) argued that cultural norms concerning socially anxious behavior determine, in part, not only the display of the behavior but also social judgments and evaluations of the behavior.

In another study in Western (Australia, Canada, Germany, the Netherlands, and the United States) and East Asian (China, Japan, and Korea) countries, Rapee et al. (2011) presented to adolescents vignettes describing individuals who displayed shy and reserved behaviors or outgoing and socially confident behaviors. The participants were then asked to indicate the extent to which they would expect the individuals in the vignettes to be liked by others and to succeed in their careers. The results showed that the difference in perceived social and career impact between shy and outgoing vignettes was smaller among participants from East Asian countries than from Western countries. Shyness tended to be negatively associated with experienced quality of life for all groups of countries, but the associations were more evident for Western groups than for East Asian groups. These results suggested that participants in Western countries viewed shy behavior as having a more negative impact on social relationships and life adjustment than did their counterparts in East Asia.

In the literature of peer relationships and social behaviors, unsociability or social disinterest, which refers to nonfearful preference for solitary activities, is considered another major aspect of social withdrawal (Asendorpf, 1990; Coplan & Armer, 2007). Unlike shyness, unsociability in children remains relatively understudied, particularly from middle childhood. According to a conceptual model proposed by Asendorpf (1990), whereas shyness-inhibition is derived from an internal conflict of approach and avoidance motivations, unsociability is based on low levels of both approach and avoidance in social settings. Unsociable children do not have a strong desire to play with others, although they may not strongly avoid peer interactions (Coplan et al., 2004). It has been argued that in Western cultures, preference for solitude may be considered

representing an autonomous action of the individual if it is based on personal choice (Coplan & Armer, 2007). Thus, unsociability does not necessarily indicate social incompetence and deviance because personal decision making and self-oriented acts are encouraged in Western societies. Moreover, it has been suggested that engagement in solitary activities may have potential benefits for well-being (Leary et al., 2003; Long & Averill, 2003).

Unsociability or social disinterest is related to more negative social attitudes in more collectivistic cultures that emphasize group affiliation and interpersonal connectedness (Greenfield, Suzuki, & Rothstein-Fisch, 2006). There is great pressure in collectivistic societies on individuals to identify with the group and to function in a group context (Sharabany, 2006). During socialization, children are encouraged to develop a sense of social belonging and integration to the group. Because preference for solitude, including pursuing personal autonomy and independence, does not fit a group orientation, children who prefer solitude and maintain distance from the group are viewed as selfish and deviant (X. Chen & French, 2008). Thus, unsociability is likely to elicit negative peer evaluations. Consistent with this argument, in a sample of children in a rural area of China where traditional values were still well maintained, X. Chen, Wang, and Cao (2011) found that unsociability was positively associated with peer rejection although shyness was associated with peer acceptance. In addition, Coplan, Zheng, Weeks, and Chen (2012) found that children in Canada and China responded differently when they were presented with hypothetical vignettes describing the behaviors of an unsociable figure. Compared to their Canadian counterparts, Chinese children viewed the behaviors of the unsociable child as less intentional, and they characterized the unsociable child as having a greater motivation to play with others. Coplan et al. (2012) argued that given the social pressure to engage in affiliative and collectivistic activities, it was more difficult for Chinese children to believe that any child would display socially disinterested behaviors intentionally. As a result, Chinese children believed that the unsociable peer might still desire to play with others and their socially disinterested behavior might be less intentional.

Peer Evaluations of Aggressive and Antisocial Behaviors

Compared with shy and anxious behaviors, aggressive and antisocial behaviors are associated with negative peer attitudes more consistently across cultures, which is understandable, given that aggression, disruption, and violence are likely to threaten not only the well-being of individuals but also the harmony of the group. Nevertheless, variations have been found across cultures or subcultures in peer attitudes toward these behaviors. In cultures such as that of the Yanomami Indians, where violent behaviors are regarded as socially acceptable or encouraged, children, especially boys, who display these behaviors may be admired as heroes by their peers (Chagnon, 1983). In some central and southern Italian communities, due to social and historical circumstances, aggressive and defiant behaviors may be viewed by children as reflecting social assertiveness (Casiglia et al., 1998; Schneider & Fonzi, 1996). In the United States, aggression is generally discouraged. However, aggressive children and adolescents may obtain support from their peers (e.g., Cairns & Cairns, 1994; Rodkin, Farmer, Pearl, & van Acker, 2000). In peer groups that encourage violence, being able to fight and display aggressive behaviors is related to the acquisition of personal status in the group (Bernburg & Thorlindsson, 2005; K. Graham & Wells, 2003).

Positive evaluations of aggressive and antisocial behaviors in peer groups are illustrated in Dishion and his colleagues' work (e.g., Boislard, Poulina, Kiesner, & Dishion, 2009; Dishion, McCord, & Poulin, 1999). In a study of delinquent behavior, the researchers asked 13- to 14-year-olds to discuss a variety of topics, such as planning a joint activity and solving a social problem, and found that delinquent youth engaged in four times the amount of talk about rule breaking than nondelinquent youth did. Moreover, delinquent youth were likely to display positive reactions to deviant talk, such as laughter and expression of interest, whereas nondelinquent youth often ignored deviant talk. In contrast, delinquent youth were less likely to react positively to normative talk than nondelinquent youth. Dishion et al. (1999) argued that deviant talk seems to be a tool that antisocial and delinquent youth use to formulate, establish, and maintain social support networks. The deviant talk of delinquent adolescents indicates their understanding of (1) the group norm that values rule breaking and other antisocial behaviors, (2) peer expectations of their actions to be in accord with the norm, and (3) the potential damage of violation of the norm on their relationships with others in the group. Positive reactions of adolescents to the talk signify their endorsement of the group norm, which is an indication of their collective attitudes about rule breaking. At the same time, deviant talk is useful for individual members to acquire and enhance their status and peer recognition in the group.

Children's aggressive and antisocial behaviors are generally regarded as more problematic in group-oriented cultures (e.g., X. Chen & French, 2008). In Chinese

schools, for example, these behaviors are strictly prohibited in social interactions. To help children control their aggressive and disruptive behaviors, students are required to engage in public evaluations in which they evaluate each other's behaviors according to school standards. Although aggressive children in China may form groups with peers that exhibit similar behavior (X. Chen, Chang, Liu, & He, 2008), they are likely to be rejected, criticized, and even shamed by others in the larger context (e.g., X. Chen et al., 2005).

In a cross-cultural study of adolescent misconduct, C. Chen, Greenberger, Lester, Dong, and Guo (1998) explored perceptions of peer approval and disapproval of externalizing behaviors in four samples: European Americans, Chinese Americans, Chinese in Taipei, and Chinese in Beijing. Students in junior high schools (grades 7 and 8) reported their peers' attitudes toward their behaviors such as talking back to teacher, doing something dangerous for excitement, stealing, and lying to parents. Students were asked whether their peers would admire or think badly of them if they were to engage in these behaviors, on a 7-point rating scale (e.g., 1 = endorsing none of the misbehaviors; 7 = endorsing all six types of misbehaviors). The results showed that European American adolescents (M = .86) had higher scores on peer approval for the behaviors than did Chinese adolescents in Beijing and Taipei (M = .28 and .28). Chinese American adolescents (M = .51) fell between European Americans and the two Chinese groups. In contrast, Chinese in Beijing and Taipei (M = 4.30 and 3.49) reported a higher level of peer disapproval of the behaviors than did European and Chinese Americans (M = 2.21 and 2.85). Greenberger and colleagues (2000) found similar results in another study conducted with adolescents in different samples in the United States, China, and Korea. In this study, the participants in the United States (M = 2.71 and 1.42) perceived a lower level of negative sanctions against physical aggression toward others and other antisocial behaviors from parents and friends than did Koreans (M = 2.78 and 1.61) and Chinese (M = 2.78 and 1.69), and Koreans perceived friends as less disapproving of the behaviors than did Chinese. Taken together, the findings from these studies clearly show that Chinese and Korean adolescents are less likely than American adolescents to believe that their peers and parents would endorse aggressive and antisocial behaviors.

Peer Evaluations of Conflict Behavior and Bullying

Some studies have been conducted to examine peer evaluations of conflict and bullying and their effects on children's behaviors. In addition to examining similarities and differences between Chinese and Canadian children on social behaviors in limited-resource and potential conflict situations, French et al.'s study (2011) examined how the behaviors were associated with peer attitudes. Upon completion of the behavioral observation of conflict, children were individually interviewed about how much they liked playing with the other children in the group. The analyses revealed a series of cross-country differences in the relations between conflict behaviors and peer evaluations of liking. Specifically, assertive behavior in the attempt to acquire the only toy in the playroom was negatively associated with peer liking and passive behavior, and uninvolvement was positively associated with peer liking in Chinese children; these associations were not significant in Canadian children. Holding control of the toy was positively associated with peer liking and passive behavior was negatively associated with peer liking in Canadian children but not in Chinese children. Thus, the results suggest a very different profile of esteemed behaviors in conflict situations for Chinese and Canadian children. Children who hang back, let others play with the toy, and watch others are liked by their peers in China. By contrast, their peers in Canada accept children who are assertive and successful in attaining control of the resource. The differences in relations between behavior and group member's evaluations of liking among Canadian and Chinese children are striking but consistent with previous findings that socially constrained behaviors, such as modesty, are valued by Chinese children whereas active behaviors in controlling the situations are valued by Western children (e.g., X. Chen, DeSouza, et al., 2006).

Researchers have studied the third-party mediation in children's conflict, which also provides information about peer attitudes. In observational studies conducted by Butovskaya, Verbeek, Ljungberg, and Lunardini (2000) comparing 2- to 7-year-old children in Russia, the United States, Sweden, and Italy, third parties were found to typically support one side rather than to seek a way to settle the conflict. However, Russian children were more likely than children in other countries to try to find a compromise, indicating that peer conflict might be perceived as more disturbing and less tolerable in the Russian culture (Verbeek, Hartup, & Collins, 2000). Butovskaya et al. (2000) found that among 2- and 3-year old children in a multicultural child care center, 30% Moroccan and 37% Antillean children intervened in the conflict, compared to only 17% Dutch children. The authors suggested that collectivistic characteristics,

which promote third-party intervention, might explain the greater tendency of Antillean and Moroccan children to intervene.

Concerning peer attitudes toward bullying, it appears that children who explicitly demonstrate a negative attitude show less bullying behaviors than children who show a positive regard toward bullying (van Goethem, Scholte, & Wiers, 2010), although this association may be moderated by a number of factors. In a study conducted by Pepler and colleagues (1993), approximately half of the children said they would intervene to support victims during bullying episodes. In another study (Rogers & Tisak, 1996), when children were asked how peers ought to respond when witnessing a peer hitting another child, responses varied by age and by the relationship they had with the peer. Although all children believed that the attack should be reported to an authority, older children were more likely to think that the bystander would confront the perpetuator or not respond at all. Moreover, children thought that the bystander would be more likely to respond or intervene if the victim or the perpetuator was a friend rather than an acquaintance. Salmivalli and colleagues (1996) used peer reports to examine bullying among sixth graders in Finland and found that girls tended to align themselves with the victim by telling an adult about the bullying or staying out of the situation, whereas boys tended to incite the bullying. These results point to the role of gender on third-party conflict intervention in childhood.

In short, research findings have indicated different cultural norms and values with regard to children's shyness-inhibition, social anxiety, aggression, conflict, and bullying. These norms and values are manifested in peer attitudes and responses in interactions, which, along with adult socialization attitudes and practices, constitute important social environments for the development of adaptive and maladaptive behaviors.

The Regulatory Function of Culturally Directed Peer Interactions

Whereas culture provides guidance for social evaluations of children's behaviors, social evaluations in interactions, in turn, may serve to regulate children's behaviors and their developmental patterns. Research has indicated that social interaction situations are likely to elicit attention to external demands, which is an important condition for the regulation of behaviors (Duval & Silvia, 2002). Feedback from others in the interaction process may enhance children's awareness of social expectations and the differences between their behaviors and the expectations.

From the contextual-developmental perspective, the regulatory function of social evaluations and responses is an important part of the mediating process of cultural influence on individual development. The process may occur as children attempt to maintain or modify their behaviors or behavioral styles according to culturally based social expectations. The need for social approval, group affiliation, intimate feelings within relationships, and overall social acceptance in larger settings is the main motivational force that directs children to participate in social interactions, attend to social evaluations, and maintain or modify their behaviors according to social expectations. To obtain social affiliation and integration, children need to understand others' attitudes and to maintain their behaviors accordingly. As illustrated in the C. Chen et al. study (1998), the perceptions of peer approval of misconduct were positively associated with antisocial behavior, school misconduct, and deviant behaviors such as cigarette smoking and alcoholic drinking, whereas the perceptions of peer disapproval of misconduct were negatively associated with these behaviors. The patterns of the associations were generally consistent in European American, Chinese American, Taipei Chinese, and Beijing Chinese adolescents.

Regulatory Role of Social Interaction in the Development of Internalizing Behaviors

Little research has been conducted to directly examine how social interaction processes play a role in regulating the development of socioemotional functioning, particularly of an internalizing nature. Nevertheless, the results of several studies suggest that there exists a peer contagion effect on children's and adolescents' socioemotional distress, such as depression, which indicates that peer interactions may enhance or weaken children's internalizing behaviors. Prinstein and his colleagues, for example, studied how the characteristics of friends and peer groups contributed to the development of adolescent depression (Prinstein, 2007; Stevens & Prinstein, 2005). An interesting finding was that youth in socially active groups, such as those identified by the participants as Populars and Jocks, had experienced significant declines in internalizing distress in development. In contrast, youth in groups that were academically oriented, such as the Brains, exhibited increased internalizing distress from childhood to adolescence (Prinstein & La Greca, 2002). Conway, Rancourt, Adelman, Burk, and Prinstein (2011) extended the work by examining depression socialization among adolescents with different status in the peer group. The results indicated that the peer group had stronger effects for adolescents who

were peripheral members of the group, which was likely due to the fact that, compared with nuclear members, peripheral members faced greater pressure to conform to the group norm and thus were more susceptible to peer influence.

Van Zalk, van Zalk, and Kerr (2011) investigated whether adolescent crowds affected individual social anxiety in Sweden. The researchers focused on Radical crowds (Punks and Goths) comprised of adolescents who were shy and socially fearful with extremely eye-catching or shocking appearance (e.g., wearing white face paint, faked bloodstains around the eyes or mouth, or half-shaved long black hair). Adolescents in these crowd groups were believed to create unusual appearance to limit anxiety-arousing social contacts. The distinct striking physical feature of the Radical peer crowd appeared to facilitate the socialization of social anxiety. Through social interaction processes, adolescents in Radical crowds were more susceptible to peer influence than adolescents in the other groups. According to van Zalk et al., group members might strengthen socially anxious behavior of one another by providing empathy and approval in situations that provoke social fear because the behavior is consistent with the group norm.

Finally, in a study of adolescents' suicide attempts in Hong Kong, T. Ho, Leung, Hung, Lee, and Tang (2000) found that suicidal behaviors (ideation, plans, and acts) increased among adolescents with friends who had attempted or completed suicide. As Ho et al. pointed out, although the study could not determine a causal relationship between individual suicidal acts and their friends' suicidal behaviors, the results showed that youth with friends who carried suicidal attempts increased the risk of suicidal behaviors themselves.

Regulatory Role of Social Interaction in the Development of Aggressive and Antisocial Behaviors

The regulatory function of peer interaction has been observed in a number of studies of the development of aggressive, antisocial, and delinquent behaviors (e.g., Lavallee, Bierman, & Nix, 2005; Zakriski, Wright, & Cardoos, 2011). Among them, studies conducted by Dishion and his colleagues (e.g., Dishion et al., 1999; Piehler & Dishion, 2007) concerning deviancy training, delinquency training, or peer contagion processes provided particularly compelling evidence that interaction among youth with externalizing behaviors led to the escalation of the behaviors. The researchers found that peer activities, such as talk about rule breaking and positive reactions to the talk, predicted increase in later substance use, delinquency, violence, and high-risk sexual behavior (e.g., Patterson, Dishion, & Yoerger, 2000; Piehler & Dishion, 2007). As argued by Dishion and Dodge (2005), the grouping of antisocial and delinquent adolescents provides a context that elicits and reinforces their externalizing behaviors.

The salience of the group norm and uniformity of norm-based social evaluations and responses may affect the regulatory effects of peer interactions. Battin, Hill, Abbott, Catalano, and Hawkins (1998), for example, found that gangs with explicit norms and rules exerted greater influence on youth than more informal peer groups. Gang involvement made a unique contribution to the development of criminal behavior beyond the membership of nongang delinquent networks. With a few exceptions (e.g., Mager, Milich, Harris, & Howard, 2005), studies have shown that homogenous groups consisting of similarly antisocial and delinquent youth seem to have particularly evident negative effects; inclusion of prosocial members in the group may reduce adolescents' antisocial behavior (e.g., Dishion et al., 1999; Tremblay, Pagani-Kurtz, Mâsse, Vitaro, & Pihl, 1995). In mixed groups, such as those consisting of aggressive and nonaggressive children, for example, peer interaction may pull the children toward the mean level of members' behavior. Thus, peer interaction may reduce aggression for highly aggressive children but make nonaggressive children more aggressive. Moreover, effects seem to be magnified in either direction for those who are more discrepant from their peers (Boxer, Guerra, Huesmann, & Morales, 2005).

Bernburg and Thorlindsson (2005) examined how cultural values of violence affected youth aggression through the peer group in Iceland. The results indicated that group adherence to violent values and norms predicted aggression through social control beyond individual internalization of the cultural values. Thus, by directing the group processes, such as social control, culture may be involved in individual development of aggressive behavior.

Chen and his colleagues (e.g., X. Chen, Chang, et al., 2003; X. Chen, Chang, et al., 2008) examined how peer group context contributed to individual development in Chinese children. The results indicated that peer groups not only contributed to individual behavior but also affected the significance of individual behaviors for development. Specifically, in groups that functioned on the basis of academic achievement as a major standard, children evaluated each other according to their attitudes and achievement in academic areas. Moreover, group members were sensitive to the feedback from group peers on their academic performance. Within the group, children who performed better on academic subjects were more likely to

receive social and emotional support from others and had more opportunities to learn from others. In groups that did not value academic achievement, however, the common negative attitudes toward academic achievement led to group approval and support for deviant behaviors, such as violation of school rules and disruption of classroom instruction. This group context exacerbated the development of social and behavioral problems of academically poor children and thus placed them at particular risk for maladaptive social development.

Personal and Social Moderators of Regulatory Function of Social Interactions

Various personal and social factors may affect the regulatory function of social interactions. Child age or developmental period may be an important factor that moderates the effects of social interactions. Although the regulatory role of social interaction in human development may be evident from childhood to adolescence, the process of regulation may vary qualitatively and quantitatively across developmental stages. With age, social interactions become more complicated as children are more interested in, and capable of, exploring different lifestyles with others (Brown, 1990). The development of social-cognitive abilities also makes children more competent in understanding social evaluations, integrating various norms and values for group activities, and regulating their behaviors.

In addition to age, children's sensitivity to social evaluations, which includes cognitive and affective activities, such as attention to evaluations of peers, understanding of social cues, and concern about social relationships, has been shown to promote or hinder behaviors that are expected and encouraged by others and to motivate children to be attuned to social environments and actively resolve problems in interactions (Henirch, Blatt, Kuperminc, Zohar, & Leadbeater, 2001; Rudolph & Conley, 2005). Prinstein (2007) studied how individual characteristics, such as social anxiety and global self-worth, and peer characteristics, such as friends' popularity and friendship quality, moderated peer contagion effects on adolescent development of depression. The results indicated that higher levels of social anxiety were associated with adolescents' greater susceptibility to peer contagion, particularly among girls, which was consistent with a previous finding that socially anxious adolescents were particularly likely to conform to the attitudes and behaviors of their peers (Cohen & Prinstein, 2006). Moreover, higher levels of friends' popularity and lower levels of positive friendship quality were associated with greater susceptibility to depressive symptom contagion, suggesting that individuals were more likely to conform to norms that were established by peers of high status and based on more intimate relationships.

Laursen, Hafen, Kerr, and Stattin (2012) found in a sample of secondary school students in Sweden that friends influenced adolescents' alcohol intoxication and delinquent behavior over time, but the influence was moderated by the social status of adolescents in the friendship. Friends shared similar behavioral problems before the friendship was formed, and similarity increased after the friendship began and continued to grow among those who remained friends 1 year later. In stable friendships, the partner who was more accepted by peers exerted greater influence over the less accepted partner. As a result, less accepted adolescents were most vulnerable to behavioral problems when their friends had high initial level of alcohol intoxication and delinquency and at the same time had a relatively higher status among peers.

Peer influence may also be moderated by affective and attitudinal processes in peer interactions, such as mutual responsiveness, understanding of each other's ideas, and shared beliefs and values. Piehler and Dishion (2007) found that deviant talk was associated with escalated levels of antisocial behavior for adolescents who were involved in more mutually responsive and intimate interactions and relationships. Thus, supportive social context facilitated the links between deviant peer activities and the development of antisocial behavior. These findings suggest that intensive interactions may increase the salience of the group norm and uniformity of norm-based social evaluations and responses, which in turn may promote children's commitment to the norms of the group and eventually strengthen the regulatory function of peer interactions.

Cultural Variations in Regulatory Function of Social Interaction

Children's social-evaluative sensitivity may be related to individual past experiences and social-cognitive abilities (Dodge, Coie, & Lynam, 2006; Rudolph & Conley, 2005) as well as sociocultural conditions, such as values of self versus group orientation. In cultures where the view of others is regarded more important than the view of one's self, children may be inclined to attend to others' perceptions of them. Indeed, it has been found that children and adolescents in East Asian societies, such as Japan, display higher levels of social-evaluative sensitivity due to the concern about losing face than in North America (e.g., Dong, Yang, & Ollendick, 1994). Consequently, peer interactions and attitudes may play a more important role in individual development in East Asian societies. Dekovic

et al. (2002) found that participation in peer activities and peer acceptance were associated more strongly with developmental outcomes such as emotional well-being in Japanese than in Dutch adolescents, which, according to the authors, was due to the higher sensitivity of Japanese adolescents to social feedback.

In Western societies, children are expected to develop personal autonomy during social interactions. Children are encouraged to pursue personal interest and gradually develop individuality and self-identity through activities with peers. Thus, peer interactions provide a context for children to understand themselves in relation to others and to experience self-validation (Rubin, Bukowski, et al., 2006; Sullivan, 1953). As children seek independence, they may become dissatisfied with the constraint of social relationships and attempt to maintain a balance between the pursuit of self-interest and social restriction. It has been noticed that there is a trend of loosening of group ties during late adolescence and that children's sense of belongingness declines steadily with age (see Rubin, Bukowski, et al., 2006).

In group-oriented societies, the tension between the pursuit of independence and personal identity and group commitment may be less evident than in Western cultures. Thus, children and adolescents may maintain strong social affiliation and group identification across different developmental periods in these societies. Social relationships are valued mainly according to their socialization functions in helping children learn social standards and in developing socially acceptable behaviors (X. Chen, Kaspar, Zhang, Wang, & Zheng, 2004; Sharabany, 2006). Children and adolescents in China, for example, tend to describe social activities in terms of how well the activities are compatible with social requirements and standards, such as maintaining interpersonal cooperation and collective well-being (X. Chen, Kaspar, et al., 2004). In C. Chen et al.'s study (1998) and Greenberger et al.'s study (2000), perceptions of parents' and friends' negative attitudes toward externalizing behaviors were positively associated with adolescents' display of aggressive and antisocial behaviors and misconduct in the United States, Korean, and Chinese samples. Thus, youth who believed that their parents and friends would respond less negatively to their externalizing behaviors engaged in more externalizing behaviors. Interestingly, after controlling for others' perceived behaviors, attitudes toward adolescents' externalizing behaviors contributed uniquely to the prediction of adolescents' externalizing behaviors in Korean and Chinese samples but not in the U.S. sample (Greenberger et al., 2000). The results suggest that the attitudes of others play a more important role in affecting adolescents' externalizing behaviors in societies that are more group-oriented.

In summary, children's social experiences in peer interactions and relationships are culturally bound, as argued by Stevenson-Hinde (2011). Cultural norms and values provide a basis for social evaluations and responses in peer interactions, which in turn serve to regulate children's adaptive and maladaptive behaviors. The social-evaluative and regulatory processes occur mainly at the group level. Individual characteristics, such as sensitivity to social evaluations and susceptibility to peer influence, may affect the processes through constraining or facilitating group influence. Along with parental socialization practices, culturally directed peer interactions constitute important social contexts in which children and adolescents develop their social, behavioral, and psychological characteristics and problems.

CHILDREN'S PEER EXPERIENCES AND ADAPTIVE AND MALADAPTIVE OUTCOMES: THE ROLE OF CULTURE

According to the contextual-development perspective (X. Chen, 2012), culturally directed evaluation and response processes in social interactions may have pervasive effects on children's adjustment in various domains. Therefore, to understand whether and to what extent children's behaviors are adaptive or maladaptive in a society, it is important to examine their associations with social attitudes and relationships as well as their adjustment outcomes. An in-depth and comprehensive examination of behaviors in a social interaction context from a developmental perspective is critical to grasping their functional meanings. Cultural variations in developmental outcomes of children's behaviors are sometimes described in terms of goodness of fit—the adjustment of children in the society depending on how their behavioral characteristics fit cultural requirements (e.g., García Coll et al., 2000; Lerner & Lerner, 1983). The contextual-development perspective (X. Chen, 2012) stresses the social interaction processes in which social evaluations and responses regulate children's behaviors and their developmental patterns. At the same time, children play an active role through displaying their reactions to social influence and through participating in constructing the social interaction context. The bidirectional coregulatory process, especially in the peer interaction context, is dynamic and active, beyond the mutual fit between the child and the socialization agent.

The contextual-developmental perspective is consistent with the constructivist view (Piaget, 1970; Vygotsky, 1978), asserting that the social challenge or the lack of fit between the child and the context may be a motivational force for children to pursue higher levels of mental and socioemotional functioning.

Shyness-Inhibition, Unsociability, and Adjustment

In the literature, shyness-inhibition, social anxiety, and, broadly, social withdrawal in childhood and adolescence are associated with a variety of later maladaptive outcomes, such as poor family and social relationships, occupational instability, and mental health problems (Caspi, Elder, & Bem, 1988; Clark, Rodgers, Caldwell, Power, & Stansfeld, 2007; Fergusson, Horwood, & Ridder, 2005; Rubin et al., 2009). The findings, however, are based almost entirely on studies with Western children. Findings of relatively recent cross-cultural studies suggest that relations between shyness-inhibition and other aspects of social withdrawal and adjustment outcomes may be different in children in other societies.

In Western, particularly North American, societies, children who display shy-inhibited behavior likely develop social problems, negative self-perceptions of their competence, and other psychological problems, such as loneliness, social dissatisfaction, depression, and emotional disorders (e.g., Coplan et al., 2004). C. E. Schwartz, Snidman, and Kagan (1999) reported that inhibition in early childhood predicted psychopathological symptoms, such as social anxiety in adolescence. Gest (1997) found that childhood inhibition, as indexed by apprehensive and shy acts and initiation of little social interaction during interviews with researchers, predicted less active and less positive social life in adulthood. Moreover, inhibition was associated with later greater emotional distress, particularly in men. In addition, inhibited children were less likely than uninhibited children to establish independence in early adulthood, such as moving out of the home of their family of origin (34% versus 64% respectively). In another longitudinal study, Gest, Sesma, Masten, and Tellegen (2006) found that peer-assessed shy-withdrawn behavior in childhood negatively contributed to the prediction of the quality of social life, as indexed by overall social acceptance, formation of friendships and networks, and romantic relationships, 10 years later. Similarly, Asendorpf, Denissen, and van Aken (2008) and Caspi et al. (1988) found that shy-anxious children, particularly boys, experienced a variety of problems in adulthood, including delay entry into marriage, parenthood, and career. Childhood shyness was also associated with lower occupational achievement and occupational instability in adulthood. These results support the argument that shyness-inhibition represents a risk factor that may lead to psychopathological development in Western societies (Kagan, 1997).

Shy-inhibited and socially anxious behaviors tend to be related to less negative outcomes in less self-oriented and competitive societies. X. Chen, Chen, Li, and Wang (2009) examined relations between early inhibition and social and school outcomes in middle childhood in Chinese children. Data on behavioral inhibition were collected through laboratory observations from a sample of toddlers (X. Chen et al., 1998). Follow-up data were collected 5 years later when the children were 7 years of age from multiple sources, including observations of free-play peer interactions, interviews, teacher ratings, and school records. The results indicated that early childhood inhibition positively predicted later cooperative behavior, peer liking, perceived social integration, positive school attitudes, and school competence. Early inhibition was also negatively associated with later learning problems. Further analyses based on extreme groups (extremely inhibited and uninhibited groups identified using the criteria of the top and bottom 15% and 8% of the distribution) indicated that the associations were due mainly to the differences between highly inhibited children and other children; children who were identified as inhibited in toddlerhood were more competent in social and school performance and had fewer behavioral and learning problems in middle childhood than those identified as average and uninhibited.

X. Chen, Rubin, Li, and Li (1999) found that shyness in middle childhood positively contributed to adolescent social, school, and psychological adjustment in China. In this study, children's shyness was assessed using peer evaluations when the children were 8 and 10 years old. Follow-up data were collected 4 years later on children's leadership, academic achievement, self-perceptions, and behavioral problems, obtained using teacher and parent ratings, self-reports, and school records. It was found that shyness was not associated with later adjustment problems, either externalizing or internalizing. Moreover, shyness was positively associated with indexes of adolescent adjustment, including teacher-assessed competence, leadership, academic achievement, and self-perceptions of competence. Thus, shy-inhibited Chinese children continued to be well adjusted to the social and school environments in adolescence. Nevertheless, as China has shifted toward a competitive, market-oriented society, shy Chinese children, particularly in urban regions, have experienced increased school adjustment problems and socioemotional problems,

such as depression (Chang et al., 2005; X. Chen et al., 2005; X. Chen, Wang, & Wang, 2009).

Relatively less negative outcomes of shyness have been found in other societies compared with findings from U.S. samples (e.g., Caspi et al., 1988). Kerr, Lambert, and Bem (1996), for example, examined the long-term outcomes of shyness in Swedish society, where shy-reserved behavior was perceived as less problematic than in North America. The researchers followed a sample of children born in a suburb of Stockholm in the mid-1950s to adulthood. It was found that although shyness was related to later marriage and parenthood, it did not affect adulthood income, education, or occupational stability as indicated by frequency of job changes among Swedish men. Kerr et al. argued that the social welfare systems in Sweden assured that people did not need to be assertive or competitive to achieve career success. In the study, Swedish shy girls attained lower levels of education than nonshy girls, which, according to the authors, might be due to the fact that similar social support systems were not available for women at that time.

There is little research on adjustment outcomes of unsociability or social disinterest. The results from relatively limited studies, mostly cross-sectional, seem to indicate that unsociability is not necessarily associated with social or emotional problems in Western cultures (e.g., Asendorpf & Meier, 1993; Harrist, Zaia, Bates, Dodge, & Pettit, 1997). Coplan et al. (2004) found that unsociability was related to lower levels of negative emotionality than shyness. Jennings (1975) found that unsociable children did not display evident deficits in social knowledge and social skills. Harrist et al. (1997) reported that unsociable children did not differ from other children in general and were more competent than shy-anxious children on social-information processing tasks. Finally, Coplan and Weeks (2010) reported that unsociable children had more positive school attitudes than other children.

As indicated earlier, unsociability is regarded as more negative in more group-oriented cultures (X. Chen & French, 2008). Thus, one would expect that children's unsociability is associated with, and contributes to, the development of adjustment problems in these cultures. Liu et al. (2015) found in a cross-cultural study that unsociability was more strongly associated with adjustment difficulties, such as peer rejection, academic failure, and loneliness, in China than in Canada. Relative to their counterparts in urban China, unsociable children seemed to experience even more pervasive difficulties in rural areas of China, which may be because group orientation and social affiliation are emphasized to a greater extent in rural than urban areas. Indeed, X. Chen, Wang, et al.'s results (2011) showed that among rural Chinese children, whereas shyness-sensitivity was associated with social and social status, teacher-rated competence, and academic achievement, unsociability was associated with pervasive problems such as school incompetence and depression. The negative evaluations and response that unsociable children receive from peers and adults may be intensive and persistent in rural Chinese society, where personal choice and individual autonomy are highly discouraged. Many rural areas in China are currently undergoing rapid changes toward urbanization and modernization. It will be interesting to investigate how unsociable children respond to the social, economic, and cultural changes, which will further our understanding of the role of changing context in human development.

In short, research findings suggest that shyness-inhibition and social anxiety in some cultures, such as Chinese and Northern European cultures, lead to less maladaptive outcomes than what has been found in North America. In these cultures, shy, inhibited, and anxious children may not experience heightened difficulties in social interactions. Moreover, these children may receive support and assistance from others, which likely enhances their confidence and ability to form social relationships. Participation in social activities, in turn, provides the opportunity for these children to learn skills to behave appropriately in social situations. At the same time, social relationships that they establish may help them develop positive attitudes toward others and the motivation to achieve success in various areas. Unsociability or social disinterest may reflect, to some extent, personal autonomy and independence, which are more valued in Western individualistic cultures than in group-oriented cultures. Therefore, unsociability tends to be associated with more adjustment problems among children in group-oriented than in individualistic societies. Longitudinal research is needed to understand the developmental outcomes of unsociability in both Western and non-Western contexts.

Aggression, Self-Control, and Adjustment

Research in Western societies has shown that aggressive and antisocial behaviors in childhood and adolescence are associated with a number of social and psychological problems, including delinquency, school dropout, and mental health problems (e.g., Dodge et al., 2006; Landford, Malone, Dodge, Pettit, & Bates, 2010; Tremblay, 2010). Longitudinal data have also indicated that early aggression predicts adolescent and adulthood adjustment

problems (e.g., Dodge et al., 2006). Relative to the large number of projects conducted in Western societies, there is little research on the adjustment outcomes of aggressive and other externalizing behaviors in non-Western societies, although these behaviors may be regarded as equally or even more problematic in some of these societies (X. Chen & French, 2008). The extant findings (e.g., X. Chen et al., 1999; Zhou, Lengua, & Wang, 2009) seem to suggest that the developmental outcomes of aggression in non-Western societies are similar to those in Western societies.

Despite generally similar cross-cultural patterns of relations between aggression and adjustment outcomes, some evidence suggests that children who display aggressive behavior in group-oriented cultures report more negative self-perceptions and self-feelings than their counterparts in self-oriented cultures (e.g., X. Chen, He, et al., 2004). In the Western literature, the findings concerning the relations between aggressive behavior and psychological problems are inconsistent. While some researchers found comorbidity of externalizing and internalizing behaviors, particularly in elementary school ages (e.g., M. K. Holt & Espelage, 2007), others failed to find significant relations (e.g., Mercer & DeRosier, 2008; Palmen, Vermande, Deković, & van Aken, 2011). High comorbidity was often found in studies based on data from a single source, such as parent or youth self-report. With data collected from different sources, such relations were considerably weaker or nonsignificant. It has been argued that aggressive children tend to develop biased self-perceptions of social competence (Dodge et al., 2006), perhaps due to their cognitive deficits or social support received from their peers or both (e.g., Rodkin et al., 2000). X. Chen, Zappulla, et al. (2004) found that whereas aggression was not associated with self-perceptions in Brazilian, Chinese, or Italian children, it was significantly and positively associated with perceived social competence in Canadian children. Canadian aggressive children were more likely than their nonaggressive counterparts to report that they were socially competent. As such, it may be understandable that most aggressive children in North America do not experience emotional problems.

In group-oriented Asian societies, such as those of China, Japan, and Korea, children's behaviors are often evaluated by others in public settings. During the public evaluations, children who display aggressive and antisocial behaviors may be criticized and humiliated. It is believed that negative social evaluations, such as shaming, may lead to self-examination, which may facilitate the internalization of rules and the development of social responsibility (Fung, 2006). This evaluation process makes it difficult for aggressive children to develop inflated or biased self-perceptions of their competence. Moreover, the adverse social experience of aggressive children may facilitate the development of psychopathological problems, such as feelings of loneliness and depression. Consistent with this argument, X. Chen, He, et al. (2004) found that aggression was positively associated with loneliness through the mediation of peer relationships in Chinese children but not in Brazilian, Canadian, or Italian children. X. Chen, Liu, et al. (2003) also found that externalizing behaviors in Chinese children negatively predicted teacher-rated social competence, academic achievement, and self-perceptions of self-worth and positively predicted depression 2 years later. Similar results were found in a 4-year longitudinal study in which aggressive behavior predicted teacher-rated incompetence, low social status, and negative self-perceptions of competence in Chinese adolescents (X. Chen et al., 1999).

Crick and her colleagues (e.g., Kawabata, Crick, & Hamaguchi, 2010) examined associations of overt and relational forms of aggression with adjustment problems in U.S. and Japanese elementary school children. The results indicated similar patterns in the two samples: Physical aggression was positively associated with delinquency, and relational aggression was positively associated with depression. However, the associations between relational aggression and depressive symptoms were stronger in Japanese children than in U.S. children. Thus, Japanese children appeared to be more vulnerable than U.S. children to negative interpersonal experiences. Kawabata et al. (2010) argued that relational aggression toward peers is typically associated with interpersonal conflict and stress, which in turn is associated with social-psychological adjustment problems. Relational aggression may be more detrimental to psychological well-being for Japanese children than for American children because interdependence in peer relationships and friendships are highly valued in Asian cultures, which makes children vulnerable to negative relationship experiences. It is also possible that, relative to their counterparts in Western cultures, children who are relationally aggressive in Japan are perceived as more aversive and are more rejected by peers because relational aggression contrasts greatly with the Japanese cultural beliefs and values. Consequently, these children may feel isolated from peer groups and lack a sense of belonging and relatedness.

Consistent with the results from cross-cultural studies concerning the emotional problems of aggressive children, self-control or regulation may be associated differently with adjustment in Western and Asian cultures.

There seem to be robust links between low self-control and aggression among children in the United States (e.g., Eisenberg et al., 2006; Olson et al., 2005). Zhou et al. (2009) reported that low control and high anger-irritability were also associated with high externalizing problems in Chinese children. However, the associations were stronger in Chinese children than in American children. The results suggest that self-control has comprehensive effects on social and behavioral development in Chinese and perhaps other Asian cultures.

The results concerning relations between self-control and emotional adjustment in the Western literature are inconsistent with each other. Several studies conducted with children in the United States indicated that self-control was not associated with emotional problems (Eisenberg et al., 2005; Oosterlaan & Sergeant, 1996). Some studies suggested that self-control tended to be positively associated with emotional problems in North American children (e.g., Murray & Kochanska, 2002), supporting the argument that some emotional problems may result from overcontrol (Weisz, Sigman, Weiss, & Mosk, 1993). Different results have been found in Chinese children. Eisenberg et al. (2007) found that self-control in Chinese children was negatively associated with symptoms of fearfulness and anxiety. Similarly, X. Chen, Zhang, Chen, and Li (2012) found in a longitudinal study in China that self-control as assessed by performance on delay tasks at 2 years of age negatively predicted self-reported loneliness and depression at 11 years of age. Children who have the ability to control their behaviors likely display appropriate characteristics, such as cautiousness and compliance, which are highly valued in group-oriented societies. At the same time, high emphasis on self-control in Chinese culture is likely to create a challenging situation for children who have difficulties maintaining their behaviors according to social conventions and standards. The stressful experience may trigger negative emotions and psychopathological symptoms in these children.

Cheung and Park (2010) conducted a study of anger suppression and depression in Asian American and European American students and found that whereas anger suppression was positively associated with depression in European Americans, the associations were significantly weaker in Asian Americans. Moreover, an interdependent self-construal attenuated the link between anger suppression and depressive symptoms. According to Cheung and Park, suppression serves a self-protective function for individuals holding Western values, whereas for individuals who hold more Asian values, suppression may be conducive to achieving prosocial goals. Anger suppression may be a form of emotion regulation that promotes social engagement and psychological well-being for interdependent individuals.

Peer Conflict and Adjustment

Studies of the relation between peer conflict and adjustment have been mostly descriptive, with a focus mainly on the link between conflict management and socioemotional development and peer relationships (French, Pidada, Denoma, et al., 2005; Murphy & Eisenberg, 2002; D. W. Shantz, 1986). In general, effective problem-solving methods for resolving peer conflict, which are considered a major aspect of social competence, are associated with positive adjustment outcomes. What is considered an effective strategy to address conflict, however, is likely to be dependent on cultural norms.

French, Pidada, Denoma, et al. (2005), for example, found that disengaging from a conflict was negatively associated with teacher ratings of adjustment problems and positively associated with teaching ratings of social preference in Indonesian children but not in U.S. children. In contrast, negotiation in conflict situations tended to be negatively associated with teacher-rated problems and positively with competence in U.S. children. These findings suggest that Indonesian children who disengage from conflict are better adjusted than others in social areas, similar to Chinese children who use passive strategies to address peer conflict (French et al., 2011). In North American cultures, however, children who use assertive methods and negotiation to resolve conflict are more likely than others to achieve social success (e.g., Laursen et al., 2001).

Bullying and Victimization and Adjustment

Bullying has adverse psychological, social, and physical effects on the development of bullies, victims, and bully-victims. Research has shown that victims and bully-victims are more likely than others to experience anxiety, depression, and psychosomatic symptoms (Kaltiala-Heino, Rimpelä, Rantanen, & Rimpelä, 2000; Özdemir & Stattin, 2011) and are likely to be bullied later as adults (Smith, Singer, Hoel, & Cooper, 2003). Bullies tend to develop difficulties in social relationships and substance use in adulthood (Kaltiala-Heino et al., 2000).

Several cross-cultural studies have been conducted to examine the relations between children's engagement in bullying and adjustment outcomes. Overall, both victims and bullies develop social and life adjustment problems, including higher levels of health problems, poorer

emotional adjustment, and poorer school adjustment, compared to youth who are not involved in bullying. The relations between bullying and adjustment problems may also vary across cultures. Nansel et al. (2004) conducted a comparative study of bullying in 25 countries and found that the rate of bully-victims in Sweden was the lowest among all the countries. However, bully-victims in Sweden were more likely to experience problems in their health, emotional well-being, school adjustment, and peer relationships than their counterparts in other countries. Another study by Due and colleagues (2005) comparing 28 countries on health outcomes among victims who were bullied weekly revealed likelihood ranges from 1.83 to 2.11 for physical symptoms (headache, stomachache, backache, dizziness) and 1.67 to 7.47 for psychological symptoms (bad temper, feeling nervous, feeling low, difficulties in getting to sleep, morning tiredness, feeling left out, loneliness, helplessness). Again, the associations between victimization and psychopathological symptoms tended to be stronger in countries with lower levels of bullying. Specifically, Sweden had the lowest prevalence of bullying, but the risk for having five or more symptoms were three- to fourfold higher in Swedish adolescents, compared to adolescents from Lithuania, a country with a higher bullying prevalence rate. The greater risk of children that experience bullying in countries with lower prevalence may be related to the fact that bullying and other peer relationship problems, especially those involving force and aggression, may be perceived as less acceptable and thus trigger greater negative social and emotional reactions among children in these countries.

Researchers have studied adjustment outcomes of bullying experience among youth in the United States with different ethnic and cultural backgrounds. S. G. Graham and Juvonen (2002), for example, examined relations between victimization and psychological adjustment among Hispanic, Asian, and African-American middle-schoolers in the United States. The results indicated that having the reputation as a victim of peer harassment was positively associated with loneliness and low self-esteem, but only in African-American youth. The authors suggested that these results might be due to the deviation of being victimized from the stereotypical perceptions of African American groups.

A study conducted by D. Schwartz and colleagues (2002) highlights the need for a nuanced view of peer victimization in cultural contexts. In this study, South Korean children exhibiting submissive-withdrawn behavior were found to be more likely than others to be victims of peer bullying. The results appear to be consistent with X. Chen, Wang, et al.'s findings (2011) and Liu et al.'s findings (2015) that unsociable and withdrawn children in China experienced social, school, and psychological problems. In another study with South Korean primary school children (Yang, Kim, Kim, Shin, & Yoon, 2006), female bullies reported greater social and behavioral problems than male bullies. A possible explanation is that female bullies feel more uneasy, given that bullying behaviors do not correspond with cultural norms for girls to be quiet, obedient, and self-controlled.

Peer Group Involvement, Friendships, and Adjustment

The relationships that children form with their peers serve as key contexts for shaping social, emotional, and cognitive outcomes (e.g., Brown, 1990; La Greca & Harrison, 2005; Urberg et al., 1997). Research has demonstrated that having friends is associated with better school adjustment and social satisfaction in children, whereas children without friends tend to experience more internalizing problems and poorer social and academic performance (Pedersen, Vitaro, Barker, & Borge, 2007). Research in Western cultures has also illustrated that peer groups serve as a major social resource for fulfilling individual psychological needs, such as the formation of self-identity and the development of positive self-perceptions and self-feelings (e.g., Rubin, Bukowski, et al., 2006; Sullivan, 1953). However, affiliation with deviant peer groups may contribute significantly to individual adjustment problems, such as school dropout, early pregnancy, substance use, and antisocial behavior (e.g., Cairns & Cairns, 1994; Espelage, Holt, & Henkel, 2003; Kiesner et al., 2003; Kindermann et al., 1995).

Despite the scarcity of longitudinal studies examining the effects of peer relationships on adjustment, the existing literature suggests that the function of friendships and peer groups may play different roles in individual development across cultures. In Western societies, support from friends and peer groups may be an important mechanism for children to accomplish the socialization goal of developing confidence and positive views about themselves (Sullivan, 1953). The role of peer relationships in promoting self-perceptions and self-feelings may be less salient in many non-Western cultures, where the development of the self is not considered a major developmental task. Indeed, findings of cross-cultural studies seem to indicate that children's friendship plays a less important role in enhancing perceived self-worth in group-oriented cultures than in Western individualistic cultures. Whereas one of the major reasons for friendship among Western children is that friends make people feel good about themselves, Chinese

and Indonesian children and children with an Arab and Caribbean background do not view the enhancement of self-worth as an important function of peer relationships (X. Chen, Kaspar, et al., 2004; Cho, Sandel, Miller, & Wang, 2005; Dayan, Doyle, & Markiewicz, 2001; French, Pidada, et al., 2005).

In contrast to self-validation, instrumental aid appears to be a more important function of peer relationships of children in many group-oriented cultures (Smart, 1999; Tietjen, 1989). For example, sharing money and protecting friends from harm are important aspects of the friendships of low-income Black and Hispanic adolescents in the United States (Way, 2006). Instrumental assistance has also been documented to be a salient feature of friendships in Asian countries, such as China (X. Chen, Kaspar, et al., 2004), Indonesia (French, Pidada, et al., 2005), South Korea (French et al., 2006), and the Philippines (Hollnsteiner, 1979), and in Latino societies, such as Cuba (Gonzalez et al., 2004) and Costa Rica (DeRosier & Kupersmidt, 1991). In these societies, instrumental assistance may include helping others solve problems and learn social skills. French and colleagues (2006) showed that Indonesian children without friends demonstrated lower levels of academic achievement than children with friends. Similarly, X. Chen, Kaspar, and colleagues (2004) found that Chinese children were more likely to endorse picking friends who would improve social and academic standing. Dekovic and colleagues (2002) found differences between Japanese and Dutch adolescents in the pattern of associations between peer relationships with development. The quality of peer relationships was associated with self-reported well-being more strongly in Japan than in the Netherlands, which might indicate greater emphasis in Japanese culture on interpersonal relationships in the individual development of well-being.

It should be noted that both the definitions and the cultural norms for peer relationships and group affiliation have changed dramatically with the popularity of online social connections and networks. Peer interactions currently take place over a variety of online contexts, including text messaging, e-mailing, instant message, or chatting, and social networking sites such as Facebook. Normative experiences in youth development, such as increased autonomy, identity exploration, or the formation of intimate peer relationships, unfold through these newer technologies (Lenhart, Purcell, Smith, & Zickuhr, 2010).

How the use of these technologies for online communication affects real-world peer relationships and well-being in children and adolescents is an interesting issue for researchers and professionals. In a study with over 1,000 Dutch adolescents, Valkenburg and Peter (2007) found that adolescents spent most of their online communication time with existing friends and that instant messaging with friends significantly predicted friendship quality and well-being. The researchers also found that personal disclosures through instant messaging were positively associated with friendship quality 1 year later. However, other studies reported no significant associations between online communication and real-world friendship quality or well-being (Gross, 2004; Mesch, 2001; Sanders, Field, Diego, & Kaplan, 2000). It is proposed that unexplored moderators or mediators may explain these inconsistent findings (Wang, Jackson, & Zhang, 2011).

How social and cultural circumstances impact the relations between peer relationships facilitated through online communication and adjustment is another interesting question. Online communication and social networking sites could serve different purposes in collectivistic and individualistic cultures. Chau, Cole, Massey, Montoya-Weiss, and O'Keefe (2002), for example, argued that Internet users from Hong Kong tend to view the Internet as a means of social interaction, whereas Americans tend to use the Internet to seek and gain information. Chau and colleagues (2002) found that U.S. students had more individuals in their networks than Korean students and attributed this difference to how relationships are viewed. Consistent with French et al.'s findings on friendship exclusivity (2006), it has been speculated that Koreans utilize social networking sites to obtain social support and develop deeper relationships from existing and committed relationships whereas American students may use social networking sites to acquire or maintain casual relationships (Y. Kim, Sohn, & Choi, 2011).

In studies of international students in the United States, K. H. Kim, Yun, and Yoon (2009) and Ye (2006) found that online social networking helped international students maintain and develop their social support from their networks in the United States and from online ethnic social groups, which in turn helped them reduce their social difficulties and adjust to the new environment quickly. Reich, Subrahmanyam, and Espinoza (2012) examined the use of online communication and its association with adjustment in Latino adolescents. The results, however, showed no differences between Latino and European American adolescents in the frequency of social interactions and adjustment outcomes.

In summary, research findings have indicated that individual behaviors and experiences in peer contexts, such as shyness-inhibition, aggression, conflict, bullying, and group involvement, may be associated differently with

adjustment outcomes in different cultures. The differences in the associations further indicate that culture plays an essential role in determining the functional significance of individual behaviors through shaping social attitudes and social interaction processes.

Peer Relationships and Resilience

Resilience is concerned with the process or phenomenon of positive adaptation in the context of significant risk or adversity (Masten & Powell, 2003; Luthar, Crossman, & Small, 2015). Research on resilience often focuses on protective factors in the development of individuals who experience high levels of risk, such as parental mental illness, family economic hardship and conflict, and neighborhood violence. Protective factors are assets that weaken the adverse effects of risk, such as supportive parenting and effective skills to cope with difficult circumstances (Luthar et al., 2015; Masten, 2014).

It is commonly believed that positive peer relationships, including overall peer acceptance, intimate friendship, and constructive group activities, can serve protective functions for at-risk children (e.g., Rubin et al., 2006). Findings of a number of studies have indicated that negative experiences in the family, such as child abuse and poverty, are associated with psychopathological symptoms, such as low self-esteem, lack of school engagement and achievement, and high peer victimization, but the associations are often weaker or nonsignificant for children who have high-quality friendship and peer networks (e.g., Bolgar, Schwartz, & Kupersmidt, 1998). In a study of negative parenting and adolescent externalizing problems, for example, Lansford, Criss, Pettit, Dodge, and Bates (2003) found that friendship quality and peer group affiliation served as protective factors for adolescents who were exposed to unilateral parental decision making, low supervision, and harsh discipline; positive peer relationships attenuated the associations between aspects of family adversity and externalizing problems.

Cultural norms about children's behaviors and peer relationships may affect the meaning, function, and development of resilience in children and adolescents. According to Ungar (2013), resilience is concerned with a set of processes that serve to help individuals to obtain psychological and social resources in culturally meaningful ways. The social-ecological perspective emphasizes that resilience represents the capacity of both individuals (e.g., children's capacity to seek help) and their environments (e.g., the availability of health resources and assets in the community) to optimize adaptive development. Consistent with this perspective, in the International Resilience Project, a large-scale cross-cultural study, Ungar and colleagues (e.g., Ungar, 2013; Ungar et al., 2007) found that there might be culturally distinct aspects of resilience. More specifically, a series of qualitative and quantitative analyses revealed that youth who were resilient were those who successfully navigated their way through a series of tensions in accessing material resources and in finding appropriate roles in the community. The experience of resilience was determined largely by how youth used different strategies to address the challenges posed by the tensions within social and cultural constraints. Moreover, the impact of aspects of resilience (e.g., affiliation with a religious organization) on children's lives might depend on social and cultural contexts (e.g., the importance of the religion or spirituality in the society) (see Ungar et al., 2007).

Other studies have also provided evidence for the role of social and cultural circumstances in the development of resilience, including the protective force of peer relationships. For example, De Antoni and Koller (2000) showed that Brazilian street children developed relationships with one another, which served as a support when caring adults were unavailable. Similarly, in a study of 3,000 street children in Colombia, Felsman (1989) found that children sought existing social supports, including gang affiliation, when primary physical and emotional needs were not met elsewhere. The studies demonstrate that resilience may develop as a result of the requirements of the particular context and that aspects of resilience may serve particular functions in the context.

CONCLUSIONS, PRACTICAL IMPLICATIONS, AND FUTURE DIRECTIONS

The experience of children and adolescents in the peer context, including social behaviors in interactions with others and relationships established through interactions, has an extensive and lengthy influence on normal and abnormal development (e.g., Rubin et al., 2015). Failure to maintain appropriate behaviors in peer interactions, solve problems in interactions in an effective manner, establish desirable relationships, or obtain supportive group affiliation likely leads to psychopathological outcomes. Yet how children interact with others and form social relationships is constrained by cultural norms and values in the society or community. By guiding social interaction processes and shaping functional and structural features of social relationships, culture exerts a significant impact on individual development in various areas.

In this chapter, we reviewed research findings on cross-cultural variations in the prevalence of major internalizing and externalizing behaviors, such as social anxiety, aggression, conflict, and bullying, that children and adolescents display in the peer settings. We discussed the role of culture in affecting social attitudes and responses toward specific behaviors, which in turn serve to regulate the development of the behaviors and their relations with adjustment outcomes. Based on our review and discussion, it seems reasonable to conclude that adaptive and maladaptive human development is a complex phenomenon that must be understood with cultural factors taken into account (García Coll et al., 2000; Kleinman, 1980; Tamis-LeMonda et al., 2008).

Research on culture, peer relationships, and developmental psychopathology has far-reaching practical implications. As Cicchetti and Toth (2009) indicated, to promote psychological health and well-being of individuals, it is important to translate scientific findings into practical applications. Thus, researchers and professionals should consider how research results concerning cultural contexts for adaptive and maladaptive development help address issues in the diagnosis, prevention, and treatment of problems in culturally relevant and effective manners. For example, the findings on the influence of cultural norms and values on individual behaviors and problems suggest that researchers, policymakers, and clinicians need to be sensitive in assessing and assigning cultural meanings to psychopathological symptoms among children of different backgrounds. To determine the extent to which a specific behavior (e.g., social anxiety and shyness) is normal or abnormal, it is essential to understand how it is defined in the society or community, including (1) how people perceive, evaluate, and respond to the behavior, particularly in the context of social interactions; and (2) how the behavior is associated with concurrent and developmental adjustment outcomes. Thus, obtaining information regarding culturally directed social attitudes about the behavior and its developmental patterns is an integral part of diagnosis. In addition, according to the contextual-developmental perspective (X. Chen, 2012), peer interactions and relationships serve as a crucial group-level mediator in bridging culture and individual development. Therefore, parents, educators, and practitioners should consider the social interaction context when they develop prevention and intervention programs for children and adolescents who display psychopathological problems.

From a multiple-levels-of-analysis perspective, Cicchetti and colleagues (e.g., Cicchetti, 2006; Cicchetti & Blender, 2006; Cicchetti & Toth, 2009) have indicated that biological, psychological, and social-contextual factors may jointly and interactively influence individual normal and abnormal development. For example, there is growing evidence indicating the genetic underpinnings of social relationships and psychopathological functioning (e.g., Kendler et al., 2007). Moreover, a number of studies have demonstrated interactions between gene polymorphisms and environmental conditions (e.g., early parent-child relationships, parenting practices) in predicting developmental outcomes (e.g., Caspi et al., 2002; Hankin, Jenness, Abela, & Smolen, 2011; Sheese, Voelker, Rothbart, & Posner, 2007). However, these studies have been conducted mainly within a Western society. Cultural similarities and differences in the relations of genetic factors to children's peer relationships and adaptive and maladaptive behaviors have not been explored. As argued by Chiao and Ambady (2007) and Miller and Kinsbourne (2012), it will be interesting to investigate genetic influence on social relationships and behaviors in different cultures, which will help us achieve a more complete understanding of gene–environment interactions in human development.

Researchers often use a broad framework, such as collectivism versus individualism or independence versus interdependence, to conceptualize cross-cultural studies, especially in comparing children in Western societies with those in non-Western societies. The broad framework has been criticized from both theoretical and methodological perspectives. Theoretically, it is considered oversimplistic for describing complex cultural systems and for explaining the heterogeneity within a particular culture and differences between cultures that are believed to be collectivist/interdependent or individualist/independent (see X. Chen, French, & Schneider, 2006; Miller, 2002). Methodologically, it is difficult to identify the defining features of individualistic and collectivist cultures and to assess these features. It also appears ineffective and problematic to measure macro-level sociological constructs of collectivism and individualism (Hofstede, 1994), which are defined mainly by political, social, economic, and ideological organizations, using attitudinal scales at the individual level (Oyserman, Coon, & Kemmelmeier, 2002). The relations between societal or group-level cultural orientations and individual values systems and behaviors may not be straightforward.

Despite the criticisms, however, researchers continue to use the framework of collectivism versus individualism or interdependence versus independence to characterize cross-cultural differences in individual attitudes and behaviors. The dimension of collectivism-individualism may be useful in distinguishing cultures that differ in

extreme form (e.g., the United States and some Asian countries). However, it is important for researchers to be aware that the broad framework may have limited value in characterizing different types of collectivist or individualistic cultures and cultures with mixed individualistic and collectivist features.

Research on culture, peer relationships, and developmental psychopathology has relied on direct or indirect comparisons of groups of children and adolescents in different societies or communities. Cross-cultural comparisons can provide interesting findings about similarities and differences between children and adolescents with different backgrounds, which are important for understanding the role of culture in development. However, researchers need to pay attention to various issues in the research processes, such as selecting representative samples in the culture and controlling for potential confounding factors, such as socioeconomic status (Schneider et al., 2006). Moreover, cross-cultural comparisons provide little information about how culture is involved in peer interactions and relationships and individual development. Cultural influence on children's functioning in social settings is highly complex, involving personal and contextual factors at multiple levels. According to the contextual-developmental perspective (X. Chen, 2012), for example, children play an increasingly active role in socialization and development through participating in social interactions in which they construct cultural norms for their activities and mutual evaluations (Corsaro & Nelson, 2003; Edwards et al., 2006). It will be important to investigate how children in different cultures actively engage in the socialization processes.

Self-reports are commonly used in cross-cultural studies of children's behaviors and problems because of relatively low costs for data collection and advantages in data analysis. With young children, parental reports are perhaps the most common, and sometimes the only accessible, method. However, self-report methods have obvious limitations that may undermine valid cross-cultural comparisons; these include culturally specific response biases, the reference group effect, and differences in the understanding of questions or items in measures (e.g., Schneider et al., 2006). Peer evaluation is a reliable method in assessing children's social behaviors and peer relationships (e.g., the Revised Class Play, X. Chen et al., 1992; Masten, Morison, & Pellegrini, 1985); the method is particularly useful for cross-cultural research because it taps insiders' perspectives of children. However, peer evaluation is used with children in schools mainly from third or fourth grade. Moreover, it does not allow for cross-cultural comparisons on group mean scores because peer nomination or rating data typically need to be standardized within the class or grade. In addition, when assessing behaviors that are not apparent in social interactions, such as anxiety, fear, or other internalizing behaviors, it may be difficult for peers to provide accurate and reliable information. Compared with self-reports and peer assessments, observations, in either controlled laboratory or naturalistic settings, can provide more objective information about children's peer interactions and individual behaviors, which allows for more straightforward cross-cultural comparisons. However, conducting observations of children in equivalent conditions, developing culturally sensitive and comparable coding systems, training coders to reliably code data from different cultures, and interpreting the results beyond observed variables are highly challenging tasks for researchers. A strategy for handling many of the methodological difficulties is to use a multimethod approach and integrative analysis, which likely reduces potential biases and errors in data from a single source.

Cross-cultural researchers often study children in non-Western societies by comparing them with children in Western, especially American, societies. Due to globalization and technological development, rapid large-scale social and cultural changes have been occurring around the world, including both Western and non-Western countries. Cultural exchanges and interactions and massive movements of populations have led to the merging and coexistence of diverse value systems (X. Chen, 2015; Tamis-LeMonda et al., 2008), which has made the exposure to different cultures an integral part of the experience of children and adults today. Adapting to a changing environment with mixed and even conflictual social and cultural values may be stressful for youth. However, social and cultural changes also provide opportunities for young people to interact with peers of different backgrounds, which may help them develop competence to function in different circumstances. It will be important to investigate children's and adolescents' peer experiences and adaptive and maladaptive development in the new environment.

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CHAPTER 15

Classroom Processes and Teacher–Student Interaction: Integrations with a Developmental Psychopathology Perspective

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A decade ago, a chapter on schools, schooling, and developmental psychopathology appeared in the prior version of this volume (Pianta, 2006). A major aim of that chapter was to articulate pathways for interdisciplinary intersections between education and developmental psychopathology. At that time, the task involved identifying mutual and overlapping interests, presenting a conceptual framework for mapping those interests to scientific questions and programs of study, and reviewing evidence from extant research consistent with the emerging interdisciplinary paradigm. A number of intersecting research programs and topics were described in more detail, and possibilities for further work were identified. In large part, that effort was about describing parameters of schools of interest to developmentalists.

In the time since, the progress made in understanding the intersections between educational structures and processes with developmental processes has been nothing short of astonishing. Developmentalists have much more fully exploited school settings as a means to more fully understand development in context (M. Greenberg & Harris, 2012), while scholarship in education has been transformed

by a combination of funding structures (Institute of Education Sciences [IES], 2013), increasing sophistication of developmental science (Bakermans-Kranenberg & van IJzendoorn, 2011), and policy initiatives that have provided metrics and benchmarks for educational performance and opportunity (Kane, Kerr, & Pianta, 2014). Methodological frameworks and research infrastructure (measures, analytics, funding, professional societies) have enabled a level of engagement between the educational and developmental sciences that was barely conceivable a decade ago. As just one example, a recent report describes results from a longitudinal study of impacts of an elementary-grade, school-based aggression prevention program on high school outcomes as they are moderated by genetic factors (Musci et al., 2013). The promise reflected in that paper pertains not only to better understanding individual heterogeneity of intervention outcomes in terms of gene polymorphisms but to the idea that, through continued deepening of the connections between developmental psychopathology and education, we more fully understand development in context (Blair et al., 2011). The Musci et al. (2013) and other studies (Essex, Armstrong, Burk, Goldsmith, & Boyce, 2011) suggest a promising future for exploration. In short, an array of opportunities has emerged and been explored, and the promise of deepening and extending these connections has been revealed further.

The fundamental premise of this chapter is that realizing the promise of linking developmental psychopathology (methods, models, and understandings) with education science, practice, and policy will require an even greater appreciation and deepening exploitation of schools as contexts for human development (Aber, Brown, Jones, & Roderick, 2010; Allen, Pianta, Gregory, Mikami, & Lun, 2011; Crosnoe et al., 2010). This chapter narrows and presses these possibilities for intersection with some depth, around the particular focus on proximal processes in classrooms related to interactions with teachers. Superficial linkages between the disciplines, in which schools are treated as locations (for data collection, intervention implementation, or recruitment of samples) rather than developmental contexts with their own dynamics and properties worthy of examination in their own right (Seidman & Tseng, 2011; Tseng, 2010), will fail to build on the extant capacity for knowledge generation. Similarly superficial are educationally focused research programs that are not developmentally informed, failing to recognize the deep linkages between academic achievement and development in other domains (Jang, Reeve, & Deci, 2010; S. M. Jones, Brown, Hoglund, & Aber, 2010; Pedersen et al., 2005), for example, or defining students' experiences in school only in terms of the curriculum to which they are exposed or the years of experience of the teacher delivering it (Goldhaber & Hansen, 2010; Harris & Sass, 2011; Sanders & Rivers, 1996). More fully exploiting the intersection of schooling and development remains important for developmental psychopathology precisely because of the role school context dynamics play in shaping the outcome trajectories of children and youth, and perhaps even the adults who also populate these settings (MetLife, 2002; National Center for Education Statistics [NCES], 2014; National Education Association [NEA], 2010). And this intersection is critical for education scientists, practitioners, and policymakers if they hope to fully understand and explain the student outcomes around which most of their efforts are organized.

The bulk of this chapter is devoted to experiences of children and youth in classroom settings and the opportunities they create for development of human capital. Structural elements of schooling—schools set standards and metrics for performance, educators develop and implement policy (Goe, 2007; Loeb, Kalogrides, & Béteille, 2012; Office of Head Start, 2011)—are a focus only insofar as they influence interactions with teachers and thereby shape the level and flow of this form of resources intended to shape development (Kane & Staiger, 2012; La Paro et al., 2009; Sabol, Hong, Pianta, & Burchinal, 2013; Yoshikawa et al., 2015). Proximal process experiences in schools play a meaningful role in organizing development—aspects of identity, competence, relationships, risk, and opportunity all emerge and consolidate in part through experiences in schools (Allen, Kuperminc, Philliber, & Herre, 1994; Bassok & Rorem, 2014; Connell & Wellborn, 1991; Eccles, Wigfield, & Schiefele, 1998; Hughes & Kwok, 2006; O'Connor & McCartney, 2007; Pianta & Allen, 2008; Pianta, Belsky, Houts, & Morrison, 2007; Sullivan & Bal, 2013). For the purposes of this chapter, the specific form of proximal process that is the focus is teacher-student interaction. And although the bulk of the chapter reviews evidence on the nature, quality, and impact of teacher-student interactions as they pertain to development, a section focuses on extending new evidence from the study of teacher-child interaction that reflects developmental psychopathology frameworks for understanding biological mechanisms that intersect with context and experience (Ellis, Boyce, Belsky, Bakermans-Kranenberg, & van IJzendoorn, 2011)—differential susceptibility (Belsky & Pluess, 2013; Ellis et al., 2011), gene–environment interaction (Beach et al., 2014; Musci et al., 2013), and allostatic load (Blair et al., 2011).

The study of schools and schooling, from a developmental psychopathology perspective, may challenge many

prevailing models, methods, and theories of how disorder manifests and develops, in large part because schools present an astonishing level of variation and differentiation in setting-level affordances for adaptations (MET Project, 2010; NCES 2014; Pianta et al., 2007). Drawing from Boyce and Ellis (2005), schools and schooling processes are developmentally relevant in part because they are so dynamic and fluid, they organize experience in ways meaningful for individuals and for groups, and they provide highly differentiated niches for adaptation (Williams, Tolan, Durkee, Francois, & Anderson, 2012). As one example, the richness of peer contexts in schools is just beginning to be understood, in part due to advances in social network analysis (McKown, 2013) that provide a much more nuanced and dynamic understanding of peer microclimates. This understanding of peer relations in schools as consisting of multiple, overlapping, shifting settings, each with unique norms and rituals and structures, has been applied in one way to understand racially related school experiences and outcomes (McKown, 2013; Williams et al., 2012) but also has relevance for appreciating the roles of schools in organizing peer experience, with broader implications for youth development and well-being. For example, the impacts of peer relations, accrued in part in school-based microclimates, can be seen more than a decade later in markers of physical health and functioning in jobs and relationships (Allen et al., 2011).

In terms of teachers' influence on students, a proximal process organized in schools, studies evaluating teacher impacts consistently find that the nature and quality of students' experiences with teachers, teachers' sensitivity, and their calibration to students' developmental needs vary tremendously across grades, teachers, and even within a day with the same teacher (Curby, Grimm, & Pianta, 2010; Jerome, Hamre, & Pianta, 2009; Plank & Condliffe, 2013). This means that any given middle school student may have strikingly different, developmentally relevant experiences with five different teachers each day and across a number of peer settings structured by courses, by where classrooms may be located in a building or how lunchtime is organized or scheduled (NCES, 2014; NICHD ECCRN, 2005). Put another way, schooling affords children and youth a stunning number of social settings (Spilt, Hughes, Wu, & Kwok, 2012; Weinstein, 2002; Zelazo & Lyons, 2012) that each pose developmental challenges and opportunities. This school-centric, multilevel, multisetting dynamism, and the actors, actions, and structures that shape it, is only beginning to be understood and mapped yet has important consequences for better appreciating not only their contributions to development but also the shifting nature of adaptation in context (Baker, Grant, & Morlock, 2008; Pedersen et al., 2005; Rudasill, Reio, Stipanovic, & Taylor, 2010; Weinstein, 2008).

It is also the case that the scientific tools (theories and paradigms, analytics, aims) heretofore brought to bear on schools as settings and on their impacts are somewhat limited with regard to their potential for illuminating the nature and impact of proximal processes. As one trend reflecting this broader pattern, education scientists, shaped by funders' priorities (e.g., IES, 2013), are highly focused on interventions that drive improvements in standardized achievement test scores or on econometric analyses that model impacts of various policies and programs on those same test scores (Glazerman et al., 2011; Goe, 2007; Goldhaber, 2007; Raudenbush & Jean, 2014). This is a limited design for scientific inquiry, constraining attention to narrow outcomes and lacking attention to basic developmental processes and mechanisms influencing those and a range of collateral outcomes that may in fact mediate test score performance. Given this, it may be no surprise that education reform can be criticized for promoting policies and applications that have limited capacity to engage local dynamics and conditions (Aber et al., 2010; Aber, Brown, Jones, Berg, & Torrente, 2011; Weinstein, 2002). Education science, or the study of schools and schooling, could benefit tremendously from the full complement of tools (theories, measurement, scientists) of developmental psychopathology.

In the sections that follow, this chapter tracks progress of research linking schools and schooling with developmental psychopathology with a focus in a domain of proximal processes through which schooling intersects with development—interaction with teachers. Given the predominant focus of education science funders on school achievement outcomes, developmentally informed efforts to expand knowledge regarding teacher-student interactions processes are often promoted by foundations seeking to address knowledge gaps created by federal agencies' priorities for support and by their structuring of the intellectual or practical landscapes.

Major foundations now supplement the portfolio of research support for investigating the nature and impact of students' experiences with teachers in school settings. For over a decade the Wm. T. Grant Foundation has dedicated a major portion of funding to the study of settings that serve children and youth, including families, schools, and out-of-school settings (Seidman & Tseng, 2011; Tseng, 2010; Tseng & Seidman, 2007). These efforts were a direct response to the convergence between the increased understanding and evidence that contexts played a tremendous

role in shaping youth development and the fact that very little was known about their properties and dynamics; therefore, both theory and potential applications relevant to improving youth outcomes were severely limited (Broader, Bolder Approach to Education, 2010; Skiba et al., 2014; Sullivan & Bal, 2013; Weinstein, 2008). The foundation funded efforts to articulate theoretical frameworks for inquiry into settings, basic science of setting measurement and work on implications for application, and a major grants program focused on interventions in which properties of the setting were the outcome of focus (Allen et al., 2011; S. M. Jones, Brown, & Aber, 2008; S. M. Jones et al., 2010; S. M. Jones, Bub, & Raver, 2013).

A recent call for proposals by the Spencer Foundation (2014) explicitly acknowledges this gap in knowledge and in funding. In a major grants program the foundation characterizes as an effort to "reinforce our commitment to intellectually ambitious research, oriented ultimately to improving the practice of education," (p. 3), a call for proposals was issued to specifically address concerns that the last decade of scientific work in education has been singularly focused on intervention impacts on standardized achievement tests. The Spencer call notes that "the popularity of doing research to learn 'what works' has a tendency to squeeze out deeper questions of how, when, for whom, and why an intervention works" (p. 3). The Spencer Request For Applications therefore focuses attention on three types of studies that reflect a developmental and interdisciplinary perspective on questions of significance related to the intersection of schooling experiences, over time, and the emergent outcomes of children, youth, and professional educators. The next excerpt presents this perspective in brief, starting with a description of the types of studies the foundation seeks.

> Studies that focus more or less directly on teaching and learning processes themselves, at the classroom level (or in instructional settings outside classrooms).
>
> Studies that pay attention to the larger policy and institutional environments within which educational transactions take place. Key . . . is attention to the conceptual and empirical links between . . . infrastructure and the actual character of educational practice.
>
> Studies that help develop research tools that can support advancing the kinds of research we have identified here. The development of improved measurement tools, stronger theoretical frameworks and analytical methods. (pp. 3–4)

Foreshadowing the sections to follow, and emerging from the streams of research supported by the mechanisms just described, are studies that now utilize methods and measures, conceptual frameworks, and analytic tools to achieve a focus on the intersection between schooling and development that is far more cross-disciplinary, multilevel, and multisystem than a decade ago. For example, programs of research are beginning to advance understanding of basic mechanisms of influence and coregulation in classrooms between teacher behavior and student learning by sensoring candidate markers across multiple systems that hypothetically coregulate teaching and learning processes (e.g., teacher and student behavior, mood, effort; heart rate, cortisol levels; attention and learning). The result could be a multisystem mapping of classroom process and examination of linkages (causal, leading, lagging) of association and coregulation across multiple levels and domains of candidate behavioral, social, neurological, and physiological processes in the context of actual classroom interactions (e.g., Coan, Schaefer, & Davidson, 2006: Montpetit, Bergeman, Deboek, Tiberio, & Boker, 2010).

Examples of the promise of this work include K. F. Miller's (2011) use of video and eye gaze to track teachers' attention in real-time classroom interactions, experience sampling of teacher emotion and stress (N. Jones & Youngs, 2012), and studies showing impact(s) of feedback on teachers' interactions with students (Allen et al., 2011; Pianta et al., 2014; Pianta, Mashburn, Downer, Hamre, & Justice, 2008), some of which takes place in real time (K. F. Miller, 2011). Importantly, knowledge of the interface between child development and context expanded rapidly when studies of behavioral and psychological variables incorporated measurement and theory of biological, physiological, and neurological processes (see Boyce & Ellis, 2005). It is now possible to study and understand similar processes in classrooms and their relations with teaching and learning. Typical educational research on classrooms is focused primarily on behavioral or psychological variables assessed at fixed time points, providing an extraordinarily limited sample of the actual processes active in classrooms that are likely responsible for mediating or moderating the effects of schooling.

The basic science implications of this work are clear; it would not only map candidate processes and generate hypotheses for theory and further testing but also provide a methodological template for extensions across variations in teachers, students, grade levels, content areas, and other relevant features. Such work also has applied implications. For example, evidence indicates observations of teachers' interactions with students account for a modest but significant proportion of variation in student

learning (e.g., Hamre, Hatfield, Jamil, & Pianta, 2014), and teachers can be coached to improve those behaviors, in turn improving student learning (Allen et al., 2011; Downer, Pianta, et al., 2012; Pianta et al., 2008). These coaching and assessment procedures focus on observed teacher and student behavior. By embedding behavioral foci (e.g., teacher-student interaction and student engagement) within assessment of other coregulating processes (e.g., stress reactivity, emotions, neurological activity, heart rate, movement) during classroom interactions, it may be possible to identify neuropsychological and biobehavioral coregulators of teachers' behavior that could become candidate targets for professional development. Evidence suggests several possible candidate processes (e.g., real-time noticing, self-regulation of emotion and stress) that influence teachers' interactions with students and can be trained as skills (Hamre, Pianta, et al., 2012), while there is a growing body of literature on teachers' mindfulness and contemplative practices demonstrating impacts on a range of biobehavioral mediators of classroom interactions and outcomes (Davidson et al., 2012; Jennings, 2014; Roeser, Skinner, Beers, & Jennings, 2012). And by tracking students' neuropsychological activity in real time, it may become possible to identify links between such activity and teacher behavior and therefore sharpen the focus of behavioral observations of, and interventions for, teacher competence.

In short, emerging methods and approaches in cognitive neuroscience and learning sciences, biobehavioral science, developmental psychology, quantitative and computational methods of analysis, combined with the scientific study of teaching, enable investigators to map a new frontier in this translational sector of knowledge generation and activity linking education and human development. This interdisciplinary, multisystem, multilevel focus on classroom process is increasingly feasible (Coan, Beckes, & Allen, 2013; Essex et al., 2011; Hamre, Downer, Jamil, & Pianta, 2012) and reflects the confluence of education, developmental science, and cognitive neuroscience exploration of causal and coregulating links of social behavior and interpersonal relationships with physiological and neurological systems and associations with learning, mental health, and other developmental outcomes (e.g., Beckes & Coan, in press; Essex et al., 2011; Gazelle, 2006; Mikhail, El-Hayat, Allen, & Coan, 2013; Montpetit et al., 2010). The potential of these new paradigms for furthering the integration of education and developmental psychopathology is evident and could be advanced through the study of teacher-student interactions, at least in the short term.

CONSIDERING THE INTERSECTION OF EDUCATION AND HUMAN DEVELOPMENT

What Are the Key Questions?

Further integration of inquiry in education and developmental psychopathology pivots on questions of common interest to scientists from various disciplines that leverage not only knowledge in respective fields but new knowledge in this integrative domain (e.g., M. Greenberg & Harris, 2012; Kane et al., 2014; Kemeny et al., 2012;). As has been noted on many occasions, one of the foundational studies pressing a developmental orientation to the study of psychopathology, *15,000 hours* (Rutter & Maughan, 2002), was in part a study of school effects and adaptation to school, linking schooling to developmental psychopathology at its inception (see Rutter & Maughan, 2002; Sroufe & Rutter, 1984). Marking progress in the exploration of this connection, Rutter and Maughan (2002) summarized themes in research on schooling and development in the then-20 years since *15,000 hours* with a series of gapsonly partially addressed in the span since their seminal work was published, questions that remain relevant even now, some 35-plus years since the original study. These seven gaps in the knowledge base posed by Rutter and Maughan mapped the landscape of investigation and application for more than a decade and included:

1. the need for hard empirical evidence on factors related to changing failing schools, including attention to contextual features (such as community attitudes), resources (intake mix), teacher recruitment, finances, and leadership;
2. research on peer processes and influences within schools;
3. studying characteristics of schools that matter for social, behavioral, and self-efficacy outcomes;
4. how schools foster connections to the goals of schooling and socialization;
5. how selective and nonselective school systems function to influence child outcomes;
6. how different experiences in schools affect children differently based on their pattern of strengths and limitations, and vice versa; and
7. how and why children respond so differently to the school environment.

In the ensuing years, robust scientific literatures grew around each of these questions and were codified in contemporary reviews (e.g., Aber et al., 2011; Durlak,

Weissberg, Dymnicki, Taylor, & Schelling, 2011; Guerra & Bradshaw, 2008; McKown, 2013; National Council for Accreditation of Teacher Education [NCATE], 2010).

These varying literatures codify four fairly general impressions:

1. Documentation of efforts to change failing schools remains an idiosyncratic enterprise without any strong scientific backing for factors predictive of success or failure (e.g., Rockoff, Jacob, Kane, & Staiger, 2011; Tseng, 2010; Weinstein, 2002).
2. Schools are now well understood not only as settings for development of peer relations; increasing attention is being paid to processes related to shaping of social norms as well as peers' role as mediators of learning (Hughes & Kwok, 2006; McKown, 2013; Mikami, Lerner, & Lun, 2010).
3. Multilevel analysis of school and classroom effects continue to point out that schools, as a setting, are poorly understood in terms of the key characteristics and features that operate through various mediating mechanisms to promote development; while it is widely accepted that schools matter, how they matter separate from classroom or peer influences is much less well understood, and science in this domain of school-level effects is challenging (Ferguson with Hirsch, 2014; Lau & Nie, 2008; Raudenbush & Jean, 2014; Ruzek, Hafen, Hamre, & Pianta, 2014).
4. The science of individual differences in children's response to school settings remains relatively uninformed with respect to integration of advances in developmental science and methods (Beach et al., 2014; Essex et al., 2011; Musci et al., 2013) in part because the individual differences among children and youth are understood and assessed by educators and education scientists too often only in terms of education-defined metrics in single domains. The need for further understanding, on the part of educators and education scientists, of contemporary developmental science and its methods, has been well documented (NCATE, 2010; Rockoff et al., 2011). At the same time, developmentalists need to formulate constructs and measures that align to educationally relevant contexts and processes (Plank & Condliffe, 2013; Sullivan & Bal, 2013) if this knowledge gap is to be closed.

One result of the scientific progress around these questions, and a pathway that could lead to productive knowledge generation and integration, would derive from a reformulation of the linkage between development and education from one limited to focal areas of inquiry as reflected in those questions (i.e., effective schools, peer relations, individual differences) toward a perspective in which inquiry is integrative, process or mechanism focused. As is reflected in the Spencer Foundation request for proposals described earlier, present-day understanding of the relevance of educational settings and processes for developmental psychopathology starts with a description of features that form the affordances present in school settings, which include: actors (teachers, peers, leaders), developmental processes, actions that engage those processes, and aspects of school structure (policy, size, timing, curriculum) that shape those actions. The features of schooling, their determinants, and their interrelations create the functional contours of schooling as a system of proximal process affordances (assets or risks) for human development. One example of incorporating a process orientation is recent scholarship aimed at applied decision making, including large-scale studies of policy metrics used in teacher evaluation (see Harris & Sass, 2011; Kane et al., 2014), which now includes process mediators (such as teacher-student interaction or student motivation) of the links between the structural inputs (e.g., categories of teacher effectiveness) and outcomes (student performance on multiple-choice assessments of state standards) that are typically the primary points of interest.

The Hierarchical Nature of Schooling and School Settings

As a prelude to a more thorough examination of research on teacher-student interaction, it is critical to recognize that schools are multilayered, multilevel settings composed of structural and process features that reciprocally interact to affect child outcomes and adaptation. This organization of school settings has consequences for research aiming to better understand schooling and its connection to human development and makes that work very challenging, one of the reasons why there has been so little rigorous science identifying replicable features of effective schools (Loeb et al., 2012; Rockoff et al., 2011; Weinstein, 2008). The typical starting point for understanding the multilayered nature of schooling is to view it only in terms of a hierarchical (and static) organization or a nesting structure. In this frame, schools are nested within districts or classrooms nested in schools, as if the nesting only was a classification scheme or, even more, a causal structure in which higher-order units (districts) determined the nature of activity in lower-order units (schools and classrooms). This layering of the various levels of schooling process

and structure is intentionally designed as a parameter of influence; financial and regulatory actions at district, state, and federal levels causally influence actions and conditions that affect children and their opportunities. Yet despite this hierarchical administrative and political structure, the evidence is overwhelming of stunning variation in local opportunities that more directly influence development (Goldhaber & Hansen, 2010; McKown, 2013; NICHD ECCRN, 2005; Office of Head Start, 2011; Pianta et al., 2007). Thus, not only is it a challenge to measure and model the multilevel nature of schooling in an effort to understand developmental impacts, sorting the developmentally salient features of actions at various levels from those that appear critical but are perhaps irrelevant remains a particular challenge.

For example, school districts closely attend to regulations related to student-teacher ratios, often referring to ratios as key determinants of students' educational experiences and outcomes. Yet rigorous evaluations of the impact of ratios on student experience and learning indicate few, if any, effects within the range of ratios that encompass nearly every variant present in classrooms across the United States (NICHD ECCRN, 2004). Furthermore, to the extent ratios have any impact on student outcomes, it takes place in the tails of the distribution and is mediated by processes, such as teacher's management of the classroom, which is developmentally and educationally relevant across the entire range of student-teacher ratios. Another example of this distinction between developmentally relevant and irrelevant aspects of the hierarchical nature of education is evident in studies of curricular decisions, implementation, and impacts (Clements & Sarama, 2008; Durlak et al., 2011; Fukkink, 2007). The literature is replete with examples of district-mandated curricula (e.g., in elementary math or in secondary history) that are implemented with such variation at the classroom level so as to not even yield a detectable impact on student learning separate from more generic properties of peers or teachers' instructional style (Mashburn, Downer, Hamre, Justice, & Pianta, 2010).

Nonetheless, the hierarchical nature of schooling can result in substantial changes at the more proximal levels where educationally and developmentally salient experience takes place. School policies and practice, largely regulated by states, are increasingly affected by federal priorities and initiatives, adding a layer of regulation and direct influence that has expanded considerably in the last decade and was virtually nonexistent in decades prior. For example, the Federal Race to the Top (RTTT) competition (Nicholson-Crotty & Staley, 2012) delivered hundreds of millions of dollars to schools, through state-managed programs, for activities focused on federal priorities. More specifically, the federal interests in teacher performance evaluation, and the use of standardized test scores as a metric for evaluation, were a condition of states receiving RTTT funds. Another federal priority, written into requirements for states to receive RTTT funds, was replacement of existing state standards and assessments with implementation of the Common Core standards and assessments. These two federal initiatives, despite intermediary layers of interpretation and implementation, have already proven to be rather potent determinants of opportunity for students (Glazerman et al., 2011; Goldhaber, 2007; Los Angeles Unified School District [LAUSD], n.d.; Nicholson-Crotty & Staley, 2012).

Teacher evaluation policies, reflecting the RTTT emphasis on test scores as determinants of decisions related to tenure and promotion, have induced shifts in the nature of the teacher workforce (Boyd, Grossman, Lanford, Loeb, & Wyckoff, 2009; Goe, 2007; NEA, 2010; Plank & Condliffe, 2013; Ronfeldt, Loeb, & Wyckoff, 2013) and indications of shifts in student performance (Taylor & Tyler, 2012). For example, Wyckoff and colleagues (Loeb, Miller, & Wyckoff, 2014) recently reported on the impacts of changes in teacher tenure policies and practices in New York City. In a longitudinal examination of the causal impact of a tenure policy shift that extended the probationary period and conditioned tenure or additional probation on the basis of teacher performance assessments, Wyckoff et al. reported that such changes led to an increase of ineffective teachers leaving the workforce, an effect particularly noted for Black and Latino students. In effect, these shifts to the teacher tenure law, in part predicated on measurements of teacher performance that included classroom observation of teachers' behaviors with students, led to changes in staffing that were likely to also shift the nature and quality of teacher behaviors toward children.

The Common Core standards, while not yet implemented fully, are a pronounced departure from most existing state standards that define student success (and in turn most school efforts to promote success), which are largely focused on rote recall of facts assessed through group-administered multiple-choice assessment. In contrast, Common Core emphasizes greater conceptual understanding, peer-mediated learning opportunities, application in context, and authentic assessments. Adoption of Common Core and the resulting district- and school-level policies and practices could have a pronounced effect on shaping classroom experiences for students despite the expected variation in implementation locally.

The Dynamics of School Settings

A second feature of schooling is its dynamic quality. Time and change are fundamental to how schools are organized as opportunity structures and are expressed in several forms. Schools themselves are structured to change over time —in aspects such as size of schools or classrooms, curriculum and expectations for student performance, and allocation of staff. One might consider these to be elements programmed into the design of schools to shape experiences and opportunities for students and learning. These programmed features are triggered largely by an operationalization of time as chronologically coded, in terms of age or grade level, for example (Bassok & Rorem, 2014; Mihaly & McCaffrey, 2014). This operationalization creates a sense of dynamics that are fairly predictable: When children reach a certain age they enter kindergarten; when they reach the end of elementary school, they start middle school. In each case, the change is predictable and intentionally shifts the opportunity structure. In addition to these designed dynamics is an assortment of schooling features that are less predictable and are often triggered by aspects of individuals or higher-level systems. For example, annual district budget cycles may determine availability or termination of specific programs, often intended for vulnerable students (e.g., Star, Lynch, & Perova, 2011; Stroub & Richards, 2013), while adaptation and performance of individuals can trigger responses by the school that might completely reshape the opportunity structure for that person (Skiba et al., 2014; Stroub & Richards, 2013; Sullivan & Bal, 2013). This individual-level dynamism might be seen in responses as formal as referrals for special education or other services (Sullivan & Bal, 2013) or informal shifts, such as regrouping with different peers for instructional or social purposes (Cameron, Connor, & Morrison, 2005; McKown, 2013). In short, between predictable dynamics (changes triggered by external forces or responses to individual adaptation) and the microdynamics of everyday interactions and routines (McKown, 2013; Williams et al., 2012), schools are highly dynamic systems in which the opportunity structure might shift radically or ebb and flow with the contours of the day (Curby, Brock, & Hamre, 2013) or week.

The individually triggered dynamics of schooling also operate for school staff, with consequences for students that are both direct and mediated through school-level factors. An exquisite illustration of such dynamism is presented in Ronfeldt, Loeb, and Wyckoff's (2013) analysis of teacher turnover in a large urban school system. It is widely reported that teacher turnover rates are higher than desired (30% annually on average) and costly to districts. Utilizing multiple years of data on student performance, teacher retention, turnover, and transfers, as well as information on teacher performance and other attributes, the Ronfedlt analysis corrects for some methodological challenges in other studies and demonstrates that turnover has negative effects specifically on the most disadvantaged students and schools. These effects are transmitted not only directly to the students being taught by new teachers but are distributed at the school level as newly hired teachers require additional resources. And turnover itself is often a function of both larger social and economic conditions that affect teachers, students, neighborhood, and schools (MetLife, 2002; NEA, 2010; Stroub & Richards, 2013). The primary point is that teacher turnover is an illustration of school dynamics that has consequences for opportunity.

In sum, the multilayered, dynamic nature of schooling creates a structure in which proximal opportunities to influence development are shaped in ways that can be predicted and in turn evaluated under some circumstances for causal influences, while in other cases they provide opportunities to model complex mediating and moderating patterns of association over time. These features of the ecology of schools in turn create opportunities for scientists. With these larger points about the nature of schooling as background, the chapter now turns to a focus on key agents of proximal process in schools and contemporary evidence for their roles in this ecology and its effects on students.

EDUCATIONAL DEMANDS AND OPPORTUNITIES THAT SHAPE STUDENT EXPERIENCE AND OUTCOMES

One way to frame the intersection of schooling and development is to consider the school setting in terms of demand and opportunity (Tseng & Seidman, 2007). And although recent national reports (e.g., Aud et al., 2013; Bassok & Rorem, 2014; LAUSD, n.d.; NCES, 2014) clearly show that academic demands, and some opportunities, have risen considerably in the past decade, they also point to stark inconsistencies between these opportunities and student outcomes, particularly for more vulnerable groups in the population. For example, between 1982 and 2009, the rates of students taking Algebra II coursework rose from 40% to 76%, and steady increases have been reported annually for the percentages of students taking Advanced Placement tests and the number of tests that these student take (NCES, 2014), but such increases largely involve White, upper-income, suburban students. At the same time, performance benchmarks in

the major areas of reading and math remain flat over time for U.S. students with increasing gaps between U.S. students and their international counterparts and among race and income groups of U.S. students. According to the National Assessment of Educational Progress (2015), there were no gains in students' scores in reading and math across the period of 1980 to 2008 or even from 2004 to 2008, a period of considerable effort to improve the rigor and intensity of educational experience and inputs in these areas. Nonetheless, in international assessments from 2009, 15-year-olds in the United States scored in the midrange of the 34 countries of the Organization for Economic Cooperation and Development. This general pattern of results—relatively flat trajectories, modest closing of gaps, midrange performance relative to international peers—is replicated at nearly all grade levels (NCES, 2014). Thus, despite intensive efforts to improve the nature and quality of educational inputs and outcomes, progress as assessed by performance on standardized achievement tests has been minimal or nonexistent. In short, demands have clearly increased for many children while outcomes have not, leading us to question whether what appear to be enriched opportunities for learning and development are being actualized in students' proximal experiences.

In understanding schools in terms of demand and opportunity, Tseng and Seidman (2007), in their description of social settings, emphasized the interpersonal transactions between members within the environment as the most developmentally salient characteristic of a setting,—even stating that interventions would be best served to target such interpersonal interactions (Allen et al., 2011; Seidman & Tseng, 2011). Perhaps not surprisingly to developmentalists, large-scale efforts to decompose variance sources to which various school-relevant outcomes metrics (achievement, dropout rate, disciplinary infractions) could be attributed invariably identify classrooms as the single most important locus of effects, with teachers and peers described as the source of relevant experiences (Goldhaber, 2007; Mihaly & McCaffrey, 2014; Sanders & Horn, 1998; Sanders & Rivers, 1996). For these reasons, any effort to fully understand the impact of schooling and the link between schooling and development will benefit from a primary focus on proximal process in classrooms (Hamre, Pianta, et al., 2013).

Classrooms

Students spend at least one-quarter of their waking hours in schools, most of it in classrooms, and the capacity of these settings to promote developmental learning, on average, is modest at best (Bassok & Rorem, 2014; Hamre, Pianta, et al., 2013; Kane et al., 2014; LAUSD, n.d.). Adolescents routinely describe experiences in classrooms that promote disengagement and alienation, a sense that these settings and the adults responsible for their quality are disconnected from developmental needs of youth (Eccles, Lord, Roeser, Barber, & Hernandez Jozefowicz, 1997; Morin, Maïano, Marsh, Nagengast, & Janosz, 2013; Roseth, Johnson, & Johnson, 2008). In a recent population-level survey of students in Los Angeles secondary schools (LAUSD, n.d.), a little more than half expressed agreement with statements reporting easy access to supportive adults, a feeling of being cared for at school, or receiving helpful feedback from teachers, and although 90% of all students expressed plans to go on to some post–high school education, only 16% of seniors had specific plans to continue their education.

Evidence from national-level observations of American elementary school classrooms shows clearly that the nature and quality of the instructional and social supports actually offered to young students in classrooms is generally low, and even lower for less advantaged students (Kane & Staiger, 2012; MET Project, 2010; NICHD ECCRN, 2005; Pianta et al., 2007). Just to illustrate using some of the results from the NICHD observations of more than 800 classrooms in each of first, third, and fifth grades across more than 23 states, of the opportunities for academic activities and learning to which a typical student is exposed, more than 85% of those opportunities take place in the context of teacher-directed whole-group instruction or individual seatwork, in contrast to small-group work (Pianta et al., 2007). These academic opportunities also have a pronounced focus on performing basic skills, tasks that require a discrete answer that is correct or not rather than eliciting analysis, reasoning, or problem solving around a more ambiguous challenge. Students in these settings have few individual interactions with their teacher. When examining the classroom from the perspective of more global dimensions of teacher-student interaction, the picture produced is of a setting that is mildly positive socially and lacking in cognitive stimulation or active engagement. Teachers' interactions with students were almost devoid of conceptual challenges or abstract information, and students were not engaged in interactions that provided feedback that elicited higher levels of performance. From the student perspective, the picture was one of passive, compliant engagement. And, over time, the likelihood of a student being exposed to a teacher rated in the top third of the sample distributions for quality of their interactions with students (emotional

and instructional features of behavior) was less than 10% (Pianta et al., 2007)

More recently, the Measures of Effective Teaching (MET) Study, funded by the Bill and Melinda Gates Foundation, reported on the nature of experiences across 2 consecutive years in more than 3,000 fourth- to tenth-grade classrooms in four large school districts (Kane & Staiger, 2012; Kane et al., 2014; MET Project, 2010). Using a suite of standardized observation protocols (very similar to those in the NICHD study) that scanned for both general qualities of teachers' interactions toward students and teaching practices relevant to specific content areas (see Kane & Staiger, 2012), the MET findings corroborate the impressions gleaned years earlier from the NICHD Study of Early Child Care and Youth Development observations—classroom learning experiences were largely rote in nature and rarely called for reasoning, problem solving, or analytic skills; instruction was delivered primarily in large groups; content was discrete and isolated rather than made relevant and connected to other knowledge; and students were engaged in very passive ways (Kane & Staiger, 2012; Kane et al., 2014).

Additional work from the MET study and other investigative teams show quite clearly that the kind of instruction observed in these large-scale studies – a narrow focus on decontextualized skills and knowledge—contributes directly to the sense of alienation and disengagement described by youth (Crosnoe et al., 2010; Ferguson with Hirsch, 2014). It should come as no surprise then that engagement in school begins to decline early in adolescence and by entry into high school this decline is so pronounced that half of high school students report that they do not take their school or their studies seriously (e.g., LAUSD, n.d.; NCES, 2014; Wang, Brinkworth, & Eccles, 2012). Not surprisingly, given the developmental salience of active engagement and intrinsic motivation in adolescence, middle and high school youth not only withdraw energy from school but also drop out (S. M. Jones et al., 2008; NCES, 2014).

In sum, at the most macro-level, as schools have ramped up academic demands and focused more intently on skills and knowledge defined by standards and assessed using group-based multiple-choice tests, an argument can be made that the first wave of school reform efforts has not created developmentally salient opportunities for learning (Plank & Condliffe, 2013; Skiba et al., 2014) or teaching (Abenavoli et al., 2013; NEA, 2010). Moreover, as economic stresses have been placed on students, families, and communities over the past decade, the risks associated with poverty have interacted with, and exacerbated, school-based demands (Plank & Condliffe, 2013; Skiba et al., 2014; Weinstein, 2008). Students report increasing levels of stress (NCES, 2014), as do teachers (MetLife, 2002; NEA, 2010), and rates of teachers' use of exclusionary discipline practices (e.g., suspension) have increased dramatically over the past decade, a trend that has been characterized as reflecting notable misalignment between demands on students and educators and resources that are relevant for their success in creating and realizing educational opportunity. Signs of increasing misalignment are notably evident for several groups of students, including African Americans and other students of color, those with mental health or behavioral problems, and those from low-income backgrounds (Skiba et al., 2014; Sullivan & Bal, 2013). Moreover, indications of strain and misalignment are also reflected in educational personnel and structures. Fifty percent of the teaching workforce leaves the profession after 5 years, with the vast majority reporting feeling inadequately trained to respond effectively to students' social needs and behaviors (J. Greenberg, Pomerance, & Walsh, 2011; NEA, 2010). And by some indications roughly 10% of schools in America are chronically failing to engage students in productive learning opportunities (NCES, 2014).

These trends bring to the foreground the gaps in knowledge that would provide a more informed understanding of how schools foster developmentally salient experiences for students and the parameters that shape those experiences toward promotive and preventive opportunities in contrast to risk-exacerbating ones. At present, there is ample evidence that schools play roles that shape development toward competence and toward pathology, with signs that conditions in communities marked by greater economic or social risk, or for students characterized by those risks, are tilting in a negative direction.

The next sections turn to a more detailed and in-depth analysis of scientific progress related to one nexus of education and human development: teacher-student interaction. Within this broad domain of research on a key proximal process in schooling, the focus is on describing these interactions in developmentally salient terms, identifying key points of impact on outcomes for children and youth, and presenting evidence from interventions related to improving their impact.

CONCEPTUALIZING AND MEASURING TEACHER–STUDENT CLASSROOM INTERACTIONS

Analysis of the substantial empirical literature in education policy research focused on identifying teachers' effects

on student performance (i.e., teachers' value-added for student learning gains) leads to the quite clear conclusion that teachers matter for student achievement (Goe, 2007; Kane & Staiger, 2012; Loeb et al., 2012), motivation (Patrick, Anderman, Ryan, Edelin, & Midgley, 2001; Reeve, Jang, Carrell, Jeon, & Barch, 2004; Ruzek, Domina, Duncan, Conley, & Karabenick, 2014; Wang & Holcombe, 2010), and a range of behavioral and social outcomes (S. M. Jones et al., 2010; Pakarinen et al., 2011; Wang et al., 2012). However, in the education policy literature, much of the work on teacher impact or effectiveness relies primarily on administrative data sets that typically are limited in measurement to teacher demographics and student achievement test scores. Thus, most of the teacher-effects studies fail to document the specific teaching behaviors that count for detected impacts on students' outcomes or how those behaviors are organized and produced. Yet description and measurement of teachers' developmentally salient classroom behaviors is one area of considerable progress in research over the last decade, such that some of the conceptual models and accompanying assessments have been integrated into the first wave of teacher performance assessments implemented at scale in districts and states (see Kane et al., 2014). These assessment tools derive from the larger literature on teacher-student interactions showing impacts on social, behavioral, and cognitive development in the early years of schooling and beyond, documented in both experimental and well-controlled quasi-experimental studies (Cameron et al., 2005; Curby et al., 2010; Howes et al., 2008; S. M. Jones et al., 2013; Raver et al., 2011). And although this body of work provides credible support for the value of teacher-child interactions for development, the accrued evidence also outlines a number of pressing questions for further conceptual and empirical investigation.

A cluster of questions for further study is motivated by the lack of consensus on the basic lexicon and classification scheme for describing teacher-student classroom interactions (Hamre et al., 2013). Extending back more than 25 years to Brophy and Good's seminal work (1986) on describing and measuring teachers' classroom interactions, there have been numerous efforts to address this challenge, each with varying degrees of success. Given what one would imagine as the scientific and applied importance of this focus, there has been very little in the way of systematic progress in measurement or understanding. Rather, efforts to describe effective teaching have collectively led to a mostly fragmented understanding: large numbers of small-scale studies; many attempts at description that lack evidence of validity or tools for data collection (Lemov, 2010); challenges in more systematically discerning and measuring the aspects of teacher behavior that are unique to teaching a certain content area (Grossman, Cohen, Ronfeldt, & Brown, 2014; Hill, 2010; van Hover, Hicks, & Cotton, 2012) or grade level (Pianta et al., 2014); or derivations that are specific to data collection methods, such as observation or informant report (Kane et al., 2014; Raudenbush & Jean, 2014; Ruzek, Hafen, Allen, et al., 2014). The descriptive basis for measuring and understanding the effects of teaching on developmental outcomes is both limited and limiting.

Making matters more challenging is the widespread demand for descriptions of effective and ineffective teaching, including schemes that could be used in performance evaluation, accountability, and improvement efforts (see Archer, Kerr, & Pianta, 2014; Glazerman et al., 2011; Harris & Sass, 2011; Rockoff et al., 2011). With nearly every state requiring some form of teacher performance assessment, the portfolio of existing efforts is broad, ranging from district-specific rubrics to widely used approaches that have been applied with precise adherence to standards or, more typically, adapted by local educators (see Archer et al., 2014; Kane & Staiger, 2012). When studies have included various forms of assessing teacher-student interaction, including multiple observation tools (Kane & Staiger, 2012; Staiger & Rockoff, 2010) or combinations of observation and student report (Brock, Nishida, Chiong, Grimm, & Rimm-Kaufman, 2008; Kane et al., 2014; Raudenbush & Jean, 2014), the evidence indicates considerable commonality across clusters of behaviors identified through these forms as readily and reliably detectable and as salient for student learning (Hamre, Pianta, et al., 2013). These behavioral clusters include aspects of teachers' social and emotional behaviors toward students, their practices related to classroom management, and how they deliver instruction (Danielson, 2007; Marzano, 2014). Thus, although operationalized descriptions of the elements of developmentally salient teacher behavior remain fragmented and unstandardized in the sense of a systematic lexicon and lack the precision and structure of a formal classification system, the evidence does suggest possibilities for convergence among the various forms in use. There is tremendous demand for tools that can be used in the evaluation of effective and ineffective teachers (Kane & Staiger, 2012; Rockoff et al., 2011) and that support high-stakes and low-stakes decisions (Archer et al., 2014). However, even though there is, in concept, general agreement on broad clusters of effective teacher behaviors, the scientific work to derive strong assessments has been outstripped by applied demands, and so research has quickly moved

more to a focus on application than on the basic science of description. This is unfortunate because valid and replicable description the teacher behaviors most salient for student learning and development is the linchpin of scientifically derived applications that could meet current and projected demands in practice.

A Framework for Conceptualizing and Measuring Teacher-Student Interactions

As noted, the need to further articulate and validate theoretical frameworks for teaching is exceptionally important and was suggested by Douglas (2009): "Our knowledge of classroom instruction will be well served by studies that build on a common theoretical framework" (p. 519). In a series of theoretical and empirical papers published over the past decade, Pianta, Hamre, and colleagues (Hamre, Hatfield, et al., 2014; Hamre, Pianta, et al., 2013; Pianta & Allen, 2008; Pianta et al., 2007; Pianta, La Paro, & Hamre, 2008) have presented and evaluated one such framework of effective teaching, Teaching Through Interactions (TTI), operationalized through observation, and focusing exclusively on interactions between teachers and students as the proximal process through which teachers influence learning and development. This framework and the empirical work associated with it is presented here as an illustration of a systematic, empirically based effort to describe developmentally salient teacher-student interactions, which can also serve as the basis for contrasting approaches and models.

The TTI framework situates the study of teacher-student interaction within a developmental systems theory framework (Bronfenbrenner & Morris, 1998; Lerner, 2002); interactions are embedded within the dyadic system of teacher-child relationships and involve psychological, behavioral, biological, and cultural processes. Within dyadic relationship systems, interactions reflect behavioral exchanges in which information and experience are transmitted between adult and child through channels that operate bidirectionally and transactionally (Sroufe, 2005). The original version of the TTI framework posited a conceptualization of teacher-student interactions predicated on domains of child development they foster. This developmental-domain approach to conceptualization organized teachers' classroom interactions into three broad domains of support for student development: Emotional Supports, Classroom Organization, and Instructional Supports (Hamre, Pianta, et al., 2013; Pianta et al., 2008) based on their presumptive salience for student development in the areas of social and emotional development, self-regulation and attention, and achievement, respectively. And TTI further defines these three broad domains to encompass and organize sets of increasingly molecular features of interactions that are presumed to be important to students' academic and/or social development and that can be observed in classrooms.

Factor Analytic Examination of the Organization of Teacher-Student Interaction

A considerable body of work on teacher-child interactions draws from the TTI conceptual framework (Hamre, Pianta, et al., 2013) and the observational measure corresponding to this framework, the Classroom Assessment Scoring System (CLASS; Pianta et al., 2008) as applied to age spans that encompass preschool through late adolescence. And although other theoretical frameworks and accompanying assessment tools have been in widespread use in the field (Lemov, 2010; Marzano, 2014), the empirical evidence base surrounding their use and validity is more limited in scope and rigor. Research using the CLASS has provided evidence supporting the TTI three hypothesized broad domains of teacher-child interactions—Emotional Support, Classroom Organization, and Instructional Support —as an empirically sound approach to describing teacher-student interactions in classrooms (Hamre, Pianta, et al., 2013), addressing in part Douglas's (2009) call for a common description. More specifically, results from a confirmatory factor analytic study of CLASS-derived observational data from over 4,000 preschool to fifth-grade U.S. classrooms (Hamre, Pianta, et al., 2013) suggested that the TTI hypothesized 3-factor structure provided better fit to the observed data than 1- or 2-factor solutions. However, analysis of CLASS-based observations in upper elementary and secondary grades (Allen et al., 2011), most notably from the MET sample of more than 3,000 classrooms (Kane & Staiger, 2012), suggests that a more general, single domain reflects a combination of teachers' management and instruction is the best-fitting descriptor of effective teaching. Evidence from students' reports of effective teaching, when examined for factor structure, tends to confirm this more general, single factor as the best-fitting descriptor (Downer, Lopez, et al., 2011; Ferguson with Hirsch, 2014; Kane & Staiger, 2012). Both the general, single-factor structure and the three-domain structure have received support in empirical studies examining predictions to student learning and development (Allen et al., 2011; S. M. Jones et al., 2013; Kane & Staiger, 2012; Lüdtke, Robitzsch, Trautwein, & Kunter, 2009; MET Project, 2010; Pianta et al., 2007; Ruzek, Hafen, Hamre, et al., 2014).

Associations with Student Outcomes

In numerous studies, three domains of teacher-child interactions (emotional, organization, instruction) have been linked to students' social, emotional, regulatory, and cognitive development (see Downer, Sabol, & Hamre, 2010, for review). In general, effect sizes obtained between these ratings of the features of teachers' interactive behaviors and student outcomes such as achievement test scores are small (Brock et al., 2008; Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Mashburn et al., 2008; Pakarinen et al., 2011; Rimm-Kaufman, Curby, Grimm, Nathanson, & Brock, 2009), although larger correlations are detected for students with higher risk profiles (Hamre & Pianta, 2005; McCartney, Dearing, Taylor, & Bub, 2007), or for students' reports of the classroom environment or motivation (Ferguson with Hirsch, 2014). Recent evidence also indicates that children's gains in language and literacy skills when they experience higher-quality teacher-child interactions and instruction are larger at upper levels of the distribution of teacher effectiveness (Burchinal et al., 2010; Hatfield, Burchinal, Pianta, & Sideris, in press), suggesting the greater potency, for some children, of certain teacher behaviors. Evidence also suggests that features of teacher-child interaction support children's executive functioning skills (Weiland & Yoshikawa, 2013) and social and emotional skills (Gormley, Phillips, Newmark, Perper, & Adelstein, 2011). However, as noted, the effect sizes are typically small, and it is quite possible that the small magnitude of the overall association may not be linear. This possibility is supported by limited evidence of a cutoff or differences in magnitude in the association between quality and child outcomes at varying points on the quality distribution, although the study of such cutoffs has yielded inconsistent results (e.g., Burchinal, Kainz, & Cai, 2011, for a review).

A recent meta-analysis of 10 large preschool and child care studies provided evidence of thresholds teacher-child interactions and child outcomes, but such thresholds did not emerge in all analyses (Burchinal et al., 2011). Factors such as the actual threshold levels tested, how thresholds are derived (empirically or on an a priori basis), use of different covariates or measures of quality all seem to influence the likelihood of detecting a threshold. Other studies replicate threshold-related findings with some success and also extend the range of outcomes examined (Burchinal, Sideris, Vernon-Feagans, & Pianta, 2013; Weiland, Ulvestad, Sachs, & Yoshikawa, 2013). For example, Weiland et al. (2013) reported that children showed larger gains in executive functioning skills at higher levels of teacher-child interaction quality, thus suggesting some possible threshold effect.

The consistency or stability of students' exposure to effective teacher-student interactions also appears to be of additional benefit for promoting behavioral development and academic trajectories (Landry, Smith, Swank, Assel, & Vellet, 2001; Sanders & Horn, 1998). At the same time, there is clear evidence that students rarely have the same quality experiences from year to year (La Paro et al., 2009; Pianta et al., 2007). However, most research on consistency of student experiences is conducted on a year-to-year basis, not fully exploring the potential developmental ramifications of variation experienced on a day-to-day or within-day basis (Kern & Clemens, 2007). Recent analysis of observed experiences in early childhood classrooms offers new insights about the importance of within-day variability.

Results from a series of observational studies examining consistency of teacher-child interactions across the preschool day indicate that students do experience variability in these domains of teacher behavior (Curby et al., 2010) and that greater variability is related to poorer developmental outcomes (Brock & Curby, 2014; Curby et al., 2010; Zinsser et al., 2013). For example, variability in emotionally supportive features of teachers' interactions across a day moderated associations between teacher-student relationship quality and students' problem behaviors and social competence (Brock & Curby, 2014). Additionally, Curby, Brock, and Hamre (2013) found that, even after accounting for mean levels of observed features of teacher-student interaction, consistency of interaction quality predicted within-year gains in academic and social outcomes. Similarly, Zinsser and colleagues (2013) found that students were more aggressive in classrooms with inconsistent teachers, even when those teachers provided, on average, high levels of support. And recent studies of students in middle schools, with multiple teachers, demonstrate the consistency in the features of teacher-student interactions, across teachers and within days, accounted for students' levels of problem behavior (LoCasale-Crouch, Jamil, Pianta, Rudasill, & DeCoster, 2013). In sum, it appears that not only the general level of teacher-student interaction quality is a developmentally salient feature of the classroom setting and that consistency in such features can have additional value.

Challenges to Detecting and Interpreting Associations Between Domains of Teacher-Student Interaction and Student Outcomes

Over the course of the last decade of research on teacher-student interactions, using either the CLASS

or the Framework for Teaching (Danielson, 2007) as the tool for observations of classroom teaching, a number of important limitations pertaining to description of teacher-student inter actions have surfaced in factor analytic studies and in studies examining associations with student outcomes. As noted earlier, for both the FFT and CLASS, the best-fitting factor structure across numerous studies (Hamre, Pianta, et al., 2013; Pakarinen et al., 2011) identifies factors reflecting instruction, classroom management, and warmth/support dimensions, although these can vary from study to study and in most studies display less-than-ideal fit indices (Hamre, Pianta, et al., 2013; Mihaly & McCaffrey, 2014; Raab, Dunst, Wilson, & Parkey, 2009; Salminen et al., 2012; Wagner, Göllner, Helmke, Trautwein, & Lüdtke, 2013). However, most studies using the CLASS report very high correlations among the three domains, limiting examination of the extent to which individual domains of interactions are associated with specific domains of children's development (Hamre, Pianta, et al., 2013). Studies using the FFT also indicate factors to be highly correlated, and due to high multicollinearity among domains, researchers sometimes use only one domain of teacher-child interaction at a time (e.g., Pakarinen et al., 2011; Rudasill, Gallagher, & White, 2010), use an overall score (e.g., Jamil, Downer, & Pianta, 2014), or struggle to interpret results when all three domains are in the same model (Mashburn, Downer, Rivers, Brackett, & Martinez, 2014; Rimm-Kaufman et al., 2009). Thus, although possibly a conceptual and empirically satisfying map of classroom interactions, the three broad domains posited by the TTI framework posed a less-than-satisfactory solution for understanding the specific ways in which teachers' interactions with children support development, despite the consistent evidence of teacher-student interaction effects overall.

Therefore, a challenge to better understanding the nature and impact of teacher-student interactions on development has been the specificity of relations between and among domains of such interaction (e.g., social interactions, instructional interactions) and domains of children's development (e.g., peer relationships, language development). Challenges in parsing that association for a clearer understanding of effects are posed by frequently noted associations among features of teachers' behaviors. For example, teachers who are highly sensitive are also often more like to engage in effective language stimulation practices. Within the larger debate about the domain specificity of socialization (Downer et al., 2010; Dunn, 2010; Grusec & Davidov, 2010), Grusec and Davidov (2010) argued against a general socialization factor, "but rather each form of relationship between the object and the agent of socialization serves a different function, involves different rules and mechanisms for effecting behavior change, and facilitates different outcomes" (p. 687), a rather strong statement in support of domain specificity. Dunn (2010) noted that a domain-specific approach may offer conceptual clarity but fails to fully acknowledge the real-world overlap among domains, on both the input (e.g., teacher-child or parent-child interactions) and the outcomes sides, pointing out the lack of empirical support for this strong assertion of domain-specificity.

A Dyadic Systems Model for Conceptualizing Teacher-Student Interaction and Effects

Following from published reports of challenges with regard to identifying associations between the three TTI domains and child outcomes, Hamre, Hatfield, et al. (2014) advanced and evaluated a model for considering both domain-general and domain-specific associations between teacher-child interactions and children's development. In a recent revision to their TTI framework, Hamre, Pianta, and colleagues (2013) argued that there are both generic properties of interactive behavioral exchanges between adults and children as well as properties that are specific to role, intent, and content. This reformulation posits a general dyadic systems-level property of teacher-child interactions, responsive teaching, which is hypothesized to foster development in all domains (social-emotional, behavioral, and cognitive outcomes) because it reflects a property of coregulation that both activates students' attention and engages them in learning opportunities presented at the time. This general feature of dyadic interaction systems is hypothesized to engage the members of the dyad, providing a platform for the features of exchange (behavior, language, information) that have a specific focus or intent. This reformulation argues that there are systems-level properties of interactions that characterize general properties of exchange regardless of the intent or content of those exchanges. In empirical tests of instruments such as CLASS or FFT, in which the focus of observation is on teachers' behavior toward and response to students' cues, this generic factor is assumed to be present in all dimensions of teacher behavior being observed, an assumption confirmed in factor analyses of these instruments, which typically yield a large first factor loading on all dimensions (Kane & Staiger, 2012; MET Project, 2010; Mihaly & McCaffrey, 2014).

Beyond general features of responsivity, it is clear that teacher-student interactions typically also carry an intent,

a focus on learning or on content, that in part reflect desired consequences of that interaction for children's performance. In research on teacher-child interactions, this impact of intent or learning focus has been most clearly demonstrated in relation to interactions that foster early literacy development. For example, interactions in which attention is explicitly paid to the phonological properties of written and spoken language appear necessary for most children to gain these foundational skills in early literacy (see B. M. Phillips, Clancy-Menchetti, & Lonigan, 2008, for review). Such features of teachers' interactions have been conceptualized as distinct from more general responsivity (Justice, Mashburn, Hamre, & Pianta, 2008). Moreover, in the domain of mathematics, Hill (2010) has conceptualized a set of teacher behaviors relevant for math learning that are not captured by general responsivity features. Evidence suggests that these math-specific features indeed are unique to predicting student mathematics learning gains separate from the contributions of more general features (Hill, 2010). Most recently, van Hover and colleagues (2012) conceptualized a set of interactive behaviors displayed by teachers that are unique to teaching in the content areas of history and social studies, behaviors that in turn can be codified and observed reliably. On the basis of this conceptual distinction between features of teacher-student interaction that reflect general properties of dyadic systems (responsive teaching) and features reflecting the intent or learning focus of the interaction, Hamre, Hatfield, et al. (2014) hypothesized that general and domain-specific features reflecting intent and content of interactions should show common and differential associations to outcomes in social and cognitive domains.

Responsivity

At the core of all of the dyadic systems conceptualizations described in TTI are general features of interaction that reflect a dyadic system-level property that is best captured by the construct of responsivity. There is a long history of theory and research describing responsivity as a property of interactions between adults and children, both in the parenting (Bornstein, Tamis-LeMonda, Hahn, & Haynes, 2008; Landry, Taylor, Guttentag, & Smith, 2008) and early childhood education (Howes & Smith, 1995) literatures. *Responsivity* is defined as "prompt, contingent, and appropriate reactions to . . . children" (Bornstein et al., 2008, p. 867). Early work by attachment theorists highlighted the importance of this type of parenting for fostering positive social, emotional, and cognitive development (Bowlby, 1973). However, responsivity, as a construct or dyadic process, transcends a single theoretical approach (Landry et al., 2008), with similar descriptions coming from sociocultural (e.g., Rogoff, 1990) and socialization (e.g., Maccoby & Martin, 1983) researchers. Several other features of responsivity are reflected in various approaches to describing general properties of effective teacher-student interactions, including active engagement, cue detection, and contingent responding (Brophy & Good, 1986; Danielson, 2007; Lemov, 2010).

Teachers are active agents, and the classroom is intentionally designed to foster development. Children learn more when teachers actively and intentionally use their interactions to engage children in classroom experiences. This emphasis on active and intentional engagement is in contrast to approaches that emphasize a more passive role for the teacher (Landry, Anthony, Swank, & Monseque-Bailey, 2009). Thus, elements of active engagement may be present in nearly all features of teacher-child exchanges. Another common element of interactions is cue detection (Linhares & Brum, 2009). Many descriptions of effective teaching mention teachers' recognition of children's cues in moment-to-moment bouts of attending and response. In the educational literature, this phenomenon is sometimes referred to as teacher noticing (e.g., van Es & Sherin, 2002) or with-it-ness (Kounin, Friesen, & Norton, 1966), although these descriptions have tended to focus on the behavioral aspects of cue detection rather than on teachers' abilities to visually detect when children are in need of emotional or cognitive support. And for adults to engage effectively with children, they must not only attend to cues but also respond contingently in back-and-forth exchanges that build on each other to form the functional episodes of attachment and cognitive scaffolding that foster development (Allen et al., 2011; Bodrova & Leong, 2012; Raver et al., 2011; Rimm-Kaufman et al., 2009). The properties of interactive behaviors—cue recognition and accurate interpretation, contingent responses, loops of back-and-forth cycles of calibrated behavior and emotion—collectively define the construct of responsive teaching (Hamre, Pianta, et al. 2013).

Intended Learning Targets

Effective teaching also requires more than being responsive to student cues and activation of engagement and attention; in nearly all instructional or social encounters, teachers have a goal or aim associated with their role and function; this is the aspect of teaching that is often described as intentional or goal directed (Piasta et al., 2012; Urdan & Schoenfelder, 2006; Wasik & Hindman, 2011). The Hamre, Pianta, et al. (2013) formulation posits three more specific aspects of teacher-student interaction that

reflect teachers' intent—motivation-inducing supports, management and routines, and cognitive facilitation—that also are complemented by content-specific behaviors (Hill, 2010; van Hover, Hicks & Cotton, 2012). In the Hamre, Pianta, et al. (2013) formulation, features of teacher-student interaction that are focused on intended learning targets are also hypothesized as distinct from the general elements of responsive teaching.

Thus, aside from interacting in a generally responsive manner that engages students, interactions with teachers must also convey supports that enable students to approach difficult tasks and persist in those tasks toward mastery (Ruzek, Hafen, Allen, et al., 2014; Wang & Holcombe, 2010; Wang et al., 2012;). Therefore, a primary intent of effective teacher-child interactions must be to activate and foster motivational processes. The strategies teachers may use to enhance motivation, informed in part by self-determination theory (Connell & Wellborn, 1991), focus on fostering connection, competence, and autonomy (Allen et al., 2011; Ruzek, Domina, et al., 2014; Ruzek, Hafen, Allen, et al., 2014; Wang & Holcombe, 2010). A second functional intent of teacher-student interaction is to organize and manage activity, time, and attention, with teachers providing very clear expectations to students about behavior, performance, and self-regulation concerning tasks and time in the classroom. Teachers' interactions in this broader area of management and routines have been shown to support the development of self-regulation and executive functioning skills (Cameron et al., 2005; Patrick et al., 2001; Raver et al., 2011; Ursache, Blair, & Raver, 2011). Finally, teachers' exchanges with students should convey information, expand knowledge, and develop cognitive capacities. As noted in an earlier section, classrooms vary considerably in elements of cognitive demands through which teachers intentionally engage students to foster conceptual understanding and reasoning skills (Ferguson with Danielson, 2014). Such stimulation of cognitive processes may occur in the context of general interactions as well as in the context of content-specific instruction. One recent study suggests that science activities in particular may stimulate more cognitively challenging interactions among teachers and children (Cabell et al., 2011). For the most part, evidence routinely points out the low level of cognitive demands and facilitation present in teachers' instruction, a consistent finding across grade levels and resource levels of schools (LAUSD, n.d.; MET Project, 2010; NICHD ECCRN, 2005; Pianta et al., 2007).

Unfortunately, conceptualization and measurement of teacher-student interaction often confound the general properties of interaction with features related to intent and focus. To disentangle this challenge empirically, Hamre, Pianta, et al. (2013) employed a bifactor analytic strategy to explicitly test the revised model describing teacher-student interactions, positing both general and domain-specific features of teacher-student interaction. Bifactor modeling produces independent, uncorrelated factors that can be examined as unique predictors of student outcomes, even when all factors are in the same model (Chen, Hayes, Carver, Laurenceau, & Zhang, 2012). The bifactor model is an approach to dealing with the common situation in which researchers propose a general construct of interest that is hypothesized to include several highly related domains (Chen et al., 2012; Chen, West, & Sousa, 2006).

More specifically, Hamre, Hatfield, et al. (2014) used bifactor modeling to examine the existence of general (i.e., Responsive Teaching) and domain-specific factors (i.e., Motivation-Inducing Supports, Management and Routines, and Cognitive Facilitation) present in teacher-student interactions and hypothetically differential prediction of child outcomes by those factors. They note a*s* a primary rationale the difficulties that arise in analyses with correlated factors such as in the multiple correlated domains of the CLASS or FFT (see MET Project, 2010; Kane & Staiger, 2012). The standard analytic methods (including ANOVA, regression, and logistic regression) test the extent to which each predictor explains variability in the outcome adjusting for other predictors in the model (J. Cohen, Cohen, West, & Aiken, 2003). In these approaches, even moderately correlated predictors are less likely to provide significant results, and when detected, multicollinearity makes these results more difficult to interpret and explain. The bifactor approach allows for a more precise evaluation of general and domain-specific elements of teacher-student interactions.

In the first study to examine teacher-student interactions using the bi-factor approach, Hamre, Hatfield, et al. (2014) drew from live observations of 325 preschool classrooms, comparing bifactor model fit to one-, two-, and three-domain solutions. More importantly, this study further evaluated the bifactor approach (and validity of the reformulated TTI theoretical framework) by examining the extent to which the general factor of responsive teaching as well as the posited domain-specific factors (i.e., motivational support, management and routines, and cognitive facilitation) differentially predict children's executive functioning, social, and early academic development from fall to spring of the preschool year. The authors expected responsive teaching, because of its hypothesized role in promoting student engagement, to

predict growth across all student outcome domains; they also expected domain-specific associations in which more positive student-teacher relationships were predicted by motivational support, students' executive function outcomes by management and routines, and growth in early academic outcomes predicted by cognitive facilitation.

Results from this study provided new insight into the ways in which teachers' interactions with young children in preschool classrooms support growth across a range of developmental domains, suggesting that arguments regarding general or domain-specific approaches to conceptualizing the influence of adults on development (Downer et al., 2010; Dunn, 2010; Grusec & Davidov, 2010) may be oversimplified, with support present for both sides of the argument. In the Hamre, Hatfield, et al. (2014) study, children in classrooms with high levels of responsive teaching, a *general* system-level property of teachers' interactions, demonstrated greater gains across a number of outcome domains, including cognitive, self-regulatory, and relational functioning. Moreover, there was also support for domain specificity in relations between specific features of teacher-child interaction and child outcomes, with teachers' positive management and cognitive stimulation uniquely predicting self-regulation skills and academic performance, respectively, independent of responsive teaching.

This initial empirical support for the reformulated TTI framework suggests a promising direction for further refinement and evaluation of what could be an important advance toward a validated theoretical description of teacher-student interaction as a developmentally salient feature of educational settings (Brown, Jones, LaRusso, & Aber, 2010; Seidman & Tseng, 2011; Tseng & Seidman, 2007). Efforts that use the bifactor analytic strategy to replicate the Hamre, Hatfield, et al. model (2014) suggest some level of support and need for further conceptual refinements. For example, in secondary grades, Hafen and colleagues (in press) have applied the bifactor strategy to the MET data, confirming a general factor that tracks closely to responsive teaching, with a somewhat different set of domain-specific factors than reported in Hamre, Hatfield, et al. (2014), perhaps due to the content-learning focus of secondary schools in contrast to the socialization focus of the early education settings in the Hamre, Hatfield, et al. study. Replication efforts in elementary settings (Downer, Ruzek, Stuhlman, & Hamre, 2014) confirmed the general responsive teaching feature of teacher-student interaction but differed from the early childhood results in terms of domain-specific features (Hamre, Hatfield, et al., 2013).

Students' Perceptions of Teacher-Student Interaction

In addition to the study of teacher-student interaction and classrooms based on observations at the classroom level, there is a large literature that addresses understanding students' unique perceptions of the classroom setting, their individual experiences, and their views of others in that setting, using student self-report methods, a body of work that is integral to understanding proximal processes in classrooms (Fraser & Walberg, 1981; Turner & Meyer, 2000; Weinstein, 1983). This is particularly notable in research on the effects of classroom environments on students' motivation and psychological beliefs, some of which has employed observations to assess instructional climates (e.g., Jang et al., 2010; Patrick et al., 2001; Spearman & Watt, 2013), but most studies utilize student surveys to measure classroom climate or experiences with teachers (Ferguson with Danielson, 2014). This preference for describing teacher-student interaction through measuring student perceptions stems from the view that students' own perspectives are primary determinants of their responses to the classroom as an opportunity setting and therefore the most salient for predicting student-level outcomes (Lüdtke et al., 2009).

A benefit of surveys is that students draw on a deep set of personalized experiences to assess their teacher's instructional practices (Wagner et al., 2013), perspectives that may add unique predictive value in understanding the classroom as a learning environment (Lüdtke et al., 2009; Ruzek, Hafen, Allen, et al., 2014). Conceptualization and measurement of the classroom setting, and in particular teacher-student interaction, from students' individual perspectives also posits general and domain-specific features. For example, surveys measure the overall classroom climate based on multiple students' reports within the same classroom (Marsh et al., 2012) as well as differential student experiences both *within* (Kuklinski & Weinstein, 2001) and *across* classrooms (Oakes, 2005). Moreover, factor analytic evidence confirms a general factor reflecting responsive, engaging teaching as well as specific elements pertaining to management and cognitive demand (Ferguson & Danielson, 2014), suggesting some convergence between student experience and observational data regarding the organization of teacher-student interaction in classrooms.

However, despite these convergences in description, student survey research also reveals additional complexity in classroom processes (Tseng & Seidman, 2007) in that different students in the same classroom disagree about the extent to which their teacher engages in various practices. Significant within-classroom variability in student

reports suggests that surveys of student perceptions do not describe or measure classroom processes in aggregate form (Lüdtke et al., 2008; A. D. Miller & Murdock, 2007;) but actually provide a complementary window on teacher-student interaction, in which observation of teachers' behavior can assess a central tendency or level of resources available (Pianta & Allen, 2008; Pianta et al., 2007), while student surveys capture the salience of individual experiences (Marsh et al., 2012; Wagner et al., 2013; Wang et al., 2012).

In sum, the significance of work to conceptualize and validate models for describing and understanding the developmental salient features of teacher-student interaction is notable, and progress in the past decade has been substantial. As mentioned earlier, the absence of empirically validated models for descriptions of teacher-student interaction and developmentally salient classroom processes leaves the field wide open for opinions, conjecture, and as-yet-to-be tested good ideas (Lemov, 2010) that have a tendency to drive into the popular understanding of teaching and even shape policy (Green, 2014), particularly in the absence of rigorous tests of assumptions (Loveless, 2014). In fact, although as is discussed in sections to follow, there is a growing body of evidence on the improvement of student learning and development as a consequence of interventions that improve teacher-student interaction (Allen et al., 2011; Jennings, Frank, Snowberg, Coccia, & Greenberg, 2013; S. M. Jones et al., 2010, 2013; Kemeny et al., 2012; Pianta et al., 2008, 2013), the need for a lexicon and classification scheme for teaching is critical to scientific and applied progress.

PSYCHOLOGICAL AND CONTEXTUAL FACTORS RELATED TO QUALITIES OF TEACHERS' INTERACTIONS WITH STUDENTS

There are large literatures examining an assortment of psychological (e.g., attitudes, beliefs) and contextual (e.g., school size, principal leadership skills) factors as they are related to elements of teaching. By and large these literatures are composed of correlational, cross-sectional studies, most without strong designs or measurement of confounding factors or strong theoretical bases (Ferguson with Danielson, 2014; Henry et al., 2013; Kane & Staiger, 2012; Tsouloupas, Carson, Matthews, Grawitch, & Barber, 2010.). For these reasons, there are few conclusions to be drawn from the vast majority of this work; however, there are converging indications from studies with a strong basis in cognitive science and in the area of self-regulation and stress management that point to a cluster of psychological attributes that may bear important causal connections to qualities of teacher-student interaction experienced by students.

Teachers' Cue Detection Skills Shape Their Interactions with Students

Threaded throughout theoretical and empirical studies on effective teaching is the premise that teachers' behavior toward students (and hence the proximal processes involved in promoting development) involve mechanisms associated with teachers' psychological processing of the information flow available to them in everyday interactions in classrooms in real time. Presumably, the more accurate teachers' processing of information, the more well calibrated their interactions can be with regard to the individual and collective needs of students. This linkage between information processing theory and teachers' practices in the classroom has a fair level of basis in empirical results in cognitive science, specifically the dual-process model of cognition.

The dual-process model of cognition emphasizes the importance of efficiency of educators' conscious processing of information (see Feldon, 2007); these processes form and rely on comprehensive schemas about effective teacher practices that are not biased by personal perceptions or irrelevant sensory information and can both guide practice efficiently and enable cognitive capacity to focus on information relevant for intentional action in the present moment. For the novice teacher, preparation should lead to schemas based on unbiased, research-based practices (Artino, 2008). For more experienced teachers, experience and professional development might help them actively identify, question, and modify the biased or inappropriate schemas they currently utilize to automatically guide their classroom behavior (Artino, 2008).

Regardless of whether teachers are using effortful or automatic cognitive processing at any given moment, their processing of information needs to be accurate, unbiased, and effective for the particular situation (van Merriënboer, Kirschner, & Kester, 2010). And, in the case of classroom teachers, incoming information should also effectively link to accessible, relevant, and accurate knowledge about learning and development (NCATE, 2010). Efficient processing focuses available cognitive resources on information relevant for effective teaching (germane load) rather than on irrelevant events (extraneous load) that arise in the classroom (Artino, 2008; Feldon, 2007). In addition, processing should take into consideration the

breadth of information available to identify and interpret relevant information, helping the teacher guard against creating faulty, stereotyped responses (Feldon, 2007; Gregory & Weinstein, 2008). As new information is integrated into existing knowledge, chunking, or the creation of a single, comprehensive unit, can help guide behavior. Because chunked data forms one piece of information in working memory terms, the data are processed more efficiently and require less mental effort, thus reducing teachers' cognitive load (Feldon, 2007; van Merriënboer et al., 2010) and presumably their errors in interpreting cues in the classroom information flow.

With this background of applying cognitive load theory, a particularly promising area of research on effective teacher-student interaction focuses on teachers' skills in observing and analyzing others' or their own practices, typically using video as a stimulus (Hamre, Pianta, et al., 2012). Much of the work in this domain of teacher competence has occurred in the context of case studies (Rosaen, Lundeberg, Cooper, Fritzen, & Terpstra, 2008; Tripp & Rich, 2012) or small, informal video viewing groups (Alsawaie & Alghazo, 2010; Borko, Jacobs, Eiteljorg, & Pittman, 2008; Sherin & van Es, 2005; van Es & Sherin, 2002, 2006; van Es, Tunney, Goldsmith, & Seago, 2014) and so relies on small samples and qualitative analysis (Borko et al., 2008; Rosaen et al., 2008; Sherin & Van Es, 2005; Tripp & Rich, 2012; van Es & Sherin, 2008, 2010). Therefore, the evidence base is very descriptive in nature and subject to misinterpretation for various reasons.

However, these and other more rigorous studies do suggest that the psychological processes tapped by video analysis correlate with their behavior in the classroom (Jamil, Sabol, Hamre, & Pianta, 2015; Wiens, Hessberg, LoCasale-Crouch, & DeCoster, 2013). In the one experimental study of teachers' video analysis skills, Hamre and colleagues (2012) demonstrated not only that teachers' observation and video analysis skills can be assessed and variations in teachers' responses quantified but that these skills mediate intervention effects on gains in quality of observed teacher-student interaction and student engagement. More specifically, Hamre, Pianta, et al. (2012) used a random assignment experiment to examine the impact of a course designed to promote knowledge of effective teaching (using the Classroom Assessment Scoring System as a template for description) and teachers' skills in observing specific behavioral examples and indicators of effective teaching using video-tagging software. Teachers in the treatment group were observed postcourse and 1 year later and on each occasion were rated as demonstrating higher levels of instructional support interactions in their classrooms (Hamre, Pianta, et al., 2012). Subsequent analyses indicated that the gains in interaction for the treatment group were attributable to gains in their skills in observing effective interaction in video tagging activities. The importance of teachers' observation skills for supporting effective classroom interaction is also demonstrated in experimental studies of effective coaching with middle and high school teachers showing that teachers' observation skills promote teacher-student interactions and student engagement, and mediate gains in achievement across content areas (Allen et al., 2011). In treatment-on-the-treated designs, preschool teachers' greater exposure to video examples of effective teaching (presumably a means to increase observation skills) has been shown to correlate strongly with improvements in qualities of their interactions with children (Downer, Ruzek, et al., 2014; Pianta et al., 2014).

Another pattern of findings demonstrating the promise of a focus on teachers' cue-detection skills as a facilitator of effectiveness emanate from a set of professional development evaluations in which interventions focused on cue detection in video analysis resulted in increases in teachers' effectiveness as indicated by observed classroom instruction. Santagata (Santagata, Zannoni, & Stigler, 2007; Santagata & Angelici, 2010) reported that when novice teachers learned to apply an observation framework and assessment to three videotaped lessons, improvement was evident not only in their analysis skill but in their observed instruction. In a qualitative study, video analysis of their own teaching using tagging software (MediaNotes) appeared to help teachers focus on specific aspects of their teaching and see progress (Tripp & Rich, 2012), a finding consistent with evidence gleaned from video clubs (Alsawaie & Alghazo, 2010). In an experimental study of 26 middle/high math teacher candidates, those who viewed videos and posted analysis for discussion showed improvement in their instructional interactions, as assessed using a standard observation rubric (Alsawaie & Alghazo, 2010). And Van Es & Sherin (2010), in a small-sample study, showed that fourth-and fifth-grade teachers who met once or twice a month for a year to observe and analyze video of their classroom interactions not only improved analysis skills but also increased effectiveness of observed practice.

In sum, evidence emerging from the growing body of literature on teachers' capacities for accurate identification and interpretation of children's cues suggests the potential importance of competencies in this area of knowledge of and skill in enabling the classroom to function as a social and behavioral context for learning (Borko et al., 2008). The mechanisms involved in teachers' psychological

processing of the information flowing to them in real time from their everyday interactions in classrooms are not well understood and are posited to be mediators of their effectiveness in the classroom, an area for considerable further research, with stronger linkages to cognitive science needed. Presumably, the more accurate teachers' processing of information, the more well calibrated their interactions can be with regard to the individual and collective needs of students. However, this is only one of many hypotheses needing to be tested rigorously. This linkage between information processing theory and teacher-student interactions in the classroom has profound implications for understanding and improving the effectiveness of teachers and is an area of research that could be greatly expanded and linked to cognitive neuroscience.

Teachers' Capacities for Self-Regulation and Stress Management

Perhaps one of the more promising areas of recent investigation related to factors that shape the nature, quality, and developmental impact of teacher-student interactions is research on features of teachers' own personal skills in emotion regulation, self-awareness, and management of stress (Abenavoli et al., 2013; Jennings et al., 2013; Kameny et al., 2012; Roeser et al., 2012). This literature on teachers' personal characteristics, which at one point was largely focused on static personality traits and teacher beliefs, has become far more developmental in nature, both in terms of examining the dynamics of teachers' capacities over time and in the ways in which it is informed by contemporary theories of developmental science that link features of interactive behavior to an array of social, cognitive, emotional, and physiological processes (Roeser et al., 2012). As such, this body of work has opened up a far more comprehensive understanding of the personal and contextual supports for effective teaching (and hence the developmental salience of the classroom for students).

By way of background, accumulating evidence demonstrates a rather direct link between aspects of teachers' mood, stress, and emotional resourcefulness and qualities of the classroom setting (see Roeser et al., 2012, for an overview). In a study using the NICHD Study of Early Child Care and Youth Development data set, Hamre and Pianta (2004) examined associations between child care providers' self-reported depressive symptoms and sensitivity of their behavior toward children, identifying not only a relation between higher levels of depression and less sensitive behavior but specifically a relation between negative mood and harshness of behavior toward children. Other work shows that teachers' negative emotional experience, stress, and lack of efficacy forecast higher rates of student problem behavior (Tsouloupas et al., 2010; Wang et al., 2012) and lower levels of observed emotional support behaviors toward to students in the classroom (Merritt, Wanless, Rimm-Kaufman, Cameron, & Peigh, 2012). Given the apparent importance of teachers' emotional health and well-being for their capacity to engage in effective interactions with students, it is of some concern that so many teachers report high levels of stress; nearly half leave the profession in the first 5 years of teaching, citing stress or burnout as the primary factor (Jalongo & Heider, 2006), and half of the early retirements from teaching are attributed to chronic occupational stress and symptoms of mental or physical health problems (e.g., McCarthy, Lambert, O'Donnell, & Melendres, 2009). In short, the available evidence suggests quite clearly that the capacity for the classroom to enable students' learning and development is considerably eroded by teachers' emotional well-being. Roeser and colleagues (2012) have advanced a comprehensive logic model that suggests a pivotal role for teacher emotional well-being and emotion regulation in mediating the relation between workplace demands and stress, on one hand, and the qualities of their classroom interactions, on the other.

The literature on teacher working conditions, drawn from a range of studies relying on state- or district-wide samples of teachers, confirms the importance of the social nature of the classroom and teachers' emotional states. A recent study by Johnson, Kraft, and Papay (2012) examined a broad range of teacher working conditions in relation to student achievement gains and showed that between-school differences in achievement growth in Massachusetts are in part attributable to teachers' reports of more or less stressful working conditions in schools. Ladd (2009) and Hirsch and Emerick (2006) found evidence that working conditions (defined to include facilities and material resource conditions in addition to task demands, collegiality, and leadership) account for significant between-school variance in student achievement. Johnson, Kraft, and Papay (2012) found that indices of the social conditions of the school as a workplace, including community support, principal leadership, and relationships among teachers, were the working conditions most strongly associated with student achievement gains,.

In an important conceptual shift, Ferguson with Danielson (2014) hypothesized that some working conditions are more directly enabling of teachers' effectiveness in the classroom; more specifically, those conditions that describe social resources and enable motivation are posited

to have greater effects on classroom behavior, in part as a function of emotional well-being and stress, as suggested in the Roeser et al. model (2012). Similarly, after more than a decade of tracking schools in Chicago, Bryk (2010) concluded that classroom learning "depends in large measure on how the school as a social context supports teaching and sustains student engagement" (p. 24). In some education scholarship, these school-level conditions are bundled under school leadership and studied through a lens of effects of school leaders. Consistent with this focus, Robinson, Lloyd, and Rowe (2008) conducted a meta-analysis of 27 peer-reviewed studies examining school leadership with student outcomes. They found that the strongest predictors of achievement were not leadership practices that aimed to inspire teachers but those that were directly supportive of their effectiveness in the classroom, particularly quality of instruction.

Importantly, one mechanism that is posited to mediate the influence of emotional well-being and stress on qualities of teacher-student interaction is teachers' capacity to be flexibly attentive to students' cues during ongoing classroom interaction. These capacities for teachers to read and respond to varying students' behavior, to shift attention across multiple sources of information, and to maintain cognitive flexibility to solve problems and project potential solutions have all been identified as coalescing around a core of self-management skills that enable smooth and effective interactions (see Roeser et al., 2012, for summary). They also are highly consistent with the line of research on teachers' observation and cue-detection skills described earlier. Perhaps not surprisingly, as practitioners and scientists have designed interventions to bolster teachers' emotion-management capacities and counteract the harmful effects of stress, they have turned to the literature of tools related to mindfulness-based stress reduction (MBSR; Mind and Life Education Research Network, 2012) both because of the success of MBSR and related contemplative practices (e.g., yoga) for promoting health and reducing stress-related problems and because these practices are intended to promote awareness, empathy, cognitive flexibility, and capacity to engage socially (Abenavoli et al., 2013; Jennings & Greenberg, 2009; Jennings et al., 2013; Kemeny et al., 2012; Zelazo & Lyons, 2012).

Over the last decade, the role of teachers' emotional well-being in enabling their effective interactions with students has been clearly demonstrated in evaluations of interventions using MBSR and related contemplative practices with teachers (see Abenavoli, et al., 2013; Jennings et al., 2013; Kameny et al., 2012). In a number of randomized controlled trials, training teachers in mindfulness techniques or yoga has resulted in dramatically lower levels of stress and negative mood, increased skills in cue detection and cognitive flexibility, and more positive qualities of interactions with students (Jennings et al., 2013; Kemeny et al., 2012). In a detailed random assignment evaluation of an 8-week (42-hour) meditation-oriented training program, Kameny and colleagues (2012) reported the typical drop in teachers' self-reported stress and negative mood but also showed enhanced performance on direct assessments of emotion recognition, empathy-related cognitions, and an assortment of physiological indicators of lowered stress. Interestingly, a recent report of results from an intervention designed to promote teachers' cue-reading skills in interactions with children with whom they report high levels of conflict and stress demonstrated that teachers exposed to the treatment not only increased the sensitivity of their behavior toward students but also showed drops in cortisol levels (Hatfield & Williford, 2014).

In sum, a body of evidence, increasingly drawn from causal design studies, demonstrates strong linkages between and among the developmentally salient features of teachers' behavior experienced by children (e.g., sensitivity), teachers' skills in reading and interpreting children's behavioral cues, and a cluster of cognitive and self-regulatory mechanisms. The further expansion and deepening of this literature has tremendous promise not only for understanding the determinants of classroom processes that promote learning and development but for training and support of the teacher workforce (MetLife, 2002).

ACTIVATING THE CLASSROOM AS A SETTING FOR DEVELOPMENT

As has been emphasized throughout this chapter, the educational and developmental salience of the classroom setting is in no small part a function of the qualities of teachers' interactions with students. Whether classroom processes are conceptualized in terms of broad domains such as responsivity or more narrow-band practices related to classroom management or language stimulation, or assessed using observation or student self-report, the last decade of research has produced a compelling body of evidence on the nature, value, and determinants of teacher-student interactions. It should come as no surprise, then, that there is also considerable research and development activity related to the design and evaluation of interventions to improve the quality of teacher-student interactions and thereby activate the classroom as a setting that promotes learning and development. The next

sections present evidence for the impact of such treatments on classroom processes and student outcomes, starting in early education settings and extending to high school.

Need for Professional Development Targeting Effective Teacher-Child Interactions

The quality of teachers' interactions with children is a prime target for intervention for several reasons. First, as noted throughout, the nature and quality of teachers' interactions with children are consistently linked with children's development. This is as true within early education and primary grades (Bridges, Justice, Hogan, & Gray, 2012; Curby et al., 2009, 2010; Dickinson & Brady, 2005; Guo, Piasta, Justice, & Kaderavek, 2010; Jackson et al., 2006; McCartney et al., 2007) as it is from late elementary through high school (Allen et al., 2011; Kane et al., 2014). Second, large-sample standardized observations of PK–12 classrooms from across the nation suggest that students at all grade levels and economic backgrounds are likely to experience teacher-child interactions of mediocre to low quality (Justice et al., 2008; Kane & Staiger, 2012; D. Phillips, Gormley, & Lowenstein, 2009), particularly in relation to cognitive demands placed on students' responses and the feedback provided for students to perform analytic and reasoning skills and activities (Kane et al., 2014; Pianta et al., 2007). The limited use and intensity of practices such as offering stimulating conversational language, encouraging conceptual understanding, and providing rich feedback is particularly concerning, given evidence that these features of interaction are consistently linked with children's development of early academic and language skills (Howes et al., 2008; S. M. Jones et al., 2010; Mashburn et al., 2008) and in students' engagement in the upper grades (Allen et al., 2011, 2013; Wang & Holcombe, 2010). And third, assessments of teacher-student interactions increasingly are used as components of states accountability frameworks in early education (Hamre, Goffin, & Kraft-Sayre, 2009; Maxwell & Tout, 2012; Sabol et al., 2013) and in teacher performance accountability assessments in grades K–12 (Kane et al., 2014). Therefore, interventions designed to improve interactions are likely to be of considerable interest and are an opportunity to evaluate mechanisms of influence on salient proximal processes in classrooms and their subsequent impact on students over time.

Not surprisingly, and perhaps as a result of the lackluster impacts of standard-fare professional development (PD) interventions to promote more effective teaching (Early et al., 2007), an emerging trend for PD is to focus on teachers' actual classroom practices and behaviors, using a variety of behavior change techniques, such as coaching, modeling, and rehearsal practice. In support of this shift, meta-analytic findings of effects related to general forms of such interventions suggests that training focused on teacher skills improves both the competency of child care providers ($d = .45$, $SE = 0.10$) and children's outcomes ($d = 0.55$, $SE = 0.30$), and that skills training is most effective when there is a specific behavioral focus (Fukkink, 2007). Other research demonstrates that targeting teacher-child interactions can be effective in producing improvements in their implementation of instructional activities and socio-emotional interventions (Domitrovich et al., 2009; Hsieh, Hemmeter, McCollum, & Ostrosky, 2009; Landry et al., 2009; Powell, Diamond, Burchinal, & Koehler, 2010; Raver et al., 2008). Although the results of both primary studies and meta-analyses point out the value of focusing on teachers' skills in the classroom, the field is only beginning to explore specific features of these PD approaches responsible for impacts and the manipulable features of each treatment (e.g., dosage) that might inform designing uses at scale (Aber et al., 2011).

Coaching and Improvement of Teacher-Student Interaction in Early Education Settings

Sheridan and colleagues (2009) suggested that studies of PD interventions be designed to better understand the dynamic processes underlying intervention effects. Desimone (2009) similarly suggested that studies should attempt to identify the mechanism responsible for any detected effects. Such a focus requires a theory of why a certain input to teachers would produce certain intended outcomes for teachers and children. In formulating one approach to coaching teachers, consistent with the prior discussion on observation and cue-detection skills, it has been hypothesized that change in teachers' interactive behaviors could be improved by building skills in detecting effective teacher-child interactions through video analysis of others' or their own interactions (Downer et al., 2012; Hamre et al., 2012; Toth, Pianta, & Erickson, 2011).

This hypothesis draws from the literature cited earlier, in which the benefits of coaching might arise from the development of observation skills (Feldon, 2007). In complex classroom settings with high information processing demands, teachers' capacities for enacting effective interactions are dependent in part on their skills in detecting moment-to-moment cues within the flow of interaction as it unfolds in real time (Hamre, Downer, & Jamil, & Pianta, 2012), and such skills may also help lower teachers' stress

and emotionally reactive responses to classroom situations (Roeser et al., 2012). This capacity for processing information must be deployed efficiently and used flexibly to guide and respond to local circumstances (Feldon, 2007; Schank, 1997; van Es & Sherin, 2002). The MyTeachingPartner (MTP) coaching model (Allen et al., 2011; Pianta et al., 2008) was designed specifically to focus teachers' attention on and analysis of moment-to-moment interaction cycles and build observation skills by engaging in guided analysis of video clips of their own interactions and access to exemplars of positive or effective indicators in the form of annotated video clips.

In the first evaluation of MTP coaching, teachers assigned to coaching showed more positive growth across a number of teacher-child interaction features, with effect sizes (*d*) ranging from .77 to .97 (Pianta et al., 2008). And for teachers in classrooms in which the majority of the children's family income fell below federal poverty guidelines, coaching had a stronger effect on improvements in both emotional and instructional features of teacher-student interaction than was the case in the entire sample. A series of follow-up studies using the original pre-K MTP sample examined features of access, use, and engagement of teachers with the website and coaching as well as impacts on child outcomes (Downer, Kraft-Sayre, & Pianta, 2009; Hamre et al., 2010; Mashburn et al., 2010; Pianta et al., 2013). One follow-up showed that early career teachers who spent more time watching themselves on video also showed greater improvements increased growth in interactions (Pianta, Mashburn, Downer, Hamre, & Justice, 2008). With regard to impacts on child outcomes, for children in classrooms in which teachers received coaching, greater gains were observed for literacy skills and vocabulary, and they demonstrated lower levels of problem behavior (Downer, Jamil, Maier, & Pianta, 2011; Downer, Pianta, et al., 2014; Hamre et al., 2010; Mashburn et al., 2010). Overall, these results from that initial MTP evaluation suggested that exposure to structured viewing of teacher-student interaction, using video, was a particularly helpful feature of professional development for improving interaction and children's learning, confirming the hypothesis of the importance of teacher observation skills,

As part of the National Center for Research in Early Childhood Education (NCRECE) program of research on professional development and preschool quality, MTP coaching was the focus of a more recent and larger-scale experimental evaluation. The NCRECE study of MTP enrolled nearly 500 teachers in preschool programs for 4-year-olds from 10 sites across the country, randomly assigned to MTP coaching implemented by local coaches or a "business as usual" control group. In the intent-to-treat evaluation of MTP as implemented in the NCRECE study, coaching produced substantial positive impacts on teachers' instructionally focused interactions with children (Downer et al., 2012). Teachers receiving coaching were observed to use more strategies that facilitate children's higher-order thinking skills, provide more intensive and frequent feedback, and support children's language development, with effect sizes (*d*) ranging from .51 to .69. Moreover, during the year in which teachers received coaching, children in classrooms in which teachers received coaching were observed to exhibit more multiword language behavior than children in control classrooms, while in the subsequent postcoaching year, children whose teachers had received coaching demonstrated higher levels of inhibitory control in direct assessments. However, treatment effects were not detected for directly assessed literacy or language skills, unlike the prior study of MTP coaching.

Controlled experimental evaluations of other forms of coaching focused on teacher-student interactions in early education settings confirm quite clearly that interactions are highly sensitive to feedback from coaches and to models of effective behavior with children (Bierman et al., 2008; Domitrovich et al., 2009; Landry et al., 2009). Moreover, many of these studies also demonstrate that when teachers are provided with feedback and modeling on behaviors related to a targeted instructional activity or child outcome, not only are there impacts on interaction, but there are also effects detected for improved child outcomes, whether academic or behavioral in nature (Allen et al., 2011; Mashburn et al., 2013; Neuman & Cunningham, 2009; Reeve et al., 2004; Powell et al., 2010; Reyes, Brackett, Rivers, White, & Salovey, 2012). Collectively, these results confirm a causal role for teacher-child interaction and children's learning and development (particularly in the context of targeted behaviors or curricular activities) and also demonstrate the surprising sensitivity and responsiveness to intervention and feedback of developmentally salient features of teacher-student interaction. Finally, the suggestion that impacts on teacher behavior and in turn on student outcomes may in part be a function of increases in teachers' knowledge of and skill in observing interactions suggests a pathway forward for further research on mechanisms of impact and increased efficiency of interventions.

Coaching and Improvement of Teacher-Student Interaction in the Upper Grades

As children age through the grade levels, they become increasingly responsible for organizing their own responses

to the opportunities provided in the classroom setting (Allen et al., 1994; Connell & Wellborn, 1991; Deci & Ryan, 1985; Pianta & Allen, 2008). In contrast to the younger grades, in which direct inputs from teachers' instruction related to knowledge and skill development are critical for promoting children's learning and social gains (Bierman et al., 2008; Domitrovich et al., 2009; Piasta et al., 2012), in the middle and secondary grades, the value of the classroom setting for promoting learning is increasingly a function of promoting students' experiences of autonomy, their interpretation of the material to be learned as relevant, and the integration of peer relations in the process of learning (Allen et al., 1994; Wang et al., 2012; Wang & Holcombe, 2010). Thus, interventions that promote teachers' influence in this process must be tailored to acknowledge the manner in which teacher-student interactions can facilitate students sense of autonomy and relevance of the material and recruit the influence of peers.

Teacher-Student Interactions and Peer Relations

Particularly at the secondary level, teachers perceive their primary function as imparting academic content rather than facilitating good social relationships with peers (Barber & Olsen, 2004). Teachers' behaviors toward students should theoretically relate to students' behaviors toward one another in that classroom (S. M. Jones et al., 2008); however, empirical tests of this relation are limited. Literature involving elementary school youth suggests that teachers promote students' good peer interactions in the classroom by having warm relationships with students and using instructional practices that sensitively engage students. Effects of teachers' interactions with students on peer-peer interactions may be due to a modeling effect for peers to follow in their treatment of each other (Mikami, Lerner, & Lun, 2010). In fact, in experiments (White, Jones, & Sherman, 1998) and in naturalistic designs (Hughes, Cavell, & Wilson, 2001), peers increased in their personal liking of a target child who is praised by the teacher. Peer perceptions that a teacher had a good relationship with a child also predicts subsequent increases in their acceptance of that child (Hughes & Kwok, 2006). And when teachers are observed to exhibit warm relationships with students, social conversation among peers increases (Rimm-Kaufman, La Paro, Downer, & Pianta, 2005).

It is also the case that instructional practices that sensitively engage students also promote positive classroom peer interactions, not only through modeling but also by conveying that all students are valued, thereby diminishing a social hierarchy (E. G. Cohen & Lotan, 1995; Mikami et al., 2010). Early elementary school teachers' practices that cater to students' diverse learning needs (Donohue, Perry, & Weinstein, 2003) as well as those that dismantle academic status hierarchies (Mikami, Griggs, Reuland, & Gregory, 2012) each predicted students having better peer relationships over the course of a school year. And the widespread practice of cooperative learning—mostly though interventions that engage all students across diverse academic backgrounds in particular academic activities—has been associated in meta-analysis with children's positive interactions with peers (Roseth et al., 2008). And in a middle school sample, Mikami, Boucher, and Humphreys (2005) found that training teachers in a cooperative learning intervention improved student self-report of positive peer relationships in the classroom.

The role of classroom experiences in promoting positive peer relations may be particularly important in adolescence, as features of classroom experience with peers is apparent in links from peer relations in middle school to verbal aggression, antisocial behavior, and greater anxiety into the 20s (Allen, Chango, et al., 2012; Chango, McElhaney, Allen, Schad, & Marston, 2012; Szwedo, Mikami, & Allen, 2012). Teenagers' experiences of peer rejection, which can heighten vulnerability to anxiety and depression, can be reduced in classrooms in which teachers are sensitive and supportive. (Chango, et al., 2012). When examined together, the combination of observed autonomy and connection with peers in early adolescence provides the strongest prediction of global adjustment in early adulthood. The importance of teachers' roles as facilitators of peer relations through their interactions in the classroom setting, often clash with their views of their roles as managers (MetLife, 2011) or with school-level pressures for test-score outcomes as part of accountability frameworks (Clotfelter, Ladd, & Vigdor, 2007), creating a potential misalignment between teachers' and students' aims in secondary education that is confirmed in student reports of the classroom (LAUSD, n.d.) and in observations (Kane et al., 2014). In one random-assignment study of coaching teachers focused on improving interactions, Mikami et al. (2011) noted that a substantial side benefit of improved behavior of teachers toward students was a rise in positive interactions noted among peers.

Interaction-Focused Coaching and Student Academic Achievement

Allen et al. (2011) designed an approach to coaching teachers in secondary grades that specifically focuses on enabling autonomy, increasing relevance, and integrating peers as resources for teaching and learning in the context of improving the overall nature and quality of

teacher-student interactions. This coaching program did not target instruction or knowledge in specific content areas but rather focused on enhancing the motivational and instructional qualities of teachers' ongoing, daily interactions with students in a manner that applied to teachers across a range of content areas. The first experimental evaluation indicated significant promise at the secondary grade level. In a randomized controlled design across several rural and small-town school districts, coaching focused on interactions with students yielded 9-percentile-point gains in end-of-year standardized achievement tests classes relative to control classes (Allen et al., 2011). Coaching significantly improved teachers' sensitivity toward students and behavioral indications of their understanding and awareness of students' perspectives, as well as greater use of instructional strategies focused on conceptual understanding and analysis rather than performance of rote activities. Interestingly, results suggest that the impact detected on student outcomes was mediated in part by higher levels of student motivation and engagement (Allen et al., 2011).

However, this initial study had several important limitations. The largest limitation was significant attrition (with 33% of teachers dropping out postrandomization). Other limitations to the generalizability of the study included implementation with a primarily rural population of schools, teachers, and students, which may not be comparable to the challenges facing large urban school districts (Provasnik, Kewal, Ramani, et al., 2007). Equally importantly, the initial version of the program (a 1-year, relatively intensive intervention, requiring rapid ramp-up) was not optimally suited to the structure and needs of most schools, in which teachers take time to form trusting relationships with coaches and have relatively little time during their school week to devote to training activities. Perhaps reflecting this, effects detected on student achievement from the initial intervention study were seen only in the year following completion of the intervention rather than during the intervention itself (Allen et al., 2011), suggesting a relatively gradual uptake process.

The need for replication of initially promising programs, especially of challenging interventions implemented in complex systems, has been long and widely recognized (Forman et al., 2013), so further work evaluated this interaction-focused coaching model in an urban setting with primarily high school students (Allen et al., 2012). Two notable modifications to the original coaching program were made. First, the coaching program was decreased in intensity, such that the average teacher participated in five to six coaching cycles per year (as compared to 10 to 12 cycles targeted in the original intervention). At the same time, the intervention was extended to take place over a 2-year period instead of a 1-year period. This allowed more time for teachers to form relationships with their coaches and also allowed coaching to extend across two different classrooms of students for each teacher across the 2 successive years. This more distributed approach to coaching was considered more suitable to the needs and demands of a large, stressed, urban school district serving a high proportion of students in poverty. Evaluation of this modified interaction-focused coaching model demonstrated clear and significant benefits, this time during the first year of treatment, on students' state standardized test scores as well as a range of indicators of observed and student-reported engagement (Allen et al., 2012).

Of considerable importance in these two controlled evaluations of interaction-focused coaching on secondary students' performance on state achievement tests was not only the increase in the quality of teacher-student interactions and the nearly 10-percentile-point benefit attributed to coaching, but that achievement gains were equal in magnitude across content areas (i.e., math, language arts, science, history). That is, coaching teachers to improve features of interaction not specific to any content or learning target caused increases in achievement equally across all four different content domains taught in secondary school classrooms. Features of teacher-student interactions changed through coaching—regard for students' perspectives, conceptually focused instruction—were developmentally salient for students learning a broad array of information, suggesting perhaps that teachers' knowledge of adolescent development and skills in interacting with adolescents are at least as important to the developmental value of the classroom as is their knowledge of the content they are teaching (NCATE, 2010; NEA, 2010).

Interaction-Focused Coaching and Racial Disparities in Discipline

Persistent disparities in school discipline have been documented for a range of groups including males, academically underperforming students, low-income students, and students who qualify for special education services (e.g., Losen & Orfield, 2002; Skiba et al., 2014; Sullivan & Bal, 2013; Weinstein, 2002). Whereas each of these group trends is important to consider on its own, a phenomenon that cuts across groups is of special concern. Namely, African-American students within all of the groups receive a disproportionate number of discipline sanctions. Said differently, being African American places a student at risk for receiving a discipline sanction in school no matter

his or her gender, socioeconomic status, special education placement, or achievement level (Skiba et al., 2014).

In most middle and high school classrooms, teachers typically have the right to send a student out of their classroom by issuing a disciplinary referral to an administrator. These are commonplace practices; in one study that reported 2,000 referrals issued in a single semester in a school with 3,000 students, 70% of these referrals were issued to African-American students, who comprised 38% of the student body (Gregory, Nygreen, & Moran, 2006); disproportionality in out-of-school suspensions can be explained by the disproportionality in these classroom-initiated referrals (Skiba et al., 2014). In the case of special education referral and placement, disproportionality is evident throughout the grades and is identified most closely with what are termed *high-incidence disabilities*, which include learning disabilities as well as emotional or behavioral problems that interfere with learning (Sullivan & Bal, 2013). For both disciplinary infractions and high-incidence special education classification, teacher referral is a critical, if not necessary, factor in determination.

Three strands of research suggest the importance of understanding teachers' actions in the context of the classroom as a setting for proximal processes when examining disparities in disciplinary actions or special education referrals. First, a differential behavior hypothesis asserts that African-American students have higher rates of misconduct than other groups and would, therefore, be referred more often. Studies have not found support for this hypothesis based on minimal differences in student self-reported behavior, perhaps best exemplified in a nationally representative sample showing few and generally small differences in self-reported unsafe behavior across racial groups compared to the racial discrepancy in discipline sanctions (Dinkes, Cataldi, & Lin-Kelly, 2007; Gregory & Weinstein, 2008). Second, accruing evidence shows that students are issued referrals for reasons in which an adult interprets a behavior as misconduct; Gregory and Weinstein (2008) found that African-American students were more likely than White students to be referred for reasons related to perceived defiance, such as inappropriate language, insubordination, and an unwillingness to cooperate. In a recent, longitudinal study with school records from across Texas school districts, more than three-quarters of African Americans were issued sanctions for discretionary reasons (76.7%) compared to less than half of White students (47.9%; Fabelo et al., 2011), even when racial groups were equally represented in mandatory removal from schools for serious violations (e.g., illegal use of a firearm). And when accounting for a range of risk factors associated with discipline, multivariate analyses showed that African-American students were more likely than White students to receive a discretionary discipline sanction but less likely to receive a mandatory one (Fabelo et al., 2011). A third line of research on adults' interpretation shows that African-American students receive harsher sanctions for perceived misbehavior compared to White students. Even after controlling for their own ratings of student behavior, teachers tend to issue discipline referrals more to African-American than White students (Bradshaw, Mitchell, O'Brennan, & Leaf, 2010; Horner, Fireman, & Wang, 2010), and African-American students are more likely to be issued out-of-school suspension for their first infraction (Fabelo et al., 2011).

Consistent with the larger body of research on the value of teacher-student interaction in fostering a classroom setting conducive to student learning and development, interventions that improve teacher-student interactions are also effective in eliminating the racial discipline gap. For example, Gregory et al. (2014) reported an evaluation of the Allen et al. (2011) coaching that focused on teachers' providing clear routines, fair implementation of rules, and proactive monitoring of behavior and that fostered respectful relationships that recognized students' needs for autonomy, leadership, relevancy, and peer interactions. After the first year of the intervention, coaching improved teachers' interactions with students, as noted earlier, and also reduced levels of disciplinary referrals for all students and lowered the odds that African-American students were referred for disciplinary reasons. Gregory and colleagues then followed those teachers into the subsequent year to examine effects with a new group of students. Analyses took into account student (e.g., gender, achievement), teacher (e.g., race, years of teaching experience), and classroom (% African American) factors, showing that teachers who received coaching used fewer disciplinary referrals overall and especially with African American students. African-American students in the control-teacher classrooms were over two times more likely to be issued a referral compared to non–African American students, a disparity that was significantly reduced for teachers receiving coaching that focused on increasing the value of their interactions with students.

Disaggregating Components of Coaching and Their Impacts on Teacher-Student Interaction

As described, interventions that directly target teacher-child interactions can be effective in producing improvements across a range of practices, both instructional and social (Domitrovich et al., 2009, 2012; Hsieh et al., 2009;

Landry et al., 2009; Powell et al., 2010; Raver et al., 2008). Yet for the most part, investigators are only beginning to explore mechanisms responsible for impacts (aside from the focus on interactions and promotion of labeling and observation skills) and the manipulable features of treatment (e.g., dosage etc.) that might inform designing uses at scale. To the extent that interaction skills-focused coaching appears to have some empirical basis as effective, studies that have evaluated effects of coaching on teachers typically have examined dosage as a feature of fidelity, with results demonstrating the importance of dosage but providing little in terms of effective levels or thresholds. In one example, Landry et al. (2009) varied dosage of a coaching intervention to reveal that greater dosage was important for elevating skills of teachers who were less well trained. In another, Ramey and Ramey (2008) reported that dosage was a key moderator of treatment effects in large-scale professional development efforts. An unanswered question in the coaching literature is the minimal dosage of specific components of coaching needed to effect change in teacher practice as well as the upper thresholds for dosage after which more training has diminishing returns.

In a follow-up study to evaluations of interaction-focused coaching reported earlier for early childhood education teachers (Downer, Ruzek, et al., 2014), a series of treatment-on-the-treated analyses examined associations of dosage of exposure to coaching components (feedback, video) with qualities of their interactions and, further, the extent to which the amount of exposure to feedback or videos with a focus on a certain domain of interaction would relate to increases in quality of their interaction in that domain and not to other areas of interaction.

Coaching usually takes place in cycles of engagement between teacher and coach (Sheridan et al., 2009), which typically include some form of feedback and coaching input. Results of analyses indicated that all three domains of teacher-child interaction that were the focus of the coaching program (instructional, emotional, organizational) were sensitive to dosage of exposure in terms of number(s) of coaching cycles to which the teacher was exposed (Pianta et al., 2014). However, improvements in teachers' instructional and organizational behaviors were associated with increases in the number of coaching cycles only up to a point; after roughly seven cycles, increases in organizational support leveled off, while the same pattern was observed for instructional support after twice as many cycles. Teachers' emotionally supportive behaviors increased steadily with an increasing number of cycles.

Findings that more coaching cycles tend to result in greater change over time are consistent with prior results (Pianta, Mashburn, et al., 2008) and evaluations of other coaching models in preschool programs (Landry et al., 2009; Powell et al., (2010) as well as the literature on mental health consultation (Domitrovich et al., 2012; Durlak et al., 2011). The results suggesting that a teacher's behavior may not change appreciably after a certain quantity of coaching have not been reported in other studies. If this type of curvilinear association were to be replicated, an important aim for further research could be to determine the reasons for this effect; this may suggest a need for better timing and pacing of coaching inputs to teachers so that learning can be consolidated before additional progress can be made, or it may be a sign of some ceiling effect on teacher progress related to teachers' own personal histories or characteristics.

In terms of the specific components of coaching, hypotheses were supported regarding the importance of focused feedback or watching video exemplars, both intended to promote observation and analytic skills, but in different ways for different domains of interaction. Feedback that called teachers' attention on their own instructionally focused interactions or that requested teachers' observation and analysis of their instruction was related to observed increases in all areas interaction in the classroom. Apparently, teachers' exposure to feedback focused on instructional behaviors had a broad-spectrum impact, contributing as well to improvements in emotionally supportive behaviors and classroom management. It may be true that the learning that makes it possible to change instruction (e.g., seeing and understanding feedback loops, stimulating language and conversation) transfers into other areas of interaction rather easily. Interestingly, Piasta et al. (2012) reported that this sort of cross-domain transfer effect, when teachers learn a new skill in one area of classroom interaction and improvements are seen in a wide variety of other areas, may occur under conditions in which the phenotypic skill change may in fact be the consequence of acquiring proficiency in a competence (such as observation) that supports multiple skills. If there is some broad-spectrum effect, this would suggest that one possible way to make coaching, which is often described as an expensive and inefficient intervention (Kane & Staiger, 2012), more efficient might be to focus coaching dosage more exclusively on instructional behaviors.

Summary of Coaching Impacts on Teacher-Student Interaction

The findings reported herein describing the impact of coaching focused on teacher-student interactions show

the widespread benefits of such interventions. Although primarily describing evaluations of a particular model of coaching, the consistency of results across samples and across grade levels aligns well with other rigorous evaluations of other coaching models focused on teacher-student interaction. Across all these models, the core components of each treatment approach involved providing teachers with feedback (e.g., information, video, probes for analysis) from a coach, based on that coach's observation of the teachers' actual interactions with students in their classroom. This feedback takes place in periodic cycles across an academic year or even longer. Some models include additional didactic components (Bierman et al., 2008; Piasta et al., 2012) and more or less emphasis on behavior related to a specific content area of instruction, classroom management, or curriculum (e.g., Clements & Sarama, 2008). The variation across models is substantial in terms of the specificity and concentration of feedback on interactions, in terms of dosage and cycles of feedback, and in replicability and standardization of the coaching model. Given the now-almost-ubiquitous use of coaching as a means of improving teacher performance, rigorous studies of replicable and scalable coaching models, and the components responsible for impact, have a critical role to play in efforts to promote student learning and development. Given this context, the experimental studies on interaction-focused coaching suggest a number of tentative summary points for further empirical examination.

Clearly, providing teachers with structured, focused feedback on their interactions with students leads to improvement in a range of features, including sensitivity and responsiveness as well as aspects of cognitive stimulation. The regularity with which coaching produces changes in features of teacher-student interaction suggests how malleable these interactions can be and how responsive to a range of contextual supports. These features of interaction, in short, are apparently not a function of some matrix of fixed personality traits but rather properties of a rather dynamic system of contextual and personal factors. A second tentative conclusion concerns the impacts of improved teacher-student interactions on student outcomes. The evidence from the early childhood literature indicates greater impact on proximal outcomes, such as self-regulation and observed language skills, while for secondary students, improving teacher-student interactions appears consistently related to academic and behavioral gains. In short, there does appear to be some empirical support for the contention that teacher-student interactions have broad-spectrum value for student learning and development. However, such conclusions have to be tested against far more rigorous standards for domain generality and domain specificity, on both the interactions and the outcomes sides of the equation. Further decomposition of coaching components and examination of dose-response effects, while promising, have yielded only suggestive results indicating the potency of feedback for teachers that calls attention to key features of interactions, again confirming indications of the importance of observation skills and cue detection as mediators of interaction quality.

Overall, it is apparent that this key proximal process, teacher-student interaction, has considerable salience for development and can be shaped by structured inputs that increase its value for deflecting developmental trajectories toward more positive outcomes. Given this larger conclusion related to the linkage between education and developmental processes relevant for adaptation, the chapter concludes in the next section by examining larger trends that will shape this literature, and its promise, in the coming years.

FUTURE DIRECTIONS: DEEPENING KNOWLEDGE ON THE LINKS BETWEEN CLASSROOM PROCESSES AND DEVELOPMENT OF CHILDREN AND YOUTH

This chapter has focused on the value of classroom processes for the development of children and youth, in particular features of teacher-student interaction as a core mechanism for transmitting that value, in the larger context of understanding the intersection between education and human development. A decade or more of basic descriptive studies, research on the correlates and determinants of interaction quality, and controlled evaluations of interventions to promote the quality and impact of teacher-student interactions have led to pronounced gains in knowledge. Gaps exist in all these domains—description, determinants, and intervention. The extent to which another decade of research yields substantial gains in knowledge will depend in part on three larger trends affecting the nature and quality of science in this area: funding for research on classroom processes; establishing and supporting programmatic the developmental science of applied practice; and harnessing the scientific and applied potential of studying biological processes as they relate to classroom processes and educational outcomes.

Funding Science at the Intersection of Education and Human Development

In the past decade, a considerable investment of largely federal research and development funds has been distributed to a range of scientific activities at the intersection of education and human development. Given the source of these funds in the Department of Education's Institute of Education Sciences, the Department of Health and Human Services' National Institutes of Health, and the National Science Foundation, the focus of activities on producing evidence for policies, programs, and practices that improve educational and developmental outcomes for children and youth is not surprising. Scanning recent reports from these agencies (e.g., IES, 2013) as well as policy documents that are used to align funds to aims (NCES, 2014) reveals notable concerns in the extent to which the investments of research funds have delivered improved outcomes for children and youth.

NIH, IES, and NSF all adhere to a pipeline conceptualization of inquiry as moving from basic description and exploration, through development of interventions, to early-stage efficacy evaluations, and on to larger-scale evaluations of more widespread implementations at a population level (IES, 2013). In each agency, the aim is to produce knowledge, in the form of theory or technique, that is relevant to improving the outcomes of, in this case, children and youth. Schools and schooling factor differently into the design of these agencies portfolios in a way that shapes the resulting research products. For example, within various branches of NIH, school contexts and schooling processes are involved largely as sites for treatment delivery or as locations from which to collect data, all in the service of addressing health or mental health outcomes typically conceptualized and assessed as somewhat static properties of individuals. In the NIH branches, relevant outcomes include diagnosis and assessment of psychopathology, socio-emotional, or behavioral disturbances as presented in nosologies or in continuous form, relevant health outcomes (e.g., drug abuse), and to a lesser or secondary extent attainment or achievement. Funding mechanisms are often disorder-driven and focused on isolating cause and effect in highly controlled trials.

In IES, schools are the locus of inquiry, inputs, and outcomes. Not surprisingly, in nearly all IES calls for proposals, the outcome or aim of the scientific activity to be funded is an outcome assessed in school-age children and youth, most often operationalized as performance on standardized tests. In many ways, IES funding is yoked to the standardized end-of-year assessments of state standards. In IES and NSF, performance on learning and achievement-related assessments is considered the primary aim of nearly all scientific work, with social and behavioral conditions or outcomes viewed as secondary (IES, 2013). For example, of the more than a dozen topical areas that are the focus of IES funding, a handful concern social or behavioral outcomes and only one focuses on the "social and behavioral context for learning."

Two fundamental concerns arise from this analysis and are relevant for the present discussion. First, there are tremendous gaps in integration at the level of child and youth outcomes. That is, research activities tend be organized around studying or producing outcomes in the achievement *or* socio-emotional domains; consequently, this may lead to distortions in the knowledge base regarding how performance in various domains of development may be linked (and may also be a key to intervention success). This is a particular risk with the IES portfolio, which has an almost uniform focus on standardized achievement assessments as the defined target of research. However, the NIH-related portfolio shows increasing signs of fragmenting in this way as well. With recent indications that school-based interventions that have strong value for youth's social and emotional experiences of classrooms produce gains in achievement (Aber et al., 2011; Allen et al., 1994, 2011; Domitrovich et al., 2012; Durlak et al., 2011) and that school attainment based on achievement appears to be one of a set of leading indicators of problem behavior trajectories (NCES, 2014; Office of Head Start, 2011; Pedersen et al., 2005; Rudasill et al., 2010), it may be important for funding agencies to more explicitly and intentionally broaden and balance the ways in which outcomes for children and youth are included and prioritized in their funding mechanisms and aims.

A second and perhaps more important gap is the lack of a basic science focus, in any funding agency, on the processes and mechanisms of school settings as a focus of study in their own right. In other words, there is little or no funding available for science that aims to understand the fundamental mechanisms related to schooling processes as the actual outcome of a research activity. If, as suggested throughout this chapter and in scores of policy documents, teachers' behaviors with students cause student performance to improve (however weakly or indirectly), it would appear that the basic science devoted to describing, producing, and improving such behaviors would be a top priority of funding agencies. This is not the case. At present, there are virtually no federally supported research mechanisms that promote rigorous basic science in teacher preparation, even when almost a half

million new teachers enter the workforce each year from university-based teacher preparation programs (Harris & Sass, 2011; Henry, Kershaw, Smith, & Zulli, 2012; Loeb et al., 2012; NEA, 2010; Ronfeldt, 2012) and large state agencies are tasked with certification, accreditation, and standards monitoring for this workforce sector.

Moreover, there are no funding mechanisms and hence no extant studies that track teachers longitudinally, either from selection into the profession and through training or throughout various points in their careers. This is the case despite the fact that teaching is the single largest professional group in the United States; teachers leave the profession at a very high rate (at considerable economic costs and at some costs to students and schools); and factors such as burnout, fatigue, and job-related health and mental health concerns are listed among the more frequent reasons for leaving (Bauer et al., 2006; Jennings & Greenberg, 2009; MetLife, 2002). Moreover, we know very little about the development of teachers' competence in the classroom, what skills can be trained or the conditions under which skills are enhanced or eroded over time, or the personal and contextual forces in teachers' lives that are involved. Given recent and consistent evidence that interventions focused on teachers' own personal well-being (such as mindfulness or other contemplative practices) have pronounced benefits on their well-being, on qualities of their practices in the classroom, and on outcomes for the children they teach (Bauer et al., 2006; Jamil et al., 2014; Jennings et al., 2013) this knowledge gap is remarkable yet may be a significant impediment to the very aims of funding agencies to support research activities that improve the lives of children and youth.

THE DEVELOPMENTAL SCIENCE OF APPLIED PRACTICE IN SCHOOLS

Any discussion of schools, schooling, and education at some point becomes filtered through a lens of application—how knowledge or technique can be applied in practice in real-world settings like classrooms or can drive policies in ways that more effectively or efficiently shape those practices or intended outcomes (Aber et al., 2011; Harris & Sass, 2011; Rockoff et al., 2011). Unfortunately, as well described by Aber et al. (2011) in a recent paper outlining the conditions through which the study of schooling and human development can be enabled, the dichotomization of research and practice remains a major conceptual and pragmatic impediment to constructing programs of research relevant to both knowledge generation and its application to solve social problems. Given the architecture of funding mechanisms outlined earlier, with one major source aimed at discovery and another at application and impact, it should come as no surprise that much of research at the intersection of education and human development is dismissed by practitioners or policymakers as irrelevant for reasons related to either their lack of attention to the realities of school settings and therefore lacking in practical utility (see Aber et al., 2011) or their being black box impact studies (randomized controlled trials or econometrics) that are high on methodological rigor and technique but insufficiently descriptive of the processes and mechanisms responsible for the impacts being evaluated or detected (Taylor & Tyler, 2012).

Historically, the linkage between research and practice has often been addressed by efforts or paradigms that shape the output or translation/dissemination of investigations (Tseng, 2010). The assumption of many of these efforts is that the best way to overcome the dichotomization of research and practice is for investigators to report findings in formats and venues relevant to practitioners or for practitioners to select from proven-effective models and implement them with fidelity. These two, admittedly oversimplified, patterns of linkage are exemplified by the kind of brief reports often used to disseminate findings or resources, such as the What Works Clearinghouse (http://ies.ed.gov/ncee/wwc/default.aspx). In both patterns, there is an underlying assumption that evidence is revealed under highly controlled circumstances that in fact reduce relevance or understanding of the role of the school setting in the associations or impacts being examined and that the act of making evidence relevant for applied purposes is one of translation of such evidence (Aber et al., 2010). Put another way, these links are bridges, not integrations, the end result of which is typically a somewhat limited and constrained understanding of impacts and a growing number of proven-effective treatments that glance off the complex social systems for which they were intended to solve problems. Or, as might be argued by economists or policymakers, the social returns on investments in research and development related to school-based interventions has been staggering low, despite ubiquitous evidence of impact (Durlak et al., 2011). In large part, very little has changed in the past decade to overcome the dichotomization of research and practice. The field continues to be challenged by implementation in clinical trial research: Interventions developed for application in schools routinely suffer from challenges with fidelity of implementation in evaluation trials, even when the intervention development process has been sensitive to the challenges of school

settings (Aber et al., 2011; Berkel, Mauricio, Schoenfelder, & Sandler, 2011; Sabol et al., 2013; Tseng, 2010). The research-practice dichotomy also comes to the fore in a different but related context: that of scale-up of interventions proven effective in evaluation trials (Berkel et al., 2011).

The field of implementation science, with its aim of studying the translation of interventions from efficacy studies to application at scale, focuses on conditions enabling high levels of implementation fidelity and quality in the delivery of treatments in settings (Halle, Metz, & Martinez-Beck, 2013; Tseng, 2010). This relatively recent effort to conceptualize and rigorously study the conditions under which impacts of successful treatments erode or maintain when the treatment is turned over to large number of new implementers is a critical advance in breaking down barriers between science and practice (Dane & Schneider, 1998; Neuman & Cunningham, 2009; Resnicow et al., 1992; Taggart, Bush, Zuckerman, & Theiss, 1990). By and large, the results of this effort have centered on conditions of treatments and of settings that determine the fidelity with which an intervention can be applied by practitioners in the field. As the knowledge base of intervention science builds, it is increasingly apparent that even basic concepts of fidelity, in which the prescribed set of procedures that determine treatment success developed in the controlled laboratory setting are relevant to field settings and personnel, are being called into question because they assume a more unidirectional relation between the lab and the field (Aber et al., 2011).

The question of how best to make research more useful to practitioners in schools is not new (e.g., National Research Council, 2002). Recent attention to this topic has focused on the conceptualization of the linkage between evidence and application and has made explicit the need to measure and study these processes in their own right (Tseng, 2010). Tseng (2010) focused on communication between researcher and practitioner as the basis for the disconnect, arguing that the research community needs a better understanding of how practitioners define, acquire, interpret, and use research. In education science, there is increasing recognition that strides in evaluating the impacts of education policies and interventions that improve outcomes for students have not been matched to the use or adoption of proven-effective approaches. For example, the What Works Clearinghouse lists over 400 studies that meet the highest scientific standards for research and that show evidence of efficacy for the intervention being evaluated (http://ies.ed.gov/ncee/wwc/default.aspx). Other organizations (Coalition for Evidence-Based Practice, www.coalition4evidence.org) also maintain lists of school-based interventions tested as effective. In a decade or more of knowledge generation with regard to effective programs and practices, there have been virtually no positive improvements in mental health, behavioral, or academic outcomes in school (NCES, 2014). Is it possible that knowledge generation (research) is disconnected from the realities experienced by children and youth in school settings and the work of professionals in these settings in ways that simply prevent the flow of information and value?

Aber and colleagues (2011) took a different approach to the questions of application, dissemination, and translation, in effect reconceptualizing both the relationship between the scientist and practitioner as well as the relationship between the laboratory and the field. In so doing, they provided a new frame for work in the research-practice dialectic at the intersection of "mental health prevention meeting education reform" (p. 411), drawing from more than a decade of experience in developing, implementing, and evaluating a universal, school-based preventive intervention focused on literacy and socio-emotional competencies in middle childhood (Aber et al., 2011; Brown et al., 2010; S. M. Jones et al., 2008, 2010). Working in New York City, this team drew the focus of their intervention development and evaluation from national (NCES, 2014) and city-level (Hoven et al., 2005; see Aber et al., 2011) reports of the prevalence of emotional and behavioral disorders to substantiate the need for delivering intervention supports at a population level. Their focus on schools as the place for intervention was admittedly driven by the convenience of reaching population-level scale (Aber et al., 2010) through working in schools as a setting. What this team then realized was the need to fundamentally reorganize their approach to development and implementation of mental health supports, shifting from a focus on program application to a deliberate, cyclical process of integrating theory with conditions in settings.

In their reflection on a decade of this work, Aber et al. (2011) outlined three dimensions operating at the intersection of research and practice that they believe shift the nature of this linkage from bridge or translation to one carrying more of an integrative stance. Importantly, the overriding feature of these dimensions is a scientifically derived theory of practice. Consistent with the primary focus of this chapter on schools as social settings (Seidman & Tseng, 2011; Tseng & Seidman, 2007), Aber et al. (2011) emphasized that their starting point for their version of translational research is practice. Invited by a partner who was at the time deeply and programmatically embedded in the schools with a focus on conflict resolution, the research

team devoted an initial period of time to forming a deep and comprehensive understanding and articulation of a logic model for the practice(s) they wished to further refine and evaluate. This focus on actor, actions, and structures in the social setting of the school enabled not only the refinement of the intervention but also the specification of key constructs and assessments that could be the focus of research (Aber, Brown, Chaudry, Jones, & Samples, 1996). Importantly, though, this team explicitly acknowledged the dialectic dynamic of research and practice and so drew from validated developmental and intervention sciences theory to shape the views and understanding of practice as articulated by practitioners. For example, a teacher's practice intended to reduce student aggression that involves contingent responding to student misbehavior with a set of consequences might be understood by practitioners as informed by and consistent with operant conditioning learning theory, whereas it could also be interpreted from the developmental lens of attachment theory or motivation theory, which might alter understanding of the meaning and consequences of that practice in the social setting of the classroom. This dialectic, in which practice is understood and examined through a series of varying lenses, when engaged in over time, enables the derivation of what Aber et al. (2011) called a "mutually fitting program intervention theory and developmental/contextual theory" (p. 412).

This effort to develop a scientifically based theory of practice can have profound influences on the thinking of practitioners working daily in classroom and school settings (Aber et al., 2010; Roderick, 2014). Often working in isolation and focused narrowly on daily circumstances and conditions, practitioners develop local theories of their work, which can often fail to reflect advances in knowledge in relevant domains. Thus, local actions, such as daily practices in classroom settings, become governed by a set of beliefs, schema, and routines that may become increasingly idiosyncratic, constraining, and isolated from new knowledge. As Roderick (2014) observed, cycles of practice-focused engagement with researchers introduces new elements into the local theories that develop around practice, foster contradictions and questions around operating assumptions, and create a higher-order dialogue and meta-framework in which everyday practices of educators, conditions of settings, theories of youth development, and intervention protocols are mutually informative and integrated.

This iterative, programmatic, and explicit embrace of bidirectionality and dialectical dynamics, evolving over time in the context of repeated engagement of researcher (organized around standardization) and practitioner (organized around situational nuance), organizes into its own social system capable of producing an emergent organizing principle that is then realized in the behavior and methods of scientists and practitioners. This is the "mutually fitting program intervention theory and developmental/contextual theory" that Aber et al. (2011) described, with the emphasis on mutuality and fit at the research-practice nexus in which understanding and action align over time. To be clear, this emergent principle is not a translation, extension, application; it is not a bridging device; rather, it is an integration that transcends and includes the research-practice dichotomy and reflects a new domain of knowledge. This is not dissimilar to a recent conceptualization in implementation science proposed by Berkel et al. (2011) that focuses on transformation and calibration taking place through high levels of engagement between facilitators of an intervention and participants. Fundamentally, what these authors (Aber et al. 2011; Berkel et al., 2011; Roderick, 2014) and a host of others describe is the growing irrelevance of constructs such as dissemination or translation, which presuppose knowledge generation as primarily emanating from scholarship taking place in relatively controlled conditions. Rather, they point to an emergent knowledge generated through structured engagement that brings rigorous, systematic, theoretically informed inquiry to problems of practice *and* problems of theory. What is suggested by this work is that these emergent forms of knowledge are a different and perhaps uniquely important source of information about human development. Knowledge of and immersion in the school setting are therefore indispensable.

INDIVIDUALIZATION OF CLASSROOM PROCESS EFFECTS ON TEACHERS AND STUDENTS: BIOLOGICAL SENSITIVITY TO EXPERIENCE

A common point of considerable interest to education scientists, educators, and developmental scientists with an interest in psychopathology is how to best account for range and variation across individuals in any number of key outcomes. Although much activity in this broad domain is centered on characterization of groups demonstrating various outcomes or processes in common, there is equally as much, if not more, attention devoted to understanding individual variation and how to respond to individuals through professional practice.

In the past decade, developmental science has brought new understanding to the problem of individual differences and the forces that shape them. This in part

has been the result of a set of conceptual advances for understanding biological mechanisms that intersect with context and experience—differential susceptibility and biological sensitivity to context (Bakermans-Kranenburg & van IJzendoorn, 2011; Belsky & Pluess, 2013; Boyce et al., 2006), gene–environment interaction (Musci et al., 2013; Beach et al., 2014), and allostatic load (Blair et al., 2011). In each case, the theoretical advance incorporates individual biological makeup and individual experience to explain individual differences in outcomes. Powerful advances in assessment of individual genotype(s) and associated physiological mechanisms have been linked to relevant experiences with some known association with individual differences in outcomes (Beach et al., 2014; Musci et al., 2013).

Boyce and Ellis (2005) first used the term *biological sensitivity to context* to describe one such cluster of mechanisms responsible for individual differences, at the time focused on understanding effects of child rearing. In the Boyce and Ellis model, genetics determines an individual's susceptibility to environmental influence, largely through stress response systems. Greater stress exposure upregulates reactivity to create vigilance in response to threat, while nurturing experiences also upregulate stress response, resulting in vigilance that produces exploratory behavior and greater social resources. Thus, highly susceptible organisms respond differentially to variation in settings, producing differences in developmental outcome. Belsky (2005) and colleagues (Belsky & Pleuss, 2009) also advanced evidence for differential susceptibility to experience as a means of explaining why some individuals exposed to known risk factors perform better than average on certain developmental outcomes while the majority of their peers perform worse. This finding has been captured as for better *and* for worse as a way of more fully explaining why some highly reactive children develop problems while others appear to function at higher-than-typical levels.

Evidence in support of these sensitivity-susceptibility arguments has grown considerably in the last decade and advanced exponentially with increased knowledge of the genome and methods for collecting genomic and physiological data. For the most part, the concepts have been tested and confirmed with parenting as the context of interest; that is, studies have consistently supported these models when examining outcomes for highly reactive children reared in supportive or negative parenting relationships. In this literature, biological risk is increasingly measured in terms of dopamine-related genes (Bakermans-Kronenburg & van IJzendoorn, 2011), while literature also suggests that genes involving serotonin transfer and uptake may also lead to the for-better-and-for-worse pattern (Beach et al., 2014). Bakersman-Kronenburg and van IJzendoorn (2011) reported results of a meta-analysis of susceptibility/sensitivity studies involving dopamine-related genes, finding confirmation of poor outcomes in adverse settings and more positive than average outcomes among children reared in nurturing settings.

Emerging evidence suggests that classroom settings, and teacher-child relationships, are contexts that influence development consistent with this susceptibility or sensitivity to context frame. For example, Essex and colleagues (2011) showed the for-better-and-for-worse pattern of results for children demonstrating high physiological and behavioral reactivity in first grade when examined for mental health symptoms in adolescence; reactive students with more positive teacher-child relationships performed better than expected while their counterparts with negative teacher-child relationships fared much more poorly.

Two Forces that Will Shape Research in the Next Decade

This chapter has focused on one set of processes related to the intersection of educational experiences in schools and developmental psychopathology: interactions between teachers and students. As has been outlined throughout, there is a strong conceptual case to be made for the study of teacher-student interaction to function as a pathway for developing theory and strong science that fosters improved understanding of the conditions under which development of children and youth are influenced (intentionally and otherwise) by experiences in schools. Studies on the nature, determinants, and consequences of teacher-student interaction, and the production of more effective interactions all begin to fill gaps in various relevant literatures. And yet, at the same time scientific work is proceeding, the pressures to apply any available knowledge or tools is unprecedented and often outpaces the production capacity of any research program. The demand for knowledge and application is at once a tremendous challenge to science and an opportunity, if identified and harnessed strategically. Aber and colleagues' (2011) work on socio-emotional learning programs is an example of the benefits that can be gained, scientifically and in the application of knowledge to pressing problems, when joint interests are identified early and take a primary role in defining and conducting research in the field that is both scientifically rigorous and has strong applied value. This concluding section takes the prior discussion of future directions in research funding, the science of applied practice, and new knowledge to be gained through study of biological processes in classroom

interactions and contextualizes it within the opportunity structure for scientific work in the schools.

Teacher Performance Evaluation

At the most macro-level context, consider that as states seek to implement education reforms, assessment and evaluation of teacher performance as a vehicle for driving continued growth and improvement is top of mind for school district superintendents, school principals, teachers, union leaders, and state or federal policymakers. This is a tremendous opportunity not only for establishing important links between science and application; the advent of large-scale data collection on teacher performance affords the opportunity for investing strategically in capacity to analyze these data for purposes of better understanding teacher efforts on developmental and learning outcomes and to complement existing data collection with protocols that advance the next frontier of understanding, including intervention protocols or biometrics.

There is no shortage of need for evidence as teacher performance evaluation gets applied on a widespread basis, with interests weighing in on all sides—unions seeking to protect members from undue harm; reformers advancing a good argument for the need to use metrics as levers for workforce development and improvement; teachers pressing for fair and reliable systems and meaningful feedback and support; and parents and members of the public wanting better schools for all students (Kane et al., 2014). Assessment of teacher performance—particularly teachers' classroom behaviors that cause increases in students' knowledge and skills—is not only a driving force in educational reform but a context in which the scientific study of teacher-student interaction can play an enormous role and in which strong developmentally oriented science can be designed and conducted.

In this context, in which assessment plays such a prominent role, both for purposes of evaluation and more important for purposes of improvement, it is tremendously important that evidence guides development, uses, and decision making. Widely reported analyses of the most common teacher assessment methods practiced for decades (principal drive-by observations and ratings; hiring interviews and selection procedures; tenure reviews, etc.) all led to the same conclusion:— There is virtually no connection between these tests and student learning and development, teachers' own professional development, or incentives to improve. In fact, teacher performance assessment and its uses, as typically practiced in the field or in teacher preparation, until very recently had no basis in evidence (Kane et al., 2014; Rockoff et al., 2011; Staiger & Rockoff, 2010). With a wave of federal funding, many states began to tie data on teacher education graduates to data on K–12 student learning; and many developed multimethod approaches for measuring teachers' performance, including data from observation, state standards tests, and student surveys, among others. Moreover, many states are now in the process of implementing Common Core standards, with plans to assess the attainment of students' higher-order learning, teamwork skills, and application of knowledge. States are now in the process of implementing new standards for evaluating teachers and teacher preparation programs in light of Common Core. The infrastructure for collecting data both on teacher performance (including behavior) and student learning (including some aspects of social and cognitive skills) will soon exist at very large scale and will be linked to resources and initiatives designed to drive improvements in these broad domains (Glazerman et al., 2011).

There are big and meaningful questions driving teacher performance assessment (Goldhaber, 2007; Rockoff et al., 2011; Staiger & Rockoff, 2010): What methods can be used to select or hire an effective teacher? What data are useful sources of feedback for teacher improvement? What experiences in preparation or professional development cause teachers' performance and student development to improve? Although most studies of these early-stage performance assessments have been important in laying a foundation for inquiry into teacher effects on student development, most fail to articulate specific processes or instructional practices that may lead to student learning and other positive classroom and student outcomes.

Linking Educationally Relevant Behavior and Psychological Processes to Biology

Despite increasing use of biometrics in developmental science and the transformation of theories human behavior to now incorporate biological processes in nearly every formulation of basic mechanisms of influence and coregulation, the penetration of measures or theories in education has been minimal at most. We know virtually nothing about intersections among multiple systems that presumably would be involved in coregulation of teaching and learning processes (e.g., teacher and student behavior, mood, effort; eye gaze, vocal tone, heart rate, cortisol levels, neurophysiological activity; attention and learning). This is the case even though there are multiple examples of links between biology and behavioral science from the

literatures on parenting and peer relations (e.g., Coan et al., 2006: Montpetit et al., 2010).

Developmental psychopathology advanced rapidly when studies of behavioral and psychological variables incorporated measurement and theory of biological, physiological, and neurological processes (see Boyce & Ellis, 2005; Essex et al., 2011). It is now possible to study and understand similar processes in classrooms and their relations with teaching and learning. A host of questions concerning causal mechanisms, individualization of effects, and aggregation of effects over time could be informed by more integrative scientific work. Moreover, the nature and dynamics of schooling—the way that inputs are structured and delivered, the timing of changes in social and instructional contexts, the hierarchical forces involved—all introduce sources of variation that could be of interest in further understanding the coregulation of biology and behavioral development. In short, building a stronger infrastructure and scientific architecture for the integration of biological measurement and theoretical perspectives into the study of schooling would likely catalyze interdisciplinary science on the intersection of education and human development.

Integrating biometrics and biologically informed theory into the study of teaching and learning in classrooms has considerable applied implications. Existing metrics and tools are inefficient, resulting in empirical findings that suggest promise but are also possibly quite incomplete—teachers' interactions with students account for only a modest level of variation in student learning (e.g., Hamre et al., 2013), and although teachers can trained to improve those behaviors, thereby improving student learning (Allen et al., 2011; Bierman et al., 2008; Downer, Pianta, et al., 2014; S. M. Jones et al., 2013; Pianta et al., 2008), the interventions are expensive, time-consuming, and blunt in terms of precision of impact. Embedding behavioral foci (e.g., teacher-student interaction and student engagement) within assessment of other coregulating processes (e.g., stress reactivity, emotions, neurological activity, heart rate, movement) during classroom interactions could help identify mediating mechanisms and assessments that drive efficiencies in identifying the most important teacher (and student) behaviors on which to focus attention. In turn, these behaviors or their coregulators (e.g., heart rate) could become candidate targets for interventions or more widespread training through teacher preparation. This type of integration could yield more precise targeting of observations and professional development to focus on teacher behaviors most potent for student engagement and learning.

In conclusion, it is highly plausible to conceive of a field in which the methods of cognitive neuroscience, biological science, developmental psychology, computational analytics, and education science become further integrated and organized around a focus on teacher-student interaction and student learning. It is equally plausible that the new knowledge and tools developed by this scientific integration would scale into applications at a very rapid pace, with considerable potential to accelerate inquiry and application. These advances set the stage for future interdisciplinary integrations that will shape research on classroom process for decades to come.

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CHAPTER 16

Advances in Prevention Science: A Developmental Psychopathology Perspective

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INTRODUCTION

Prevention Science

The overarching objective of prevention science involves intervening in the course of development to reduce the emergence of maladaptation or psychopathology. Although the ultimate goal of prevention involves altering the developmental course for individuals who are at risk for maladaptation to foster positive outcomes and reduce future problems (Durlak, 1997), prevention trials also possess important implications for informing developmental theory. Specifically, understanding the processes that can right the course of development can inform our understanding of the operation of risk and protective factors in normative development (Cicchetti & Toth, 1991, 1992; Kellam & Rebok, 1992). It then follows that although ideally theory should provide the foundation for the development of preventive interventions, once delivered, the outcomes of preventive interventions should also link directly back to developmental theory (Ialongo et al., 2006).

From its inception, developmental psychopathology has embraced the importance of facilitating the development, delivery, and evaluation of theoretically informed prevention and intervention initiatives (Cicchetti, 1999; Cicchetti & Toth, 2009; Toth, Pianta, & Erickson, 2011). This investment emanates from the discipline's core conceptualization of normative and atypical development as a continuum, thereby forgoing the need for discrete (and

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all-too-often arbitrary) categorical classifications of mental illness. Moreover, leaders in the field of developmental psychopathology have consistently maintained that they are as interested in understanding how some individuals at risk for psychopathology maintain positive adaptation as they are in understanding contributors to the emergence of maladaptation and mental disorders (Sroufe & Rutter, 1984). Given these core tenets, it is quite understandable why developmental psychopathology has been at the forefront of progress in the field of prevention science.

The magnitude and pervasiveness of mental disorders highlight the criticality of implementing initiatives to prevent the personal and societal costs associated with mental illness. According to the World Health Organization (2003), 450 million individuals worldwide are affected by mental or behavioral problems at any given time. In the United States, an estimated 40.3% of adolescents and 26.2% of adults suffer from a diagnosable mental disorder annually (Kessler, Chiu, Demler, & Walters, 2005; Kessler et al., 2012). Moreover, 3.1 million American youth aged 12 to 17 (12.7% of the U.S. population aged 12–17 in 2012) and 34.1 million American adults (14.5% of the U.S. population aged 18 or older) received mental health treatment or counseling in the past year (Substance Abuse and Mental Health Services Administration, 2013).

In this chapter, we invoke a developmental psychopathology perspective to guide our discussion of the current state of prevention science. Rather than providing a comprehensive review of the field of prevention, we examine developments that have occurred since the publication of the prior volume of *Developmental Psychopathology* (Cicchetti & Cohen, 2006). After reviewing programmatic preventive initiatives that are consistent with goals articulated by Ialongo and colleagues (2006), we direct our attention to conceptual and methodological considerations in the field of prevention science. We then discuss translational research and the importance of dissemination of efficacious interventions. We conclude by proffering recommendations for future directions for prevention science in the next decade.

Contributions of Developmental Psychopathology to Prevention Science

In an article marking the twenty-fifth anniversary of the journal *Development and Psychopathology*, Alan Sroufe (2013) reflected on the achievements of developmental psychopathology. He noted that the volume of descriptive work on psychopathology has been remarkable, highlighting advances in our understanding of the antecedents and correlates of behavior problems, neurophysiological correlates of maladaptation, and research on brain development and gene–environment (G×E) interactions. Sroufe also stated that our knowledge about the developmental course and the role of predictors of problems during different periods of life has greatly increased. The latter progress is particularly important as it confirms a premise of developmental psychopathology—namely, that understanding the developmental course is more important than listing symptoms alone (Sroufe, 2013). However, despite these remarkable advances, Sroufe also cautioned that we have much more to learn about how psychopathology develops. This point is integrally related to how best to facilitate advances in the area of prevention science. It is clear that understanding how psychopathology develops and not simply relying on categorical diagnostic classification systems will poise us to better target early precursors of future maladaptation into our prevention strategies.

Toward this goal, and in describing "a path forward," Sroufe (2013) suggested an approach that diverges from a search for correlates of categorical disorders. Rather, "the path would be one in which we begin with early patterns of adaptation, trace their courses and manifestations in different phases of development, and document when and how they may be manifest in disorder" (p. 1221). In further elaborating on this conceptualization, Sroufe described key capacities that consistently have been found to undergird the core of healthy or unhealthy psychological development. These include: (1) the capacity for stable emotional connection with others; (2) internalization of standards of conduct; and (3) attainment of flexible self-regulation. Interestingly, the salience of these constructs is readily observable in multiple current diagnostic classification systems of mental disorders. Importantly, focusing on core capacities rather than diagnostic categorizations of disorders may help to circumvent the myriad of problems associated with the comorbidity of disorders. By fully understanding these core capacities, their development, and how they may become diverted onto maladaptive pathways, it will be increasingly possible to design prevention strategies with these issues as the target of intervention. Of course, such a paradigm shift possesses implications for policies regarding what constitutes reimbursable services, an issue that would need to be resolved before adopting this approach.

Definitional Perspectives on Prevention

To begin our examination of the current state of prevention science, it is first important to define terminology.

The original prevention classification schemata was developed by the Commission on Chronic Illness in 1957 and included the now commonly recognized terms of primary, secondary, and tertiary prevention (Durlak, 1997; Mrazek & Haggerty, 1994). In this classification system, the term *primary prevention* referred to an intervention delivered to a normative population who do not evidence any disease to decrease the occurrence of disorder or illness. Secondary prevention programs were designed to decrease the prevalence or rates of established disorders or diseases; as such, these programs were targeted at individuals at higher risk for developing disorders. Tertiary prevention was directed at reducing or eliminating the duration or consequences of a disorder or illness. This original classification system failed to articulate the relationship between mechanisms linking the causes of diseases to outcomes or the occurrence of the disease. Moreover, the roots of this original classification system were based largely on infectious diseases with a biological origin and were consequently less useful when considering conditions that did not have a clear biological manifestation (Foxcroft, 2013).

Over time, a more sophisticated understanding of the complexity associated with the relations between risk and protective factors and health outcomes, variations in developmental pathways, and empirical strategies to test these relations emerged (Ialongo et al., 2006). In 1994, the U.S. Institute of Medicine (IOM) adopted the prevention classification system originally proposed by Gordon (Gordon, 1983; IOM, 1994). In their report, the IOM rejected the notions of primary and secondary prevention and opted for universal, selective, and indicated prevention descriptors. According to this system, universal preventions are delivered broadly to the general public. Selective preventions are provided to individuals who are considered to be at increased risk of developing a disorder. Indicated prevention, most similar to actual treatment provision, is targeted at individuals who have exhibited early symptoms of disorder or who have biological markers indicating a predisposition to a disorder.

Most recently, the IOM reviewed the definition and classification of prevention in a report on preventing mental, emotional, and behavioral disorders in young people (National Research Council [NRC] & IOM, 2009). After considering alternative approaches to the classification of prevention, including the original conceptualizations of primary and secondary prevention, as well as identifying at-risk individuals through genomic analysis, the report endorsed the 1994 IOM system (universal, selective, and indicated prevention) as the preferred system for classifying prevention initiatives prior to the emergence of disorders.

SELECTIVE REVIEW OF PROGRAMMATIC PREVENTIVE INTERVENTIONS

At the start of the twenty-first century, Ialongo and colleagues (2006) highlighted several areas requiring the attention of preventive intervention scientists in the field, including a need for randomized controlled trials (RCTs) with long-term follow-ups, investigations of mediators and moderators, and integration of psychological and biological assessments. A paucity of RCTs, the gold standard of treatment evaluation, was found in the evaluation of preventive interventions when the last edition of this text was published. In the last 10 years, a multitude of RCTs of preventive intervention programs have been conducted, resulting in a greater understanding of which programs are effective for preventing the development of a wide range of psychopathology. Additionally, long-term follow-ups have become more common, with some studies including 12-month follow-ups and beyond as part of the evaluation of preventive interventions. Studies also have increasingly tested moderators of intervention efficacy, including a handful that have examined genetic moderators, to allow for a better understanding of who is most likely to benefit from particular preventive programs. Furthermore, preventive intervention RCTs have increasingly evaluated hypothesized mechanisms of intervention change, another point of needed improvement noted by Ialongo and colleagues. However, despite advances that have occurred since the 2006 chapter, the issues highlighted by Ialongo and colleagues remain among the most pressing in the field of prevention science. In fact, emerging work in the biological/genetic arenas has raised more issues and highlighted the complexity inherent in understanding mechanisms contributing to the efficacy of prevention strategies. Toward this goal, the identification of mediators of intervention efficacy must be accelerated.

Attention to mediators of intervention efficacy is paramount for several reasons. First, an understanding of how an intervention works allows for the most potent factors to be identified and potentially built into the subsequent provisions of the prevention program. Second, preventive interventions, by design, offer an opportunity to understand the basic processes of development (Cicchetti & Toth, 2009; Ialongo et al., 2006), and mediators of treatment efficacy highlight developmental pathways, which can then inform basic research in developmental science. These advances in basic science, promoted by an understanding of intervention mediators, can then be used to further progress in the field of prevention science through translational research, thus completing the prevention research

cycle (Gunnar, Fisher, & the Early Experience, Stress, and Prevention Network, 2006; Ialongo et al., 2006).

Next we highlight some of the key preventive intervention studies published since the last edition of *Developmental Psychopathology*. This text is not intended to be an extensive and complete review of all RCTs published in the preventive intervention literature in the last 10 years. Rather, we primarily emphasize cohesive programs of research that have responded to the goals for the field set forth by Ialongo et al. (2006), including utilizing multiple levels of analysis in study design and examining sustained effects, mediators, and moderators of intervention efficacy. To begin our review, we discuss strategies targeted at the prevention of specific disorders or those directed toward individuals confronted with high-risk conditions. Our focus on disorders is not meant to suggest that we favor reliance on categorical diagnostic classification systems but rather reflects the approach generally taken in the extant literature to date.

Internalizing Disorders

Several programs of research have focused on preventing the further development of internalizing symptoms, most notably depression, in youth. Many of these preventive intervention programs have targeted preadolescents and adolescents, given the increased rates of depression, particularly for females, observed throughout the adolescent developmental period (Hankin et al., 1998; Lewinsohn et al., 1994). Several recent meta-analyses have confirmed positive but small effect sizes for preventive interventions for depression (Merry et al., 2012; Stice, Shaw, Bohon, Marti, & Rohde, 2009). Stice and colleagues (2009) established that larger effect sizes were found for intervention programs that focused on high-risk participants and older adolescents as well as those using samples with a greater portion of females and individuals from ethnic minority groups. Interventions that were brief (but include homework) and were delivered by professional interventionists rather than by paraprofessionals or schools also produced larger effects (Stice et al., 2009). Studies included in this meta-analysis were coded as to whether they contained cognitive change, behavioral activation, problem solving, or social skill content, and it was hypothesized that programs including these content areas also would have larger effect sizes; however, program content was not found to be related to effect size in this meta-analysis (Stice et al., 2009).

One well-studied example of the cognitive-behavioral approach to prevention is the Penn Resiliency Program (PRP), which aims to change negative explanatory thinking styles and decrease depressive symptoms. It was designed for youth (typically ages 10–14) as a short-term, school-based program to be administered in groups. This program was initially evaluated in the context of efficacy studies, with results suggesting preventive effects on depressive symptoms up to 2 years later (e.g., Gillham, Reivich, Jaycox, & Seligman, 1995). More recent work with PRP has yielded varied results in the application of PRP in both school and primary care settings. In a school-based RCT, PRP was compared to two control conditions, the Penn Enhancement Program (matched in frequency and duration to PRP to control for the nonspecifics of the active condition without focusing on cognitive-behavioral and social problem-solving skills) and a no-intervention control condition. A total of 697 middle school children (many with elevated depressive symptoms, but excluding those meeting criteria for major depressive disorder) from three schools were randomized to one of the three conditions. Children who received PRP had reduced depressive symptoms over the follow-up period compared to children in both control conditions; however, this result was found in only two of the three schools involved in the trial (Gillham et al., 2007). In an RCT conducted in a primary care setting with early adolescents with elevated depressive symptoms, no overall prevention effect was found for PRP on depressive disorders (Gillham, Hamilton, Freres, Patton, & Gallop, 2006). A meta-analysis of 17 controlled evaluations of the effect of PRP (including those conducted in both school and nonschool settings) on depressive symptoms found an overall small but significant effect size for PRP in reducing depressive symptoms compared to no-intervention control conditions (Brunwasser, Gillham, & Kim, 2009). Limited data were available to examine PRP compared to active control conditions, and available data showed no advantage of PRP on reducing depression symptoms compared to active controls (Brunwasser et al., 2009). Gender, group leader characteristics (i.e., research team leader versus community leader), and baseline level of depressive symptoms were all examined as moderators. Results suggested that none of these moderators explained a significant amount of heterogeneity; moderation effects may have been difficult to detect as only 17 studies were included in the meta-analysis (see Brunwasser et al., 2009, for more details). Overall, results from studies evaluating the utility of PRP are mixed, with PRP developers noting reduced and/or inconsistent intervention effects when moving along the continuum from efficacy studies to real-world application (Gillham et al., 2007).

The Positive Thoughts and Action preventive intervention is another program that focuses on applying traditional cognitive-behavioral strategies to stressors typically encountered during the pre- and early—adolescent period. In a school-based RCT for adolescents, those randomized to receive the Positive Thoughts and Action program (versus a supportive therapy) reported greater decreases in depressive symptoms and improvements in self-esteem (McCarty, Violette, Duong, Crz, & McCauley, 2013). Notably, improvements on measures of interpersonal relationships were not found for the students receiving the cognitive-behavioral preventive intervention (McCarty et al., 2013).

Other preventive interventions for depression during the adolescent period have focused on interpersonal relationships and communication in recognition of the increased importance of relationships during this developmental period. A program originally developed to target substance abuse, the Iowa Strengthening Families Program (ISFP), has more recently been evaluated with regard to its impact on internalizing symptom trajectories for adolescents (Trudeau, Spoth, Randall, & Azevedo, 2007). ISFP is a universal relational intervention that focuses on familial relationships. It is delivered in group format over the course of 7 weeks when children are in the sixth grade via concurrent parent and child training sessions followed by joint 1-hour family sessions, where skills learned in the separate sessions are practiced. Videotapes of family interactions are used to convey key concepts of ISFP. Trudeau and colleagues (2007) evaluated internalizing symptom development through twelfth grade for 238 sixth graders receiving ISFP compared to 208 children from families in a minimal contact condition. Internalizing symptom growth rate was slower for adolescents in the ISFP condition compared to those in the control condition (Trudeau et al., 2007).

Other preventive interventions have used the framework of interpersonal psychotherapy (IPT) to focus on relational patterns and communication strategies more broadly as a way to decrease depressive symptoms. IPT addresses the interpersonal aspects of depression, focusing specifically on disputes with close others, grief, role transitions, and interpersonal sensitivities (S. Stuart & Robertson, 2003; Weissman, Markowitz, & Klerman, 2000). Importantly, it has been adapted specifically for use with adolescents (Mufson et al., 1994; Mufson, Weissman, Moreau, & Garfinkle, 1999). An indicated preventive intervention RCT compared IPT-Adolescent Skills Training (IPT-AST), administered in group format in schools, to school counseling as needed, provided by the school guidance counselor or social worker. Forty-one students in grades 7 to 10 were randomized to the two conditions; those who received IPT-AST had fewer depressive symptoms at postintervention 3-month and 6-month follow-up compared to the students who received school counseling (Young, Mufson, & Davies, 2006). Additionally, mother-child conflict was reduced in the IPT-AST group compared to the school counseling group and emerged as a moderator of intervention effects, such that adolescents receiving IPT-AST with high baseline mother-child conflict evidenced greater decreases in depressive symptoms than adolescents with high baseline mother-child conflict in the school counseling condition (Young, Gallop, & Mufson, 2009). This moderation finding is consistent with the explicit focus on relationships in IPT and highlights the utility of this intervention for adolescents with elevated depressive symptoms and mother-child conflict. A second study by this research group compared IPT-AST to school counseling for 57 adolescents in the ninth and tenth grades; again, adolescents in the IPT-AST condition had fewer depressive symptoms compared to those in the school counseling at postintervention; however, there were no significant differences between the two groups at 12-month follow-up (Young, Mufson, & Gallop, 2010). An RCT for 380 high school students compared a brief cognitive-behavioral-based preventive intervention to a brief IPT-AST intervention (Horowitz, Garber, Ciesla, Young & Mufson, 2007). A third group of students was randomized to a control condition. Students in both active school-based intervention conditions had lower levels of depressive symptoms at the end of the intervention, and the largest differences between intervention and control groups were seen in adolescents with the highest levels of baseline depressive symptoms. The intervention effect of cognitive-behavioral treatment, but not IPT-AST, was partially mediated by attributional style. Surprisingly, however, differences in level of depressive symptoms between intervention and control adolescents were not maintained at 6-month follow-up. Findings suggest that two effective interventions can operate through different pathways yet impact the same outcome variable, highlighting the need for inclusion of postulated mediators in preventive intervention RCTs to better understand how and why interventions are successful. This study identified baseline severity as a moderator of intervention efficacy, thus identifying the group most likely to benefit from this intervention. Finally, although immediate improvement in symptoms occurred, benefits were not maintained at 6-month follow-up, similar to the findings of Young et al. (2010) in which the benefits of IPT-AST compared to

school counseling did not emerge at 12-month follow-up. Because the fields of developmental psychopathology and prevention science aspire to promote long-term adaptive development, continued efforts to develop and evaluate sustained intervention efforts are needed.

A large-scale indicated preventive RCT for adolescent depression utilizing the IPT model is currently under way at Mt. Hope Family Center, University of Rochester, in Rochester, NY. This study is building on previous preventive intervention research as well as treatment trials utilizing IPT-A for depression to target developing depressive syndromes in 13- to 15-year-old adolescent girls from disadvantaged backgrounds, half of whom have a history of maltreatment. The multilevel study design includes a 1-year and an 18-month follow-up to assess the stability of hypothesized intervention gains as well as the assessment of hypothesized mechanisms at multiple time points to allow for mediational analyses. Cortisol and genetic samples also are being collected at multiple time points as part of the preventive intervention to assess multiple levels of functioning at which the intervention may be efficacious. This innovative design will allow for changes in these biological indicators to be assessed in relation to social and psychological measures over the course of the study; additionally it will allow for gene × intervention analyses to be conducted. Examining the efficacy of an IPT-based preventive intervention in this population is critical, given the increased rates of depressive symptoms in children with maltreatment histories (Kaufman & Charney, 2001; Toth, Manly, & Cicchetti, 1992) as well as the crucial need for interventions that target the maladaptive relational representations and patterns that often develop in individuals with histories of maltreatment (Cicchetti & Toth, 2006a; Toth, Cicchetti, Macfie, Maughan, & VanMeenan, 2000). Moreover, Heim and Binder (2012) have found differential responses to treatment in depressed adults with and without histories of child maltreatment, thereby highlighting the implications of this line of research for prevention and intervention. The work is very promising, given results from a recent RCT study of IPT for young socioeconomically disadvantaged racially and ethnically diverse depressed mothers, many with a history of interpersonal trauma (Toth et al., 2013). Results from this study indicated that IPT was effective for reducing symptoms of depression in this population (Toth et al., 2013). Thus, these results suggest that IPT is well suited for treating depression in women from disadvantaged socioeconomic backgrounds and may be an acceptable and effective approach to preventing the development of depression syndromes in this high-risk population.

Two recent meta-analyses examined the effectiveness of anxiety prevention programs for children and adolescents. Overall small but significant effects were found on the reduction of anxiety symptoms, with mixed evidence regarding larger effect sizes for selected and indicated programs (Fisak, Richard & Mann, 2011; Teubert & Pinquart, 2011). The FRIENDS program, a cognitive-behavioral preventive intervention for child anxiety, was identified as being commonly used, and programs using the FRIENDS manual evidenced significantly larger effects compared to those that had not used the FRIENDS manual (Fisak et al., 2011). In a universal preventive intervention for child anxiety utilizing the FRIENDS program, a large sample of 9- to 10-year-olds and 14- to 16-year-olds were randomized to the active intervention or a monitoring control condition; randomization occurred at the school level. and the intervention was delivered in the school setting (Barrett, Lock, & Farrell, 2005). The intervention was tailored to each of the two age groups and consisted of 10 weekly group sessions for the children, followed by two booster sessions conducted 1 and 3 months after the 10-week intervention. Parents of children in the intervention condition received four, 2-hour parent workshops. At postintervention assessment, no differences were found between the intervention and monitoring groups regarding anxiety symptom reduction; however, at 12-month follow-up, children in the intervention group demonstrated greater reductions in anxiety than those in the monitoring group (Barrett et al., 2005). Overall, children in the 9- to 10-year-old sample showed initially higher levels of anxiety and greater reductions in anxiety symptoms at postassessment compared to those in the 14- to 16-year-old group, suggesting that younger children may be an important target for anxiety preventive intervention efforts. Accordingly, Fun FRIENDS is a developmentally appropriate derivation of the FRIENDS intervention for 4- to 7-year-olds, which includes teachers and parents to promote child skill development. Fun FRIENDS was compared to another active intervention condition (a social and emotional skill program based on cognitive-behavioral therapy) and a waitlist control group for a group of 488 4- to 7-year-olds. Randomization occurred at the school level. Children in the Fun FRIENDS condition and the other active intervention condition showed greater gains in social and emotional competence and reductions in symptoms compared to the waitlist control group; notably, children in the Fun FRIENDS group evidenced greater improvements at postintervention and 12-month follow-up (Anticich, Barrett, Silverman, Lacherez, & Gillies, 2013). Consistent with a developmental psychopathology framework, it is

critical for preventive interventions to be tailored to the developmental level of the recipients and for prevention science to continue to examine the developmental window during which provision of a preventive intervention is most likely to promote optimal development.

Parental Depression and Anxiety

Children of parents with depression and anxiety disorders are a group especially at risk for the development of internalizing symptoms. More specifically, children of depressed parents are at increased risk for behavior problems, insecure attachment, and diagnoses of depression, anxiety, and other psychiatric disorders later in life (Beardslee, Gladstone, & O'Connor, 2011; Hammen & Brennan, 2003; Silk, Shaw, Forbes, Lane, & Kovacs, 2006; Toth, Rogosch, Manly, & Cicchetti, 2006; Weissman et al., 2006). Accordingly, this has been an important focus area for preventive intervention research, with notable progress evident over the last decade. A recent meta-analysis concluded that preventive interventions for children of parents with mental illness significantly decrease offspring internalizing symptoms as well as incidence of developing the same mental disorder of the diagnosed parent (Siegenthaler, Munder, & Egger, 2012). Toth and colleagues used a relational intervention, Child-parent psychotherapy (CPP), to promote secure attachment in the offspring of mothers who had a major depressive disorder (Toth et al., 2006). CPP, grounded in the work of Selma Fraiberg, focuses on the mother-child relationship and promotes the caregiver's understanding of how her own experiences being parented may be impacting her current relationship with her child and the way that she parents (Lieberman & Van Horn, 2008). In the study, 130 depressed mothers and their toddlers were randomized to either CPP or a treatment-as-usual comparison group. Consistent with a developmental psychopathology perspective of understanding the continuum between normal and abnormal development, a nonpsychiatric group of mothers and their infants was recruited for comparison purposes. At postintervention, toddlers in the CPP condition had higher rates of secure attachment compared to those in the intervention comparison group as well as compared to the offspring of a nondepressed comparison group (Toth et al., 2006). Thus, CPP was successful at promoting a healthy course of development for at-risk toddlers of mothers with depression in this preventive intervention.

Research in developmental psychopathology has consistently been dedicated to examining the generalizability of findings developed on middle-class, primarily Caucasian samples to underserved, racially/ethnically and economically diverse populations. Accordingly, the findings from the preventive intervention by Toth and colleagues (2006) have been used to develop a similar preventive intervention program for socioeconomically disadvantaged depressed women from diverse backgrounds and their infants. Toth and colleagues (2013) recently published the first study from this RCT, supporting the efficacy of IPT for reducing depression in mothers in this sample. This multilevel investigation also examined possible genetic moderators of treatment outcome with results indicating that changes in depressive symptoms over time depended on both intervention group (IPT versus enhanced community standard) and genotypic variation in corticotropin releasing hormone receptor 1 (CRHR1) and the linked polymorphic region of the serotonin transporter gene (5-HTTLPR; Cicchetti, Toth, & Handley, 2015). Importantly, IPT as an indicated treatment for maternal depression was simultaneously being examined as a selective preventive intervention for the 12-month-old infants of the mothers in the Toth et al. (2006) study, considered at risk due to exposure to maternal depression. Data from this study are being examined to determine the efficacy of IPT for maternal depression at enhancing the socio-emotional development of offspring as well as the utility of combining CPP and IPT for preventing the sequelae associated with maternal depression, including insecure and disorganized attachment.

Cognitive-behavioral interventions also have been utilized for interventions with children of depressed parents. Beardslee, Wright, Gladstone, and Forbes (2007) examined the long-term effects of two family-based preventive interventions utilizing a cognitive framework for offspring of depressed parents. A clinician-facilitated intervention was designed to increase family understanding of depression and build family support networks during approximately seven sessions plus refresher meetings or calls at 6- to 9-month intervals (family meetings as well as separate session with parents and children were used) and was compared to a lecture intervention in which parents attended two meetings and received similar psychoeducation about depression and its impact on families. However, the information was not connected to the individual family's experience, and children were not included in this very brief lecture-based intervention. Participants in the study included 105 families in which at least one parent had a mood disorder and at least one child was not depressed and fell between ages 8 and 15 at the start of the study. Four and half years after the initial intervention, families were assessed to examine the long-term effects of both preventive interventions on family functioning. Children in both

groups experienced decreases from baseline internalizing symptoms, with no advantage of either intervention group. Parental changes in attitudes and illness-related behaviors were sustained and greater in the clinician group, as was children's understanding of parental mood disorder. The demonstration of long-term sustained change 4.5 years after the initial intervention is an important strength of this program of research and suggests the utility of short-term interventions, specifically for school-age and adolescent offspring of depressed parents.

Compas and colleagues (2009, 2010, 2011) also have developed a brief cognitive-behavioral intervention designed for children in the 9- to 15-year age range with a depressed parent. The focus of this 12-session intervention is on providing cognitive-behavioral skills to enhance parenting and promote child coping skills in a small family-group format (Compas et al., 2009). Twelve months after the initiation of the intervention, children in the active condition had fewer depressive and other internalizing symptoms compared to those in the provision of written information control group; marginally significant effects were found for child externalizing symptoms (Compas et al., 2009). When Compas and colleagues (2010) examined mediators of 12-month outcomes, they found that increases in use of coping strategies, such as acceptance, positive thinking, and distraction, as well as positive parenting (praising child, scheduling enjoyable activities with the child), accounted for a significant portion of the intervention effect. Children in the cognitive-behavioral condition also had lower rates of major depressive disorder compared to children in the control cognition at 24-month follow-up (Compas et al., 2011). The 24-month follow-up and examination of efficacy mediators of this RCT for parental depression are important strengths of this program of research and are consistent with the goals set forth by Ialongo and colleagues (2006).

The Coping and Promoting Strength is another program based largely on cognitive-behavioral strategies to prevent psychopathology in children at risk due to parental mental illness. Ginsburg (2009) recruited 40 families in which a parent had an anxiety disorder diagnosed with the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (*DSM-IV*), and the child (ages 7–12) did not meet criteria for an anxiety disorder. Twenty families were randomized to the active preventive intervention and the other 20 to a waiting list control group. The program aimed to teach children specific skills, such as problem solving, provide psychoeducation about anxiety, address maladaptive cognitions, and reduce parental overprotection and modeling of anxiety symptoms. The program was also informed by a family-based intervention for offspring of depressed parents; thus another goal of the Coping and Promoting Strength program was improving communication within the family (Ginsburg, 2009). Families received 6 to 8 weekly 60-minute sessions, followed by 3 monthly booster sessions. A year after this brief intervention, none of the children in the active condition met criteria for an anxiety disorder; in comparison, 30% of the children in the waitlist group had developed an anxiety disorder. Despite these impressive findings, the sample size was very small in this study, and more research is needed on preventive interventions for children of parents with an anxiety disorder.

Externalizing Disorders

A large number of RCTs evaluating preventive interventions for child and adolescent externalizing behaviors have emerged in the last decade. The behaviors targeted include childhood disruptive behaviors and violent and substance-abusing behaviors in older children, adolescents, and young adults. One well-studied preventive intervention program in this line of research is Fast Track, a multicomponent intervention focused on at-risk children. A sample of 891 children from schools in four geographic regions was selected during kindergarten for inclusion in the study due to elevated externalizing symptoms. Of the children in the study, 76% scored in the clinical range for externalizing symptoms on the Child Behavior Checklist. Families were randomized to either Fast Track or a control condition. Services were provided over a 10-year span, which started in first grade and included components designed to address risk factors in the classroom, peer relationships, family risk factors, and the communication between families and school, tailored to each age group (see Conduct Problems Prevention Research Group, 2010, for details on specific intervention components in elementary and middle school). The efficacy of Fast Track has been demonstrated for promoting prosocial child development during elementary school (Conduct Problems Prevention Research Group, 1999, 2002, 2004, 2007). More recently, research on Fast Track has examined its impact on child socio-emotional development during the middle school years. When children were assessed in seventh grade, positive intervention effects were found only for children's parent-reported hyperactive behaviors and self-reported delinquent behaviors; there was no reduction in parent-rated oppositional-aggressive scores (Conduct Problems Prevention Research Group, 2010). There was also no reduction in parent-rated oppositional-aggressive

scores in eighth grade, and children in Fast Track reported being more likely to have a deviant best friend in eighth grade. These findings are in contrast to the positive intervention findings reported at the end of elementary school (Conduct Problems Prevention Research Group, 2004). However, when initial risk level was considered as a moderator of Fast Track effects, those in the highest risk group receiving the Fast Track intervention showed lower rates of externalizing disorders when assessed not only in third grade but also in sixth, ninth, and twelfth grades (Conduct Problems Prevention Research Group, 2011), suggesting the importance of subgroup analyses to more fully understand intervention effects. Dodge, Godwin, and the Conduct Problems Prevention Research Group (2013) found that the mechanism by which Fast Track reduced antisocial behavior after ninth grade was through altering patterns of social information processing, including reducing hostile-attribution bias, devaluing aggression, and increasing competency in responding to social problems. The research on Fast Track highlights the critical need to conduct long-term evaluations of preventive interventions, to examine intervention effects during multiple developmental stages, and to consider the impact of moderating variables, such as initial risk level.

The Incredible Years is another well-researched example of an intervention approach to prevent the development of oppositional defiant disorder and conduct disorder in young children. The program was originally developed to treat clinic-referred children (Webster-Stratton & Hammond, 1997; Webster-Stratton & Reid, 2003; Webster-Stratton, Reid, & Hammond, 2001, 2004); however, more recently the components of Incredible Years have been adapted for use as preventive interventions. An RCT was used to examine the efficacy of teacher training and a teacher-administered component of the Incredible Years curriculum, Dinosaur School (Webster-Stratton, Reid, & Stoolmiller, 2008) which is based on cognitive social learning theory and basic research on children with social and emotional disturbances and developed for children ages 3 to 7 (Webster-Stratton & Reid, 2004). Elementary schools (focused on children in kindergarten and first-grade classrooms) and Head Start programs were identified based on high rates of poverty and then randomized to receive either the Incredible Years curriculum or a control condition. Findings supported significant improvements in the classroom management strategies of teachers in the intervention condition and significant improvements in self-regulation, conduct problems, and social competence in children in the intervention condition (Webster-Stratton et al., 2008). The greatest improvements were observed for children in classrooms assessed to have a higher risk level at baseline, again suggesting that level of initial risk can be an important moderator of intervention effects.

The parenting component of the Incredible Years also has been adapted for use as a preventive intervention (Webster-Stratton, 1998). In a recent RCT, preschool-age siblings of youth with delinquency adjudication histories ($n = 92$) were randomly assigned to either the active intervention based on the Incredible Years curriculum, involving both child social competence group sessions and parenting competence group sessions in addition to home visits, or a control condition, involving monthly telephone calls (Brotman et al., 2008). The intervention resulted in differences in observed child aggression during parent-child interactions but not in parent reported aggression. Improvements in parenting practices also were observed for the intervention group, and these were sustained at 16-month follow-up (Brotman et al., 2008). In an effort to incorporate biological outcome assessments, critical for understanding the multiple levels at which a preventive intervention may successfully promote adaptive development, cortisol regulation also was examined after this preventive intervention (Brotman et al., 2007). Salivary cortisol samples were collected pre- and postintervention from both groups before and after exposure to a socially challenging situation. Children in the active intervention group evidenced an increase in cortisol levels in response to anticipation of the social challenge from pre- to postintervention, and this pattern is similar to what would be expected in typically developing low-risk children (Brotman et al., 2007). This effect was not observed for the preschoolers in the control condition. This study highlights the need to examine biological changes in response to preventive intervention to more fully understand the multifaceted ways in which preventive intervention rights the course of development for at-risk children. Finally, more recent work within this program of research has been directed toward identifying ways to successfully disseminate the Incredible Years curriculum into the community more broadly while maintaining fidelity to the model (e.g., Taylor et al., 2008; Webster-Stratton & Herman, 2010).

Triple P—Positive Parenting Program is another well-studied parent training program with solid evidence for the prevention and treatment of externalizing behavior problems (de Graaf, Speetjens, Smit, de Wolff, & Taveechio, 2008; Sanders, Kirby, Tellegen, & Day, 2014; Sanders, Markie-Dadds, & Turner, 2003). Triple P was developed in Australia and has a unique structure that recognizes the varying levels of support appropriate for

different families based on need and preferences for the type, intensity, and modality of assistance. It targets parents of children birth to age 12 and consists of five levels of increasing strength: a universal population-level media strategy for all parents, two levels of brief primary care consultations for mild behavior problems, and two intensive parent training and family interventions for children at risk for severe behavior problems (Sanders et al., 2003). The modality of delivery is flexible, including face-to-face, group, telephone-assisted, and self-directed formats, to meet the requirements of individual families and settings. The multilevel program and flexible format are optimal characteristics for prevention efforts as they allow the program to be disseminated broadly in the community and reach families that may otherwise be reluctant or unable to access programs through standard entry points. Triple P emphasizes parents' capacity for self-regulation of parenting behaviors. It aims to prevent externalizing behaviors by providing parents the knowledge, skills, and confidence to utilize positive parenting practices and promote nurturing and nonviolent environments for children (Sanders et al., 2003).

A variety of derivative programs of Triple P have been developed to target specific populations (Sanders et al., 2003). For example, Stepping Stones Triple P has been adapted at all five levels for parents of children with developmental disabilities, given the increased risk for behavior problems in this population (Tellegen & Sanders, 2013). Level 5 of Triple P also has been enhanced for parents at risk for child maltreatment (Pathways Triple P) and includes content on anger management and other behavioral strategies to improve a parent's ability to cope with raising children. Other variants include Teen Triple P (for parents of teens ages 12–16), Workplace Triple P (delivered through workplaces as an employee assistance strategy), Lifestyle Triple P (for parents of obese and overweight children), and Indigenous Triple P (a version for Aboriginal parents), among others.

A recent meta-analysis of Triple P (Sanders et al., 2014) and its adaptations has found medium intervention effects for children's behavioral outcomes ($d = 0.47$), parenting practices ($d = 0.58$), and parent satisfaction and efficacy ($d = 0.52$). Small to medium effects were seen for parent adjustment ($d = 0.34$) and parental relationship ($d = 0.25$). Fifteen moderator variables were examined across outcomes, and nearly all were a significant moderator for at least one of the outcomes. However, none consistently moderated across all outcomes. After controlling for other moderators, only study power (greater or less than 35 in smallest group), study approach (i.e., universal, targeted, treatment), Triple P level, and the severity of initial child problems uniquely moderated one or more of the outcomes. In addition to the body of work evaluating program levels, formats, and adaptations (see de Graaf et al., 2008; Sanders, Markie-Dadds & Turner, 2003; Sanders et al., 2014), Triple P has undergone large-scale population trials to evaluate the efficacy of the multilevel system at reducing behavior problems or child maltreatment across communities. The first trial (Sanders, 2008) targeted all parents of children ages 4 to 7 in 10 catchment areas in Brisbane, Australia. Relative to matched communities in Sydney and Melbourne, a random sample of households ($N = 3{,}000$) demonstrated significantly greater reductions in emotional and behavioral problems 2 years postintervention. Parents in intervention communities also reported greater reductions in depression, parenting stress, and coercive parenting practices. Prinz and colleagues (2009) randomly assigned 18 counties in South Carolina, US, to receive Triple P or care as usual. Following intervention, Triple P counties had lower rates of maltreatment and placements in out-of-home care. These studies on Triple P represent a coherent program of research suggesting the utility of the program for promoting adaptive child and parent functioning for several populations. Its unique flexibility of intensity and modality, as well as its proven portability into the community with long-term sustained effects, make it an exemplary model of preventive interventions for children at risk for externalizing behaviors. However, more work is needed to better understand moderators of treatment efficacy.

The Good Behavior Game (GBG; Dolan, Turkkan, Werthamer-Larsson, & Kellam, 1989; van der Sar & Goudswaard, 2001) is another preventive intervention aimed at the reduction of externalizing behaviors in children. It is a universal, school-based program designed to promote prosocial behaviors and prevent disruptive behavior. Consistent with the aims set forth by Ialongo et al. (2006), recent research on this preventive intervention has aimed to understand the long-term effects of the GBG as well as mechanisms by which it works. Witvliet, van Lier, Cuijpers, and Koot (2009) examined mechanisms of efficacy of an RCT for the GBG that was initiated in 2004. In the study, 758 children were randomly assigned to the GBG or a control condition, and the group-based intervention took place in first and second grade. The 2-year intervention successfully reduced child externalizing behaviors, specifically for boys enrolled in the study (Witvliet et al., 2009). Increases in peer acceptance were found to partially mediate the reduction in externalizing symptoms for boys (Witvliet et al., 2009). Another RCT

of the GBG found that it successfully reduced aggressive behavior, but only for children who initially showed a low level of on-task behavior, highlighting their high-risk status (Leflot, van Lier, Onghena, & Colpin, 2013). These effects were mediated by reductions in peer rejection (Leflot et al., 2013). Results from this set of studies underscore the importance of examining moderators of treatment effects so as not to conclude that an intervention is ineffective when it is, in fact, effective for a subset of the sample receiving it. Results also suggest that the GBG intervention works through one of its initially postulated mechanisms of action, that is, improving youth social relations.

Consistent with a developmental psychopathology approach to examining multiple levels of a system in the context of a preventive intervention, Leflot, van Lier, Onghena, and Colpin (2010) and colleagues examined teacher behaviors rather than child-centered variables as a mediator of the efficacy of the GBG. They found that improvements in teacher classroom management strategies (i.e., using fewer negative remarks) predicted fewer talking out behaviors, which then predicted reductions in oppositional behavior in the children receiving the GBG intervention (Leflot et al., 2010). Accordingly, this program of research also highlights the importance of examining multiple mediators of efficacy that take into consideration the myriad levels at which a preventive intervention can operate (e.g., child, teacher, system).

Another area of research on the GBG over the last 10 years has aimed to understand its utility at preventing a wide range of externalizing behaviors and disorders in young adults. One strategy to address potential variability in participant response to intervention effects, informed by a developmental psychopathology approach and called for by Ialongo et al. (2006), is to account for potential interactions between individual developmental trajectories and intervention effects. This can be done using growth mixture modeling (Muthén et al., 2002). Petras and colleagues (2008) used general growth mixture models to examine trajectories of youth, ages 19 to 21, who had been enrolled in the GBG during first and second grade. Children in the study were identified as having one of three aggressive and disruptive behavior trajectories from first through seventh grade: persistent high, escalating medium, stable low. Findings supported reductions in rates of antisocial personality disorder and violent and criminal behavior for male GBG participants in the persistent high trajectory (Petras et al., 2008). Other studies of outcomes approximately 10 years after GBG intervention found reductions in substance abuse disorders and smoking and antisocial personality disorder (Kellam et al., 2008) and service utilization for behavioral, emotional, and substance-related problems (Poduska et al., 2008) specifically for males who had been in the highest risk group in first grade. This program of research again exemplifies the importance of including moderators and person-centered analyses in follow-up research to identify the groups of participants most likely to benefit from a preventive intervention over time.

Another high-risk externalizing behavior, often associated with myriad comorbidities, involves alcohol and other substance abuse among teens. A prime example of a cohesive program of preventive intervention research for teen substance abuse is the Strong African American Families Program (SAAF). SAAF is a universal preventive intervention that targets alcohol use among rural African American teens (Brody et al., 2004; Murry & Brody, 2004), informed by several earlier validated interventions for families, such as the Strong Families Program (Spoth, Redmond, Shin, & Azevedo, 2004). We focus on SAAF, given its consistency with the aims of developmental psychopathology to develop preventive interventions that demonstrate utility with diverse, often underserved, populations. Additionally, this intervention also was developed out of a program of basic developmental research with rural African American families that elucidated ways in which parenting practices impact adolescent alcohol use (e.g., Brody, Flor, Hollett-Wright, & McCoy, 1998; Brody, Ge, Katz, & Arias, 2000; Brody, Murry, Kim, & Brown, 2002; Wills, Gibbons, Gerrard, & Brody, 2000; Wills, Gibbons, Gerrard, Murry, & Brody, 2003). This strategy of translating basic research into intervention and using it as a test of developmental theory is closely in line with the tenets of developmental psychopathology.

Brody, Murry, Kogan, et al. (2006) conducted an RCT of SAAF that examined both its long-term effects as well as potential mediators of efficacy, which were tied back to the conceptual theories from which the intervention was derived. In the study, 332 families were assigned to either a 7-week family skills training program (SAAF) or the control condition when offspring were 11 years of age. Highlighting the cultural sensitivity of this study, randomization occurred at the county level, acknowledging the close-knit and widespread familial ties of the population targeted. Additionally, data collection occurred in the home, conducted by African American research assistants (Brody, Murry, Kogan, et al., 2006). The intervention was administered both at the individual (child, parent) level as well as the level of the parent-child dyad each week of the intervention, and youth were followed 29 months after baseline assessment. Adolescents who had been

in the intervention condition were less likely to initiate alcohol use, and for those who did use alcohol, their rate of increase over time was slower based on latent growth modeling results (Brody, Murry, Kogan, et al., 2006). Mediational results confirmed the mechanism of action on which the intervention was based, namely, the SAAF intervention reduced alcohol use through the development of youth protective factors, including a goal-oriented future orientation and more vigilant parenting (Brody, Murry, Kogan, et al., 2006). Positive changes in parenting in the intervention condition also were linked with improvements in the parent-child relationship and youth self-control at postintervention (Brody et al., 2005) as well as at 65-month follow-up (Murry, McNair, Myers, Chen, & Brody, 2013). Similar to findings reviewed earlier from the GBG, findings from SAAF indicated an impact on other risk behaviors besides substance use, including reduced sexual risk behaviors at longitudinal follow-up when participants were 17 years of age (Murry et al., 2011; Murry et al., 2013). These studies demonstrate that targeting the prevention of a single risk factor early in development or during a critical risk phase can have a positive cascade, subsequently preventing multiple risky behaviors and disorders.

Brody and colleagues (2009, 2014) also investigated gene × intervention effects for the SAAF intervention. They examined the dopamine receptor-4 gene (DRD4) alleles that have 7 or more repeats as a potential moderator of the efficacy of SAAF adapted for teens (SAAF-T) on preventing adolescent substance abuse (Brody et al., 2014). They found that male participants in the control condition with at least 1 allele of DRD4 who were randomly assigned to the control condition were more likely to use substances over the course of the study compared to participants with at least 1 allele of DRD4 with 7 or more repeats who received the SAAF-T intervention. Males in the control condition with at least 1 allele of DRD4 were also more likely to use substances over the course of the study compared to adolescents in either the control or intervention groups who carried 2 alleles of DRD4 with 6 or less repeats (i.e., neither DRD4 allele had 7 or more repeats). Thus, results support DRD4 as a moderator of treatment efficacy and identify the group, male carriers of at least 1 allele of DRD4 with 7 or more repeats, as potentially most in need of preventive intervention in this population. Similarly, Brody and colleagues (2009) found that participants in an RCT of SAAF who were assigned to the control condition and carried a genetic risk, defined as a variable-nucleotide repeat polymorphism in the promoter region of gene SLC6A4, were more likely to display an increase in risk behaviors over the course of the study compared to those at genetic risk who were assigned to SAAF.

Child Maltreatment

Children who have experienced maltreatment are especially at risk for a variety of internalizing and externalizing symptoms. Child maltreatment represents an egregious failure of the caregiving environment to meet children's basic needs for safety and security. When children are exposed to these conditions, they are at risk for maladaptation in multiple psychological, biological, and relational domains of functioning (Cicchetti & Manly, 2001; Cicchetti & Valentino, 2006). As development is cumulative, maltreatment often results in negative cascades wherein early failures to resolve stage-salient issues lead to subsequent maladaptation (Masten & Cicchetti, 2010). Accordingly, ideal preventive interventions for child maltreatment are administered early in development, thereby promoting a healthy developmental trajectory from a young age. Given that a large percentage of maltreated children are abused or neglected by a primary caregiver, preventive interventions that focus on parenting and the relationship between child and caregiver are of utmost importance (Toth & Gravener, 2012).

An exemplary preventive intervention for child maltreatment was conducted by Cicchetti, Rogosch, and Toth (2006), who compared two active prevention strategies in an RCT for 1-year-old infants in maltreating families and their mothers. Basic research on attachment security in children who have been maltreated suggests that a large majority develop a disorganized attachment (Cicchetti & Barnett, 1991; Cicchetti et al., 2006a), increasing the likelihood of subsequent failures to navigate stage-salient issues of development (Sroufe, 2005) and clearly suggesting the need for relationally based preventive interventions with this population (Toth, Pianta, & Erickson, 2011). Using findings from basic science as a guide, one of the interventions chosen for this RCT was CPP (described earlier), which focuses on the relationship between primary caregiver and child. A psychoeducational parenting intervention (PPI) was chosen as the second active intervention for comparison, given clear deficits in basic parenting skills found in maltreating parents. Socioeconomically disadvantaged mothers and their infants ($n = 137$) were randomly assigned to one of the two treatment conditions or a community standard (CS) group that received treatment as usual. Additionally, a sample of mother-child dyads also with low socioeconomic status (SES) but without a history of maltreatment was recruited as a normative comparison

(NC; $n = 52$). The inclusion of this normative group allowed for basic comparisons on study variables between maltreated and nonmaltreated infants, consistent with the aim of developmental psychopathology to understand the continuum between normal and abnormal development. Moreover, the inclusion of the normative group enabled the determination of whether provision of the preventive intervention could result in promoting functioning in the maltreatment group receiving intervention that is comparable to that seen in nonmaltreated infants. Prior to intervention, significantly higher rates of disorganized attachment were observed in the maltreated compared to the nonmaltreated infants (Cicchetti et al., 2006). Several differences also were noted between the mothers in the maltreating group compared to the nonmaltreating group, including higher rates of self-reported maltreatment in their own childhoods and maladaptive parenting attitudes in the mothers in the maltreatment group. This group of mothers also reported less family support and evidenced less maternal sensitivity. Both active interventions were administered weekly in the home over a 1-year period. Postintervention, children who were in the CPP and PPI conditions, as well as those in the NC group, differed significantly from the CS group on attachment classifications. Although disorganized attachment continued to predominate in the children in the CS group, this was no longer the case for children in the CPP and PPI conditions. Additionally, less than 2% of the children in the CS group moved from an insecure to a secure attachment from pre- to posttreatment, in contrast to more than half of the toddlers in the CPP and PPI groups who developed a secure attachment over the course of the intervention. Somewhat surprisingly and contrary to expectations, infants in the CPP group did not evidence greater attachment security than those whose mothers received PPI. No evidence was found for treatment mediators, despite the sound theoretical choice of each of these interventions and hypothesized pathways through which they are believed to operate. These results suggest that early in development, the provision of a good-enough intervention, even if it is not targeted at improving attachment, may be efficacious in doing so. However, it remained unclear whether these results would be sustained over time.

Importantly, attachment security in the four groups was examined 12 months after the completion of the intervention. Children in the CPP condition had higher rates of secure attachment and lower rates of insecure attachment than those in the PPI or CS groups (Stronach, Toth, Rogosch, & Cicchetti, 2013). The CPP group and the NC groups did not differ from each other, meaning that 12 months after preventive intervention, children who had received the relational intervention continued to be more likely to evidence a secure attachment with their mothers and at rates comparable to those observed in the nonmaltreated group of children. Children in dyads that had received the PPI did not continue to evidence benefits regarding increased attachment security. The findings from this study highlight the importance of longitudinal follow-ups, consistent with recommendations that such follow-ups are necessary to fully understand the impact of preventive interventions (Ialongo et al., 2006). These results suggest that for sustained change in attachment security in maltreated children to occur, a theoretically informed intervention directed specifically at the attachment relationship, such as CPP, is more efficacious than a PPI.

An important next step in preventive intervention science involves the integration of biological and psychological processes in the evaluation of preventive interventions, with increasing recognition that experience can impact biology (Cicchetti & Gunnar, 2008; Ialongo et al., 2006). Basic research with maltreated children has suggested the negative impact of early adverse care on the development of the hypothalamic-pituitary-adrenal (HPA) axis; this research has necessitated an evaluation of changes in HPA axis functioning postintervention to more fully understand the impact of psychosocial intervention on biological processes in this population (Bruce, Gunnar, Pears, & Fisher, 2013; Cicchetti & Gunnar, 2008). Cicchetti, Rogosch, Toth, and Sturge-Apple (2011b) offered an example of this integration in a study that examined cortisol regulation in response to the above-described preventive intervention for maltreated infants and their mothers. Morning cortisol was collected from offspring in maltreating families ($n = 91$) and from those in the nonmaltreated group ($n = 52$) at baseline, midintervention, postintervention, and 1-year follow-up, when offspring were approximately 38 months of age. No group differences in morning cortisol existed at baseline between the maltreated and nonmaltreated infants. Latent growth curve analyses were used to examine similarities and differences in cortisol regulation over time among the nonmaltreated, community standard, and combined (CPP, PPI) maltreated intervention group over the 25-month period. Children in the maltreated community standard comparison condition experienced declines in morning cortisol over the course of the intervention, whereas the trajectory of morning cortisol for the intervention group over time remained statistically indistinguishable from the trajectory of morning cortisol for the nonmaltreated

comparison group of children. These results underscore the potential of psychosocial interventions to affect biological processes in maltreated children, diverting their developmental course toward a more positive trajectory via multiple levels of functioning. In an effort to understand whether the impact of this preventive intervention on child attachment security was impacted by genotype, Cicchetti, Rogosch, and Toth (2011a) also examined the moderating effects of polymorphisms of the serotonin transporter and dopamine D4 receptor genes on the efficacy of the previously described RCT. Genetic variation did not moderate the efficacy of the intervention on improving attachment security, suggesting that the experience of maltreatment may be so powerful that it overrides the effects of genetics and that maltreated children may benefit from intervention regardless of genetic vulnerability.

Notably, CPP also has been evaluated by another research group and found to be an efficacious intervention for improving behavioral problems and trauma symptoms in preschool children exposed to domestic violence (Lieberman, Ghosh Ippen, & Van Horn, 2006; Lieberman, Van Horn, & Ghosh Ippen, 2005).

The Nurse-Family Partnership (NFP) is another early intervention designed to prevent child maltreatment and promote adaptive functioning and subsequent development in young, economically disadvantaged mothers and their offspring (Olds, 2006). NFP provides services for low-income, first-time mothers during pregnancy and continuing through the child's second birthday. Nurses provide in-home intervention to promote health behavior during pregnancy, facilitate the development of supportive relationship between new mothers and friends and family, link mothers with other needed resources, promote sensitive and competent caregiving behaviors, plan future pregnancies, and complete their education and/or find work (see Olds, 2006, for more details). Mixed evidence has been found for the effects of NFP on incidence of maltreatment and emergency room visits among young children (e.g., Matone, O'Reilly, Luan, Localio, & Rubin, 2012; Olds, Henderson, Chamberlin, & Tatelbaum, 1986; Olds, Henderson, & Kitzman, 1994). More recent efforts to understand the impact of NFP on timing of maltreatment reports found that after age 5, children in dyads receiving NFP compared to those in a comparison group (which included screenings and referrals as needed) had fewer first child protective services reports up through age 15; the effect was more pronounced in an identified high-risk subgroup and for neglect compared to any abuse onset (Zielinski, Eckenrode, & Olds, 2009). Results again highlight the importance of conducting long-term evaluations and identifying potential moderators to more fully understand the effects of preventive intervention programs.

Other preventive interventions for children who have been maltreated have focused on children placed in out-of-home care. Attachment and Biobehavioral Catch-up (ABC) is a preventive intervention that was designed for infant, toddler, and preschool-age maltreated children in the foster care system. Ten conjoint foster parent-child sessions are used to promote the caregiver's ability to create an environment in which the child feels nurtured and loved, even when the caregiver feels pushed away; to work with the caregiver on personal issues that may be arising in the context of caring for the foster child and reduce frightening behaviors on the part of the parent; and to develop a highly controllable interpersonal environment so children can begin to learn to regulate their emotions and behaviors (Dozier, 2003; Dozier, Peloso, Lewis, Laurenceau, & Levine, 2008). Preliminary results from an RCT comparing ABC to a time-matched educational control condition found that foster children in the ABC condition evidenced fewer avoiding behaviors when distressed compared to children in the control condition (Dozier et al., 2009). The impact of ABC on HPA axis functioning also has been examined to provide a better understanding of the multiple domains in which ABC may be advantageous to maltreated children. Consistent with hypotheses regarding this preventive intervention, children who received ABC were found to be able to regulate HPA axis functioning better than children in a control condition postintervention (Dozier et al., 2008). Notably, ABC has also been adapted for use with biological parents at risk for neglecting their infant and toddler-age children. Children in parent-child dyads receiving ABC were found to have lower rates of disorganized attachment and higher rates of secure attachment compared to those in an educational control condition (Bernard et al., 2012), suggesting that effective programs developed for out-of-home placements may also be utilized with appropriate amendments with biological parent-child dyads.

The Early Intervention Foster Care Program, more recently termed Multidimensional Treatment Foster Care for Preschoolers (MTFC-P), focuses on improving placement success specifically for preschool children in the foster care system (Fisher, Burraston, & Pears, 2005). MTFC-P is a family-based intervention that works with foster children, foster parents, and permanent placement resources over a 6- to 9-month period. It involves intensive training for foster parents prior to child placement, consultation and support for foster parents during placement,

weekly therapeutic play groups for children, and services to bridge the transition to a permanent placement (Fisher, Stoolmiller, Gunnar, & Burraston, 2007). This intervention has been shown to be effective at reducing the number of failed placements for children in foster care relative to the comparison condition (Fisher, Burraston, & Pears, 2005). More recent research on MTFC-P has included biological and physiological measures of intervention efficacy. An RCT for young maltreated children who were randomly assigned to either MTFC-P or foster care as usual found that children receiving MTFC-P evidenced improvements in cortisol regulation (Fisher et al., 2007). Additionally, children who received MTFC-P were found to be more responsive to performance feedback errors when using an electrophysiological measure of response monitoring compared to those who received treatment as usual and comparable to nonmaltreated peers (Bruce, McDermott, Fisher, & Fox, 2009).

Consistent with a developmental psychopathology perspective, the needs of children in out-of-home care are likely to differ depending on the child's developmental stage. ABC and MTFC-P both focus on young children in out-of-home placements; alternatively, Fostering Healthy Futures (FHF) is a child-focused preventive intervention designed for preadolescent children (ages 9–11) that has been found to have effects on placement stability and permanence (Taussig, Culhane, & Hettleman, 2007; Taussig, Culhane, Garrido, & Knudtson, 2012). FHF is a 30-week program for preadolescent youth in out-of-home care that involves weekly child skills groups and individual mentoring by graduate students in social work or psychology. FHF was designed to promote child well-being by identifying and addressing mental health issues, preventing adolescent risk behaviors, and promoting competence (Taussig et al., 2007). The initial RCT of FHF ($n = 156$) revealed significantly better outcomes on a multi-informant factor score of mental health functioning for youth randomized to the FHF preventive intervention relative to youth in the assessment-only condition 6 months postintervention (Taussig & Culhane, 2010). The more positive mental health outcomes associated with FHF likely contribute to better placement stability and permanency found for intervention youth, especially for those initially placed in nonrelative foster care. Specifically, after controlling for baseline behavior problems, youth initially placed in nonrelative foster care who participated in FHF had 44% fewer placement changes, were 82% less likely to be placed in residential treatment, and were five times more likely to have attained permanency 1-year postintervention than control youth in nonrelative foster care at baseline (Taussig et al., 2012). This study was particularly rigorous in that it integrated data from interviews with children and caregivers, social histories completed by caseworkers, legal petitions filed in the dependency and neglect court that led to out-of-home placement, and statewide administrative case and placement records. Longitudinal follow-up of this sample is currently under way through young adulthood.

Taken together, these studies suggest that psychosocial preventive interventions administered to at-risk or maltreated infants and children and their biological or foster parents can have a sustained impact on child functioning, placement success, and biological processes in the child. Expanding the scope of assessments administered in preventive intervention RCTs to include biological measures provides additional evidence for the importance of preventive interventions for correcting the course of development for at-risk children.

Child Trauma

In a historical climate marred by national and international terrorist acts, war, highly publicized school shootings, domestic violence, and natural disasters occurring in densely populated areas, there is a vital need for the evaluation of preventive interventions geared toward preventing posttraumatic stress disorder (PTSD) and other negative sequelae associated with exposure, both direct and vicarious, to traumatic events. In fact, it is estimated that about 14% of children and adolescents experience a disaster by age 16 (Becker-Blease, Turner, & Finkelhor, 2010), and yet few RCTs have been conducted in this area. This is likely in part due to the numerous ethical, logistical, and methodological challenges associated with research in the context of large-scale catastrophic events (Masten & Osofsky, 2010). And yet the need for evidence-based services in these situations is paramount. For example, in the 2 years following Hurricane Katrina, more than 40% of 7,258 children (grades 4–12) from affected areas met the National Child Traumatic Stress Network cutoff for referral to mental health services (Osofsky, Osofsky, Kronenberg, Brennan, & Hansel, 2009). In the last decade, the Psychological First Aid (PFA) approach has been developed in collaboration between the National Child Traumatic Stress Network and the National Center for PTSD. PFA interventions are grouped into eight core actions:

1. Initiate compassionate contact.
2. Enhance feelings of safety and comfort.

3. Gather information to identify immediate needs and concerns.
4. Provide practical assistance.
5. Connect individuals with social supports.
6. Provide psychoeducation about stress and coping.
7. Link families with appropriate community services to be utilized now and/or in the future.
8. Provide educational handouts (Vernberg et al., 2008).

These core actions are grounded in the five basic principles for facilitating positive adaptation after a traumatic event, principles that have received empirical support (Hobfoll et al., 2007). Tools have also been developed to facilitate the development of an evidence base for PFA (Vernberg et al., 2008). There is a growing consensus that this is the approach of choice for children and adults in the aftermath of disasters (Watson, Brymer, & Bonanno, 2011); yet without empirical evidence, many questions remain regarding the application of PFA with children and adolescents immediately postdisaster (La Greca & Silverman, 2009).

Other empirical research on preventive interventions for disaster exposure has been limited. An RCT comparing a universal, teacher-administered resilience-focused intervention to a control condition found that the active intervention effectively prepared children in fourth and fifth grade for mass trauma in Israel (Wolmer, Hamiel, & Laor, 2011). A school-based preventive intervention also was found to reduce PTSD symptoms compared to a waitlist control group for second- to sixth-grade children exposed to a terrorist attack in Israel (Berger, Pat-Horenczyk, & Gelkopf, 2007). In contrast, an early intervention for child (ages 7–18) survivors of car accidents found no advantage for children receiving a psychological debriefing intervention compared to no intervention (Stallard et al., 2006).

In summary, despite research highlighting the criticality of providing adequate supports following the occurrence of traumatic events (Kronenberg et al., 2010), there continues to be a dearth of studies designed to assess preventive intervention in the aftermath of mass trauma (Foa et al., 2005), and many of the existing preventive interventions for trauma exposure have not employed an experimental RCT design (see Peltonen & Punamaki, 2010, for a review), which makes firm conclusions about the efficacy of these preventive interventions difficult to ascertain. Importantly, previous research indicating the iatrogenic effects of universal intervention immediately after exposure to a traumatic event in adults (Lilienfeld, 2007) underscores the need to carefully evaluate postdisaster preventive interventions for children and adolescents.

Parental Divorce

Offspring of divorced parents are also at risk for maladaptive development (Afifi, Boman, Fleisher, & Sareen, 2009; Amato, 2001; Pedro-Carroll, 2005) and have been the recipients of preventive interventions to ameliorate the course of development. The New Beginnings Program (NBP) for youth (ages 9–12) and their mothers is one such program that was developed from basic research on risk and protective factors for children of divorced parents. The NBP has been found to be effective for this population (Wolchik et al., 2000, 2002), and more recent research has examined the long-term effects of this preventive intervention and putative mediators of treatment efficacy. NBP involves both mother and child intervention components. Offspring who received NBP were found to have fewer internalizing and externalizing symptoms, mental health diagnoses and other risk factors, and greater academic achievement and self-esteem compared to youth in a literature control condition 6 years after the intervention concluded (Wolchik, Sandler, Weiss, & Winslow, 2007). Zhou and colleagues (2008) tested putative mediators of 6-year longitudinal effects, both to better understand the pathways through which intervention effected change and, equally important, to test the causal inferences regarding how divorce leads to the development of psychopathology. Improvements in the mother-child relationship were found to mediate NBP effects on offspring mental health for those who were at high risk for maladjustment at baseline. Results suggest the importance of the mother-child relationship as a protective factor for high-risk youth who experience parental divorce and highlight the continued need to study the caregiver-child relationship over the course of development.

Another recent study of the NBP intervention moved beyond mediational models toward examining developmental cascade effects of intervention on child adaptation (McClain et al., 2010). Developmental cascade models recognize the dynamic interplay between adaptive (or maladaptive) changes over the course of development. Using this framework, support was found for a model in which improvements in the mother-child relationship were followed by related decreases in child internalizing symptoms, subsequently related to increases in youth self-esteem and decreases in internalizing disorder symptoms in adolescence (McClain et al., 2010). This program of research has been strengthened by a 15-year follow-up on the effects of

NBP, which indicated that the active intervention reduces the occurrence of internalizing disorders for youth and substance-related disorders for male youth (Wolchik et al., 2013). Taken together, these findings support the utility of NBP for improving the developmental trajectory for youth of divorced parents and also provide a detailed and developmentally informed understanding of how the intervention works both in the short and the long term.

Summary

Just as there are many pathways to risk over the course of childhood and adolescence, so are there many pathways to health, exemplifying one of the core concepts in developmental psychopathology, equifinality (Cicchetti & Rogosch, 1996). Since the turn of the century, researchers have made great strides using the gold standard RCT design to evaluate preventive interventions for at-risk children and families, many developed out of relational (e.g., Bernard et al., 2012; Cicchetti et al., 2006; Horowitz et al., 2007; Toth et al., 2006) or cognitive-behavioral approaches (e.g., Compas et al., 2009; Gillham et al., 2007; McCarty et al., 2012) and grounded in basic developmental science (Toth, Pianta, & Erickson, 2011). Follow-ups 1 year and beyond have become more common (e.g., Barrett et al., 2005; Compas et al., 2011; Conduct Problems Prevention Research Group, 2011; Kellam et al., 2008; Murry et al., 2013; Stronach et al., 2013), allowing the field to identify which interventions have lasting positive impacts on developmental trajectories and are therefore most important to disseminate. Progress has been made on the identification of mediators (e.g., Compas et al., 2010; Horowitz et al., 2007; Leflot et al., 2010; Witvliet et al., 2009; Zhou et al., 2008) of treatment efficacy. Genetic and other biological assessments have increasingly been incorporated into preventive intervention trials (e.g., Brody et al., 2009, 2011; Cicchetti et al., 2011a; Cicchetti et al., 2011b; Dozier et al., 2008), although much more is necessary on this frontier, which is likely to shape the future of preventive intervention research. An overview of meta-analyses of preventive interventions conducted in the last two decades suggests overall small to medium effect sizes (Sandler et al., 2014). Importantly, this review also highlighted the heterogeneity of effects in a majority of the meta-analyses reviewed and identified possible sources for future research to investigate (Sandler et al., 2014). And so, in the midst of progress comes the acknowledgment that we still have far to go to ameliorate the negative course of development for the many children and families at risk for psychopathology.

CURRENT DIRECTIONS IN CONCEPTUALIZING COMPLEXITY

As evidenced in the previous section, the field of prevention science has achieved significant gains over the last decade. The developmental psychopathology perspective has paved the way for many of these gains through its advancement of a unifying conceptual framework and emphasis on multidisciplinary and translational research (Cicchetti & Toth, 2009; Rutter, 2013; Toth et al., 2011). However, as advances in theory and methodology are made, new directions and challenges arise. One of the major challenges facing the field is how to conceptualize and evaluate preventive interventions in the context of increased complexity. This section focuses on current directions in the field to advance our ability to capture the complexity of mechanistic processes and outcomes involved in preventive interventions. We first discuss the importance of rich theoretical models in designing and evaluating preventive interventions. We present an assessment of advances and limitations in measuring intervention effects at multiple levels of analysis (e.g., genetic, neuroimaging, psychosocial) and in multiple ecological contexts (e.g., individual, interpersonal, cultural). To conclude this section, we highlight recent thinking on developmental cascade models, models that aim to integrate multiple risk and protective processes in examining preventive intervention effects longitudinally.

Theoretical Foundations

Intervention targets in prevention science are inherently complex. Preventive interventions aim to alter developmental and adaptive processes that typically occur at multiple levels within complex social, biological, and environmental systems (Cicchetti & Toth, in press; Lich, Ginexi, Osgood, & Mabry, 2013). Individuals within systems also present with their own unique mix of genetic, biological, and psychological strengths and weaknesses and history of prior experiences that influence the probability of intervention efficacy (Lich et al., 2013). Conceptualizing how an intervention alters individual and systems-level factors and their transactions is not an easy task. Given the complexity of intervention targets, multiple mechanisms are likely involved in most preventive interventions. As illustrated in the selected review of programs just presented, a wide variety of efficacious preventive interventions currently exist. Our challenge in the field is to move beyond establishing efficacy and to focus on closely aligning preventive interventions with theory to delineate the underlying mechanisms by which interventions work

and to identify subgroups for which interventions are more or less effective.

Both the design and evaluation of preventive interventions need to be more theory-driven than is currently the norm (Cicchetti & Toth, 2009; Ialongo et al., 2006). The general theoretical rationale for selecting a given approach for an intervention target is usually clearly specified. However, the hypothesized mediating mechanisms of the intervention program must also be clearly delineated and grounded in theory to adequately evaluate the theorized process by which the intervention program exerts its effects. Moreover, subgroups for which interventions are expected to be more or less effective also must be specified a priori (Bloom & Michalopoulos, 2013; Fairchild & MacKinnon, 2014). Finally, consideration of theorized mediating mechanisms and subgroup analyses must be couched within a broader developmental systems perspective that emphasizes the importance of moving beyond additive or interaction models to conceptualizing dynamic reciprocal, bidirectional, and co-acting processes in our models (Lich et al., 2013; Marshall, 2013). Ideally, detailed conceptual models reflecting these dynamic processes across levels of analysis (e.g., biological, cognitive, behavioral) and ecological contexts should be constructed prior to designing or selecting intervention components. The model can then guide the development or selection of the preventive intervention components to accomplish the hypothesized underlying mechanisms and determine which measures are most appropriate to evaluate the efficacy of the intervention on these processes. Finally, researchers should determine the appropriate trial design (e.g., comparison group, level of randomization) and statistical methodologies to answer target research questions. Thinking through the conceptual model while also delineating statistical models can help researchers identify assumptions and limitations of statistical results in the context of the more complex conceptual model as well as examine feasibility issues with regard to statistical analyses and power estimates.

Multiple Levels of Analysis

Consistent with the developmental psychopathology perspective, and as just illustrated, an increasing number of empirical studies are incorporating multiple levels of analysis to understand complex developmental processes, which has resulted in theoretical advances (Cicchetti & Gunnar, 2008). The multiple-levels-of analysis approach improves on the definition of mental health problems as brain disorders and suggests that they can be better conceptualized in a more dynamic fashion that reflects the probabilistic, bidirectional, and transactional interplay among genetic, neurobiological, social, psychological, and environmental influences across the life course (Cicchetti & Toth, 2009; Cicchetti & Toth, in press; Toth, Gravener-Davis, Guild, & Cicchetti, 2013). As discussed, intervention design needs to be informed by these theories. Researchers also need to routinely incorporate measures at multiple levels of analysis in intervention trials to more fully capture and evaluate intervention effects and mechanistic processes consistent with theory. The methods and technology to assess various levels of analysis are continuing to evolve, which allow for more effective and efficient measurement of phenomena. However, the field has not yet made optimal use of these technological advances. This section highlights our evolving understanding and methodology, with a particular emphasis on biological levels of analysis.

At present, most evaluations of preventive interventions continue to involve theories, experimental designs, and measurement batteries that have been dominated by processes at the psychosocial and behavioral levels of analysis. Historically, trials of preventive interventions conducted with children and adolescents have paid minimal attention to neurobiological and physiological systems in their evaluations of treatment efficacy (Cicchetti & Gunnar, 2008). The neglect of biological levels of analysis in evaluations of preventive intervention efficacy may be in part due to beliefs that biological systems are more static and less malleable to intervention (Cicchetti & Gunnar, 2008; Ialongo et al., 2006). However, research is increasingly demonstrating that interventions can alter physiological structures and functions relating to the behavior of interest (e.g., Beauregard, 2009; Dozier et al., 2008; Fisher et al., 2007; Linden, 2006). Moreover, genetic moderation of intervention efficacy is increasingly being elucidated (Brody et al., 2009, 2013; Cicchetti, Toth, & Handley, 2015). Over the last decade, several important articles and special issues in prominent journals (e.g., Belsky & van IJzendoorn, 2015; Beauchaine, Neuhaus, Brenner, & Gatzke-Kopp, 2008) have called for increased emphasis on biological levels of analysis, especially in the area of genetics and G×E interactions.

The biological level of analysis has already provided some important directions in designing preventive interventions. Research has demonstrated that biological vulnerabilities can give rise to broad classes of homotypic comorbidity (e.g., multiple externalizing disorders in an individual, such as conduct disorder and substance abuse) and heterotypic comorbidity (e.g., co-occurrence of internalizing and externalizing disorders, such as anxiety and

attention-deficit/hyperactivity disorder; Beauchaine et al., 2008; Riosa, McArthur, & Preyde, 2011). For example, dysfunction in the mesolimbic dopamine system has been found to be a core neural substrate of risk for all or most externalizing behaviors (Beauchaine et al., 2008). Given common biological risks, preventive interventions should not focus on single disorders but rather address risk for psychopathology across internalizing and externalizing spectra that lie in homotypically continuous pathways (Beauchaine et al., 2008). For example, preventive interventions for conduct disorder ideally should include modules for substance abuse prevention even if substance use has not been initiated. Heterotypic comorbidity also should be assessed and explicitly addressed in preventive interventions (Beauchaine et al., 2008). A recent meta-analysis demonstrated that interventions can have medium to large effects on comorbid disorders, although larger effects are generally found for homotypic (ES $d = 1.18$) than heterotypic ($d = 0.54$) comorbidity, especially when interventions are directed at specific disorders (Riosa et al., 2011).

One of the most frequently stated rationales for focusing on biological systems in the context of preventive interventions is the possibility of elucidating markers of biological vulnerability for the purpose of identifying those at highest risk and therefore in greatest need of intervention (Beauchaine et al., 2008; Ialongo et al., 2006). The concept of differential susceptibility has gained momentum over the last decade, emphasizing individual differences in susceptibility to environmental influence based on biological markers (e.g., genotype, reactivity to stress, endophenotype; Belsky & Pleuss, 2009; Ellis & Boyce, 2011). Extended to preventive intervention, this theory provides a rationale for why some individuals may be more (or less) responsive to an intervention than others. Utilizing multiple levels of assessment is important in preventive interventions to more fully understand who is most at risk and most in need of preventive intervention. Importantly, differential susceptibility theory recognizes that biology can function as either a risk or a protective factor and that it is equally important to understand both ends of this continuum (Belsky, Bakermans-Kranenburg, & van IJzendoorn, 2007; Belsky & Pluess, 2009; Ellis & Boyce, 2011). Current theory suggests that individuals scoring high on a given biological susceptibility marker may be more vulnerable to both positive and negative environmental contexts (Ellis & Boyce, 2011). Based on this understanding, it is plausible that those susceptible individuals in greatest need of intervention based on prior exposure to negative environmental contexts may also be the most responsive to interventions providing more favorable environments. A number of preventive interventions have demonstrated stronger effects for individuals at highest risk (e.g., Conduct Problems Prevention Research Group, 2011; Horowitz et al., 2007; Leflot et al., 2013; Petras et al., 2008; Stice et al., 2009; Webster-Stratton et al., 2008), which is consistent with this idea. Importantly, research on differential susceptibility has generally been conducted with Caucasian populations (van IJzendoorn, Belsky, & Bakermans-Kranenburg, 2012), thereby calling into question whether similar results would be obtained with more heterogeneous populations. Moreover, few studies have directly investigated differential susceptibility as a possible mechanism for this pattern of results. Consistent with capitalizing on RCTs to test theory, researchers should investigate biological measures as moderators of intervention response and examine the way preventive interventions may alter biology (Beauchaine et al., 2008; Belsky & van IJzendoorn, 2015; Ialongo et al., 2006).

The next subsections discuss four main domains of biological inquiry represented in the field of developmental psychopathology that are ripe for furthering our understanding of differential susceptibility and intervention effects at multiple levels of analysis. These four domains include genetics, endophenotypes, neuroimaging, and reactivity to stress.

Genetics

With the completion of the Human Genome Project in 2003, considerable enthusiasm and efforts have been invested over the last decade in identifying gene variants and molecular mechanisms involved in psychopathology. To date, the results from such efforts have yielded more questions than answers. More traditional approaches in behavioral genetics using twin and adoption designs have found considerable heritability across nearly all psychological traits, with estimates most often ranging from 40% to 60% (DeYoung & Clark, 2012). Heritability estimates of mental disorders, such as schizophrenia (70%–80%) and major depression (40%), are also quite substantial (DeYoung & Clark, 2012). Given these substantial heritability estimates, many researchers expected to be able to identify the specific genes associated with mental disorders relatively easily once it became possible to examine the entire human genome. However, the expectation that simple, direct paths from gene to disorder would be found has not been realized for complex mental disorders. Few linkage studies detect genes, many genome-wide association studies fail replication, and the few genetic effects that are replicated account for only a small amount of variance

(Kendler, 2011; Moffitt, Caspi, & Rutter, 2006). One explanation for these results is that most genes contributing to psychopathology are incompletely penetrant, meaning that individuals may not develop the disorder despite having the allele(s) associated with the condition. Incomplete penetrance can lead to small effects, multiple effects, effects that vary with genetic background or environmental exposure, and effects that vary over time and developmental level (Johnson, 2012). A focus on main effect associations between gene and disorder may also contribute to the small percentage of genetic variance accounted for in disorders. Gene × environment (G×E) interactions sometimes explain more variance in outcome than main effects (Beauchaine et al., 2008). For example, marked gene effects are commonly found within environmentally exposed subgroups (G×E interaction) when virtually no relationship exists between gene and outcome (main effect; Cicchetti, Rogosch, Sturge-Apple, & Toth, 2010; Moffitt et al., 2006). Considering these findings, it may be possible that some multifactorial disorders might result from relatively few genes whose effect sizes are conditional on exposure to specific environmental experiences rather than resulting from many genes of small effect (Moffitt et al., 2006). Explicitly measuring and modeling environmental factors in basic research and preventive intervention trials will be important in evaluating this possibility.

The slow progress in elucidating genetic contributions to psychopathology should not be a deterrent against incorporating genetics into the conceptualization and measurement of outcomes in preventive intervention trials. Research over the last decade has only emphasized the complexity of psychopathology and the importance of multiple levels of analysis in evaluating vulnerability to and protection against psychopathology. For example, several important contributions of gene variants on psychopathology would have been missed if environmental factors had not been considered and explicitly modeled (Moffitt et al., 2006). The molecular mechanisms from gene to protein to phenotype are complex and multifaceted. Multiple types of genetic information can be assessed, which may contribute to our understanding of psychopathology and its prevention. At the level of deoxyribonucleic acid (DNA), sequence variants can be examined ranging from single nucleotide bases to the full DNA sequence. Structural variation in the human genome can also take many forms, including long insertions, deletions, or inversions. Regulatory elements that control the process of DNA transcription (first step in gene expression: DNA → ribonucleic acid [RNA]) are receiving increasing attention given their role in determining which genes are expressed. The rapid growth in the area of epigenetics over the last decade has provided a deeper understanding of the molecular processes likely involved in some environmental impacts on gene expression. Various aspects of gene-environment interplay are also gaining considerable attention and show promise for furthering our understanding of trajectories of psychopathology and understanding who is most likely to benefit from which preventive interventions. Molecular mechanisms also can be examined at the level of RNA and gene products (i.e., proteins, enzymes, neurotransmitters), although this area has received less attention. This section discusses the potential advantages as well as challenges of incorporating measures of gene-environment interplay and epigenetics into preventive intervention trials since these mechanisms show the most promise in advancing our understanding of genetic effects in prevention.

Most complex human behavior arises from a combination of multiple interacting genetic and environmental influences (NRC & IOM, 2009). A single genetic variant or environmental risk factor will rarely be necessary or sufficient to produce a disorder (Beauchaine et al., 2008; NRC & IOM, 2009). For this reason, most researchers in the field of developmental psychopathology are focusing their efforts on understanding the interplay between genes and environment. The investigation of gene-environment interplay is a natural progression for prevention scientists since a main focus of prevention involves altering the environment or how a person interacts with the environment. Understanding how genetic variation increases vulnerability or resilience will improve underlying developmental theories and has the potential to lead to the development and delivery of more efficient and effective preventive interventions. Moreover, the identification of genetic moderation of intervention outcome has important implications for ascertaining which individuals are most likely to derive benefit from a given intervention (Cicchetti & Toth, 2015).

There are multiple types of gene-environment interplay. The most commonly recognized form is the G×E interaction. G×E occurs when two causal factors (i.e., genetic variant, environmental exposure) contribute to an outcome in the same individual, but neither factor is sufficient in itself to produce the outcome alone (Moffitt et al., 2006; Uher, 2011). The effect of each factor depends on the presence or absence of the other. Results from studies of G×E are relevant for preventive interventions since, by definition, altering either of the interacting factors (i.e., changing the environment of a person with the vulnerable genotype) can prevent the occurrence of the problem (Uher, 2011). In the future with sufficient research

evidence, it might be advantageous and cost effective to target interventions to individuals with previously identified vulnerable genotypes. Although G×E investigations are conceptually relevant for preventive interventions, detecting G×E statistically is contingent on the scale of measurement, the statistical model applied, the distribution of genetic variants and environmental exposures in the test population, and statistical power (Uher, 2011).

A number of concerns regarding G×E research have been raised. These include low replication rates, inflated Type I error, small sample sizes to detect interactions, improper handling of potential confounders, and publication bias (Duncan & Keller, 2011; Duncan, Pollastri, & Smoller, 2014; Keller, 2014). Recommendations also have been advanced that include prioritizing replication attempts, reporting all statistical tests conducted, adapting more stringent thresholds for statistical significance, and including covariate by environment and covariate by gene interaction terms in the same model as the G×E of interest (Duncan et al., 2014; Keller, 2014). In an effort to increase methodological rigor, Moffitt and colleagues (2006) provide a useful systematic stepwise approach for the study of G×E interactions.

As highlighted in the review of advances over the last decade, G×E analyses are beginning to be incorporated into prevention trials to examine moderators of intervention effects. Because RCTs are true experiments, they complement and extend findings from nonexperimental G×E investigations and have greater power to detect effects compared to correlational studies (Howe, Beach, & Brody, 2010). However, a number of challenges involved in incorporating genetic measurement in full-scale trials may pose difficulties to implementation. The most significant barriers include substantial costs of genetic assays and the sample size required to detect effects. One proposed alternative, or preliminary step, to conducting G×E investigations in full-scale RCTs is the use of microtrials (Howe et al., 2010). Microtrials are randomized experiments testing the effects of relatively brief and focused environmental manipulations (e.g., specific program components) designed to alter risk and protective mechanisms but not to bring about full prevention effects in distal outcomes. Microtrials can serve as a bridge between laboratory or nonexperimental studies and full-scale trials and provide efficient and cost-effective tests of whether and under what circumstances a risk or protective factor is a suitable candidate for targeting in larger-scale trials. In the context of G×E, participants would be genotyped, and analyses could determine if the effect of the environmental risk or protective factor on outcome is moderated by genetic variation. There will also likely be greater profit in studying how gene-environment combinations shape specific risk or protective mechanisms than searching for genetic main effect or G×E explanations for distal clinical outcomes (Howe et al., 2010). The malleability of risk or protective mechanisms also may vary by genotype, suggesting that interventions may need to be flexible to have maximal benefit.

Gene–environment correlation (rGE) is another important type of gene-environment interplay that is often overlooked or mistaken for G×E. A rGE occurs when a person's genotype influences, or is associated with, his or her exposure to environmental risk (Jaffee, 2011; Knafo & Jaffee, 2013; Moffitt et al., 2006). In rGE, the genetic effect operates through an indirect route by affecting some behaviors (e.g., personality traits) that in turn relate to or bring about the environmental risk and related outcome. There are three types of rGE: passive, evocative, and active (Jaffee, 2011; Knafo & Jaffee, 2013). Passive rGE refers to the association between the genotype a child inherits from parents and the environment in which he or she is raised. For example, the correlation between maltreatment and increased child aggression may reflect the transmission of antisocial behavior from the parents, which is moderately heritable. In evocative rGE, partially heritable traits or behaviors evoke reactions from others in the environment. For example, an introverted child may appear aloof to peers who in turn make fewer social overtures toward the child. In active rGE, individuals actively select or create environments that are in line with their genetic propensities, such as in the case where youth high in sensation seeking affiliate with drug-abusing peers. rGEs can be erroneously interpreted as G×E if careful experimental studies are not conducted. RCTs of preventive interventions are an ethical alternative to allow for relatively strong causal inferences and can help distinguish among rGE, G×E, and gene–gene interactions (i.e., epistasis) (Uher, 2011).

The rapidly advancing field of epigenetics is making it clear that DNA is not the static entity that it was once thought to be (Mill, 2011; NRC & IOM, 2009). Epigenetic processes play a dynamic role in regulating gene expression and are responsive to the environment (Bick et al., 2012; Mill, 2011; Roth, 2013). Epigenetic regulation of gene expression occurs independently of DNA sequence and operates primarily through changes in DNA methylation and chromatin structure (Mill, 2011; Roth, 2013). Chromatin is the term used to describe the DNA-protein complex that forms to package DNA into a smaller volume, prevent damage, and regulate expression and replication functions. For example, chromatin packaging

can be altered by a change in methylation to allow regulatory proteins to more easily access promoter regions in the DNA to facilitate gene expression. These processes can be reversible, such that methylation and chromatin folding can be reversed and promoter regions may become less accessible again. Although epigenetic changes can be reversed, they are often long lasting across the course of development; some can even be transmitted across generations (Roth, 2013). Epigenetic mechanisms may also shed light on the limited associations between gene mutations or predisposing polymorphisms and disorders. Even genes that do not carry mutations or increase risk of disease can be rendered harmful if they are not expressed in the appropriate amount in the correct type of cell at the correct time in development (Mill, 2011).

Research is accumulating in humans and animal models on a broad range of environmental exposures across the life span that are associated with epigenetic variation (Bick et al., 2012; Champagne, 2010; Monk, Spicer, & Champagne, 2012; Roth, 2013). For example, several epigenetic mechanisms have been proposed linking prenatal exposure to maternal stress and early infant outcomes (Monk et al., 2012; Roth, 2013). Changes in DNA methylation have also been documented in response to prenatal exposure to cigarettes or alcohol (Haycock, 2009; Knopic, Maccani, Francazio, & McGeary, 2012). Postnatal environmental exposures, such as the quality of mother and child interactions, may also lead to shifts in developmental trajectories (for better or worse) via epigenetic pathways. Research on early adversity, such as child maltreatment, stressful separations from caregivers, and living in impoverished environments, has found differential methylation patterns in human and animal models (Bick et al., 2012; Monk et al., 2012; Roth, 2013). Methylation patterns have also been linked to specific patterns of HPA axis activity, immune response, and physical and mental health outcomes (Bick et al., 2012; Roth, 2013). Aberrant patterns of methylation have been noted in a number of psychiatric disorders, including schizophrenia, PTSD, and mood disorders (Roth, 2013). These findings highlight ripe areas for future investigation that will advance our understanding of how biological processes respond to the environment and influence developmental trajectories.

Epigenetic mechanisms may be a realistic target for intervention due to their reversibility. Epigenetically informed preventive interventions can include methylation assays in their measurement batteries to evaluate the effects of the interventions on these mechanisms and refine theory. Methylation assays can be conducted genome-wide or at the level of specific regions of candidate genes with known functional properties, such as the glucocorticoid receptor gene (Bick et al., 2012). Tremblay (2008) provides several illustrative examples of study designs that incorporate the epigenetic level of measurement. For example, pregnant women who smoke could be randomly assigned to a preventive intervention aimed at smoking cessation and improving child outcomes in development and behavior. A reasonable hypothesis based on animal and human research demonstrating altered methylation could postulate that smoking during pregnancy has negative epigenetic effects on brain development that could lead to problems with self-regulation and aggression in the offspring's early childhood. An RCT of the program could test whether the program leads to changes in methylation at specific candidate genes, birth outcomes, and cognitive and behavioral development in the child across experimental and control groups. Epigenetics is a relatively new area of investigation, and prevention scientists are just beginning to consider epigenetic mechanisms within the context of understanding the efficacy of interventions on complex outcomes. We anticipate the next decade will bring forth growth in this area.

Endophenotypes

One of the critiques of the current nosology of psychopathology is that diagnostic categories (e.g., *DSM*) are not grounded in biology (Vrieze, Iacono, & McGue, 2012). Equifinality (multiple mechanisms can lead to the same phenotype) leads to considerable heterogeneity within diagnostic classifications, and symptoms overlap across disorders. These issues likely contribute to the difficulty in identifying disorder specific genetic variants. In an effort to address the complexity of linking genetic variation to psychopathology, researchers are attempting to identify endophenotypes, which are narrowly defined behaviors, characteristics, or biological markers that can be objectively quantified and correlate with specific disorders or phenotypes (NRC & IOM, 2009). Endophenotypes are heritable and share genetic variance with the clinical disorder but are etiologically less complex and less subjective to quantify (Iacono & Malone, 2011; Lenzenweger, 2013). Because endophenotypes are heritable, once established, they can be utilized to identify individuals at risk, which can facilitate the evaluation of preventive interventions and risk and protective factors on disorder trajectories. An example of an endophenotype is the amplitude of the P300 response of the visual event-related potential in substance use disorders. There is ample evidence that a reduced P300 amplitude is associated with the development of substance use disorders and related externalizing

psychopathology (Iacono & Malone, 2011). Prevention researchers could prospectively direct interventions toward individuals positive for a specific endophenotype and could study the mechanisms by which the intervention introduces protective factors to prevent the onset of the condition. The inclusion of identified endophenotypes in investigations of preventive interventions may also provide greater insight into the biological and genetic underpinnings of psychopathology. The limited research on endophenotypes for some specific disorders makes this approach difficult to implement. Additional basic research may be needed prior to incorporating endophenotypes into prevention evaluations.

Neuroimaging

Interest in the effects of preventive interventions on brain structure and function is growing. This interest is fueled by the recognition that the brain is plastic and can change in response to internal (e.g., physiological responses to stress, molecular cascades) and external (e.g., learning opportunities, environmental exposures) experiences (Whitten, 2013). Brain plasticity is complex and can occur on multiple levels, including molecular changes, cellular alterations, shaping of neuronal structures and interconnections, and reorganization of functions (Whitten, 2013). Researchers now understand that not only does behavior change when the brain changes but that behavior can induce further brain plasticity through feedback mechanisms (Whitten, 2013). Efficacious preventive interventions may be conceptualized as a method of inducing experience-dependent plasticity to divert maladaptation and promote resilient functioning (Cicchetti & Toth, 2009). Incorporating neuroimaging methodologies into trials of preventive interventions provides various avenues with which to visualize brain structure and function and further understand the complex interplay among brain, genes, environment, and behavior.

Neuroimaging techniques can be utilized in several ways in preventive intervention research. For example, neuroimaging endophenotypes may help identify individuals at risk for a disorder and an optimal population to target interventions (Clark et al., 2013; Glahn, Thompson, & Blangero, 2007). As discussed, such endophenotypes might yield causal links in the mechanisms underlying psychopathology and resilience and refine existing theories. Neuroimaging indicators also may demonstrate effects of preventive interventions (Clark et al., 2013). A number of treatment studies have demonstrated significant intervention effects on neuroimaging indicators, especially using functional magnetic resonance imaging (fMRI) (Beauregard, 2009; Linden, 2006; Porto et al., 2009). Neuroimaging indicators could also predict which individuals are most likely to respond favorably to interventions and serve as a marker of differential susceptibility. For example, alterations or delays in cerebral maturation or functioning might predict poorer response to intervention and could potentially lead to the use of neuroimaging to identify individuals who require more intensive or alternate prevention approaches (Clark et al., 2013).

There are several commonly utilized neuroimaging methods to assess structural and functional aspects of the brain. Structural MRI can be utilized to examine cerebral macrostructure, such as volumes (e.g., whole cerebrum, lobes, subcortical structures, delineated regions of interest), white/gray matter distributions, and cortical thickness among other novel applications. Previously, researchers manually traced structures or regions of interest for quantification, but now automatic cortical parcellation methods (e.g., Freesurfer; Desikan et al. 2006) are more commonly used. Automated methods have many advantages, including being more efficient, less labor intensive, and less costly. They also lead to reduced rater bias and error and require less training. Diffusion tensor imaging is another structural imaging technique that provides data on white matter microstructure and integrity by quantifying water diffusion. White matter integrity can be examined through several approaches, including specified regions of interest (e.g., corpus callosum), whole-brain voxel-based morphometry, and tractography. Voxel-based morphometry statistically compares integrity values for each voxel (smallest unit of imaging visualization, comparable to pixel in photography) to identify local patterns across individuals. Tractography uses three-dimensional modeling to represent the integrity of white matter tracts in the brain. The values per tract can be compared across groups to investigate structural connectivity. fMRI techniques examine brain activity typically during tasks designed to elicit specific mental functions. fMRI indicators are likely to be more sensitive to intervention effects compared to structural analyses. Structural and functional approaches can also be combined and can be collected sequentially in the same scanner.

The challenges associated with utilization of neuroimaging methods have likely hindered many investigators from incorporating them in prevention trials. The collection and analysis of imaging data can easily reach $1,000 per subject, which may be cost-prohibitive for many prevention trials. Access to appropriate scanner hardware and staff expertise also can be limiting factors, and scheduling participants can be complicated as multiple researchers and

clinicians typically share equipment. Recruitment of individuals also can be problematic if people have irremovable metal objects, have fears or problems with small spaces, or have difficulty remaining still for extended periods of time. However, despite these challenges, utilization of brain imaging techniques in evaluating the efficacy of preventive interventions holds considerable promise for advancing the field.

Stress/Allostatic Load

Preventive interventions often target individuals who have experienced considerable adversity or stress in their lives. Products of the physiological stress response, such as the steroid hormone cortisol, are important biological indicators that are useful complements to an individual's subjective response in understanding the development of psychopathology and response to intervention. Researchers have reformulated their conceptualization of the physiological stress response from a process called homeostasis to a model of allostasis (Ganzel & Morris, 2011). Homeostasis is the process of maintaining and reestablishing initial conditions of a system when it is perturbed. In allostasis, an individual accommodates to a current stressor by adjusting homeostatic set points to maintain internal stability rather than trying to return to the original homeostatic balance (Ganzel & Morris, 2011). Allostatic accommodation is a dynamic process. However, these same processes that help the body adapt to stress in the short term can lead to maladaptive functioning when overused or managed ineffectively, such as when an individual is confronted with a major stressor or sustained periods of stress (Cicchetti, 2011; Doom & Gunnar, 2013; Ganzel & Morris, 2011). The wear and tear on the body from this maladaptive process is called allostatic load.

Understanding the brain's role in allostasis can inform the design and timing of preventive interventions. Measurement of allostatic load most often occurs by assaying cortisol. However, the HPA axis and its product cortisol are peripheral sites in allostasis. The brain is the central mediator of allostasis and is therefore likely to be one of the first sites to show allostatic load (Ganzel & Morris, 2011). The brain regions most highly involved in allostasis include circuits related to emotion processing and executive control, such as portions of the amygdala, anterior cingulate, orbitofrontal cortex, hippocampus, and basal ganglia. These brain regions may be affected differently depending on the developmental stage(s) during which the stressor(s) occurs. Brain regions develop and mature at different rates, and stressors can lead to very different patterns of physiological wear and tear based on the onset and duration of stress relative to periods of greater or lesser vulnerability. Stress during especially vulnerable or sensitive periods of development can also impact later brain maturation by altering the neural systems on which later development is based. The brain circuits involved in allostasis and their associated functions are prime targets for preventive interventions aimed at ameliorating maladaptive stress responses and promoting resilience. Implementing preventive interventions during the developmental stages when these neural circuits are most plastic and amenable to change is likely to have the biggest impact. Consistent with this hypothesis, researchers have demonstrated that preventive interventions can normalize cortisol patterns for young children with histories of maltreatment (Cicchetti et al., 2011b; Dozier et al., 2006; Fisher et al., 2007), suggesting positive intervention effects on allostasis. Future research with individuals at various developmental stages and experiencing a range of stressful experiences will provide important information on the plasticity of these brain regions to intervention across the life span.

Multiple Ecological Levels

Bronfenbrenner's social ecological model (1979) has been one of the most widely referenced and instrumental models within developmental psychopathology. It has encouraged researchers to go beyond individual processes to consider a broader set of social and contextual factors (Causadias, 2013; Spencer & Swanson, 2013). Within Bronfenbrenner's model, the microsystem is considered the immediate physical and interpersonal surroundings of the individual (e.g., family, school), and the mesosystem encompasses the interactions between microsystems. The exosystem involves social structures and institutions (e.g., neighborhood, government, and social service agencies), and the macrosystem represents the culture, history, and laws of the broader society in which an individual lives. Although some factors at multiple ecological levels are generally considered in conceptualizing the design of preventive interventions, the actual measurement of these factors is not yet used to its full advantage in intervention trials. In this section, we discuss challenges and current directions in measuring risk and protective factors at multiple ecological levels as well as highlight efforts to integrate analyses across multiple levels via the concept of developmental cascades.

Microsystems and Mesosystems

Many preventive interventions are designed to target factors at the micro- and mesosystems level to facilitate

change for an individual. However, measurement and analysis at these levels are often cursory at best or inferred from individual outcomes. Many studies that include measures at the microsystem level examine a single construct in isolation as a moderator of intervention efficacy. Occasionally a study examines the relative influences of multiple microsystems (e.g., Multisite Violence Prevention Project, 2012), but higher-level interactions or more complex modeling are rarely undertaken. More innovative measures and analytic approaches are needed to better capture influences at these levels.

Social network analysis is an innovative method that can model interpersonal systems and their possible influences on individuals within the system (Gest, Osgood, Feinberg, Bierman, & Moody, 2011). Unlike other approaches, social network analysis accounts for the interdependencies of social interactions and network data. Two approaches to examining social network data are most relevant for prevention science: the structural patterns of social ties and the behavioral dynamics of social networks. Structural patterns of social ties can be examined by having individuals belonging to a system (e.g., school, group, office) nominate others based on a social characteristic (i.e., friendship, whom they look up to). Social patterns can then be visualized using specialized software and summarized by variables such as the density of connectedness, reciprocity of nominations, and presence of hierarchical relationships, among others. Social network analysis can also be utilized to examine the behavioral dynamics of social networks. For example, social norms favoring a behavior can be inferred from the frequency of individuals displaying the behavior who are nominated by others. Individuals who are selected frequently and have high centrality in the network are likely to have a strong influence on behavioral norms (Gest et al., 2011).

Social network analysis may be a particularly relevant technique for preventive interventions delivered within schools or other existing social groups. Often these types of programs aim to modify the social dynamics through either explicit (e.g., social skills curriculum, modify school culture) or implicit (e.g., altering behavioral norms) approaches (Gest et al., 2011). Social network analysis could be utilized to study whether preventive interventions lead to changes in the patterns or behavioral dynamics of individuals in the system (e.g., reduce peer rejection, positive peer models increase influence). Although there are many benefits of social network analyses in understanding social dynamics, this method is difficult to apply when the researcher is not working within a system (e.g., schools, organizations, groups) and does not have access to other individuals who interact socially with participants (i.e., for nomination purposes).

Exosystems and Macrosystems

Influences of the exosystem and macrosystem have received limited attention in the design and evaluation of preventive intervention (Causadias, 2013; DiClemente, Salazar, & Crosby, 2007; El-Bassel, Calderia, Ruglass, & Gilbert, 2009). Researchers recognize the strong influences that factors such as neighborhood violence, distrust in social institutions, and cultural norms can have on individuals' developmental trajectories. However, operationalizing and measuring these factors in meaningful ways can be difficult. These factors also tend to be considered more distal determinants of outcomes when compared to other factors in the micro- and mesosystems that are viewed as more proximal to adaptation and maladaptation. With limited resources and power to detect complex effects, exo- and macrosystem variables often receive less priority and attention in their roles in prevention.

The last decade has witnessed increased attention to the role of culture in developmental psychopathology, and new models are emerging that question the appropriateness of conceptualizing culture solely within the macrosystem (Causadias, 2013; Spencer & Swanson, 2013). Culture is commonly defined as the integrated constellation of practices (e.g., competences, ideas, norms, scripts, tools, rules, goals, institutions) that is socially constructed, transmitted, and constantly renegotiated by the community and its members (Causadias, 2013; Kitayama & Uskul, 2011). This definition focuses on the social-level aspects of culture. Causadias aptly argues that culture also functions on the individual level. Culture serves as an organizing influence on development and is a normative process. Early socialization leads to the progressive consolidation of a cultural self, which is subject to change and continuity over time. By considering culture only as part of a broader distal context, as is common in investigations based on Bronfenbrenner's model, the proximal influences of social-level culture factors and an individual's cultural developmental trajectory may be neglected (Causadias, 2013). Alternate models have been proposed that conceptualize the pervasiveness of culture throughout systems (Juang, Syed, Cookston, Wang, & Kim, 2012; Spencer & Swanson, 2013). For example, Juang and colleagues (2012) viewed culture as central and exerting its influence on the levels of self, family, and value systems. Spencer's phenomenological variant of ecological systems theory (Spencer, Dupree, & Hartmann, 1997; Spencer & Swanson, 2013) focuses on the dynamic and bidirectional processes between individuals' perceptions of

their environment and development and views culture as ingrained in multiple levels of context. Within this model, individuals are viewed as engaging "in a life course process of unavoidable stage specific appraisal processes, series of environmental challenges (e.g., risks and stress) that are linked to diverse sociocultural contexts (e.g., expectations, attitudes, cultural beliefs and assumptions), and normative developmental tasks" (Spencer et al., 1997, p. 820). These alternate models represent important contributions to the field and provide useful guidance for incorporating a more nuanced and accurate modeling of cultural processes in prevention. Efforts should be undertaken to continue to evaluate and test such models.

Advances in conceptualizing culture highlight the need for multilevel assessment of individual and social levels of cultural processes. At the individual level, an appropriate multi-informant approach could include self-reports (e.g., cultural identity, acculturation), naturalistic observations, behavioral Q-sort methods or checklists, and qualitative methods (Causadias, 2013). Assessing cultural cognitions and behaviors is advantageous, as what individuals think is not always consistent with how they behave. Unfortunately, culture is often cursorily assessed in terms of racial or ethnic group identity. It is unrealistic for researchers to expect that existing instruments will adequately capture an individual's cultural self. For this reason, qualitative and mixed-methods studies may provide particularly useful insights into the influences of culture, since they allow participants to expand on their responses and elaborate the specific and local processes unique to their experiences. Measuring culture longitudinally is also important since continuity and discontinuity are expected in the process of cultural development (Causadias, 2013).

The measurement of social-level culture is more difficult and complex. Some studies have employed self-reports to examine social-level culture, but these reports are often inadequate to capture the intricacies involved in social processes. Disciplines such as anthropology, sociology, and political sciences have strong traditions in measuring complex social processes, such as culture. However, theoretical models and methodologies from these disciplines are quite distinct from those often used in prevention science, which makes integration or multidisciplinary approaches challenging. Measuring social-level cultural variables in preventive interventions represents an area for needed growth over the next decade.

Although additional work is necessary to measure culture at multiple ecological levels, researchers are increasingly considering the influences of culture in the design or adaptation of preventive interventions. The 2010 census data indicated that more than half of the 27.3 million increase in the U.S. population between 2000 and 2010 was attributed to the growth of the Hispanic population (Humes, Jones, & Ramirez, 2011), underscoring the need for the provision of culturally sensitive preventive interventions in the United States. Consistent with this change in the population composition, there has been an emphasis since the turn of the century on examining the feasibility and efficacy of adapting and applying preventive interventions to diverse cultural groups (e.g., D'Angelo et al., 2009; Dumas, Arriaga, Begle, & Longoria, 2010; Martinez & Eddy, 2005; Toth et al., 2013) as well as identifying variables that predict the retention of racially and ethnically diverse participants in preventive intervention trials (e.g., Coatsworth, Duncan, Pantin, & Szapocznik, 2006a, 2006b). Importantly, several of the interventions described in this chapter have been applied to, adapted or developed for diverse populations, including CPP, IPT, Fast Track, SAAF, and PRP. However, more systematic programs of research are needed on this topic as cultural adaptations of mainstream interventions do not always yield positive results (Kumpfer, Alvarado, Smith, & Bellamy, 2002). Barrera, Castro, and Steiker (2011) offered four approaches to the development of preventive interventions with diverse cultural groups. The first is through application of evidence-based preventive interventions to diverse cultural groups, in which cultural adaptations are not specifically made. The second approach takes the first a step further, and specific cultural adaptations of evidence-based interventions are made. In the next approach, consumers play a key role in the development of culturally sensitive interventions initiated by an investigator, so that the intervention is based around the culture rather than having surface-level changes made, as in the second approach (Barrera et al., 2011). The final approach is both community initiated and implemented. Given the increasingly diverse U.S. population, we advocate that new interventions should be culturally informed from inception and include diverse samples in initial efficacy studies, consistent with Barrera and colleagues' third-level approach. Accordingly, collaborations with community stakeholders during the development stage and long-term investment in nurturing community relations are paramount. Such efforts should include long-term implementation of interventions in the communities that play a role in intervention development and evaluation.

Developmental Cascades

Conceptualizing and evaluating models with risk and protective factors at multiple levels of analysis and multiple

ecological levels across a system is complex and challenging. The concept of developmental cascades can provide prevention researchers with a theoretically oriented guide with which to integrate the effects of risk and protective factors within and across levels. The term developmental cascades refers to the cumulative consequences of the many interactions and transactions occurring in developing systems that result in spreading effects across levels, among domains at the same level, and across different systems or generations (Masten & Cicchetti, 2010). Cascade models may be particularly relevant for understanding the development and prevention of psychopathology, given that many forms of psychopathology have complex, multifactor etiologies that accumulate over time. Rather than focusing solely on effects on isolated risk and protective factors, preventive interventions can be conceptualized as interrupting negative or promoting positive developmental cascades (Masten & Cicchetti, 2010). Cascades emphasize the continuity in development and can aid researchers in conceptualizing how interventions can be most optimally developed to promote reorganization of person-context systems (Cox, Mills-Koonce, Propper, & Gariepy, 2010). Early person-context systems affect the possibility of later reorganization, and intervention developers need to consider which strategies are likely to promote reorganization and at what point in development they would be most effective.

Developmental cascade models are inherently more complex than the basic mechanistic models focusing on one or a few risk or protective factors that are most commonly examined in the context of preventive interventions. Researchers utilizing cascade models face a number of challenges (Cox et al., 2010; Masten & Cicchetti, 2010). Cascade models require longitudinal data with repeated assessment of multiple domains or levels of function over time. These types of data require not only a significant investment of research funds and participants' time but also they can be difficult and time-consuming to collect. Missing data and subject retention also are major challenges. Multilevel data often involve domains in which a single investigator does not have expertise. Thus, such complex models typically require multidisciplinary collaborations. Without additional expertise, researchers may not conceptualize or include critical processes that involve phenomena at other levels (e.g., neighborhood, community, and cultural levels). Complex statistical approaches are also typically required to analyze multilevel longitudinal data. Other challenges include being able to demonstrate cascade effects. For example, if continuity and covariance of key measures are not controlled, it is difficult to establish if there is a unique effect on one domain on another over time (Cox et al., 2010; Masten & Cicchetti, 2010). A cascade effect also can be obscured by close waves of data collection, which may result in high correlations among variables (Masten & Cicchetti, 2010). Since cascades are inherently longitudinal, newly emerging domains of function (e.g., executive functioning) or organization can emerge, which can be difficult to link with prior functioning. Despite these challenges, Masten and Cicchetti concluded that "the most convincing evidence of a cascade effect will be based on experiments with random assignment to intervention that are designed to produce a particular cascade sequence" (p. 493).

Summary

As basic research has advanced our understanding of the complex interplay of multilevel risk and protective factors contributing to adaptive and maladaptive trajectories across the life span, prevention researchers have grappled with how to integrate and translate these findings into efficacious interventions. Conceptualizing the complexity involved in preventing complex and multidetermined phenomena is quite challenging. The developmental psychopathology perspective has directed researchers to consider the interplay of risk and protective factors at multiple ecological levels and to analyze effects at multiple levels of analysis. Initiatives derived from the developmental psychopathology perspective have led to important contributions to our understanding of the mechanisms involved in prevention. Given theoretical and methodological advances, the field is poised to continue to progress in this direction. Over the last decade, the biological levels of analysis, particularly genetic methods, have been gaining attention in the field. Prevention scientists have increased their use of biological measures in rigorous RCTs of intervention programs, but these investigations remain in the minority. Costs associated with the incorporation of biological levels of analyses into RCTs and the need for expertise that may not be easily accessible to prevention researchers continue to pose challenges to the conduct of multilevel RCTs. Researchers would benefit from a greater emphasis on the biological bases of behavior and genetics during their training. In addition to a likely increase in the number of investigations incorporating the biological level of analysis, such training would enable researchers to better understand and communicate results and would facilitate more effective multidisciplinary collaborations.

Preventive interventions are often focused at the individual level in terms of design and evaluation (DiClemente

et al., 2007). Broadening the design of interventions to target multiple ecological levels may lead to more lasting behavioral change (DiClemente et al., 2007; El-Bassel et al., 2009). The field will also benefit from an increase in RCTs that incorporate more complex modeling of multiple ecological levels and their transactions. The concept of developmental cascades may prove particularly useful in this regard. With these efforts to conceptualize and evaluate preventive interventions in the context of greater complexity come practical challenges. For example, researchers will need to strike a balance between assessing a large number of multilevel constructs and developing an assessment battery that is feasible and acceptable to participants. Multidisciplinary investigations also can be quite costly both in terms of personnel and materials. Larger samples are often needed to utilize complex modeling approaches or to detect effects at certain levels of analysis. Despite these challenges, it is imperative that such initiatives be undertaken and that increasingly sophisticated methodologies be incorporated into RCTs if the field of prevention science is to keep pace with basic research advances being made in understanding the origins and course of psychopathology.

METHODOLOGICAL CONSIDERATIONS AND CHALLENGES

In this section, we consider challenges and advances in translating developmental theory into preventive interventions as well as highlight areas for continued growth. Specifically, we begin with a discussion of challenges and new directions in the design of intervention trials. We also address conceptualizing and refining measurement of intervention outcomes and processes. Topics include how intervention success is operationalized and strategies for optimizing measurement. Complexities and recent developments in methods for evaluating intervention trials are also critically reviewed, including discussions of assessing how interventions work (mediation analyses) and for whom they are most effective (subgroup analyses) as well as systems science, person-centered methods, and qualitative analyses. The final theme encompasses complications associated with implementing and evaluating preventive interventions, such as noncompliance, selection bias, informant discrepancies, sample size, and power issues.

Designing Trials to Test Theory

Unfortunately, many evaluations of preventive interventions are inadequately designed to test theory, and many of our traditional analytic tools are not well engineered to handle the type of theoretical complexity involved in systems (Ialongo et al., 2006; Lich et al., 2013; Marshall, 2013). The interplay of preventive interventions and developmental theory can and should be bidirectional (Ialongo et al., 2006; Toth et al., 2011). Well-designed scientific evaluations of preventive interventions can test theory in an experimental design, which may otherwise not be possible to determine causality. For example, researchers obviously cannot randomly assign which families maltreat their children, but they can randomly assign families at high risk for maltreatment to a preventive intervention designed to alter relational processes and can then determine whether the hypothesized mechanisms of action of the intervention are effective at preventing maltreatment in these families relative to families randomized to a comparison group. As a true experiment in modifying the developmental course, preventive interventions can provide insight into the etiology and processes involved in psychopathology and can subsequently affirm, challenge, or refine existing developmental theory (Cicchetti & Toth, 2009). The benefit of well-designed preventive intervention trials is likely to lead to more rapid advances in our knowledge of etiology and change processes more quickly than has been garnered through traditional longitudinal studies (Tremblay, 2008).

Although RCTs are the gold standard design with which to test the efficacy and underlying mechanisms of a preventive intervention, establishing pre-intervention equivalence of conditions is necessary to draw inferences about the causality of intervention effects. Randomization ensures that systematic differences do not exist between conditions on measured or unobserved variables and that group differences are due to chance alone. Significant group differences due to chance are less likely to occur as sample size increases. Depending on the intervention and research question, randomization can occur at the individual or the cluster level.

Cluster randomization is often used in preventive intervention designs when programs are implemented within systems such as schools, communities, or organizations. Cluster randomization results in multilevel data with individuals nested within clusters. A primary advantage of cluster-randomized designs is that contamination between intervention and control groups is limited since clusters are less likely to associate with other clusters. A disadvantage of cluster randomization is establishing baseline equivalence of groups (Graham et al., 2013; Vuchinich, Flay, Aber, & Bickman, 2012). Random assignment is likely to work to produce pretest equivalence only when a sufficiently large number of units are assigned to each

group. Cluster randomization typically results in a relatively small number of clusters available for randomization, which increases the likelihood that pre-intervention equivalence will not be achieved. Several approaches have been suggested to reduce the likelihood of this problem (Graham et al., 2013). Simple matching strategies can be used to increase comparability across groups. Although this strategy achieves comparability on variables used for matching, it does not necessarily lead to equivalence on variables not included. In addition, simple matching violates randomization and is typically viewed as less rigorous. Stratified random sampling is another option in which clusters are stratified on one or more variables and then randomly assigned within strata. Pre-intervention equivalence is more likely to occur on variables involved in stratification, but equivalence on unmeasured variables is also likely within a certain probability. Graham and colleagues (2013) advocated an approach to further increase the likelihood of pre-intervention equivalence, which involves creating a single stratifying composite based on multiple relevant variables. For example, in a comparative cluster-randomized trial of the rural adaptation versus the original version of the Keeping It Real program in the prevention of substance use in adolescents, the researchers created a composite score for each school based on seven school-level variables. They also had access to school-wide drug use data for some schools and applied missing data procedures to estimate scores to include this variable in the stratifying composite. This approach greatly enhanced the pre-intervention equivalence of groups.

Another important consideration in designing trials to adequately test preventive interventions is determining the optimal comparison condition(s). In the simplest form, a fairly homogenous sample is selected from a well-defined population of interest; half are randomly assigned to receive the preventive intervention, and the other half are assigned to a no-intervention condition. However, a no-intervention comparison condition is not always possible or preferable due to ethical constraints and the nature of the research questions. Comparing the efficacy of two interventions with different underlying theoretical mechanisms is a powerful design, although more complex. For example, in the previously described intervention for infants in maltreating families, the two active interventions differed with respect to their underlying conceptualizations (attachment theory versus parent skills training). This study demonstrates the benefits of including another group that differs from trial participants on risk level for the target behavior to allow further tests of theory (Stronach, Toth, Rogosch, & Cicchetti, 2013). Utilization of an enhanced treatment-as-usual condition, wherein individuals do not receive the evidence-based intervention but rather are assisted in accessing typically available services, also addresses ethical concerns related to withholding treatment.

Studies employing adaptive interventions are also beginning to emerge in the literature and show great promise in achieving more tailored and cost-effective preventive interventions. Adaptive interventions recognize that people vary in the intensity of intervention needed to prevent a given problem. For example, an RCT to prevent child maltreatment in economically disadvantaged mothers who had their first child before age 21 is currently under way at Mt. Hope Family Center (Paradis et al., 2013). The Building Healthy Children program offers an array of evidence-based services that are delivered in accord with need. All mothers receive outreach to assist with basic needs as well as the Parents as Teachers program (Wagner & Spiker, 2001) to provide parent skills training and developmental guidance; CPP to foster secure attachment and interpersonal psychotherapy for depression are provided if these are areas of need. Although appealing from a clinical perspective, adaptive interventions can be particularly challenging to analyze since individuals are receiving different levels or combinations of interventions.

An optimal design strategy that addresses these challenges is the Sequential Multiple Assignment Randomized Trial (SMART; Almirall, Compton, Gunlicks-Stoessel, Duan, & Murphy, 2012; Collins, Murphy, & Bierman, 2004; Dawson & Lavori, 2012; Murphy, 2005; Lei et al., 2012). In a SMART design, there is a separate stage for each critical decision involved in the adaptive intervention. At each stage, all participants are randomized to a treatment option. This approach tests multiple adaptive interventions within the same trial and allows researchers to identify tailoring variables (e.g., early signs of nonresponse, environment or social characteristics) and develop decision rules based on empirical data rather than a priori decisions. SMART also can provide data on the optimal sequence of intervention components or strategies. Almirall and colleagues (2012) offer a useful illustration of employing a SMART design to a pilot study to inform a large-scale SMART intervention.

The duration of longitudinal follow-ups, although improving, continues to be a challenge in the field of prevention science. Many preventive interventions target risk and protective processes early in development to prevent later adverse outcomes in adolescence and adulthood. However, many trials are not continued long enough

to fully evaluate prevention effects through the targeted developmental window. Thus, we may have good evidence that a program increases positive adaptation for the child or family over the short term (usually 6 months to 1 year), but we often do not know whether these effects are sustained and if they alter the course of later developmental processes. Some notable programs, such as Fast Track (Dodge & Goodwin, 2013), the Perry Preschool Program (Parks, 2000), the NFP (Olds et al., 1997), and the NBP (Wolchik et al., 2013) have successfully followed samples from childhood through adulthood. Most prevention scientists recognize the value of long-term longitudinal follow-ups, but many barriers exist that interfere with their successful completion. One such barrier is obtaining adequate funding to conduct long-term follow-ups. Sample retention also can be difficult, especially with high-risk, mobile populations. For some selective and indicated interventions, ethical constraints may limit researchers' ability to follow the comparison group long term without provision of services. Without this comparison group, it is difficult to determine if the intervention had an effect over time (i.e., no change in the intervention group versus increase in symptoms in the control group; both groups have similar decrease/increase in symptoms).

Refining Measurement

Another important challenge in prevention research pertains to how to best conceptualize the measurement of preventive intervention success. This issue is becoming increasingly complicated as preventive interventions tend to be more comprehensive, multilevel, and multicomponent. Several questions are important to consider: What is the most important indicator of efficacy given the goals of the preventive intervention, and what is the best way to measure it? Should outcomes be assessed in terms of diagnosis, level of functioning, or overall quality of life? Who is the focus of outcome measurement (e.g., parent, child, teacher)? Unfortunately, there are no easy answers to these critical questions. Many important outcomes can be measured only indirectly (e.g., internal states in a child), and exclusive reliance on these types of measures may fail to do justice to complex cognitive, behavioral, and physiological processes (Fonagy, Target, Cottrell, Phillips, & Kurtz, 2002). Some other constructs are inherently unmeasurable or poorly defined (e.g., childhood quality of life). Even for those constructs that can be measured directly and reasonably well, inconsistencies across reporters are common and can be difficult to interpret (De Los Reyes, Thomas, Goodman, & Kundey, 2013).

Preventive interventions largely focus on preventing the onset or reducing the severity of a target problem, and thus it is not surprising that most trials focus on quantifying results at the diagnostic or symptom level (e.g., presence/severity of depression, incarceration rates, teen pregnancy). Numerous instruments (both categorical and dimensional) are readily available with adequate psychometric properties with which to assess intervention success at the diagnostic/symptom level. However, as discussed earlier in this chapter, symptoms alone are not the sole or even most important criterion of intervention effectiveness for an individual. For example, parents may report minimal decline in child behavioral symptoms following a preventive intervention but may experience a greater sense of parenting self-efficacy, reduced stress, and higher social support, which may be more meaningful in terms of their overall functioning. Another problem is that reports of symptomatology can vary by reporter, which results in interpretation difficulties. It is common for reports of child functioning to differ between teachers and parents, with parent but not teacher report most often suggesting intervention efficacy. Interpretation in this scenario can become particularly problematic when parents are involved in the intervention program.

An individual's level of adaptation is conceptually a more relevant indicator of intervention success than the presence of the problem or level of symptoms as it takes into account an individual's overall level of functioning across domains. For example, Masten, Burt, and Coatsworth (2006) described a number of developmental tasks in the definition of competence for various developmental stages. Adolescent competence, for instance, includes: (1) attending and behaving appropriately at school; (2) completing a course of secondary schooling; (3) getting along with peers in school; (4) maintaining close friendships; and (5) obeying the laws of the society. However, measuring the level of adaptation can be difficult in practice. Although there are adequate measures of some aspects of adaptation, measures of overall adaptation (e.g., Children's Global Assessment Scale) often have poor inter-rater reliability and may differ substantially depending on the expertise of the evaluator (Fonagy et al., 2002; Lundh, Kowalski, Sundberg, Gumpert, & Landén, 2010). One reason overall measures of adaptation may be so poor is that unevenness across dimensions of adaptation is common, and summarizing across these domains can be subjective (Fonagy et al., 2002). Some research suggests that this unevenness is particularly characteristic of clinical populations and may be a risk factor for later pathology (Fonagy et al., 2002). Multidimensional measurement of

adaptation may be preferable conceptually, although it can be difficult to integrate in analyses practically.

An important outcome measurement that is receiving increasing attention is the underlying mechanism, or mediational process, by which the intervention exerted change. Consistent with the discussion of theoretical foundations, an adequate demonstration of efficacy should include a measurable change in the theorized underlying mechanisms (MacKinnon, 2008). The transactional level of measurement is also relevant in assessing intervention efficacy. Contextual influences on an individual's functioning include parents, family relationships, characteristics of the community and the school or workplace, as well as more general cultural factors (Fonagy et al., 2002). Many preventive interventions aim for change at the level of transactional processes. However, these changes are not always directly assessed and are instead inferred from a decrease or delayed onset of the target problem in the intervention group. Both mechanistic and transactional levels of measurement require a greater sophistication in trial design and statistical analysis, as discussed previously.

A developmental psychopathology perspective (Cicchetti & Toth, 2008; Fonagy et al., 2002) highlights the criticality that the evaluation of intervention efficacy should occur in diverse developmental domains (i.e., diagnosis, level of adaptation, mechanism, transactional, psychological, social, psychophysiological). Beyond the theoretical benefit of understanding the interrelationship of these domains of functioning within the context of the intervention, outcome evaluation within multiple domains reduces the likelihood that the overall impact of a preventive intervention will be erroneously identified as effective or ineffective based on a single domain or measure. However, interpretation can become quite difficult when effects are found on some measures but not on others, especially when there are multiple measures of the same construct. Researchers invested in designing and evaluating interventions need to be especially cautious about overemphasizing significant effects and downplaying nonsignificant ones in these cases. Many researchers have grappled with how to integrate outcome data across measures and domains, but no agreed-on methods are routinely used.

Observational measures are appealing to researchers in terms of being able to measure behavior in more naturalistic settings. Synder and colleagues (2006) argued that behavioral observation may be an especially powerful tool for evaluating the training of the intervention agent (or individual responsible for delivering the intervention), the delivery of the intervention by the agent, and the response of the participant to the intervention. However, observational measures are subject to multiple sources of error that can reduce reliability. Specifically, error sources may be attributable to stable or temporary characteristics of the rater, setting, or interactions between the setting and observed individual(s) (Mashburn, Downer, Rivers, Brackett, & Martinez, 2013; Synder et al., 2006). Understanding these sources of error and adopting data collection procedures that reduce them can improve the reliability of the measure and precision of intervention effects estimated. In an innovative study, Mashburn and colleagues (2013) explicitly modeled and tested various sources of measurement error and compared how various data collection procedures affected power and study costs. Specifically, guided by generalizability theory, they utilized pilot data from an observational measure of teacher-student interactions called the Classroom Assessment Scoring System (CLASS) to optimize the most reliable and cost-effective scenario for measurement in the full-scale study. After quantifying seven sources of error variance, they compared nine scenarios with varying data collection parameters known to affect reliability in the study context, including the number of raters who observed each occasion, the number of days each classroom was observed, and the number of occasions ratings were made each day. Reliability estimates across the nine scenarios ranged from 0.44 to 0.89. Power calculations also were undertaken to illustrate the number of schools needed to achieve a given level of power based on reliability scenarios. The implications of reliability for study costs were especially illuminating, with cost estimates ranging from $4,896 (reliability = 0.48, 102 schools, 3 classrooms per school, 1 day, 2 occasions per day, 1 rater per occasion) to $49,152 (reliability = 0.84, 64 schools, 3 classrooms per school, 4 separate days, 2 occasions per day, 4 raters per occasion). However, the cost savings associated with the lower reliability scenario were greatly surpassed by increased costs associated with the higher intervention costs due to the number of schools needed to achieve adequate power, resulting in a 33% greater total cost than the scenario with greater data collection costs. Considering all of these factors prior to implementing an efficacy study can help researchers optimize measurement and power to detect effects and balance trade-offs among costs.

Evaluating Intervention Trials

The field is evolving from focusing on omnibus pre-post intervention effects to gaining a more nuanced understanding of how interventions work (mediation analyses), whom they work for (subgroup analyses), and whether they

work the same way for different subgroups (moderation of the mediated effect). Moreover, questions such as when interventions are most effective (developmental timing) and how long effects last are also gaining much-deserved consideration. Of these approaches, subgroup analyses have garnered the greatest attention over the last decade (Farrell, Henry, & Bettencourt, 2013; Ialongo et al., 2006; Supplee, Kelly, MacKinnon, & Barofsky, 2013).

Subgroup Analyses

Subgroup analyses aim to answer the question "What works for whom?" Subgroups can be differentiated by baseline status on a host of variables ranging from relatively straightforward ones (i.e., gender, age, geographic region) to complex ones (i.e., risk status, combinations of characteristics; Bloom & Michalopoulos, 2013). Researchers often rely on subgroup analyses to unpack significant main effects of the intervention program or investigate possible sources for nonsignificant main effects (Supplee et al., 2013). These analyses allow prevention scientists to explore whether a program was more or less effective for a portion of the target population. The results of such analyses are critical for understanding the generalizability of findings. For example, it is important to know if interventions are effective for a broad range of groups or if effects are more circumscribed to specific subgroups of the population. One common moderator of preventive intervention effects is baseline pre-intervention functioning. A number of well-designed preventive interventions have shown individuals with poorer functioning at baseline benefited more from the preventive intervention compared to individuals with more adaptive baseline functioning (e.g., Fritz et al., 2005; Gonzales et al., 2012; Wilson, Lipsey, & Derzon, 2003; Wolchik et al., 2000).

Subgroup analyses are also very useful for informing policy and implementation decisions. Resources are limited, and subgroup findings can help guide policymakers in selecting interventions most effective for the target population. Results from subgroup analyses can also guide the development of new interventions and provide directions for adapting or modifying existing programs to better meet the needs of specific subgroups (Fairchild & MacKinnon, 2014; Farrell et al., 2013). Given the potential benefits of subgroup analyses for understanding generalizability and guiding funding and public policy decisions, the Society for Prevention Science incorporated guidelines for examining the consistency of intervention effects across subgroups into its Standards of Evidence for Identifying Effective Interventions (Flay et al., 2005). These standards recommend that researchers conduct subgroup analyses on heterogenous samples with respect to variables such as age, gender, race/ethnicity, and risk levels (Farrell et al., 2013; Flay et al., 2005). Routine examination of subgroup effects on these variables across adequately designed trials would facilitate comparisons among preventive interventions and inform policy decisions.

Although investigating subgroups can serve several important functions, appropriately conducting subgroup analyses is not without significant methodological challenges (Fairchild & MacKinnon, 2014; Lanza & Rhoades, 2013; Supplee et al., 2013; Wang & Ware, 2013). One of the major challenges inherent to subgroup analyses is that researchers often consider them secondary or exploratory and test for moderation only when the overall main effects of the intervention do not reach statistical significance. This approach can lead to biases and misleading findings when studies are not optimally designed to conduct tests of moderation (Bloom & Michalopoulos, 2013; Rothman, 2013). Placing the emphasis on confirming a priori hypotheses about intervention moderators versus conducting exploratory post hoc analyses reduces bias and strengthens the rigor of the study. Ideally, researchers should plan for subgroup analyses during the initial conception and design of the study, thus ensuring adequate measurement and statistical power to detect interaction effects (Bloom & Michalopoulous, 2013; Fairchild et al., 2014; Farrell et al., 2013; Rothman, 2013; Supplee et al., 2013; Wang & Ware, 2013).

Greater incorporation of theory into intervention designs also will likely expand the types of moderators examined in subgroup analyses. For example, the majority of subgroup effects examined in the literature focus on individual demographic differences and baseline levels of the target behavior (Bloom & Michalopoulous, 2013; Farrell et al., 2013). The use of social-ecological theory and intervention logic models in developing a priori hypotheses about subgroup differences may highlight the influence of broader contextual factors (e.g., school factors, community violence, cultural norms, poverty) on intervention outcomes than is usually considered. Qualitative research studies are also valuable sources for generating hypotheses about possible subgroup moderators. As discussed later in this section, researchers also can focus on the interplay between mediators and moderators, which can provide a framework that can facilitate integration of evidence across multiple moderating factors (Rothman, 2013).

By considering potential moderators of treatment during the design of the study, researchers can guide their sampling and randomization plans to ensure sufficient representation of the hypothesized subgroups within the

overall sample (Bloom & Michalopoulos, 2013; Fairchild & MacKinnon, 2014; Farrell et al., 2013; Wang & Ware, 2013). Stratified randomization of treatment assignments may be an optimal approach to achieve this goal (Wang & Ware, 2013). Restricted range on a selected moderator is another problem that can be addressed by considering subgroup analyses during the design phase of the intervention study (Farrell et al., 2013). In addition to ensuring sufficient numbers of individuals per subgroup, researchers can consider strategies to sample individuals across a broader range of the moderator and also ensure that measures of the moderator allow for sufficient assessment of the construct.

As mentioned, another important design element when planning subgroup analyses is ensuring adequate statistical power to detect interactive effects. Because small effect sizes are common in social sciences, the power to detect interaction effects is often low. Many intervention trials are statistically underpowered to detect subgroup effects, which may be a consequence of not considering subgroup analyses in the design of the study as well as funding, resource, and time constraints (Brown et al., 2013; Supplee et al., 2013; Wang & Ware, 2013). Most researchers utilize power analyses to determine the sample size needed to detect intervention main effects. However, at least four times the sample size is needed to detect the same size effect in a moderation analysis (Wang & Ware, 2013). It is not uncommon for the magnitude of interaction effects to be even smaller than main effects, which reduces power even further (Wang & Ware, 2013). Unequal sample sizes per subgroup, a common problem for prevention scientists, can exacerbate the challenge of insufficient statistical power. Designing studies using stratified randomization can help address this challenge by creating subgroups of similar sizes. Since funding, resource, and time constraints restrict the size of most trials, it is in researchers' best interests to prioritize confirmatory tests with adequate power to detect subgroup effects based on theoretical rationale, prior empirical support, and policy importance (Supplee et al., 2013).

Data aggregation approaches are one way to address limited power to detect subgroup effects. For example, meta-analysis can be an effective tool to compare treatment effects in different subgroups, even if these subgroups appear in separate studies (Borenstein & Higgins, 2013). In the case where subgroups can be adequately examined in individual studies, meta-analysis still provides added benefit by yielding a more precise estimate of the intervention effect in each subgroup (and of the difference in effects) than any single study. In addition, confidence intervals around each subgroup mean provide additional context, such as the range within which the true mean falls and the size of the overlap in effects between groups. One challenge in utilizing meta-analysis is that subgroup analyses are often inadequately reported in the literature (Bloom & Michalopoulos, 2013; Farrell et al., 2013; Supplee et al., 2013; Wang & Ware, 2013). Including a theoretical rationale for the moderation tests as well as adding details regarding whether tests were hypothesized or investigated post hoc would help address this issue. Additionally, studies with adequate power to detect interaction effects should include results of both significant and nonsignificant interaction effects and total number of comparisons tested. Finally, requirements by journal reviewers and editors that these details be included in manuscripts for publication also would be useful.

In addition to meta-analysis, Brown and colleagues (2013) highlighted two other approaches that combine data sets to allow for more powerful subgroup analyses. In the integrative data analysis strategy, researchers assemble all individual data into one data set and use trial as the highest level in a multilevel modeling framework. Multilevel growth mixture modeling can be used to calibrate change across trials with different follow-up times. A major procedural challenge with this strategy is obtaining data from other researchers, which can lead to bias when others are unwilling or unable to share. The parallel analysis strategy avoids this complication by allowing researchers to conduct analyses on their own data, but it requires researchers to use standardized analysis protocols. Results are then synthesized across data sets. The availability of large-scale data repositories, such as LONGSCAN (Runyan et al., 2011), that allow researchers to pose questions that can be addressed helps to alleviate this problem.

Subgroup analyses often result in multiple comparisons, which present an additional methodological challenge to prevention scientists. Several possible approaches to dealing with this pervasive problem are proffered. Researchers can specify a small number of theoretically driven confirmatory tests and use family-wise error rate corrections (Bloom & Michalopoulos, 2013; Wang & Ware, 2013). Wang and Ware (2013) also recommended using approaches that control the false discovery rate for exploratory analyses (see also Schochet, 2008).

Latent class analysis (Collins & Lanza, 2010) is a person-centered approach that offers prevention scientists an alternative to traditional subgroup analyses. Person-centered approaches are consistent with the developmental psychopathology perspective, which stresses the importance of studying individual adaptation and maladaptation from a holistic-interactionist viewpoint

(Sterba & Bauer, 2010). Latent class analysis is a mixture model that can be used to identify unobserved latent classes of individuals with similar characteristics and to explore differential preventive intervention effects within each class. Latent class analysis may also be especially useful for researchers faced with complex subgroup questions that involve multiple moderators. Moreover, it represents an approach that addresses the challenges of high Type I error rates and low statistical power of which more traditional approaches to subgroup analyses are so often vulnerable (Lanza & Rhoades, 2013).

Mediation Analyses

Mediation analyses examine a third variable that explains the way two other variables are related. In prevention science, this generally involves an examination of the intervening variable that explains, at least in part, how the preventive intervention affected change in the outcome. As described by MacKinnon (2008), mediation analyses are critical to the evaluation of preventive interventions for a number of reasons. First and foremost, a test of mediation uncovers how the intervention achieved its effects. Second, a test of mediation allows for the investigation of whether the intervention affected the desired underlying process as the intervention designers hypothesized. Finally, lack of support for an intervention effect on the theorized mediator, and likewise lack of support for a mediator effect on an outcome, can inform intervention design by suggesting either that the measurement of the mediator and/or outcome was inadequate or that the program itself did not function as anticipated.

Within the overarching goal of mediation analysis for prevention science—namely to identify how the intervention affected change in the outcome—there are two primary theoretical components. Action theory describes how the intervention intends to affect the hypothesized mediator or intervening variable, and conceptual theory describes how the hypothesized mediator affects the outcome (MacKinnon, 2008). Both action and conceptual theory are critical because they require the researcher to ground all aspects of the preventive intervention in theory. The researcher must have a guiding theoretical framework for how the intervention can manipulate the mediator as well as a guiding theoretical framework for how the mediator subsequently will effect change in the targeted outcome.

Significant advances in statistical approaches to evaluate mediating mechanisms have been proposed over the last decade. Traditionally, causal step models (R. M. Baron & Kenny, 1986; Judd & Kenny, 1981) were the gold standard evidence of mediation. However, more recent methodological advances support the product of the coefficients method as the most flexible method because it has higher statistical power in most situations and because it is easily applied to more complex statistical models (Fairchild & MacKinnon, 2014; Fritz & MacKinnon, 2007; MacKinnon, 2008; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). As detailed in MacKinnon (2008), because the distribution of the product of regression coefficients is not normally distributed, methods such as asymmetric or bootstrapped confidence intervals are recommended for null hypothesis significance testing. In addition, reporting effect sizes for the individual paths within the mediation model and the effect size of the mediated effect is an important complement to significance testing, as it allows researchers to understand the magnitude or meaningfulness of the effects within the mediation model (see MacKinnon, 2008, for information on various effect size measures).

As is the case with subgroup analyses in prevention science, statistical power represents a methodological challenge with mediation analyses. Fritz and MacKinnon (2007) provided a useful reference for researchers interested in determining the sample size required for adequate statistical power in the case of a single-mediator model. Moreover, Thoemmes and colleagues (2010) described methods for power analyses in the case of more complex mediational designs, such as multiple mediators, mediation with latent variables, and moderated mediation. Finally, given the realities of funding and resource constraints common among preventive interventions, it is worth noting that a number of recommendations have been advanced for maximizing statistical power without increasing sample size. These include adding additional predictors to the model that explain additional variance in the mediator or outcome and blocking (see Fritz, Cox, & MacKinnon, 2013, for details).

Just as the evidence-based intervention movement in the late 1990s highlighted the need and provided direction for empirical investigations of the efficacy of intervention programs (Chambless & Hollon, 1998; Chambless & Ollendick, 2001; Chambless et al., 1998), the field now emphasizes the theoretical mechanisms underlying preventive interventions. Multiple organizations (e.g., the Substance Abuse and Mental Health Services Administration's National Registry of Evidenced-Based Programs and Practices [http://www.nrepp.samhsa.gov], the California Evidence-Based Clearinghouse for Child Welfare [http://www.cebc4cw.org], the Promising Practices Network [http://www.promisingpractices.net]) routinely catalog the empirical support for the efficacy of preventive

interventions and provide useful databases for researchers, clinicians, policymakers, and consumers to evaluate existing programs. Review criteria of these organizations could be augmented to more rigorously evaluate the evidence on the underlying theory of programs. David and Montgomery (2011) have proposed one such framework for establishing an intervention as empirically based that emphasizes the need to not only evaluate the efficacy of the intervention package but also to demonstrate the efficacy of the theory underlying the intervention package (i.e., mechanism of action). The system includes nine categories that are defined by two factors (theory, intervention package) and three levels of evidence for each factor (empirically well supported, equivocal data, strong contradictory evidence). This system provides a useful framework for prevention scientists. If adopted by organizations and funding bodies, it likely would encourage researchers to place greater emphasis on evaluating mediating mechanisms underlying preventive interventions.

Simultaneous Analysis of Mediation and Moderation

Although mediation and moderation analyses provide useful information in their own right, simultaneous modeling is more consistent with the developmental psychopathology perspective (Fairchild & MacKinnon, 2009). Simultaneous modeling allows for the study of more varied and complex hypotheses that are often more relevant to real-world settings and can answer these questions: (1) Do intervention mechanisms vary for different subgroups of participants (moderated mediation)? and (2) Can a mediation effect explain an apparent interaction effect in data (mediation of moderator effect)? Statistical approaches for addressing these complex questions have been advanced. Interested readers are encouraged to consult these sources for additional information (Edwards & Lambert, 2007; Fairchild & MacKinnon, 2009, 2014; Tein, Sandler, MacKinnon, & Wolchik, 2004).

Like many statistical techniques modeling higher-level associations among multiple variables, simultaneous modeling of mediation and moderation effects is limited by power considerations. For example, assuming an interaction effect accounts for about 1% to 3% of the variance, the overall sample size needed to detect a large effect would be between 500 and 1,000 individuals (Fairchild & MacKinnon, 2009). This sample size is untenable for the majority of prevention trials, particularly those that are delivered individually rather than in group formats. Researchers can facilitate power through alternate means such as applying different Type 1 and Type 2 criterion levels, using extreme groups designs to increase between-group and decrease within-group variation, deliver a stronger manipulation, or reduce error variance by focusing on the reliability of measures. Other limitations of simultaneous modeling include the number of assumptions, difficulties in interpretation when multiple effects are present, and inclusion of more than two time points of data collection in an analysis. Continued statistical advances may reduce the impact of some of these limitations.

Systems Science

The utilization of mediation and moderation models represents progress in our efforts to evaluate the complexity of preventive intervention effects. However, even simultaneous modeling of a mediation and moderation effect typically captures only one aspect of a complex interplay of factors and assumes directionality. Systems science refers to a number of analytic methods that are used to uncover the dynamic behavior of complex systems (Lich et al., 2013). Because developmental systems science espouses a more holistic-interactionistic perspective, the emphasis is on the dynamic interrelations between individuals and their ecology (Urban, Osgood, & Mabry, 2011). For this reason, systems science approaches have been suggested as possible tools to complement multivariate statistical modeling by guiding conceptualization and evaluation of complex developmental phenomena (Lich et al., 2013; Marshall, 2013). Conceptually, relational developmental systems theory is a good fit for the complex interplay of factors across multiple ecological levels involved in prevention and is consistent with a developmental psychopathology perspective. Systems approaches require multilevel conceptualization and measurement, which is a key tenet of developmental psychopathology (Marshall, 2013; Cicchetti, 2008; Cicchetti & Curtis, 2007; Cicchetti & Toth, 2009). However, the application of analytic methods consistent with developmental systems theory is not yet embraced within mainstream prevention or developmental science (Lich et al., 2013; Marshall, 2013; Van Geert, 2012). Training in systems science and analytic methods are not typically included in graduate curricula in clinical psychology programs, and few intervention studies have utilized these methods to date. Various systems analytic methods are applicable across the prevention science research cycle and can complement traditional analytic approaches (Lich et al., 2013). Several relevant examples include social network analysis, systems dynamics, and agent-based modeling.

Social network analysis, which is described earlier in the section titled "Multiple Ecological Levels," allows researchers to examine the structure and function of

interrelationships among individuals or groups. It can readily integrate with and expand on traditional methods and is gradually being adopted by researchers in the field. In systems dynamics methods, mathematical equations are written to quantify the relationships among components of the system under study. Parameter values are drawn from data sources or extant literature or are estimated when not available. After calibration and testing of the model, simulations are conducted to assess for changes over time. Such models may be helpful in understanding and interpreting intervention effects in the broader system context. Agent-based modeling, also referred to as agent-based computational demography and agent-based computational economics, offers researchers a rich quantitative methodology to explore how system components contribute to multilevel phenomena. In this approach, probabilistic rules are programmed into a computer model specifying how agents (e.g., individual, groups) behave, interact, or adapt. Agent-based models can be used to understand and interpret results of preventive intervention trials and evaluate outcome measures based on simulations (Lich et al., 2013; Urban et al., 2011). Systems approaches have a good conceptual fit and hold promise for increasing our ability to capture and understand the complexity of multilevel systems in prevention, but greater visibility of these approaches are needed in training programs and in the published literature. Since these approaches are not currently mainstream in prevention science and many require advanced mathematical or computer modeling skills, multidisciplinary collaborations will be necessary to undertake these approaches.

Person-Centered Methodologies

A person-centered approach focuses on a study of the person as a whole by emphasizing patterns of individual characteristics (Bergman & Magnusson, 1997). Person-centered approaches are consistent with the developmental psychopathology perspective and developmental systems theory, which emphasize individual adaptation and maladaptation from a holistic-interactionist perspective (Marshall, 2013; Sterba & Bauer, 2010). Earlier we briefly described the utility of latent class analysis (Collins & Lanza, 2010) as a novel approach. We now turn our attention to person-centered approaches more broadly and discuss their importance to evaluating preventive interventions.

The majority of investigations of preventive interventions to date have utilized variable-centered analytic approaches to test intervention effects and mechanisms. Variable-centered approaches can provide important insights about how theorized variables and constructs relate to one another in the intervention model. However, this approach tends to summarize individuals' experiences on a given characteristic in isolation from contextual factors unique to individuals. Person-centered theory assumes development involves complex interactions that are at least in part unique and specific to the individual. Rather than reducing developmental processes to component variables, person-centered theory emphasizes patterns across variables. Individual differences exist in developmental processes, and a small number of frequently observed patterns typically emerge at a more global level. A variety of person-centered methods exist, including less restrictive variable-oriented methods (e.g., latent growth curve modeling), classification methods (e.g., longitudinal cluster analysis, latent class growth modeling, latent Markov modeling), hybrid classification methods (e.g., latent growth mixture modeling, mixed latent Markov modeling), and single-subject methods (e.g., P-technique factor analysis, dynamic factor analysis) (Sterba & Bauer, 2010). Unfortunately, many researchers, even those who utilize person-centered methods, underappreciate person-centered theory and the assumptions and statistical vulnerabilities of the different person-centered methods (Sterba & Bauer, 2010). Because no single methodology can adequately test all tenets of person-centered theory, researchers must consider the trade-offs associated with each approach in the context of their research hypotheses.

Qualitative Analyses

Qualitative methodologies often are undervalued and therefore underutilized in prevention science. However, they have the potential to assess and evaluate complexity in greater depth. Prevention researchers may miss important insights by relying solely on quantitative methods. Studies using mixed methods designs that combine quantitative and qualitative methods can provide a broader and deeper understanding and corroboration of study outcomes relative to either method alone (Zhang & Watanabe-Galloway, 2013). Quantitative research methods aim to quantify and demonstrate a change in outcomes, whereas qualitative research methods can answer in depth how and why change occurs or does not occur. An advantage of using mixed methods designs is that quantitative data can yield generalizable results, and qualitative data can provide extensive insights (Zhang & Watanabe-Galloway, 2013). Mixed methods research includes concurrent and sequential designs. Concurrent designs enable researchers to compare open-ended qualitative data with close-ended quantitative data to determine if the two data sets provide

similar, different, or contradictory information about a research question (Zhang & Watanabe-Galloway, 2013). Qualitative assessment can be easily nested within a quantitative intervention trial. Alternately, data can be collected sequentially so that one component informs the other. For example, Petrenko and colleagues conducted pre-intervention qualitative research to inform the development of an intervention for children with fetal alcohol spectrum disorders (FASD) to prevent secondary conditions (e.g., mental health problems, trouble with the law, substance use) common in this population. Qualitative studies included an evaluation of systems barriers contributing to secondary conditions in this population and an investigation of perceived needs and preferences for intervention programming from the perspectives of parents of children with FASD and service providers in the targeted communities (Petrenko, Tahir, Mahoney, & Chin, 2014a, b). These studies address gaps in the existing literature and lead to refinements in early conceptualizations of the intervention program. The preventive intervention program developed from this research, called Families on Track, is currently being tested in a small-scale mixed methods RCT at Mt. Hope Family Center. Pre-intervention qualitative research, such as that highlighted here, can also aid researchers in developing relevant and culturally appropriate interventions that are acceptable to the target population. Qualitative methods are also often used following a quantitative intervention trial to further explain a pattern of unexpected numerical results.

There are three main approaches to mixing qualitative and quantitative data for analysis: (1) the two types of data are analyzed separately, and the results are integrated at the interpretation stage; (2) the two data sets are linked, and one approach builds on the findings of the other; or (3) analysis of one data type is embedded within the other (e.g., transforming qualitative themes into numbers and comparing with quantitative results) (Zhang & Watanabe-Galloway, 2013). One of the most significant challenges for mixed methods designs is overcoming common misunderstandings about the rigor of qualitative methods and the lack of adequate training in these methods in most research training programs (Liamputtong, 2009). Rigor is equally important in qualitative and quantitative research, but distinctive procedures are used to assess it within each method (Liamputtong, 2009; Zhang & Watanabe-Galloway, 2013). Mixed methods research often takes more time, can be more costly, and requires a more extensive skill set (either individually or across the research team) than qualitative or quantitative methods alone. The article length limitations in many journals may be a barrier for the publication of mixed methods research.

Implementation Challenges

The realities of implementing and analyzing the effects of preventive interventions pose a number of challenges for researchers. Randomization is not always possible, given ethical and practical constraints, and even when it is possible, selection bias still can occur. Participant noncompliance and attrition are expected in most prevention trials but complicate statistical analyses. Informant discrepancies are also problematic in analysis and interpretation. To have adequate power to reliably detect effects, many of the innovative methodologies and statistical approaches used to account for increased complexity or deal with real-world complications require large samples. Large samples are prohibitive in many cases due to funding or other resource limitations and the ability to access enough participants who meet study criteria. Each of these challenges is discussed in detail along with recommended strategies to manage it when possible.

Selection Bias

Randomized controlled trials are the gold standard for establishing the efficacy of preventive interventions. However, randomization is not always possible or appropriate. For example, randomization may not be ethical or acceptable with certain populations or in given institutions or agencies. For some selective or indicated interventions that target specific populations, randomization may fail to produce baseline equivalence of groups, especially for small or heterogeneous samples (Blair, 2004). In these cases, a nonexperimental design may be preferable. Nonexperimental studies can also be useful in program evaluation, especially in community-based disseminations of programs where less control is possible (Hill, Rosenman, Tennekoon, & Mandal, 2013). However, selection effects pose problems for both internal and external validity in nonexperimental studies. Sources of selection bias include both self-selection into the program and differential dropout. Methods based on the counterfactual model (also known as Rubin's causal model or the potential outcomes model) can aid researchers in statistically correcting for selection bias (Hill et al., 2013). These methods include propensity score matching, the Heckman two-step approach, and full information maximum likelihood based on a bivariate probit model and its trivariate generalization. In propensity score matching, a

nonexperimental control group is constructed (e.g., from a supplemental data set or separate control sample) to be equivalent to the treatment group by matching participants on a composite index (propensity score) derived from a set of explanatory variables presumed to be relevant to the outcome. In the Heckman two-step approach, the probability of selection for each individual is modeled (step 1), and the error term (reflecting both random error and the effect of unobserved variables driving selection) from this step is modeled in the outcome equation as a proxy for unobserved selection variables (step 2). The third approach involves jointly estimating three sequential equations predicting participation (eligible members attend a program or not), completion (having chosen to attend, participants complete program or not), and outcome (having completed the program, participants show positive change or not), respectively, following a preventive intervention (Hill et al., 2013). Counterfactual models permit researchers to evaluate interventions in uncontrolled settings and maintain some confidence in the internal validity of inferences.

Although the methods just described can adjust for observed confounding, unobserved confounding continues to be problematic (Liu, Kuramoto, & Stuart, 2013). Sensitivity analyses can be utilized with counterfactual methods to help increase confidence in the results from nonexperimental designs (Liu et al., 2013). There are two main approaches to sensitivity analyses. In the first approach, which is often used with matching procedures (i.e., propensity score), researchers determine the point at which intervention effects become nonsignificant (Liu et al., 2013). In the second approach, certain specifications are utilized to quantify the unobserved confounder (e.g., by modeling the relationship of observed confounders with intervention status or outcome under conditions specified by the researcher), which is then used to adjust the estimate of the intervention effect, providing an associated confidence interval. This latter group of simulation methods produces sensitivity results that do not change as a function of sample size since adjustments are not calculated directly from actual sample data (Liu et al., 2013).

Selection bias is not limited to nonexperimental trials. As mentioned, selection bias can occur in RCTs when a systematic difference arises as a result of variation in intervention compliance, quality of implementation, or attrition (McGowan et al., 2010). Unfortunately, study design features, such as random assignment, are insufficient to control for selection bias that occurs after the start of an intervention (McGowan et al., 2010). Investigations of implementation, such as dose response, therapeutic process, and fidelity, are particularly vulnerable to selection biases. McGowan and colleagues (2010) illustrated the significant effects of selection bias on effect estimates through presentation of dose response analyses from the Fast Track study and several data simulations. They demonstrated that even with very small or small levels of confounding, selection biases can lead to an increase in Type I errors (detecting an effect when there is not one). A small amount of confounding can also obscure a small true effect size and often underestimates a medium effect due to significant power reductions. Researchers can consider several strategies to deal with selection bias in experimental studies. Several alternate study design options are possible if researchers are specifically interested in examining implementation factors vulnerable to selection bias (McGowan et al., 2010). For example, participants can be randomly assigned to levels of intervention dosage to determine the thresholds of participation necessary to achieve specific outcomes. Without randomization of dose, researchers cannot be certain confounding has been ameliorated and can only use sensitivity analyses or bounding methods to assess the magnitude of potential bias. Factorial designs are another option for researchers who are interested in the impact of one part of a multicomponent intervention (e.g., peer pairing within the larger Fast Track project). Most studies consider selection biases post hoc. In these cases, statistical use of covariates can sometimes be beneficial, depending on the level of confounding and appropriate selection and collection of covariates. Controlling for pretreatment covariates can help lessen the effects for very small and small confounding, but it is generally ineffective with confounding that is larger or when there is no relation between the covariate and unobserved confounder (McGowan et al., 2010). Researchers should consider including variables in their study designs that have been found in previous studies to relate to motivation, participation in intervention, and adherence to intervention protocols and to predict response to intervention. These variables may be useful in evaluating selection bias and its effects on outcome evaluation. For example, Brody, Murry, Kogan, et al. (2006) found that youth unconventionality and ratio of adults to children in the household were predictors of inconsistent participation in the SAAF preventive intervention. The frequency of potential covariate measurement is also important to consider in the design phase. Researchers may also consider assessing selection bias through some of the sensitivity and bounding approaches (e.g., propensity score matching, Heckman two-step estimator) mentioned in more detail previously in the chapter.

Noncompliance

One of the most significant problems facing intervention trials is participant noncompliance. Noncompliance with randomization and intervention protocols is a reality for almost all trials and can influence the reliability and validity of conclusions, depending on the extent of the problem. Noncompliance is potentially a greater problem for prevention trials relative to treatment studies, since individuals are not generally experiencing serious problems or actively seeking treatment, and other more pressing life demands may outweigh their motivation or abilities to engage in an intervention to prevent possible future problems (Gross & Fogg, 2004; E. A. Stuart, Perry, Le, & Ialongo, 2008; Toth et al., 2013). Noncompliance includes several factors, including mobility processes that determine who remains in the trial at each time point, the extent of compliance with the intervention, and the actual intervention effects for those who complied. Unfortunately, these processes cannot be easily separated after data collection (Vuchinich et al., 2012). The effects of noncompliance are likely to be greatest for interventions that take longer to deliver, have larger samples, and involve more at-risk, mobile individuals. For example, in the context of school preventive interventions, student mobility can be quite large, especially within large urban schools (Vuchinich et al., 2012). Given that mobility is associated with multiple risk factors (e.g., poverty, adverse childhood experiences; Dong et al., 2005; Gasper, DeLuca, & Estacion, 2010), more mobile students (either entering or leaving a given school) may be at higher risk than the average student, resulting in biased intervention effects and poor generalization when data from these students is not captured. From a design perspective, researchers can develop recruitment and retention protocols to facilitate compliance (E. A. Stuart et al., 2008; Vuchinich et al., 2012). For example, researchers can maintain regular contact with participants and obtain contact information of others who will likely know about the participant's whereabouts if contact is lost. Person finding services or online sites can also be useful. Reducing barriers to participation, such as child care, transportation, and the setting and timing of research visits, can facilitate participation. Adequate compensation or incentives also can be helpful in retaining participants. Strategies such as these have been routinely implemented into RCTs conducted at Mt. Hope Family Center.

E. A. Stuart and colleagues (2008) outlined five statistical approaches for dealing with noncompliance. The first approach, commonly referred to as the intent-to-treat (ITT) approach, ignores noncompliance and compares participants who were randomly assigned to the treatment versus control conditions regardless of their actual compliance with their assigned conditions. Another approach involves examining different levels of participation on outcome within the treatment group only. In an as-treated analysis, individuals who did not comply with the intervention are excluded from analyses. However, this approach may lead to biased estimates because it compares the effect of completing the treatment versus all controls, including those who may not have complied if given the option. The as-treated approach also loses the benefits of random assignment. Alternately, researchers can control for the level of participation as a predictor of outcome. However, this approach also leads to biased results for reasons similar to the as-treated approach since controls do not have the option of participating, and some may be very different from noncompliers in the treatment group who receive the same score on the predictor variable. Instrumental variable approaches, which include the complier average causal effect (CACE), represent an additional approach. CACE improves on these alternate approaches by estimating the proportion of controls who would have complied with the intervention if they had been offered it and then comparing this subgroup to those participants who actually complied with the intervention.

Considering all five approaches, only ITT and CACE can make causal interpretations, and both are reasonable depending on the goal of analysis (Ialongo et al., 2006; E. A. Stuart et al., 2008; Vuchinich et al., 2012). Some researchers may be interested in testing whether offering an intervention attains results, regardless of program uptake. Thus, ITT tests causal effects due to group assignment. However, as levels of noncompliance increase, true treatment effects are likely to be obscured. Especially in cases with moderate to high levels of noncompliance, it is important to determine whether the intervention was effective for those who actually complied with it. CACE considers intervention compliance as an uncontrolled factor and estimates the average intervention effect for compliers. CACE estimates are usually larger than those from ITT. The utilization of CACE helps transport findings from RCTs to real-world settings, where noncompliance is common. Although ITT analyses continue to represent the dominant approach in the field, CACE has been increasingly used to evaluate preventive intervention outcomes, including in RCTs intended for depressed mothers with young children (Toth et al., 2013), children of substance-abusing parents, (Stanger, Ryan, Fu, & Budney, 2011), health risk behaviors (Stormshak et al., 2011), academic achievement

(Stormshak, Connell, & Dishion, 2009), and child problem behaviors (Dishion et al., 2013). To facilitate CACE analyses, researchers are advised to measure baseline characteristics believed to affect participation rates. In addition, it is important to draw on theory to determine what constitutes full participation when determining cut points for operationalizing compliance for analyses (E. A. Stuart et al., 2008).

Although compliance with randomization and intervention completion is more heavily regulated by professionals and institutions in cluster-randomized studies than when randomization occurs at the individual level, noncompliance continues to be a significant problem and an additional layer of complexity in analyses (Vuchinich et al., 2012). Vuchinich and colleagues (2012) emphasized a systematic consideration across two factors when considering noncompliance in cluster-randomized designs: (1) whether the analysis is at the person or cluster level, and (2) whether ITT or noncompliance (i.e., CACE) analyses will be utilized. A person-focused ITT analysis is appropriate when researchers want to estimate the impact of intervention assignment on individuals when it is implemented in real-world conditions including mobility. In this scenario, researchers attempt to follow all participants even if they move and do not include late entrants (i.e., people who move into the cluster and may receive part of the intervention but were not a part of the initial randomization). In person-focused noncompliance analyses, researchers estimate the impact of the intervention on participants who complied with it to receive adequate dosage. Only compliers are followed; dropouts and late entrants are not included in analyses. In contrast to person-focused approaches, cluster-focused analyses measure the rates of the problem for the cluster as a whole, not the rate of the problem for individuals who were at one time members of the cluster. Cluster-focused ITT analyses examine the impact of intervention assignment on clusters of participants. Since analysis focuses on the randomization of the overall cluster (not the specific individuals), individual participants that drop out are not followed (initial data still used), but late entrants are added. Cluster-focused noncompliance answers the question regarding the impact of the intervention on clusters that complied with it. Only clusters that remain in the trial or in which the trial was fully implemented are included. This systematic approach highlights the importance of collecting data on compliance at both person and cluster levels (Vuchinich et al., 2012). Collecting data on covariates that predict missingness, late entrants, dropouts, and compliers allows researchers to evaluate whether there are significant differences between intervention and control clusters (Vuchinich et al., 2012).

Noncompliance and missing data on outcomes often co-occur. Fortunately, advances in statistical modeling can accommodate both noncompliance and missing data outcomes to estimate causal treatment effects. The association between noncompliance and missing data status for the control condition is unknown, and therefore assumptions must be made. Jo and colleagues (2010) demonstrated how to apply CACE under various missing-data assumptions. To understand the assumptions being made, it is useful to consider four types of participants: (1) compliers—complete the group assignment given; (2) never-takers—do not participate regardless of group assignment; (3) always-takers—find a way to get the intervention regardless of group assignment; and (4) defiers —do the opposite of what is assigned. Under the first assumption, data are assumed to be missing at random, and the response rate is considered the same across compliance classes. In the response exclusion restriction, the response rate is allowed to vary for the compliers but is not allowed to vary across assignment arms for the never-takers. The stable complier response examines the opposite assumption and allows the missing-data indicator to be freely estimated for the never-taker class but fixed at zero for the complier class. In all three cases, it is common to assume that defiers and always-takers are not given access to the intervention; therefore, their effects are held at zero. Jo and colleagues acknowledged that it is rare to have more confidence in one of these assumptions over others. Even when the relative plausibility of these assumptions is known, it is still difficult to predict the performance of CACE estimators, given that bias mechanisms can be quite complex when both noncompliance and missing data are being estimated. Thus, the authors recommended reporting the range of effects across all three assumptions.

Informant Discrepancies

Although researchers recognize the value of collecting data from multiple informants, the field has shown limited growth in understanding and meaningfully interpreting informant discrepancies over the last 25 years (De Los Reyes, 2013). Because results of controlled trials often point to inconsistencies across reporters with regards to intervention effects (De Los Reyes & Kazdin, 2009), this issue is critical to prevention science. Even though researchers frequently emphasize the value of multi-informant assessment approaches, in practice it is common to interpret and methodologically and/or statistically manage discrepancies

as measurement error (De Los Reyes, Thomas, Goodman, & Kundey, 2013).

Seminal work by Achenbach and colleagues (1987) on informant discrepancies demonstrated that (1) different reports of the same behavior show low to moderate correspondence across reporters; (2) reports of children in the same setting correlate more highly than those of children in different settings; (3) reports of children correspond more than those adolescents; and (4) reports of externalizing behaviors are more highly correlated than reports of internalizing behavior. Some advances have been made in terms of theory and statistical modeling (e.g., Kraemer, 2003); however, models of informant discrepancies and empirical data supporting their utility in interpretation are needed before discrepancies should be viewed as meaningful (De Los Reyes, 2013). The theoretical model with the greatest support for understanding informant discrepancies proposes that individuals vary systematically in the behaviors being expressed and informants vary in their perspectives on the observed behavior (De Los Reyes, 2013). While this model is intuitive, limited direct empirical tests of it have been conducted. The research support for this model is limited to assessments of children's behavior that is directly observable (e.g., externalizing behavior) and examination of discrepancies between persons who fundamentally differ in the context in which they observe the child (e.g., parents and teachers). More research is needed to validate this model and establish that informant discrepancies are meaningful contextual expressions of behaviors. Systematic investigation is also needed to study how researchers and practitioners use informant discrepancies when making decisions about research designs, interpretation, and patient care (De Los Reyes, 2013).

De Los Reyes and colleagues (2013) recently advanced the Operations Triad Model as a guide for researchers handling multi-informant reports. This model encourages researchers to propose a priori hypotheses regarding whether findings across informants will converge or diverge. In the case of hypothesized divergence, it is recommended that researchers posit a priori whether divergence will be the result of measurement error or meaningful variation. Moreover, in the case of anticipated convergence, the Operations Triad Model suggests that researchers create a priori thresholds for defining convergence. If the threshold is not met, researchers are encouraged to conduct post hoc analyses to determine whether measurement error accounts for the discrepancy, in which case compensating operations (i.e., statistical and/or methodological techniques) may be conducted to compensate for the lack of convergence).

Additional general recommendations for researchers include providing informants with more specific instructions (e.g., define labels such as *often* in more concrete terms; provide decision rules) and collect information about the settings in which the behaviors being rated occur (De Los Reyes, 2013). Setting information could help identify whether discrepancies are related to variability of behavioral expression across settings and may contribute to knowledge about which treatments are effective in which settings.

Sample Size and Power Issues

As discussed throughout this chapter, sample size and resulting statistical power issues are likely among the greatest challenges for researchers designing and evaluating preventive interventions from a developmental psychopathology perspective. In previous sections we described challenges related to sample size and power with respect to specific quantitative methodologies (i.e., subgroup analyses, mediation, moderated mediation). In this section we direct our attention to other methodologies designed specifically for preventive interventions that target specific risk populations or disorders with relatively low prevalence. For example, individuals with FASD are at high risk for secondary conditions, such as mental health problems, trouble with the law, and substance abuse (Streissguth et al., 2004). Preventive interventions delivered during early childhood might be able to prevent the onset or severity of many of the secondary conditions. Although the prevalence of FASD is estimated at 2% to 5%, it often goes undiagnosed, and the population can be difficult to recruit due to various barriers (May et al., 2004; Petrenko et al., 2014). Only large multisite studies would be able to accrue an adequate sample to begin to evaluate some of the complexity involved. Unfortunately, multisite studies are very costly and involve additional challenges in coordination and maintenance of fidelity across sites.

Funding and resource limitations can also impact the power researchers can achieve to detect intervention effects and test theory with a given sample. Interventions with a longer duration or with more intensive or costly resource allocation (e.g., interventionist time, higher-skilled personnel, costly program materials) typically result in smaller samples, unless researchers are able to secure larger or longitudinal program grants or multiple funding sources, use existing delivery mechanisms (e.g., incorporating curricula into schools), or establish sustainable partnerships within the community. Such intervention costs can also be prohibitive for innovative studies being conducted, particularly for multisite evaluations. For example, costs

associated with the provision of intervention, in conjunction with the costs of implementing the research protocol, can exceed what is allowed by existing grant funding caps. Research assessment batteries are also limited by funding realities, which puts a strain on the types of questions and theoretical mechanisms that can be addressed. Incorporating multiple levels of analysis, especially at the biological level, can be very expensive and often relies on additional consultants or personnel from other disciplines, which further increases costs. As mentioned, securing funding for longitudinal follow-up evaluations can be particularly difficult, especially in the current competitive funding climate.

Many of the innovative methodologies and statistical approaches discussed earlier that are used to account for increased complexity or deal with real-world complications require large samples to have adequate power to reliably detect effects. There are few options for researchers who are limited to smaller samples. Intensive within-person designs are viable strategies, which have been underutilized in prevention science (Ridenour, Pineo, Maldonado Molina, & Lich, 2013; Sterba & Bauer, 2010). For example, rigorous idiographic studies can be used to test programs for low-prevalence outcomes, examine the efficacy of selective/indicated programs, provide pilot data for larger trials, or understand differential response to programs (Ridenour et al., 2013). Some idiographic designs include multiple waves of baseline data collection for modeling of pre-intervention variability of characteristics. This approach assumes that pre-intervention variability may be predictive of response to intervention rather than treating psychological characteristics as invariant, fixed-effects traits, as is typically done in the majority of single-baseline pre-post statistical analyses (Ridenour et al., 2013). Collecting data intensively on smaller samples allows researchers to overcome the extensive cost that would be involved with multiple-wave baseline data collection in larger studies. Idiographic statistical methods vary in how intervention effects are estimated, the method used to account for serial dependency, and how nonintervention variables (e.g., covariates) are modeled (Ridenour et al., 2013). Examples of idiographic designs include time series analysis (e.g., autoregressive moving average, mixed model trajectory analysis, and P-technique). A discussion of these techniques is beyond the scope of this chapter; interested readers are referred to referenced citations for more details. These approaches exclusively capture intra-individual etiological process and can define these processes multivariately, unlike many of the larger sample approaches, which are limited to univariate processes without more complicated analytic extensions (e.g., parallel process extensions).

Summary

In this section, we discussed the challenges and complexities inherent to preventive intervention methodology and described strategies for addressing these issues and continuing to advance the field. First and foremost, prevention scientists must ground their interventions in theory. Theoretical considerations are needed at all levels and aspects of the intervention, including the overall guiding theoretical framework, the mediating mechanisms, and the subgroup analyses. RCTs continue to be the gold standard for preventive intervention design and new exciting methodologies such as SMART (Almirall et al., 2012; Collins et al., 2004; Dawson & Lavori, 2012; Murphy, 2005; Lei et al., 2012) are now available that allow researchers to develop adaptive or individually tailored interventions to improve intervention outcomes. Person-centered approaches and qualitative methods each offer unique and important contributions to prevention science as they provide opportunities for examining individuals as a whole and in greater depth. Moreover, prevention researchers must strive to move beyond the reliance solely on symptomatology to evaluate outcomes and consider richer conceptualizations of intervention success, such as levels of adaptation, transactional measurements, diverse developmental domains, and observational methods. Finally, prevention science is not without significant challenges. The realities of funding and resource constraints and participant noncompliance, to name only a few, often require researchers to employ innovative methods to appropriately evaluate their intervention. However, the far-ranging impact of prevention for overall societal benefit warrants intensified effort and resources.

TRANSLATIONAL RESEARCH

From Research to Practice

In recent years, the term translational research has become increasingly common, although a consensus on its exact meaning has been slower to emerge (Cicchetti & Toth, 2006a; Gunnar & Cicchetti, 2009). In general, the term pertains to the bench-to-bedside goal of utilizing knowledge gained from basic science to develop and evaluate new treatments (Insel, 2009; Zerhouni, 2005). However, this definition, derived from a medical model, can fail to capture the goals of prevention science with respect to

psychosocial interventions. Importantly, the availability of research-derived interventions does not ensure that they will be accessible to those individuals most in need. Therefore, a second area of translational research pertains to improving access to evidence-based treatments (Sung et al., 2003; Woolf, 2008). Advances in the behavioral and social sciences and in the neurosciences, molecular biology, and genomics have positioned the field of prevention science to develop, evaluate, and disseminate empirically supported prevention and intervention strategies (Toth, Manly, & Nilsen, 2008). Consistent with one of the central tenets of developmental psychopathology, translational research also emphasizes the bidirectional nature of clinical and research endeavors (Cicchetti & Toth, 1998, 2006a; Rutter & Sroufe, 2000).

A key consideration in the conduct of translational research involves making a determination as to when a sufficiently large corpus of evidence exists to warrant broad access to and dissemination of an evidence-based intervention. Understandably, developers of intervention models want to ensure that the integrity of their models is maintained. However, if interventions are not made more widely accessible once a corpus of evidence supports their efficacy, a number of concerns arise. First, failure to share treatment manuals with other professionals who are interested in providing and evaluating the treatment does not allow for independent replication of the positive research outcomes. Because one of the widely accepted components of attaining the classification of an evidence-based intervention involves replication by independent researchers who were not involved with the development of the model, this is a significant problem that, unfortunately, is not widely recognized by individuals in the policy arena. Second, insistence on controlling a model that has been found to be efficacious limits its accessibility and also reduces the likelihood that the model will be evaluated in diverse geographical venues and with heterogeneous populations (Cicchetti & Toth, 2015).

That being said, it also is important that models that have been found to be efficacious are not adopted by individuals who have not been trained adequately in the conceptual underpinnings and delivery of the model. The establishment of training criteria and credentialing standards is critical to the dissemination of evidence-based models. It is highly unlikely that simply reading a treatment manual or completing an online course, in the absence of personally delivered didactics and supervision, will result in the attainment of adequate skills to provide an intervention consistent with standards adhered to by model developers.

Discussions of translational research lead directly to considerations related to the social policy arena. The personal and economic burden of mental illness highlights the importance of utilizing information derived from research to inform policy initiatives. However, despite what should be an almost seamless integration of research, practice, and social policy, reciprocally beneficial interactions among these arenas have been difficult to achieve (Toth & Cicchetti, 2006). Shonkoff (2000) addressed impediments to this integration, stating that whereas scientists are trained to raise questions and to be guided by facts, policymakers are more prone to be governed by political and economic forces. Service providers are more similar to policymakers as they are often faced with situations that require immediate action before empirical data are available to inform specific intervention strategies. In reflecting on this tension, Shonkoff (2000) stated: "Science is focused on *what we do not know*. Social policy and the delivery of health and human services are focused on *what we should do*" (p. 182, emphasis in original). Even when data are available to inform intervention strategies, the realities of heavy clinical caseloads and lack of access to easily understood empirical information by clinicians and policy advocates may limit the likelihood of clinicians and policy advocates adopting evidence-based interventions.

Increasingly, calls have been made for the utilization of science to guide policymaking and funding decisions (J. Baron & Haskins, 2011; Haskins & Baron, 2011). Unfortunately, even when evidence exists that programs are ineffective, political forces may make it difficult to eliminate funding for these programs and redirect the funding toward those that are evidence-based (J. Baron & Sawhill, 2010). In a compelling essay, Haskins and Baron (2011) argued that better population-level outcomes in education, crime reduction, and child well-being would occur if policy and funding decisions were made based on evidence of what works.

It is unlikely that anyone invested in promoting the welfare of children would disagree with the importance of attaining the above-stated objectives. Therefore, it can be difficult to understand why the synergy among research, practice, and social policy has been so difficult to realize. A number of issues need to be considered when evaluating the schisms that remain, including allocation of resources and the willingness of communities to adopt evidence-based models of intervention. In this regard, it is important that efficacious models be evaluated with diverse populations, thereby increasing the receptivity to uptake in diverse communities.

Although there has been increased recognition of the importance of supporting evidence-based social programs, political forces that operate do not always act in accord with this goal. The decisions of policymakers are governed by myriad issues, including program cost, input from constituents, the position of party leaders, public opinion, pressure from lobbyists, and their own political philosophies. Politically favored programs often are held intact or allocated increased resources (Barlow, 2010). At times, scientific evidence that identifies iatrogenic effects of programs is ignored (Lilienfeld, 2005). Unfortunately, even programs with strong scientific support are not equally effective for all individuals. Despite decades of research dedicated to evaluating programs designed to foster positive outcomes for children faced with economic and familial disadvantage, the overall effect sizes for programs found to be effective remain within the small to moderate range (Shonkoff & Fisher, 2013). Moreover, some evidence-based models, although shown to be effective for a designated population, address only a small percentage of individuals in need. For example, although the outcomes for the NFP home visitation program have been shown to be effective in a number of important arenas, such as improving parental caregiving and child health and preventing child abuse and neglect (Kitzman et al., 1997; Olds, Henderson, & Kitzman, 1994), it limits enrollment to first-time mothers who are identified during their first trimester of pregnancy. Because many young mothers living in poverty do not seek prenatal care, these inclusion criteria result in the ineligibility of significant numbers of very high-risk mothers. Therefore, although efforts to increase the availability of evidence-based programs are needed, it would be premature to conclude that resources should be directed only toward those programs that have been supported by rigorous evaluation. Rather, programs that have been found to be ineffective should be eliminated, but the investment in newly developed promising programs is equally important (Cicchetti & Toth, 2015).

When trying to ascertain how best to disseminate evidence-based interventions into community settings, possible impediments for program uptake need to be considered. In general, the evidence base for programs is derived from university-based randomized control trials. Although these approaches reflect the gold standard in the field, they are not without challenges with respect to dissemination into community settings (Sternberg, 2006; Toth & Manly, 2011). RCTs are conducted under very controlled settings and involve utilization of strict inclusion and exclusion criteria for participants that are quite different from those present in individuals seeking mental health care in community settings. Unfortunately, and not surprisingly, when such programs are disseminated into community settings, not only do they yield low rates of utilization with respect to individuals eligible for such services, but they also tend to be less effective due to issues such as lower-credentialed and less experienced providers, lack of supervision, and failure to ensure fidelity of implementation (Dodge & Mandel, 2012). This problem has been referred to as the scale-up penalty and estimated at 50% (Welsh, Sullivan, & Olds, 2010). Moreover, some changes implemented during dissemination may not always lead to the intended positive outcome, resulting in considerable variation in the effectiveness of programs initially provided as part of RCTs and subsequently exported to community settings (Weisz & Jensen, 1999). The way an intervention is conceptualized also is very likely to contribute to whether a community is invested in providing it and adhering to its fidelity (Dodge, 2008). Therefore, to promote community uptake and to achieve impact at the population level, it is critical to consider the ultimate goal of exportation from the initial conceptualization of an RCT. Lessening restrictions on the inclusion/exclusion of participants, for example, ultimately might increase the likelihood that the intervention can be disseminated more effectively (Toth, Pianta, & Erickson, 2011). Regardless, despite best efforts to ensure effective implementation of an evidence-based model in community settings, it is critical that evidence on fidelity of implementation and outcomes within a given community be generated. For this reason, some advocate that legislation should provide a mandate for ongoing evaluation of budgets for federally funded programs once evidence-based models have been disseminated to communities (Haskins & Baron, 2011).

Cross-disciplinary and community collaborations also are keys to facilitating the translation of well-controlled efficacy research into the community (Saul et al., 2008; Spoth, Clair, Greenberg, Redmond, & Shin, 2007; Toth & Gravener, 2012). Illustrative of this point, a university-community partnership has been developed between Mt. Hope Family Center, the Monroe County Department of Human Services, and the United Way of Greater Rochester, NY, to disseminate CPP as well as other evidence-based preventions to a group of at-risk young mothers with few socioeconomic resources (see Toth & Gravener, 2012, for more details). Through this program, Building Healthy Children (described earlier), over 700 young women have been recruited and enrolled through pediatric medical clinics. They were randomly assigned to the active preventive intervention condition or an enhanced care-as-usual condition. A multilevel

of analysis measurement battery was used, including assessments of emotional and behavioral functioning and genetics. Importantly, a high percentage of eligible women were willing to participate in the study and complete the research battery, and the retention rate after enrollment has been over 80%. This result suggests the feasibility of implementing CPP in the community and the need to identify factors that promoted engagement in this study to inform future research. Preliminary analyses have yielded promising results, including decreases in depressive symptoms and higher rates of well child care and immunizations in program participants (Paradis et al., 2013). The Building Healthy Children program exemplifies the bridge between efficacy research and dissemination and demonstrates that the development and maintenance of strong community collaborations allow for more professionals to be trained on evidence-based preventive interventions and more individuals to receive these much-needed programs.

Other strategies for wider dissemination also have been called for, such as disruptive innovation as a way to find inexpensive and simpler means to reach a greater number of individuals at risk for mental illness (Rotheram-Borus et al., 2012). One of the suggestions of this model is to find delivery formats that have the capacity to reach a broader population, such as via utilization of technology and media strategies. Computerized interventions with the current generation of children and adolescents, many immersed in technology from a young age (Vandewater et al., 2007), have the potential benefit of connecting with vulnerable youth in an arena in which they feel comfortable and competent. Several studies have tested an Internet/computer delivery format with positive results for preventing depressive symptoms (Van Voorhees et al., 2009), sexual risk behaviors (Lightfoot, Comulada, & Stover, 2007), and attitudes toward drug use (Williams, Griffin, Macaulay, West, & Gronewold, 2005). Webster-Stratton and colleagues (2010) have also explored a hybrid computer-based and face-to-face adaptation of the Incredible Years program in a small study with reported success, denoting an area for further research. Technology-based and hybrid interventions are a promising frontier for prevention program dissemination, given their ease of use for the current generation, potential low-cost delivery, and ability to reach rural communities with less access to specialized intervention. However, it is critical that technological solutions for broader dissemination of interventions do not neglect those most in need, many of whom may have limited or no access to technology.

As innovative solutions for dissemination are being explored, primary care offers a setting in which a large number of individuals can be reached for the delivery of brief and universal preventive interventions. One advantage of primary care settings over schools is that parents often accompany their children to pediatric appointments and thus are more readily available to participate in the interventions than they may be in the school setting. A primary prevention program developed to prevent child abuse as well as parent-child conflict in Iranian families was administered in a primary care setting, and results supported improvements in parenting and reductions in parent-child conflict compared to a control condition (Oveisi et al., 2010). The primary care setting also provides an opportunity for screenings for secondary or indicated interventions (Berkovits, O'Brien, Carter, & Eyberg, 2010) as well as a setting for disseminating indicated preventive interventions (Gillham et al., 2006, described earlier). Importantly, as child mental health treatment is increasingly provided in primary care medical settings (Olfson, Blanco, Wang, Laje, & Correll, 2014), it will be increasingly important to determine the portability of effective preventive interventions to the primary care setting to reach the widest population of children, adolescents, and families at risk for the development of psychopathology.

Cost Benefit Analyses

An important consideration in evaluating the merits of prevention initiatives ultimately relates to cost benefit analyses. Such analyses can be challenging, as the very nature of prevention involves assessing development and adaptive or maladaptive functioning over time. Such longitudinal follow-up of prevention programs can be cost prohibitive. Moreover, individuals allocating dollars to prevention most typically want to see positive results on their watch rather than hearing about future benefits that will accrue many years later. However, at a time when limited funding necessitates difficult funding decisions to be made by policymakers outside of the field of preventive science, cost-benefit analyses are more important than ever and were cited as an area for improvement in the prior edition of this text (Ialongo et al., 2006). Although such analyses are not yet routinely reported in preventive intervention RCTs and much more work is still needed, there has been some progress in this domain. The cost-effectiveness of a cognitive-behavioral intervention for adolescents at risk for depression was assessed in an RCT comparing the active intervention to care as usual (Lynch et al., 2005). Analyses using quality-adjusted life years and depression-free days suggested that the intervention was cost-effective at $1,632 per participant, although it was noted that no other studies

reporting costs of preventive interventions for teen depression were available for comparison. A cost-benefit analysis of the Communities that Care prevention system, aimed at adolescent health and behavior problems at the community level, found a return of over $5,000 per youth involved in the study (Kuklinski, Briney, Hawkins, & Catalano, 2012). These benefits were found to be largely due to preventing delinquency. Cost-effective preventive interventions for child anxiety (Simon, Dirksen, & Bogels, 2013) and late-life anxiety and depression (van't Veer-Tazelaar et al., 2010) also have been identified. Notably, many of the studies that have evaluated cost-effectiveness for preventive interventions have employed different methods of assessment, making it challenging to compare results across studies. A more coherent program of research widely used in Australia is the Assessing Cost-Effectiveness (ACE) approach (Carter et al., 2009; Mihalopoulos, Vos, Pirkis, & Carter, 2011). One of the major strengths of this approach is the use of a standardized unit, disability-adjusted life years to assist in conducting cost-benefit analysis. The use of a standardized unit, such as disability-adjusted life years or quality-adjusted life years, allows for comparisons between interventions as well as across studies. Disability-adjusted life years take into account years that one loses due to premature morbidity as well as the number of years one lives with a disability (Mihalopoulos et al., 2011). ACE-Prevention is a large-scale study that was undertaken in Australia to evaluate preventive interventions for mental illness with the goal of providing feedback to policymakers (see Mihalopoulos, Vos, Pirkis, Smit, & Carter, 2011, for more details regarding findings). A coordinated large-scale investigation of the cost-effectiveness of preventive interventions commonly used in the United States is an important direction for further exploration.

FUTURE DIRECTIONS AND RECOMMENDATIONS

As articulated in this chapter, the last decade has heralded significant advances in the identification of efficacious interventions for individuals at risk for maladaptation and psychopathology. Moreover, progress has been made in identifying mechanisms whereby efficacious interventions operate to bring about positive change. However, despite progress, much work remains if we are to have an armamentarium of interventions that not only yield large effect sizes in intervention trials but also are effective across a range of diverse populations. Although we have made recommendations throughout this chapter, we conclude by highlighting future directions that we consider integral to continuing the positive evolution of prevention science.

Perhaps first and foremost, increased attention to the theoretical foundations underlying the development and evaluation of preventive interventions is needed. To date, social learning theory and attachment theory have been two of the most widely recognized theoretical frameworks utilized to guide the development of interventions. However, even in interventions guided by these theoretical models, the processes through which positive change emerges has been more difficult to ascertain. By fully considering the components inherent in various theoretical perspectives when designing and evaluating interventions, the likelihood of identifying mechanisms of change will be increased.

Related to this point, basic research on the processes involved with the development of psychopathology needs to be continued and expanded on so that this knowledge can be incorporated into the design and evaluation of interventions. Historically, far too much emphasis has been directed toward categorical diagnoses as intervention outcome indices. Unfortunately, while understandable, such approaches have hindered the elucidation of mediators of intervention efficacy. Rather than continuing to focus on diagnoses, we endorse Sroufe's (2013) recommendation that key capacities of positive adaptation that cut across diagnostic categories be examined. Such an approach is consistent with a developmental psychopathology perspective and holds considerable promise for providing a more comprehensive roadmap of areas of focus in the design and evaluation of preventive interventions.

Additionally, studies of resilience in individuals at risk for the emergence of psychopathology hold considerable promise for informing the development of interventions. Because resilience is a dynamic developmental process, it is critical that short- and long-term longitudinal studies on the determinants of resilient functioning are conducted in the future. Transitional turning points (Rutter, 2012) provide opportunities and challenges for individuals to remain on a positive trajectory despite ongoing adversity, to bounce back from a decline in functioning, to persist on a maladaptive trajectory, or to exhibit a decline in functioning from positive functioning (Cicchetti & Rogosch, 1997). In the conduct of longitudinal investigations, resilience should be conceptualized as a multidomain, multidimensional construct. Because changes in one domain of competent functioning can cascade to affect other developmental domains over time (Cicchetti & Tucker, 1994; Masten & Cicchetti, 2010), a longitudinal multiple-levels-of-analysis approach to investigating

resilient functioning will help to ensure that resilience processes are examined in a thorough and developmentally appropriate fashion. Findings from examinations of resilience hold considerable potential for informing prevention and intervention initiatives. When indicators of resilience are identified, they can be incorporated into the development of RCTs. The conduct of longitudinal investigations of resilience will be particularly important in ensuring that interventions are timed, guided, and implemented as closely as possible to the identification of deviations from adaptive functioning.

To obtain a more comprehensive understanding not only of contributors to the emergence of maladaptation and psychopathology but also to mechanisms of change in intervention studies, we need to increase the conduct of multilevel investigations that integrate biological and psychological indices. Although such investigations are costly and require cross-disciplinary expertise, such initiatives will be seminal to advancing the field of prevention science in the next decade. Multidisciplinary collaborations have been advocated by developmental psychopathologists since the inception of the field, and the recognition by federal funding agencies that multiple principal investigators may contribute equally to the conduct of such research has been helpful in advancing the conduct of multilevel studies. However, the field of prevention science remains in its infancy with respect to such initiatives, and we strongly advocate for increased momentum in this area. As advanced statistical methods available for the analysis of longitudinal and complex intervention trials have burgeoned, incorporation of individuals with requisite expertise in these methods on RCTs also emerges as an important direction for collaboration.

In the next decade, increased attention also needs to be directed toward developmental issues in the design, provision, and evaluation of interventions. Despite repeated calls for such research (Toth & Cicchetti, 1999; Toth et al., 2011), comprehensive studies of issues such as the identification of developmental windows during which the provision of a preventive intervention are most likely to affect optimal development have been slow to emerge. Relatedly, when an individual has experienced a significant stressor or a traumatic event, it remains unclear at what point the provision of intervention is most likely to be effective in alleviating future negative sequelae. Although certainly challenging studies to design and implement, attention to issues of developmental timing of intervention and its relation to outcome are of paramount importance.

Increasingly, research has demonstrated that subgroups of individuals may be more likely to derive benefit from a given intervention. In particular, an emerging body of research suggests that individuals at highest risk may benefit the most. Such findings highlight the importance of conducting screenings to identify individuals at particularly high risk. It may not be that more is always better for everyone. Given cost considerations, it behooves prevention scientists to continue to ascertain "what works best for whom."

Although RCTs with racially and ethnically diverse populations are increasing, much more attention needs to be directed toward ensuring that our knowledge base of efficacious interventions is not limited to middle-class Caucasian populations. Not only has basic research with clinical populations been biased toward reliance on groups with minimal diversity (Nezu, 2011), but studies of intervention efficacy also have suffered from this limitation. Unfortunately, when efforts are made to export efficacious interventions into community contexts, the absence of studies that have included racially and ethnically diverse individuals may limit community uptake, thereby reducing the availability of proven interventions to individuals in need. The paucity of racial and ethnic diversity also has begun to emerge in the conduct of investigations of G×E and differential susceptibility (Van IJzendoorn et al., 2012; however, see Brody et al., 2014, and Cicchetti et al., 2015, for exceptions). Because emergent G×E research has begun to identify differential responsivity to positive and negative contexts, attention to genetic moderation of response to intervention assumes critical importance in relation to heterogeneous groups of individuals.

Related to this point, as our knowledge on the genetic moderation of intervention responsivity increases, we need to identify and/or develop interventions for those individuals who have been found to be less likely to derive benefit from extant interventions. Although some might argue that we currently possess a sufficient corpus of interventions that have been found to be efficacious and that therefore efforts should be directed toward dissemination and scaling up such interventions, we believe that ultimately such an approach is ill-advised. Rather, we advocate for increased dissemination of proven interventions for those most likely to benefit from them as well as increased attention to the development of interventions for individuals who have not been found to derive as much benefit from existing models.

In addition to ensuring that efficacious interventions are available for diverse groups of individuals, we also strongly call for increased efforts to disseminate efficacious interventions into community settings. Rural areas and communities not geographically accessible to benefiting from the developments and trainings provided

by universities continue to be less likely to have access to evidence-based interventions. Unfortunately, individuals in these often isolated communities may be experiencing very high risk contexts and, as such, may be most in need of proven strategies to prevent negative outcomes. Developers of evidence-based models must increase the availability of efficacious interventions more broadly. In this regard, dissemination efforts such as those initiated by the National Child Traumatic Stress Network (www.nctsn.org) are to be lauded.

Throughout this chapter, we have discussed advances, as well as challenges, associated with the availability of increasingly sophisticated methodological and technological strategies. The incorporation of such methodologies into the design and evaluation of interventions offers exciting opportunities for advancing prevention science and for promoting the availability of efficacious models of intervention to vulnerable populations. However, in conjunction with our enthusiasm for such innovative methods and technologies, we offer a cautionary note. Utilization of these advanced strategies must be grounded in a solid theoretical foundation if their potential is to be realized. It is possible to allow technology to outpace sound science, and, ultimately, the absence of a foundational conceptualization will only obfuscate important advances in knowledge and dissemination of effective interventions.

In closing, we are inspired by the progress that has occurred over the last decade with respect to the development, evaluation, and availability of interventions for populations at risk for the development of psychopathology. However, far from resting on past achievements, new frontiers with respect to the conduct of multilevel investigations, longitudinal assessments, and increased incorporation of solid theoretical and developmentally informed foundations into the design and evaluation of interventions beckon those prepared to face the challenges inherent in the conduct of prevention science. It is our hope that the ideas proffered in this chapter will help to foster such advances in the decades ahead.

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CHAPTER 17

Culturally Adapted Preventive Interventions for Children and Adolescents

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WHY CULTURAL ADAPTATION IN DEVELOPMENTAL PSYCHOPATHOLOGY

This third edition of *Developmental Psychopathology* is the first to include a chapter focused on the cultural adaptation of evidence-based interventions (EBIs), a topic that represents a point of convergence for many of the core values and goals of the field. Whereas the overarching goal of developmental psychopathology is to elucidate the interplay among the biological, psychological, and social-contextual aspects of normal and abnormal development, the ultimate goal is to inform intervention strategies to promote resilience and prevent or ameliorate dysfunctional outcomes and disorder across the life span (Cicchetti & Hinshaw, 2002; Cicchetti & Toth, 1992). Infusion of cultural factors into EBIs is consistent with the fundamental tenet of developmental psychopathology that maturational, experiential, and cultural aspects of development are inseparably coalesced in ontogeny (Cicchetti, 1990). To the extent this produces differences in the existence, patterning, or impact of risk and protective processes for distinct subcultural groups, modifications to intervention programs and protocols may be needed to provide the best means of reducing psychopathology for these groups. Cultural adaptation has been defined as "the systematic modification of an evidence-based intervention or intervention protocol to consider language, culture, and context in such a way that it is compatible with the client's cultural patterns, meanings, and values"

(Bernal, Jimenez-Chafey, & Domenech Rodríguez, 2009, p. 362). Introduction of this topic in the current volume is well timed with respect to several disciplinary advances in developmental, cultural, clinical, public health, and prevention science and specifically with respect to research on cultural adaptation that has evolved over the past three decades to become a systematic and rigorous field of study in its own right (Barrera, Castro, & Holleran Steiker, 2011; Bernal & Domenech-Rodríguez, 2012; Castro, Barrera, & Holleran Steiker, 2010; Lau, 2006).

This chapter reviews the historical context and challenges that have given rise to this field, the methods and models used to address these challenges, and exemplars of culturally adapted interventions for children and adolescents. Although interventions to address the needs of vulnerable youth exist on a continuum from those that seek primarily to promote health and positive development for whole populations to those targeted at individuals with severe disorders (Weisz, Sandler, Durlak, & Anton, 2005), our presentation of exemplars broadly encompasses the preventive end of the spectrum that addresses risk before it has evolved into debilitating forms of psychopathology, including *universal* prevention approaches that address risk factors in general populations, *selective* preventive interventions that target those segments of the population with greater than normal risk of developing a disorder, and *indicated* approaches that focus on subgroups exhibiting early signs or symptoms of developing a disorder (Mrazek & Haggerty, 1994). The specific goals of the chapter are to: (1) articulate the issues and challenges that have shaped current approaches to cultural adaptation of EBIs; (2) review approaches and models for designing cultural adaptations of EBIs, including frameworks for deciding when, what, and how adaptations should be made; (3) present exemplars of cultural adaptations of EBIs targeting a range of social, emotional, behavioral, and health outcomes; and (4) summarize strengths, limitations, and future directions for the field.

DEFINITION OF CULTURE

Culture is a complex construct that describes the characteristics of a particular group of people, defined by everything from language, religion, cuisine, social habits, music, and arts. A distinct group of people (a tribe, an ethnic group, professional organization, a nation) can be described as "having a culture," meaning that its members share a collective system of values, beliefs, expectations, and norms, including traditions and customs, as well as sharing established social networks and standards of conduct that define them as a cultural group (Betancourt & Lopez, 1993). Although culture can be conceptualized at multiple levels to apply to more universal characteristics of the human experience to narrower conceptualization of the lifeways and worldviews of specific cultural groups and subgroups (Muñoz & Mendelson, 2005), the majority of prior research on cultural adaptation equates culture with ethnicity and race; consistent with this trend, our review of exemplars will focus on adaptations for distinct ethnocultural groups. However, as noted by many scholars (e.g., Castro et al., 2010; B. D. M. Wilson & Miller, 2003), the tendency to equate cultural adaptation with adaptation for specific ethnocultural groups may be misguided in some cases because there are numerous other potential sources of mismatch between an EBI and potential consumers that may be more relevant (Reyno & McGrath, 2006). For example, among the many adaptations of parent training (PT) interventions that have been conducted for distinct ethnocultural groups, a few researchers have adapted PT interventions in ways that transcend ethnicity and race to address issues of low socioeconomic status (SES) (e.g., Brotman, Gouley, Klein, Castellanos, & Pine, 2003).

A focus on ethnicity per se is further complicated by considerable heterogeneity that exists within racial and ethnic groups. In the United States, the four major ethnic groups (Latinos/Hispanics, African American, Asian Americans, Native Americans) collectively comprise approximately 37% of the total population, and they range in size from about 1 million for Native Americans to over 52 million for Hispanics/Latinos (U.S. Census Bureau, 2010). Within each of these broad groups, there exist many homogenous subcultural groups based on factors such as nationality, SES, religious background, immigration history, and generational status (Castro, Barrera, & Martinez, 2004). Asian Americans as an ethnic minority group, for example, are quite heterogeneous with over 20 subgroups (e.g., Chinese, Japanese, Filipino, Korean, Vietnamese, Laotian, Cambodian, etc.), each made unique by linguistic, cultural, and sociodemographic backgrounds and immigration histories in the United States (Sue & Morishima, 1982). Diversity among these Asian subgroups has been associated with a variety of differences in mental health service need, utilization, and outcome. Many scholars advocate population segmentation (Balcazar, Castro, & Krull, 1995), the identification and targeting of subgroups based on the intersection of these cultural dimensions, to avoid ethnic gloss (Trimble, 1995) in planning an intervention. However, opposing arguments counter that the adaptation of interventions for increasingly smaller segments

of the population is not feasible given the number of treatments, disorders, developmental stages, and a host of other factors that would generate a matrix impossible to manage (Kazdin, 2008). Moreover, many interventions ultimately will be delivered in multicultural settings and for populations that are changing on cultural dimensions. Alternative models proposed to address this issue have included adaptive approaches (Collins, Murphy, & Bierman, 2004) that provide opportunities for dynamic sizing (Sue, 2006) or tailoring (Zayas, Bellamy, & Proctor, 2012) of culture-specific program elements on a case-by-case basis (McCabe, Yeh, Garland, Lau, & Chavez, 2005; Pina, Villalta, & Zerr, 2009). In most cases, however, clarity regarding one's conceptualization of "culture," including the theoretical rationale or empirical evidence for expecting cultural differences among subcultural groups or between individuals within a distinct subgroup, is often lacking to support such nuanced models.

HISTORICAL CONTEXT OF CULTURAL ADAPTATION RESEARCH

Cultural adaptation takes the position that, to be effective, interventions must be responsive to the cultural practices and worldviews of the subcultural groups for whom these interventions are intended (Resnicow, Soler, Braithwaite, Ahluwalia, & Butler, 2000). Although this view has gained significant traction over the years as the diversity of the U. S. population has expanded exponentially, this point continues to be a matter of significant debate with strong arguments still voiced about the wisdom, necessity, and feasibility of this position (Elliot & Mihalic, 2004; Kazdin, 2008; Ortiz & Del Vecchio, 2013). Objections notwithstanding, cultural adaptation has emerged as an active research area in response to several key developments across disciplines grappling with the role of culture in the provision of behavioral, psychological, and health interventions for diverse populations (Barrera, Castro, Strycker, & Toobert, 2013; Bernal & Domenech Rodríguez, 2012).

Historically, the broader debate about the cultural relevance of psychology to ethnically diverse populations has been a fundamental driving force**.** The cultural movement in psychology, including the emergence of cross-cultural, multicultural, ethnicity, culture, and race studies over the past three decades, challenged the universality of contemporary theories and raised awareness regarding the lack of representation of ethnic minority populations and the lack of attention given to culturally relevant processes in both basic and intervention research (Betancourt & Lopez, 1993; Markus & Kitayama, 1991; Sue, 1998). In developmental science, seminal papers highlighted the importance of testing integrative, ecologically, and culturally valid models that could better account for unique cultural experiences of ethnic minority children and families and the role of culture in shaping or altering normal and abnormal development (García Coll, et al., 1996; Szapocznik & Kurtines, 1993). Several scholars in intervention sciences (e.g., McGoldrick & Giordano, 1996; Rogler, Malgady, Constantino, & Blumenthal, 1987; Sue, 1998) argued that the majority of science-based interventions, while characterized as universal, are often validated on and influenced by the values and interests of urban or suburban, White, middle-class samples. Consequently, EBIs may not be relevant for addressing issues confronting differing subgroups, including racial-ethnic minority and rural White populations. Even more serious assertions have been expressed that interventions developed without respect for diversity might be used, intentionally or not, to inculcate values, beliefs, and norms of the dominant culture with the result of devaluing, dismissing, replacing, or even eliminating the culture and language of origin (Comas Díaz, 2006; Gone, 2004). Short of such colonialistic concerns, yet still troubling, was mounting evidence of massive health disparities between European American and American ethnic minorities (U.S. Department of Health and Human Services, 2001) coupled with data showing minority populations lack access, enroll at lower rates, and are more likely to drop out of interventions that might reduce these disparities (Smedley, Stith, & Nelson, 2003). Beginning in the 1990s, these developments and other awareness-raising efforts paved the way to policy changes regarding inclusion of cultural minorities in funded research (National Institutes of Health, 1994) and a growing imperative to provide culturally relevant interventions and services for these populations (U. S. Department of Health and Human Services, 2010). Although ethnic minority groups remain underrepresented in clinical trials and published research (Ortiz & Del Vecchio, 2013; Wendler et al., 2006), particularly in top-tier journals (Hartmann, Kim, Kim,et al., 2014), the number and quality of culturally informed developmental studies and interventions trials has increased steadily since the early 1990s.

A second major influence, beginning in the 1990s, was the emphasis on empirically validated interventions as the gold standard for professional practice (Chambless & Hollon, 1998) and a prerequisite for broad diffusion of prevention and health promotion programs (Flay et al., 2005). On the basis of established criteria for EBIs to receive the label of "efficacious" or "effective," special initiatives

and governing bodies across public health service sectors were charged with the task of creating registries to identify and catalog EBIs ready for public dissemination (e.g., the National Registry of Evidence-Based Prevention Programs and Practices; the Collaborative for Academic, Social, and Emotional Learning, the Blueprints Violence Prevention Initiative, the What Works Clearinghouse). By prioritizing programs with established evidence, the majority of which had been validated initially without representation or attention to cultural diversity, the cultural adaptation agenda was solidified. During the past decade and a half, increasing attention has been given to adapting EBIs for use with ethnic, cultural, and racial minority groups who were not part of the original intervention development process. The ascendancy of EBIs and standards of evidence also resulted in a high premium being placed on fidelity of implementation, often as detailed in program manuals (Addis & Cardemil, 2006), and the belief that program effects are best attained under strict adherence to the intervention's procedures as designed and validated (Elliot & Mihalic, 2004). Thus, the fundamental fidelity-adaptation dilemma, which consists of a "dialectic involving arguments favoring fidelity in the delivery of an EBI as designed versus arguments favoring the need for adaptations to reconcile intervention-consumer mismatches in accord with the needs and preferences of a subcultural group" (Castro et al., 2004, p. 221), became the core challenge for this emerging field.

Significant developments in prevention science over the past three decades have also been important in shaping the cultural adaptation agenda. Because the goal of prevention, even more so than treatment, is to maximize public health access and achieve population-level impact (Spoth et al., 2013), ensuring relevance to diverse populations has long been a central concern. A 2009 report on prevention of child social, emotional, and behavioral disorders summarized an impressive body of evidence demonstrating that, when carefully implemented, prevention and health promotion programs can prevent a wide range of health problems, promote positive development, and achieve economic benefits (National Research Council and Institute of Medicine, 2009). As summarized in this report, numerous randomized trials have shown that these types of interventions have had significant, long-term effects in reducing unhealthy eating, physical inactivity, alcohol, tobacco and other drug abuse, teen pregnancy, school failure, delinquent behavior, and violence as well as other mental, emotional, behavioral, and physical health problems. However, this same report also summarized studies showing that a relatively small percentage of these interventions actually are implemented by community-based program delivery systems (e.g., public schools, health care facilities, social service agencies). This report thus underscored a significant problem and an important shift in emphasis, already under way in the field, toward greater focus on effectiveness and implementation studies and a push toward broader community diffusion of EBIs. Distinctions between *efficacy* and *effectiveness* are important for the field of cultural adaptation. Whereas efficacy measures how well an intervention works when tested within the controlled conditions under which it was designed, effectiveness measures how well the intervention works in an applied real-world setting (Flay et al., 2005). The shift in emphasis toward evaluating the evidence of effectiveness studies to determine what preventive programs work, for whom, and under what circumstances is greatly needed to move the field forward in launching successful population-based prevention strategies (Brown, Berndt, Brinales, Zong, & Bhagwat, 2000). Further, a rigorous evaluation of broad dissemination and implementation has important implications for the future of research on cultural adaptation. Moving EBIs into widespread, population-level diffusion requires attention to cultural diversity yet also puts a high priority on adaptation to meet the needs of the local community as well as the service settings in which interventions are delivered (Brownson, Colditz, & Proctor, 2012). Such integration of cultural adaptation and implementation science ultimately will be needed to meet the challenge of reducing racial and ethnic disparities in health (Cabassa & Baumann, 2013).

A final, emergent historical force likely to shape future research on cultural adaptation is the spread of evidence-based practice throughout the world. Countries across the globe are increasingly implementing interventions developed in other countries to address their own public health problems. This trend has already resulted in the wide adoption of EBIs and a growing number of controlled trials of imported and culturally adapted EBIs. The government of Norway implemented a countrywide dissemination of the Parent Management Training–Oregon Model (Forgatch, 1994; Patterson, Reid, & Dishion, 1992) and multisystemic therapy (MST; Henggeler, Schoenwald, Borduin, Rowland, & Cunningham, 1998) to target youth behavior problems (Ogden, Amlund-Hagen, Askeland, & Christensen, 2009). The Swedish National Board of Health and Welfare (2011; cited in Ferrer-Wreder, Sundell, & Mansoory, 2012)) reported that, in the last 10 years, imported EBIs comprised over 40% of the total number of social and behavioral interventions tested in Sweden. A recent review of randomized trials narrowly focused

on parent training (PT) interventions to reduce family violence in low- to middle-income countries (Knerr, Gardner, & Cluver, 2013) identified trials spanning 9 countries (Brazil, Chile, China, Ethiopia, Iran, Jamaica, Pakistan, South Africa, and Turkey); given the strict criteria for inclusion in this study of randomized trials, the actual practice of international implementation is likely to be even more extensive.

Although the majority of imported EBIs are based on interventions initially developed in the United States, programs such as the Olweus Bullying Program developed in Norway (Schroeder et al., 2012) and the Triple P parenting intervention from Australia (Sanders, 2012) are examples of programs successfully transported to the United States and several other countries. Thus, the proliferation of interventions crossing international boundaries is well under way, and many of the same debates are taking place about the need to adapt interventions for international diffusion, with some experts cautioning against the trend for global dissemination without careful attention to cultural adaptation (Bernal & Scharró-del-Rio, 2001) and others challenging the assumption that such adaptations are necessary (Knerr et al., 2013). Noting some examples of imported EBIs that have failed to show expected benefits, Ferrer-Wreder, Sundell, and Mansoory (2012) recently advocated systematic, theory-driven international adaptation studies to give researchers an improved ability to empirically test degrees of intervention adaptation in relation to intervention effectiveness and thereby improve the field's ability to learn from both its successes and failures. Their approach draws on models that primarily have been used for domestic adaptations, yet also highlights additional challenges for the future of cultural adaptation as a global endeavor.

Propelled by these historical forces and attempts to address the underlying tensions and controversies they have engendered, cultural adaptation of EBIs has evolved over the past three decades into a well-defined area of study that now spans multiple disciplinary boundaries. The number of interventions that have been adapted and evaluated has grown and, in the process, systematic, data-driven, consumer-sensitive processes have been established for determining if EBIs should be adapted, how they should be adapted, and the results of those adaptations on engagement and intervention efficacy and effectiveness (Barrera et al., 2013). We summarize these developments in the next section, then follow with a summary of exemplars of culturally adapted EBIs that target a range of child and adolescent psychological, behavioral, and health problems.

THE RATIONALE FOR CULTURAL ADAPTATION: GUIDELINES TOWARD A MORE SYSTEMATIC AND TARGETED APPROACH

In 2006, Lau proposed a compelling framework for identifying circumstances that would justify a cultural adaptation of an EBI. This thoughtful discussion articulated a balanced perspective on cultural adaptation, assuming its importance yet also allowing there are likely to be interventions and conditions for which it is not warranted. For example, prominent examples exist of non-adapted preventive interventions, including some of the most widely disseminated programs in the field, that have demonstrated efficacy in trials with large numbers of ethnic and racial minorities (e.g., MST; Henggeler et al., 1998) or when specifically applied to distinct ethnocultural groups in the United States (e.g., Nurse Family Partnerships; Olds et al., 1997). Lau's Selective and Directed Treatment Adaptation Framework (SDTAF) advocated a theory- and data-driven approach for determining if an EBI should be culturally adapted and, if so, which intervention elements might be altered.

The "selective" dimension of this framework recommended cultural adaptations should be pursued only when evidence suggests that delivering a standard treatment would result in a high probability of failure. Some scholars suggest adaptations should not be made to interventions until the original version has been implemented and problems have arisen (Kumpfer, Pinyuchon, de Melo, & Whiteside, 2008). Sanders (2012) argued for a deployment-focused model of adaptation that privileges the responses from participants who may be in a better position to gauge the acceptability of an intervention, as reliance on the perceptions of professionals serving ethnic minority communities may result in filtering by "cultural gatekeepers" who hold views on cultural acceptability that may differ from intended recipients (Lau, 2012; Morawska et al., 2011). The "directed" part of the Lau's framework addresses the question of what to adapt, indicating that adaptations to content or procedures should be pursued only when evidence suggests such modifications are needed. This framework was additionally important for highlighting that adaptations directed at attracting and engaging distinct ethnocultural groups are equally important as those directed at improving intervention outcomes.

Lau's framework prompted dialogue among cultural adaptation scholars that led to significant changes in the conceptualization of cultural adaptation. In a response to Lau (2006), Barrera and Castro (2006) elaborated on

the conditions in which an adaptation would be justified, which they organized into four categories: (1) ineffective engagement, such as poor recruitment, retention, program attendance, or participation in intervention activities; (2) unique risk or resilience factors underlying the intervention target (e.g., discrimination experiences), or that function differently across cultural groups; (3) unique symptoms of a common disorder; and (4) poor intervention efficacy for a particular subcultural group. Other models of cultural adaptation to be discussed later have since incorporated these suggestions by placing a high priority on initial data gathering as a way to determine whether and what to adapt. However, despite these aspirational frameworks, it has been rare for such systematic decisions to be articulated in the cultural adaptation literature. EBI adaptations often have been conducted without first demonstrating diminished engagement or benefit, and often without theory or evidence about unique risk and resilience factors guiding adaptation efforts.

THE CONTENT OF CULTURAL ADAPTATION: SURFACE STRUCTURE, DEEP STRUCTURE, AND CORE COMPONENTS

Focusing on the content of cultural adaptations, Bernal, Bonilla, and Bellido (1995) were among the first to identify the intervention elements that may require adaptation to increase ecological validity or congruence between the client's ethnic and linguistic context and the cultural properties embedded in an intervention. The Ecological Validity Model identified eight dimensions in which intervention adaptations are likely to be made. Some of these dimensions are more likely to involve adaptations to specific aspects of the intervention itself (e.g., language, metaphors, content, concepts, goals, and context), while others are more relevant to the intervention's implementation support structures (e.g., persons and methods). Resnicow, Soler, Braithwaite, Ahluwalia, and Butler et al. (2000) also focused on the content of cultural adaptation, describing aspects of the program, protocol, or delivery system that might require adaptation; they introduced the influential distinction between *surface structure* and *deep structure* adaptations. In their words, "Surface structure establishes feasibility, whereas deep structure determines program impact" (p. 274). Surface structure adaptations typically involve change in an original EBI's materials or activities that address observable and superficial aspects of a target population's culture, such as language, music, foods, clothing, and other observable aspects. An intervention's deep structure involves the processes related to the problem of interest and is more likely to involve the theory-based mediators of the intervention that are thought to affect therapeutic change mechanisms or outcomes.

There is wide agreement that surface structure changes are not only permissible but often necessary to convey respect and achieve "cultural attunement," a term coined by Falicov (2009) to refer to additions to EBIs that are intended to boost engagement and retention of subcultural groups in treatment. Providing services in clients' native language, including familiar cultural traditions and teaching methods (e.g., storytelling, games), and utilizing individuals of color as educational facilitators are examples of features that might attract subcultural groups into treatment and increase their sustained participation. Surface structure changes are also important to maximize comprehension (e.g., understandable content that is matched to the linguistic, educational, and/or developmental needs of the consumer group), motivation (e.g., content that is interesting and important to this group), and cultural relevance (content and materials that are applicable to participants' everyday lives), as described by Castro et al. (2004).

Advisability of deep structure change is a matter of debate among adaptation experts. The reluctance to make deep adaptations is related to the belief that there are features of a program that should not be changed because they reflect the core components or the internal change processes of the intervention responsible for program effects (Falicov, 2009). However, the boundaries of deep structure are not always clear and are generally a matter for program developers to define. Evidence from mediation studies that aim to identify core components (MacKinnon, Fairchild, & Fritz, 2007) can provide guidance, but tests of mediation are not always available nor do they include all components that program developers might include in their definition of the program's core components. For example, in the cultural adaptation of the New Beginnings Program for divorcing parents that was conducted to prepare for an effectiveness trial in family courts (Wolchik et al., 2009), mediation analyses identified specific parenting strategies to retain because they accounted for both immediate and sustained program effects (Tein, Sandler, MacKinnon, & Wolchik, 2004; Zhou, Sandler, Millsap, Wolchik, & Dawson-McClure, 2008), but, in addition, program experts identified intervention processes (e.g., home practice assignments and review) as additional aspects of what they considered to be "core components" to be preserved in the adaptation process. Kumpfer et al.

(2008) drew a strong line at making changes to program components, the timing, and the overall structure of the Strengthening Families Program (SFP) when adapting it for international dissemination. They defined these as deep structure adaptations based on experiences and evidence from effectiveness studies of SFP with American ethnic subgroups that showed diminished effects when such adaptations were made (Kumpfer, Alvarado, Smith & Bellamy, 2002).

A second major class of adaptation involves the introduction of novel or augmented intervention content to target risk factors for youth psychopathology that fall outside the foci of the original EBI. In this way, interventionists targeting culturally diverse populations supplement intervention content to address ecological risk and protective factors pertinent to specific cultural communities (e.g., Coard, Wallace, Stevenson, & Brotman, 2004; Lau, Fung, Ho, Kiu, & Gudiño, 2011; C. R. Martinez & Eddy, 2005). Intervention development studies that draw from existing EBIs but infuse additional elements in which culture is a primary consideration sometimes favor the term *culturally informed* (Falicov, 2009) or *culturally tailored* (Bernal & Domenech Rodríguez, 2012) over *cultural adaptation*. Bernal and Domenech Rodríguez (2012) highlighted that incorporation of cultural dimensions such as interdependence, spirituality, relational views of self, and particular worldviews into an intervention can serve goals of supporting the culture and language of origin and the development and maintenance of cultural values, both of which are empowerment strategies. These added elements may not necessarily change core components but can enrich program effects in ways that are specific to the struggles, needs, and strengths of distinct ethnocultural groups. Even the Kumpfer et al. model (2008), which drew a hard line against deep structure change, did not tacitly prohibit augmented content so long as core components are not displaced. When cultural augmentation occurs, clear documentation of added components and inclusion of measures to assess change on these cultural components can facilitate understanding of whether, how, and to what extent they contribute to intervention outcomes, yet these types of analyses are rare in the literature (Castro et al., 2010)

The admonition against changing core components in the process of cultural adaptation is based on the assumption that the theory of change involved is universally relevant and powerful. To the extent that these assumptions are not accurate, more extensive modifications may be needed. Castro et al. (2004) described a continuum among interventions that incorporate cultural elements that varies between the extremes of making minor surface structure alterations to an original EBI to the complete rejection of the EBI in favor of a novel, culturally grounded approach; the latter falls outside the boundaries of what some scholars would define as "culturally adapted." Unlike cultural adaptations that begin with an established EBI and then work to integrate cultural elements that increase relevance and fit for subcultural groups, culturally grounded approaches begin with an assessment of need obtained from members of a particular subcultural group who then participate actively in developing the intervention from the ground up (McKay et al., 2004). The latter approach is based in models of community-based participatory research (CBPR; Minkler & Wallerstein, 2003) and is contrasted with the traditional Prevention Research Cycle, which includes a series of stages that begins, instead, with (a) basic research typically conducted in a university setting to identify a disorder's risk and protective factors, then continues to (b) the design of an intervention that changes modifiable risk and protective factors, (c) empirical trials of the intervention to determine efficacy and to inform intervention modifications, (d) effectiveness trials to assess generalizability to real-world applications, and (e) large-scale intervention dissemination (Mrazek & Haggerty, 1994). Interventions based on the CBPR framework have gained in popularity recently, partly in response to problems that university-based EBIs developed in the Prevention Research Cycle tradition have encountered in going to scale (Barrera et al., 2011). The belief is that programs developed through a CBRP model may be more likely to be adopted and sustained because they are responsive to the cultural and local conditions, organizational structure, and history that influence implementation and because the community has an established investment in the program from the outset (Wandersman, 2003).

PROCESS MODELS OF CULTURAL ADAPTATION: SYSTEMATIC APPLICATION OF BEST PRACTICES

Perhaps the most significant advance in the cultural adaptation literature over the past two decades is the proliferation of conceptual frameworks that describe the processes that can be used in designing, implementing, and evaluating a culturally adapted EBI. To date, more than 13 different models of cultural adaptation spanning both prevention and treatment have been published, almost all within the past 10 years (for reviews, see Castro et al., 2010; Domenech Rodríguez & Bernal, 2012; Ferrer-Wreder et al., 2012). Frameworks relevant to

prevention are listed in Table 17.1, which also identifies similarities and differences in their content, comprehensiveness, and scope. Although developed independently, these frameworks exhibit considerable consensus in their recommendations. For example, most models delineate specific stages or phases in the adaptation process, ranging from three to nine steps across models, but generally covering the four phases recommended by Barrera and Castro's (2006) Heuristic Model (HM): gather information, make preliminary adaptations to the intervention, test the preliminary adaptations, and refine adaptations.

Like most models, the first step outlined by Barrera and Castro (2006) involves a formative stage of information gathering to be used in planning along the lines of Lau's selective and adaptive recommendations. Across models, this phase relies on multiple sources of both quantitative and qualitative information, such as reviews of the literature to understand common and unique risk factors and focus groups to assess perceived positives and negatives of the original EBI. Domenech Rodríguez and Bernal (2012) highlighted the importance of blending a positivist paradigm in which randomized controlled trials (RCTs) are the gold standard for testing the utility of interventions with a pragmatist view that also uses qualitative sources of knowledge to guide decisions. Collaboration with relevant community stakeholders, such as program developers, agency staff, and community members, is another common feature at this stage and throughout the cultural adaptation process. The second phase in Barrera and Castro's model involves program design in which changes are made along the many dimensions described by Bernal et al. (1995) and Resnicow et al. (2000), including to the intervention protocol, interventionists, training, recruitment, and monitoring systems. This stage often involves multiple iterations of cultural adaptation and feedback from community stakeholders, including intervention participants themselves, in an attempt to maximize cultural fit. In the third step, case studies or pilot studies are used to refine recruitment, intervention, and assessment processes, again using both quantitative and qualitative data to evaluate impact of the intervention on engagement, consumer satisfaction, and intervention processes. This stage also may involve multiple iterations of pilot testing and refinement to prepare for the fourth stage, in which the final intervention package is prepared for a more robust test of the culturally adapted intervention.

Although most of the models listed in Table 17.1 cover similar phases and recommendations, there are important differences between them. Two of the models, the Adaptation for International Transport of Strengthening Families Program and the International Implementation of Multisystemic Therapy, were developed in relation to the adaptation of specific programs, whereas others offer generic or general guidelines for the field. The models also vary in terms of their intended application in different countries versus a primary focus on domestic ethnocultural groups. Finally, whereas some models are focused on the endpoint of preparing for evaluation of program efficacy, others are oriented toward effectiveness and dissemination. For example, the model for international implementation of MST was developed to support cross-national adaptation and dissemination of multisystemic therapy (Schoenwald, 2008). MST, a systems-oriented family therapy designed to benefit troubled adolescents who have exhibited conduct and/or substance abuse problems, has been implemented in 34 states in the United States and 15 countries to date (Henggeler & Schaeffer, 2010). In contrast to cultural adaptation models focused primarily on program content and design, the international implementation of MST model attends to implementation issues, such as the selection of appropriate clinical staff, training materials and procedures, and the clinical delivery system. Kumpfer and colleagues (2008) delineated a model based on their experience disseminating the SFP around the globe. Their 9-step model (see Table 17.1) begins with a needs assessment and selection of an appropriate EBI and ends with a model that is ready for cross-national dissemination.

The Planned Intervention Adaptation (PIA) protocol is unique because it is a generic model for cross-national adaptation of interventions and is geared toward the design of effectiveness and dissemination trials of imported EBIs (Sundell & Ferrer-Wreder, & Fraser, 2014). In PIA, cultural groups are conceptualized as nested, recognizing that distinct subgroups (e.g., Swedes with a Latino family background) are nested within a larger cultural context (e.g., a Swedish community), thus attempting to address the challenge of attaining cultural sensitivity to the unique conditions produced by these intersecting aspects of culture. PIA begins with formative research (phase I), followed by an effectiveness trial (phase II), which provides evidence that may indicate a need for another round of adaptation or a dissemination study. At the conclusion of PIA's phase II, the feasibility of a dissemination trial is evaluated by program developers and new stakeholders. PIA also specifies a time period for the initial adaptation stages and a sampling strategy for formative studies. Phase I of PIA is recommended as a roughly 1.5- to 2-year period when intervention developers and stakeholders (agency staff, potential consumers) agree to collaborate on five preliminary steps that are summarized in a table and detailed

TABLE 17.1 Models of Cultural Adaptation by Date of First Publication

		Content of Adaptation	Steps/Phases of Adaptation	Stage of Research	Cultural Groups Targeted[1]	Generic vs. Specific Application
Ecological Validity Model (EVM)	Bernal et al. (1995)	Language, persons, metaphors, content, concepts, goals, methods, context	None specified	General use in research and practice contexts	Broadly applicable (domestic, international)	Generic
Cultural Sensitivity Model	Resnicow, Baranowski, Ahluwalia, & Braithwaite (1999); Resnicow et al. (2000)	Distinguished 2 adaptation types: Surface structure Deep structure	None specified Recommended use of both qualitative and quantitative data sources	Broadly focused on preparing for implementation	Broadly applicable (domestic)	Substance use and public health programs
Cultural Adaptation Process Model	Domenech Rodríguez & Wieling (2004)	Emphasized EVM dimensions (Bernal et al., 1995)	Set the stage Initial adaptation Adaptation iterations	General use in research and practice contexts	Broadly applicable (domestic)	Generic
Selective and Directed Treatment Adaptation Framework	Lau (2006)	Identified 2 goals: Enhance engagement Enhance program effects	None specified Decisions about whether to adapt and what to adapt should be guided by evidence	Not specified	Broadly applicable (domestic)	Generic
Heuristic Framework for the Cultural Adaptation of Interventions	Barrera & Castro (2006); Castro et al. (2010)	Adaptations address: Ineffective engagement Unique risk or resilience factors Unique symptoms Lack of efficacy	Gather information Preliminary adaptations Pilot test adaptations Refine adaptations	Adaptation of EBI for efficacy trial with distinct group	Broadly applicable (domestic)	Generic
Culturally Specific Prevention Model	Whitbeck (2006)	Culture-specific risk and protective factors must be considered. Target group knowledge equally important as scientific evidence.	Review existing evidence Target group reviews existing evidence Cultural translation of risk and protective factors Identify unique risk and protective factors Conduct efficacy trial	Model starts with local community defining the problem and extends to efficacy trial	American Indian communities	Generic
Adaptation for International Transport of Strengthening Families Program	Kumpfer et al. (2008)	Fidelity requires cultural adaptation but not modification of program components, timings, or overall structure	Needs assessment Select EBI to adapt Implement original EBI with minor modifications Select and train staff Implement with fidelity Adapt continuously through pilot tests Revise to enhance engagement Conduct evaluation Disseminate results	Dissemination	International	Strengthening Families Program
International Implementation of Multisystemic Therapy	Schoenwald et al. (2008)	Adaptations relevant to: implementation processes, clinical staff, training materials and procedures, clinical service delivery	Pre-implementation (assess needs and stakeholders; understand legal and social standards; determine staffing and consultants) Implementation (translate and "tweak" intervention; adapt training protocols) Service delivery (consider service duration; time and caseload standards; on-call systems; cultural advisors)	Dissemination	International	Multisystemic therapy

TABLE 17.1 (*Continued*)

		Content of Adaptation	Steps/Phases of Adaptation	Stage of Research	Cultural Groups Targeted[1]	Generic vs. Specific Application
ADAPT-ITT	Wingood & DiClemente (2008); Latham et al. (2010)	Adapt program to maintain fidelity to core components	Assess needs of target group and agency capacity to implement. Decide on EBI. Target group input. Adapt program. Topical experts review first draft. Integrate feedback in second draft. Train implementation staff. Pilot test, revise, evaluate.	Dissemination	Broadly applicable (domestic, international)	HIV interventions
Planned Intervention Adaptation Protocol	Ferrer-Wreder et al. (2012)	Use formative research to evaluate relevance of risk and protective processes and the need for surface and deep adaptations	Formative research. Effectiveness trial. Dissemination.	Effectiveness and dissemination	International	Generic

[1] Indicates cultural groups targeted and whether the model has been applied domestically, internationally, or both.

in text (e.g., language translations, tests of translated materials, focus group checks on cultural appropriateness of intervention materials and activities). These preliminary steps help shape the adapted intervention. In phase II of PIA, the authors recommend a three-arm effectiveness study in which a minimally adapted intervention (just surface structure changes, such as language translation), a fully adapted intervention (both surface and deep structure changes), and a control condition are tested. They also recommended the inclusion of appropriate measures and data analytic procedures to identify possible mediators and moderators of intervention effects. Unfortunately, based on Sundell et al.'s (2014) article, it is not certain that the PIA framework actually has been used in international adaptations of interventions.

Common to all models is the expectation that cultural adaptations will be evaluated, either in randomized efficacy or in effectiveness studies. Several questions are critical to address, including effects on engagement and program outcomes and test of mediators and moderators. In efficacy trials, effects on program mediators are useful to identify core components of the intervention to guide future dissemination and effectiveness studies in other contexts or with other populations (e.g., Gonzales et al., 2012; Lau et al., 2011; Murry et al., 2013). Studies of culturally adapted interventions also offer important opportunities to test whether cultural elements included in the adaptation contribute to intervention efficacy (Castro et al., 2010; B. D. M. Wilson & Miller, 2003). Evaluation of cultural adaptation in the context of effectiveness studies can test whether cultural adaptations impact program uptake and fidelity, the best methods to train interventionists and monitor delivery, and program effects on distinct ethnocultural groups receiving services in natural delivery settings, and whether interventionists are more or less likely to adhere to the intervention protocol when delivering culturally adapted interventions (Spoth et al., 2013). Test of moderators can identify subgroups that may show differential response in terms of engagement or outcomes based on dimensions such as acculturation or adversity (Gonzales et al., 2011; Lau et al., 2011), thus advancing understanding of the need for population segmentation while also identifying subgroups most likely to benefit and those that may need further adaptations. Perhaps the most important question rarely addressed when evaluating culturally adapted interventions is whether the adapted EBI is more effective or offers other added benefits (e.g., increased likelihood of adoption in the community, higher enrollment rates) when compared with the original EBI (Castro et al., 2010; Resnicow et al., 2000).

Although it remains a largely unaddressed empirical question, it is possible that the extent of optimal changes to an EBI also will depend on the nature of the EBI to be adapted. For example, adaptations may be more important

for interventions that target family processes than for those delivered in schools, or when they target specific mediators or outcomes. In the next sections, we present a qualitative summary of culturally adapted interventions to prevent a range of child and adolescent emotional, behavioral, and health problems that have been evaluated in RCTs. Our presentation features exemplars and is not intended as an exhaustive review. Because the nature and impact of cultural adaptation may vary depending on the nature of the intervention, we focused our review on four distinct domains. Two broad domains—adaptations of PT interventions and adaptations of sexual risk and drug preventive interventions—were chosen because they represent the most active areas for past research on cultural adaptation. We also include a summary of adapted prevention interventions targeting child and adolescent internalizing outcomes that are less common due to a relative lack of focus in prevention on problems such as anxiety and depression. Our final domain includes health-focused preventive interventions, a newly emerging and important area of emphasis for reducing minority health disparities. Our purposes in presenting this collection of exemplars is to examine: (a) the extent to which child and adolescent interventions have been adapted for distinct ethnocultural groups, including for which groups and for what types of preventive interventions; (b) the processes used and the nature of adaptations that have resulted; (c) and the evidence base for addressing key question about efficacy or effectiveness, including tests of underlying cultural dimensions that account for program effects, subgroup differences in intervention responsiveness, and the most salient question: Do cultural adaptations make a noticeable impact on outcomes? In each section, we first describe the prevention domain, the types of EBIs in each domain that have been culturally adapted and the evidence base to support them, and the empirical or epidemiological basis to suggest that cultural adaptations of these EBIs may be relevant to the public health needs of targeted groups.

PARENT TRAINING INTERVENTIONS

Maladaptive parent-child interactions have been found to precede the onset of or to maintain multiple forms of child psychopathology across both externalizing and internalizing spectrums. Even in conditions not primarily driven by environmental socialization factors, research has documented the ameliorative effects of instantiating specific types of parent-child interactions in improving outcomes of various forms of psychopathology (e.g., joint attention and symbolic play for autism spectrum disorders). As such, family-based interventions often form the foundation of prevention and intervention programs across a range of psychopathology targets. In particular, EBIs for conduct disorder and related externalizing behavior problems in youth almost uniformly include PT as the sole or first line intervention, or as a major component of a multisystemic intervention. The purpose of PT is to prevent and decrease disruptive behavior and increase prosocial behaviors in children. The efficacy of PT is well established with robust evidence of clinically significant improvements in child conduct problems (Eyberg, Nelson, & Boggs, 2008; Sheldrick, Kendall, & Heimberg, 2001). Treatment aims to improve on parents' skills and increase the consistent use of those skills. PT is rooted in social learning theory (Bandura, 1977) with specific strategies designed to interrupt cyclical coercive interactions during which aversive behaviors emitted by parents and children are negatively reinforced (Patterson, Chamberlain, & Reid, 1982). Common elements across PT interventions serve to reinforce appropriate child behavior (e.g., positive attention, praise, tangible rewards) while removing reinforcement or punishing negative child behavior (e.g., differential attention, time-out, response cost) (Garland, Hawley, Brookman-Frazee, & Hurlburt, 2008). Parents are also instructed to structure expectations for appropriate behavior through limit setting, routines and rules, and effective commands. Consistent with the Hanf (1969) two-stage model, PT interventions typically begin with instruction, modeling, and rehearsal of positive reinforcement skills to increase prosocial behavior before introducing elements intended to address child misconduct. The rationale is that a more positive parent-child relationship sets the stage for more child compliance and better uptake of positive discipline strategies. Yet some experimental evidence refutes this assumption (Eisenstadt, Eyeberg, McNeil, Newcomb, & Funderburk, 1993).

The application of interventions prescribing fundamental changes in child-rearing practices at the population level has been questioned. Parenting sensibilities and routines are embedded within a system of meanings, shaped by cultural context and values regarding the socialization of the moral child and the expected roles of adult caregivers and children within family structures (Harkness & Super, 1996; Weisner, 2002). Discourse on the application of PT with ethnic minority families has enumerated potential cultural barriers to engagement among parents whose own socialization experiences fall outside middle-class European American heritage (e.g., Barker, Cook, & Borrego, 2010; Forehand & Kotchick, 1996; Lau, 2006). Given

that parent-child relations and discipline practices are the proximal targets of change, many have cautioned that cultural barriers may threaten the generalizability of PT effects. Wide cultural variation in parenting practices and values across ethnic groups may influence receptivity to PT elements, perhaps accounting for increased attrition (e.g., Kazdin & Whitley, 2003), low enrollment (e.g., August, Lee, Bloomquist, Realmuto, & Hektner, 2003; Cunningham et al., 2000) and reduced participation (e.g., Orrell-Valente, Pinderhughes, Valente, & Laird, 1999) among ethnic minorities and immigrants.

Central questions concerning the application of PT with culturally diverse families emerge from sociopolitical and moral perspectives as well as from epistemological and developmental science perspectives. First, widespread dissemination of PT might be viewed as a form of cultural hegemony or colonialism to the extent that it promotes assimilation to European American child rearing as superior (Dionne, Davis, Sheeber, & Madrigal, 2009). Second, the dissemination of PT interventions that were largely developed with middle-class European American families to culturally diverse communities reflects the assumption that treatment effects will generalize across distinct social and cultural family contexts (Bernal & Scharró-del-Rio, 2001). Yet some research suggests diversity in relations among parenting behaviors, family processes, and child developmental outcomes (e.g., Deater-Deckard & Dodge, 1997; Halgunseth, Ispa, & Rudy, 2006; C. Ho, Bluestein, & Jenkins, 2008; Lansford et al., 2005).

For these reasons, PT has come under scrutiny as a class of interventions with effects that may be subject to boundary conditions Accordingly, PT has been well represented among efforts in the cultural adaptation of behavioral interventions. Two distinct themes have emerged in endeavors to enhance the outcomes of PT with ethnic minority and international populations (Lau, 2006). Beyond surface adaptations and basic translation, the range of adaptations that fundamentally alter intervention content or process can be organized into those that work toward enhancing engagement versus those that focus on tailoring intervention content to augment skills training.

Cultural Adaptations to Enhance Engagement in PT

Limited engagement in PT represents a major threat to effective dissemination and implementation in disadvantaged and ethnic minority families. Clinical observations from single-case design experiments and controlled trials of PT with ethnic minority families previously suggested notable cultural distance between skills typically taught in PT and values governing parent-child relations in ethnic minority families (Borrego, Ibanez, Spendlove, & Pemberton, 2007; J. Ho, Yeh, McCabe, & Lau, 2012; T. Ho et al., 1999; Lau, Fung, L. Ho, Liu, & Gudiño, 2011; Lau, Fung, & Yung, 2010). For example, because of a cultural priority to avoid losing face and the need for constant correction of improper behavior, Chinese parents objected to ignoring misbehavior based on principles of differential attention (Lieh-Mak, Lee, & Luk, 1984). Likewise, Mexican American parents have rated differential attention as less acceptable than other PT practices (Borrego et al., 2007), with some parents objecting because ignoring may harm the parent-child relationship (Pemberton & Borrego, 2007). While praise is often rated as among the most acceptable PT techniques (J. Ho et al., 2012) some interventionists have noted that praise is problematic for Chinese parents owing to beliefs that it results in a lack of humility and complacency over persistence (Crisante & Ng, 2003; T. Ho et al., 1999).

Given that many of the concerns about PT for culturally diverse populations have focused on issues of acceptability, and most disparities in PT controlled trial research relate to differential enrollment and premature attrition, PT interventions targeting ethnic minority families have been culturally adapted by attending to barriers to engagement (e.g., Dillman Carpentier et al., 2007; Matos, Bauermeister, & Bernal, 2009; McCabe & Yeh, 2009). Engagement-focused adaptations encompass surface structure modifications (Resnicow et al., 2000) intended to sufficiently engage the target community so that the intervention can be delivered with fidelity to the so-called deep structure. Fidelity to deep structure maintains the key elements of the intervention's theory of change, or logic model specifying the theoretical relations between the treatment procedures (e.g., teaching parents to praise children for appropriate behavior), mechanisms of change (e.g., alteration of reinforcement schedules), and ultimate outcomes (e.g., increased child compliance) (McKleroy et al., 2006). Most such adaptations focus on adopting a collaborative stance by soliciting and defusing concerns about specific skill elements in PT, reframing techniques to optimize fit with parents' values, and using motivational strategies to stoke parental investment in agreed-on treatment goals.

There is, of course, within-group heterogeneity in attitudes toward PT interventions, with these attitudes covarying with cultural values in distinct ways for different groups. Among Chinese American parents, low levels of acculturation and endorsement of traditional values concerning strict discipline and shaming are associated

with lower perceived acceptability of PT (J. Ho et al., 2012). Yet endorsement of traditional Latino values that emphasize strong orientation and commitment to family, *familismo,* among Mexican Americans has been associated with positive attitudes toward PT (Pemberton & Borrego, 2007). Notably, at least one culturally adapted intervention has adopted an adaptive assessment-driven strategy to tailor the delivery of PT to promote optimal participation and acceptance among parents with a range of baseline attitudes (McCabe, Yeh, Garland, et al., 2005).

Augmenting Intervention Content to Improve Outcomes for Ethnic Minority Families

A second major class of adaptations to PT involves the introduction of novel intervention content to target risk factors for youth psychopathology or family adjustment difficulties that fall outside the original foci of PT. In this way, interventionists targeting culturally diverse families have supplemented PT content to address ecological risk and protective factors associated with child behavior problems and parenting competence pertinent to specific cultural communities (e.g., Coard et al., 2004; Lau et al., 2011; C. R. Martinez & Eddy, 2005). As with other efforts to augment PT, these adaptations address ancillary family stressors that can heighten child vulnerability and interfere with parent skill acquisition (G. E. Miller & Prinz, 1990). These culturally adapted PT protocols have addressed risk processes such as parental acculturative stress, family-level acculturation dissonance, and experiences of discrimination (Lau, 2006). In this way, these adaptations revise the intervention's deep structure or theory of change within a causal model informed by studies of risk and protective factors that highlight potential mediators of change that can improve target outcomes in the population of interest.

Cultural Adaptations of Evidence-Based Parent Training Interventions

Parent-Child Interaction Therapy

Parent-Child Interaction Therapy (PCIT) is designed to treat 2- to 7-year-olds with conduct problems (Herschell, Calzada, Eyberg, & McNeil, 2002). Parents are taught skills to establish a nurturing and secure relationship while reinforcing prosocial behavior and decreasing negative behavior. It is conducted in the context of parent-child play interactions during which the therapist actively coaches the parent in the use of skills, often unobtrusively from behind an observation window. PCIT is assessment driven and terminates when parents demonstrate mastery of the skills and their child's behavior is within the normal range on a validated scale of child conduct problems (Eyberg Child Behavior Inventory; Eyberg & Pincus, 1999). Treatment begins with the child-directed interaction (CDI) phase designed to create a mutually rewarding parent-child relationship. Toward this end, parents are taught to praise, imitate, and describe the child's appropriate play behavior, reflect appropriate child speech, ignore inappropriate behavior, and allow their child to lead the activity. Parents are also taught to refrain from criticism, commands, and questions. The goal of the second, parent-directed interaction (PDI), phase is for parents to decrease problematic behavior by directing child activity using clear, positively stated, direct commands and consistent consequences (e.g., praise for compliance, time-out for noncompliance).

PCIT has been used with diverse ethnic minority families in the United States with positive results. For example, the effects of PCIT in reducing recidivism in child maltreatment appeared to generalize across racial/ethnic groups including non-Hispanic Whites, Latinos, and African Americans, with no apparent intervention by ethnicity interactions (Chaffin et al., 2004). However, some data reveal disparities in rates of engagement and outcomes in PCIT. Fernandez, Butler, and Eyberg (2011) reported a 60% rate of attrition from PCIT in a sample of low-income African American families of preschoolers with disruptive behavior disorders. Further, only half of the treatment completers showed clinically significant change in child conduct problems, and there was no significant effect of treatment on parenting stress, as has been shown for non-Hispanic White families in PCIT. Previous trials have revealed associations between low SES and dropout from PCIT (Fernandez & Eyberg, 2009); motivational enhancement appears to prevent such attrition among ethnically diverse and disadvantaged families (Chaffin et al., 2009).

Multiple investigators have culturally adapted PCIT using varying approaches to increase responsiveness to the needs of Latino families. Borrego et al. (2006) first demonstrated the feasibility of delivering PCIT in Spanish. Matos, Torres, Santiago, Jurado, and Rodríguez (2006) went further to adapt PCIT for Puerto Rican families of young children with hyperactivity. This also represented primarily a language-based adaptation that included translation of written materials and modification of examples to reflect the daily experiences and idiomatic expressions of Puerto Rican families. Unstructured additional time was allotted to the beginning of each PCIT session to establish and maintain therapeutic rapport through personal interactions and to discuss any issues that could be affecting

treatment progress. Matos et al. (2009) reported large effect sizes (Cohen's $d = 1.37$ to 2.04) in their waitlist controlled trial, with 65% to 75% of treated families evincing clinically significant decreases in conduct problems.

McCabe and colleagues (2005) described a more comprehensive adaptation of PCIT for Mexican American families that adopted a tailoring approach to address barriers to engagement. The adaptation design involved the integration of studies of treatment barriers among Latino families and original qualitative research. The authors noted that cultural barriers for Mexican American parents included feared negative consequences of treatment (e.g., breached confidentiality), disapproval from family members, and doubts of effectiveness or alternately unrealistic expectations of rapid improvement. Specific adaptations of PCIT were informed by focus groups and interviews with Mexican American parents of youth with disruptive disorders. PCIT was described, and participants were invited to comment on its features and suggest improvements. The considerable variability in attitudes (e.g., some Latino parents viewed time-out as not punitive enough, while others felt it was too severe) suggested that adaptations must flexibly accommodate variation in values and acculturation. Yet several clear themes emerged. Given concerns about blame and stigma, mothers preferred the program to be framed as educational rather than therapeutic. Mothers highlighted the need for clear explanations for how activities, such as play, can reduce behavior problems. They also requested additional intervention materials, such as father testimonials, and augmented content, such as discussion of the negative consequences of paternal absence, to promote involvement of fathers and extended family

Based on these data and consultation with an expert panel and the PCIT developer, McCabe et al. (2005) developed Guiando A Ninos Activos (GANA) to include an intensive engagement protocol beginning with the initial phone contact to problem solve barriers to attendance, increase investment in treatment, and create a plan to enlist fathers and other caregivers. GANA is framed as an educational program, offered by a teacher (*maestro*). CDI teaches communication skills (Ejercicios de Communicacion) while PDI teaches consistent discipline (Disciplina Consistente). The use of assessment-based tailoring is unique. Given the heterogeneity in attitudes, McCabe et al. designed an initial assessment to direct the implementation of treatment elements. GANA teachers receive a computer-generated report that contains guidance for addressing potential issues (e.g., unrealistic expectations for treatment) and highlights elements that may require reframing to increase acceptability. For example, among parents favoring strict discipline, time-out is framed as a punishment (*silla de castigo*) whereas for parents who disavow punitive methods, time-out is framed as a time for calming and reflection (*silla de pensativa*).

In a controlled trial that was noteworthy as one of few that compared the culturally adapted intervention with the original EBI, McCabe and Yeh (2009) randomized 58 Mexican American parents with a child with a disruptive disorder to receive standard PCIT, GANA, or treatment as usual (TAU). McCabe and Yeh found that both PCIT and GANA outperformed TAU at posttreatment, and although the differences between PCIT and GANA were not statistically different, the mean effect sizes associated with the GANA-PCIT planned contrast were encouraging (Cohen's $\delta = .28$ for conduct symptoms, $\delta = .42$ for parenting). At follow-up, McCabe, Yeh, Lau, and Argote (2012) reported that GANA outcomes were superior to TAU on most parent-report measures, while PCIT did not maintain an advantage over TAU. Thus, the efficacy and maintenance of gains in GANA have been supported, and there is some limited evidence to suggest that GANA may yield greater longer-term benefit than standard PCIT. However, although GANA adaptations were explicitly designed to enhance engagement, there was no effect of condition on premature termination.

The Incredible Years

The Incredible Years (IY) group intervention is effective in reducing child behavior problems, improving parents' child management skills, and decreasing parenting stress (Reid, Webster-Stratton, & Baydar, 2004). Videotape modeling is an important feature of IY, to both demonstrate techniques and stimulate discussion. As with other PT programs, skill rehearsal is emphasized through role play and homework. IY incorporates many features that may promote parental engagement by introducing skills in a collaborative rather than a didactic manner. As each skill is introduced, parents discuss the benefits and barriers to using the skill, opening up issues of perceived acceptability and fit with parents' values. The group leader encourages investment by highlighting how the benefits of the skill fit with the parents' own goals. The group leader uses Socratic questioning to allow parents to identify the principles underlying effective parenting skills. Treatment manuals orient group leaders to common concerns about each PT skill (e.g., concerns that praise will "spoil" children, worries that time-out is not severe enough). Group process leverages peer-to-peer teaching and experiential learning, such as praising and rewarding parents in session as they are instructed to do with their children. Thus, IY builds in multiple, effective

strategies for enhancing engagement for culturally diverse families. Data from prevention trials fielded in Head Start preschools have shown that IY achieves parity in parenting and child behavior outcomes and parent satisfaction across non-Hispanic White, Latino, African American, and Asian American families, with the number of ethnic differences in attrition and outcomes not exceeding that expected by chance (Reid, Webster-Stratton, & Beauchaine, 2001).

However, some independent investigations of IY suggest that treatment gains among African American and Latino families may not be lasting. For example, Gross et al. (2003) showed improvements in parenting behaviors from IY among low-income, largely African American (57%) and Latino (29%) parents of toddlers in Chicago. However, there were no lasting reductions in child behavior problems based on parent reports or observer ratings at the 1-year follow-up. Similarly, Brotman et al. (2003) found significant initial improvements in parent responsiveness and parent-reported behavior problems following IY in a sample of 20 African American and 10 Latino preschoolers, but these effects were not maintained over 6 months.

IY has been augmented in order to address risk factors that appear relevant to the development of disrupted family relations and child behavior problems in ethnic minority populations. Lau et al. (2011) adapted IY to address risk factors for maladaptive discipline in high-risk immigrant Chinese families in southern California. Lau (2010) found that children's school problems are strongly associated with harsh physical discipline among Chinese immigrant families and that parent-child acculturation conflicts were related to physical discipline when parents held traditional values about firm parental authority. In a waitlist controlled trial including 54 families, PT was augmented with three skill components to reduce contextual stress to allow parents to follow through with effective PT strategies. First, cognitive restructuring was added to help parents to control upsetting thoughts about children's bids for autonomy and school problems that lead to ineffective parenting. Second, psychoeducation and communication skills training helped parents reframe and resolve acculturation-related conflicts. Parents were taught active listening skills and problem-solving steps to elicit the child's perspective and communicate their own concerns effectively. Third, to prevent punitive responses to school problems, parents were taught to increase positive involvement in children's schooling by showing interest in their child's learning, structuring a homework routine, and limiting (television and computer) screen time.

Results of the trial revealed good retention with 83% of families completing the 14-week intervention. Relative to parents in the delayed-treatment condition, parents who received the intervention responded with lower levels of negative discipline and child internalizing and externalizing problems. Posttreatment effect sizes were in the medium to large range for child behavior problems, with good durability of results at 6-month follow-up. Mediation analyses revealed that decreases in negative discipline accounted for improvements in child externalizing problems. Treatment effects were moderated by baseline parenting stress, such that more distressed parents benefited less from treatment. In contrast, an analysis of outcomes of IY among 514 families across six randomized trials did not find baseline parenting stress to moderate outcomes (Beauchaine, Webster-Stratton, & Reid, 2005). Moreover, despite the inclusion of augmented PT content to address stress in immigrant parent-child relations, intervention effects on parenting stress were not observed at posttreatment. This finding suggests that the cognitive restructuring and communication training components were not sufficient to produce effects among the most distressed immigrant parents in the sample.

ParentCorps is a culturally adapted PT protocol, strongly informed by IY, to prevent child behavior problems and promote school readiness in low-income African American and Latino families of preschoolers in New York (Brotman et al., 2008). Intervention content and process aim to be universally relevant and engaging to all families yet sufficiently intensive and tailored for families residing in disadvantaged, urban communities with risk factors such as community violence, overcrowded schools, and diverse immigrant populations. Guided by the assumption that culture informs all aspects of caregiver psychology (i.e., expected family roles, appraisals of child behavior, future aspirations, and appropriate parenting), ParentCorps focuses explicitly on cultural values, beliefs, and norms and encourages parents toward treatment goals that are culturally relevant. For example, session plans outline discussions concerning values related to obedience and respect for elders and the influence of parents' own childhood experiences on their beliefs about parenting. As in IY, videotape modeling introduces each skill in the context of the daily lives and interactions of three ethnic minority families. Group leaders individualize the use of the skill for each family's unique context and use group activities and role-plays and troubleshoot homework. Parents also receive a ParentCorps item each session to spur uptake of the assigned skill (e.g., a timer for time-outs).

A randomized trial of ParentCorps including 171 families of 4-year-olds in a university preschool program in a large New York public school district revealed effect sizes

in the .50 range for parenting practices and child behavior problems (Brotman et al., 2011). Recruitment results in this trial were good for a universal prevention design: 71% of parents in the intervention schools attended at least one session. However, in terms of retention only 54% attended at least five of 13 sessions.

Indian Family Wellness Program

In their cultural approach to implementing IY, Dionne et al. (2009) designed an initial motivation phase to engage American Indian parents in PT by acknowledging the historical role of colonization in the disruption of traditional parenting and resultant social illnesses. This phase is a three-session motivational interview designed to help parents recognize: (a) how intergenerational transmission of parenting knowledge has been disrupted by colonization, (b) the impact of historical trauma and ongoing injustices on parenting, (c) strengths across generations despite this history, and (d) their responsibility for summoning strengths and adapting their parenting to protect their children from social illnesses. In the intervention phase, IY was delivered with fidelity, but at the beginning of each session, the interventionists drew connections between the PT skill and Central American Indian traditions, beliefs, and values. For example, when teaching alternatives to corporal punishment, parents were reminded that this tactic was introduced by European colonists and in boarding schools and was not consistent with Indian teachings that children were gifts who were never to be hurt. In a controlled trial, 49 American Indian families received the motivational interview and were then randomized to receive the culturally adapted IY or no treatment. Results at posttreatment revealed significant reductions in ineffective parenting and child externalizing and internalizing problems in the treatment group relative to controls.

The Chicago Parenting Program

The Chicago Parenting Program (CPP) is another intervention building on IY that capitalizes on the strengths of videotaped modeling followed by group discussion to elicit principles of effective behavior management and a collaborative approach to engage parents. The CPP was designed in partnership with a parent advisory council of African American and Latino parents from different Chicago neighborhoods. The council advised the program developers on challenges they faced as parents, situations that should be portrayed in videotape modeling, and how best to depict PT skills to be congruent with their cultural values and lifestyle (Gross, Garvey, Julion, & Fogg, 2007). Videos were shot in homes and in public places and depicted African American, Latino, and White families in situations that are familiar, relevant, and stressful. In a departure from IY, the CPP intervention did not proscribe spanking, given the views in some communities. The 11 sessions covered child-centered time; family routines and traditions; praise and encouragement; rewards for reducing challenging behavior; setting clear limits and following through; consequences for misbehavior; strategies of ignore, distract, and time-out; stress management; and problem-solving skills. A booster session is offered 2 months later to help parents maintain gains.

The efficacy of CPP was demonstrated in a controlled trial of families from Chicago area preschools serving low-income families. Families were randomized to receive CPP or assessment only. The study had a recruitment rate of 34%, with average attendance of 4.3 (39%) of 11 sessions. Results indicated that CPP reduced corporal punishment, commands, and observed child behavior problems up to 1-year postintervention. Dosage effects were clear; mean effect sizes for observed child behavior problems, parent behaviors, and parenting self-efficacy increased by 50% when dose was included in the model. Parents of children with more behavior problems at baseline attended more sessions, suggesting that CPP was differentially reaching families who need it most.

Parent Management Training—Oregon Model

Parent Management Training–Oregon Model (PMTO) was derived from social interaction learning theory and grounded in direct observation of family interactions with a critical focus on reducing coercive family processes (Forgatch & Patterson, 2010). Child behavior problems are thought to begin with small negative behaviors that escalate over time (e.g., noncompliance, to shouting, to tantrums) through repeated escape conditioning sequences. Common parental responses to child aversive behaviors inadvertently increase their frequency. For example, a mother finds her son watching television instead of doing homework. The mother scolds, the boy complains and claims he has no homework, the mother relents and changes the topic, and the boy stops arguing. The interaction has increased the likelihood of the boy protesting; he has learned how to turn off the mother's aversive behavior. In ensuing interactions, he may escalate his protest behavior. This is conceptualized as a coercive cycle. Blame is not directed toward individuals in the family but to the interaction between them. Five core parenting practices are identified as mechanisms for change: (1) skill encouragement (promoting prosocial behavior through

teaching and contingent positive reinforcement), (2) limit setting (decreasing deviant behavior through appropriate and contingent use of mild sanctions), (3) positive involvement (ways to invest time and plan activities with children), (4) problem solving (negotiating disagreement, establishing rules and consequences for rule violations), and (5) monitoring (protecting children from involvement in risk behaviors and affiliation with deviant peers).

Cultural adaptations of the PMTO model have been described in the literature. Domenech Rodríguez, Baumann, and Schwartz (2011) described the process by which they developed, Criando con Amor: Promoviendo Armonía y Superacín (CAPAS) for Latino parents, using their Cultural Adaptation Process Model mentioned on Table 17.1. CAPAS is a product of systematic adaptations to PMTO guided by Bernal's (1995) ecological validity model and a three-stage process employing community engagement and deployment focused iterative adaptation. CAPAS incorporated adaptations to content and process to promote active parental engagement in PMTO. Adaptations focused on six areas:

1. Careful language translation, with simplified terminology and greater reliance on visual aids;
2. Inclusion of Latino-specific *dichos*, proverbs and sayings in Spanish, to provide familiar metaphors for concepts;
3. Incorporating Latino values (e.g., *respeto*, *buena educacion, valerse por si mismo*) to frame treatment goals, discussion of parent versus child values reflecting emphasis on Latino versus American orientations;
4. Framing PT as promoting family harmony and success;
5. Inviting extended family members; and
6. Attending to contextual challenges in parenting (e.g., fear of children calling child protective services, deportation).

These adaptations preserve the core PMTO elements and the putative mechanisms of change—increasing skill encouragement, positive involvement, problem solving, limit setting, and monitoring.

Consistent with the CAPAS example, C. R. Martinez and Eddy (2005) attended to many of the same cultural and contextual considerations in their adaptation of PMTO called Nuestras Familias: Andando Entre Culturas (Our Families: Moving Between Cultures) for Latino families. Nuestras Familias was developed over a 2-year period through a collaborative effort between the Oregon Social Learning Center project team, Centro Latino/Americano, other community partners, and senior Latino family intervention researchers around the country. During the intervention development phase, five Latino family interventionists from the community were provided training in basic Oregon Social Learning Center PMT. After training (which included applying PMT principles to real and fictional cases), project staff, together with community experts and trained interventionists, began the process of adapting the existing PMT intervention model. In addition to keeping the core PMTO components and framing the intervention with consonant cultural values, Martinez and Eddy augmented intervention content with two modules that focused explicitly on bridging two cultures. This augmentation focused on differential acculturation between Latino parents and youth as a specific risk factor for youth maladjustment and behavior problems. Differential acculturation is related to increases in family stress and decreases in effective parenting practices, and these processes mediated the association between discrepant acculturation and adolescent substance risk (C. R. Martinez, 2006). Nuestras Familias targets "acculturation gaps" that can increase stress and disrupt effective parenting. C. R. Martinez and Eddy (2005) reasoned that for PT to be maximally effective in this context, it must address how parents manage family relations in the context of differential acculturation. In addition to the core PMTO content, the program includes four components to provide psychoeducation about differential family acculturation and empower parents to bridge acculturation gaps through the use of effective parenting practices associated with standard PMTO. In a randomized trial of Nuestras Familias, parents in the intervention condition reported an increase in overall parenting effectiveness and a decrease in child behavior problems compared to the no-intervention control. Furthermore, some evidence indicated that the intervention resulted in stronger effects for families with U. S.-born youth, for whom family adjustment difficulties associated with differential acculturation may be more prominent (Martinez & Eddy, 2005).

PMTO was implemented nationwide in Norway in 1999 with an effectiveness trial indicating positive intervention effects. Yet the sample enrolled in the trial was predominantly native Norwegian families, with few ethnic minorities represented (Ogden & Hagen, 2008). Developmental research was conducted in 2005 to 2007 to investigate strategies for recruiting immigrant Somali and Pakistani families and to determine what types of cultural adaptations may be necessary. The investigators studied the cost-effectiveness of three strategies for recruiting ethnic minority mothers to participate: (a) referrals from human service professionals from public agencies, (b) open

information meetings in community settings, and (c) social network referrals from research staff link workers. All three recruitment strategies yielded families eligible with regard to risk for child conduct problems. However, the information meetings were the most cost-effective strategy, and the highest proportion of the sample was recruited this way. The intervention groups were not mixed gender owing to Islamic religious norms requiring gender segregation. Groups were ethnically homogeneous and led by a Norwegian therapist assisted by trained bilingual assistants (i.e., link workers) who provided direct translation in Somali/Urdu. Link workers also served as "culture-builders" to strengthen relationships between therapists and mothers. In terms of intervention content, there was an expanded focus on certain topics relevant in the context of the immigrant communities targeted, including large sibling groups, and emphasis on cultivating control over emotions.

Findings from intent-to-treat analysis of a randomized waitlist controlled trial of 96 Somali and Pakistani mothers revealed that PMTO was effective in increasing positive parenting and decreasing harsh discipline and child conduct problems, according to maternal report (Bjørknes & Manger, 2013). The largest effect sizes were found among mothers who attended more than 50% of sessions. However, teacher reports showed no significant intervention effects on conduct problems and social competence. This study provides support for contextual and cultural adaptation in order to secure recruitment to and participant attendance in available interventions.

The Triple P Positive Parenting Program

Triple P spans the prevention-intervention continuum and aims to prevent behavioral, emotional, and developmental problems in children by enhancing the knowledge, skills, and confidence of parents (Sanders, 1999). Within a public health model, Triple P incorporates five levels of intervention on a tiered continuum of increasing intensity and narrowing reach. Level 1 includes media-based psychoeducation campaigns targeting whole communities. Level 2 is Selective Triple P delivered in 1 to 2 brief consultations during well child pediatric care. Level 3 Triple P is a four-session consultation model for use in primary care. Level 4 Standard Triple P is an eight- to ten-session parenting skills program that can be delivered in a group, individual, or self-help format. Level 5 is Enhanced Triple P, which provides adjunctive interventions for families in which parenting concerns are situated in the context of other problems, such as marital conflict and parental depression. Most trials with diverse populations have examined Level 4 Standard Triple P. Meta-analyses have concluded that Triple P has a positive effect on children's behavior and adjustment, with evidence being strongest in the toddler, preschool, and elementary-school age groups (de Graaf, Speetjens, Smit, de Wolff, & Tavecchio, 2008). Effect sizes range widely from small to large positive effects, which is not be surprising that Triple P contains multiple levels of intensity across prevention and treatment trials.

Data from controlled trials, focus groups, and survey methods support the acceptability and effectiveness of parenting strategies used in Triple P with samples of parents from Australia, the United States, New Zealand, Japan, Singapore, Hong Kong, Iran, Scotland, England, Ireland, Sweden, Belgium, the Netherlands, Germany, Turkey, Switzerland, South Africa, and Panama (Sanders, 2012). The International Triple P Research Network coordinates a network of scientists and facilitates communication about research activity around the world involving Triple P. The network has created a data repository for outcome studies and coordinates an international conference for researchers, practitioners, and policymakers in a different country annually. Training in Triple P encourages practitioners to work collaboratively with parents and to be responsive to parent values, preferences, and context while preserving core elements. These needs for tailoring can be met by adapting examples used to illustrate teaching points and by customizing homework assignments.

Perhaps given the foregoing discussion of workforce training in flexible and tailored delivery, there have been few cultural adaptations of Triple P. A notable exception is Turner, Richard, and Sanders's (2007) Group Triple P tailored for Australian Indigenous families. The authors conceded that mainstream parenting programs find it difficult to recruit and engage Indigenous parents. In collaboration with Indigenous workers over 5 years, Triple P was tailored to reduce barriers for Indigenous families and to develop resources. The team assumed that the core principles of positive parenting would transcend cultures but the goals and target behaviors, practical implementation of skills, and ways of sharing information would require adaptation. Modifications were made to the language, images, and examples used to illustrate skills in the production of tailored videos, workbooks, and presentation aids. In addition, more time was devoted in sessions to sharing personal stories, developing trust, discussing the social and political context for parenting, and slowing the pace of presentation.

In a waitlist controlled trial of the adapted Triple P program with 51 Indigenous families, treatment parents

reported decreased child behavior problems and less frequent dysfunctional parenting compared to waitlist families. Effects were primarily maintained at 6-month follow-up. Qualitative data revealed high satisfaction with the intervention. Yet engagement was lower than in previous trials of Group Triple P, with only 60.9% families commencing groups. Moreover, only 28% of families randomized to waitlist subsequently attended treatment, suggesting the importance of engaging families upon first contact, reducing barriers to care, and providing care whenever family circumstances permit.

The Effective Black Parenting Program

The Effective Black Parenting Program was an early example of a culturally adapted PT intervention developed by Myers and colleagues (1992) and adapted from the Confident Parenting Program (Eimers & Aitchison, 1977). Specific skills training is provided in describing and monitoring child behavior, specific labeled praise is used for appropriate behavior, special incentives are used for respectful child behavior, and mild social disapproval, active ignoring, and time-outs are used for misbehavior. Parents are instructed in two general approaches to parenting within which these skills can be utilized. First, parents are taught a Family Rule Guideline Strategy, in which they examine the rules they have for their children and the reasoning behind their rules. This orients parents toward developing rules that have an articulated rationale. Next, the Thinking Parents Approach encourages parents to think before they act and to entertain multiple possible attributions for their child's behavior, including stage of development. The intervention is introduced in a discussion that asks parents to contrast the goals of traditional Black discipline (i.e., discipline is achieved through punishment and spanking to instill obedience) versus modern Black self-discipline (i.e., internalizing standards of effective behavior). Discussion aims to situate coercive parenting practices as once protective in African American families but perhaps no longer as adaptive in empowering African American children to strive for achievement and social change. Additional discussion is devoted to instilling pride in Blackness, avoiding racial self-disparagement, and promoting strategies for coping with racism. The program is delivered by African American professionals and organized within a framework called the Pyramid of Success for Black Children.

In a quasi-experimental design, seven schools with high African American enrollment were assigned to the intervention condition (five schools) or to the control condition (two schools). All African American families with children in the first or second grade were invited to participate in fifteen 3-hour sessions of the Effective Black Parenting Program. Across two cohorts, 109 parents were enrolled in treatment and compared over time to 64 parents in control schools. Results suggested that the intervention produced improvements in some target outcomes, including parental rejection, family relationship quality, and child behavior outcomes. One-year follow-up data from the first cohort suggested maintained effects in parental rejection and selected child behavior problems, although some return to coercive parenting practices was noted. Ultimately, the authors noted that the intensive short-term Effective Black Parenting Program was promising but that results were modest and circumscribed, even when the program was delivered in a culturally sensitive manner.

The Black Parenting Strengths and Strategies

The Black Parenting Strengths and Strategies (BPSS) program (Coard, Wallace, Stevenson & Brotman, 2004; Coard, Foy-Watson, Zimmer & Wallace, 2007) is a cultural adaptation of the Parenting the Strong-Willed Child program (Forehand & Long, 2002). BPSS teaches behavioral management skills (i.e., attending, rewarding and ignoring, giving effective directions, and how to use time-out appropriately) while also mobilizing racial socialization practices found to be protective among African American families. Coard's work is guided by the premise that for African American youth, developmental competence requires the ability to make sense of and cope with prejudice and discrimination. Coard and colleagues (2004, 2007) reviewed research linking parent racial socialization practices to child outcomes including a positive racial identity, academic functioning, self-esteem, positive parent-child interactions, and decreased depression and anger. Coard et al. (2004) conducted qualitative interviews to analyze socialization messages related to racial achievement, preparation for bias, racial equality, and racial pride emphasized by mothers of young African American children living in low-income neighborhoods. The narratives provided the basis for program components for BPSS, a PT intervention augmented to mobilize culturally specific protective factors. Content adaptations included lessons in six areas of how to:

1. Deal with common in-group events (e.g., overt and subtle incidences of racism, prejudice, and discrimination);
2. Problem-solve negative peer interactions (e.g., social exclusion because of skin color);
3. Promote achievement despite barriers (e.g., advocating for a child when low expectations are evident);

4. Reflect on one's own experiences as an African American woman or man;
5. Discuss race-related content in a developmentally appropriate manner; and
6. Access culturally affirming resources for children.

The five delivery-related adaptations included:

1. Using African American language expression and the African American–perspective use of "we";
2. Emphasis on African American values about collective responsibility, cooperation, and interdependence;
3. Use of African proverbs, sayings and affirmations, poems, quotes, symbols, and pledges;
4. Use of prayer, role-playing, storytelling, extended family participation, and humor; and
5. Use of a setting and motifs representative of the population.

Throughout the adaptation process, consultation with the original developers helped to ensure that key elements of the standard PT program were maintained and not diluted when content was augmented.

In a waitlist controlled trial of BPSS, 32 parents from urban, low-income neighborhoods were randomized to immediate or delayed 12-week treatment. Attendance and retention were strong with 88% of parents being retained in the study, with participants attending 85% of sessions on average and all participants attending at least six sessions. Results indicated significant effects of treatment on six of eight parent-reported outcomes assessed posttreatment. Relative to controls, intervention parents used significantly more racial socialization strategies, positive parenting practices, and less harsh discipline. Parent-reported externalizing problems increased in the control group but decreased in the immediate treatment group. Effect sizes were large for positive parenting, harsh discipline, racial socialization, and conduct problems.

Culturally Grounded Parent Training Interventions

The African Migrant Parenting Program

The African Migrant Parenting Program is a PT intervention for immigrant and refugee families from Africa who resettle in high-income countries, such as Australia (Renhazo & Vignjevic, 2011). The program aims to enhance effective parenting and relationship skills in order to help parents to raise their children confidently and understand their children's needs across developmental stages in the new cultural, social, and educational environment. Resettlement challenges encountered by refugee and migrant families include: adaptation to new work demands; needs for housing and schooling; changing family structure, roles, and responsibilities; establishing social networks; and learning English (Renhazo, 2002). Previously accepted practices, such as reliance on sibling care and corporal punishment, may no longer be viable. Differential family acculturation and acculturative family distancing are pertinent for these families who are transitioning from collectivistic cultures into high-income countries with social environments promoting individualism. In this context, strain on family relations and parenting are pressing (Renhazo, Swinburn, & McCabe, 2008).

The African Migrant Parenting Program consists of eight 2-hour sessions cofacilitated by African parenting educators and experienced family counselors; three 45-minute home visits by African parenting educators were used to monitor barriers to learning and skill enactment. The sessions were modeled on the Parent Skills module of the Parenting in a New Culture Guide developed for Australian Samoan parents. Session activities incorporate computer slide presentations, discussions, mini case studies, and videotape modeling. Sessions were devoted to a variety of issues including improved family relations, family stress reduction, and even family finances and legal issues.

In an open trial, 44 families receiving counseling for parenting issues at a social service agency were invited to participate. All agreed to participate, and 88.6% of families completed treatment despite a very low level of literacy and multiple barriers to treatment (e.g., housing, transportation, legal problems). Pre-post analyses suggested change on key dimensions: appropriate expectations of children, increased empathy toward children's needs, and attitudes toward corporal punishment. Treatment dose was associated with degree of change on developmental expectations and views on corporal punishment. However, key outcomes of parenting behavior and child adjustment were not examined.

The Exploring Together Program

The Exploring Together Program is a preventive intervention adapted to reduce disparities in the developmental profiles of Australian Aboriginal children relative to the general Australian population. Disparities include the higher prevalence of emotional and behavioral disorders and lower performance of Aboriginal children on national tests for literacy and numeracy. The program combines

elements of PT and children's social skills training for parents of children ages 4 to 6 years old (Littlefield et al., 2005). Children attend with one parent for 10 weekly 2-hour sessions. The first hour consists of an interactive group with all parents and children facilitated by four group leaders and focuses on parent-child interaction. Components of group activity involve turn taking, talk and play based on themes that complement content of the other groups. Then the dyads split into separate groups for parents and children for an hour. Facilitated by two group leaders, parent groups discuss observations of children's behavior, triggers for problem behaviors in the context of family interactions, and factors affecting parenting. Children play together in a separate group, with a focus on social skills and the learning of rules and consequences.

Collaboration with Aboriginal team members resulted in adaptations that drew on songs and storytelling in Aboriginal languages. Drawing activities were used to promote discussion of families, networks, and relationships and to tap into cultural symbols and idioms. These practices aimed to encourage parents to talk about the place of parent and child in the family and values of shared responsibility for children among caregivers in extended family networks. The focus was on identifying strengths and sources of difficulty in each family.

The delivery of interventions for this population faces formidable challenges in geographical dispersal and the linguistic and cultural diversity of Aboriginal communities. An open trial evaluation study was mounted for both Aboriginal and non-Aboriginal children in urban Darwin and for Aboriginal children in three communities of the Tiwi Islands, near Darwin (G. Robinson, Tyler, Jones, Silburn, & Zubrick, 2012). A wide variety of implementation strategies was used to promote reach of the intervention. Children were referred from schools; parents were invited by teachers and then visited at home when they expressed interest. Community leaders explained the program at public meetings, spoke to parents privately, and sought referrals from schools. Group leaders were mature community members with backgrounds in health, child care, or education.

Following the intensive and multipronged approach to recruitment, over 250 children were referred over 3 years, yielding an evaluation sample of 225. However, only 110 (48.9%) commenced the intervention, and only 86 (38.2%) attended at least half of the sessions. The lowest commencement and completion rates were observed among urban Aboriginal families (14% commenced and 11.5% attended at least half of the sessions). Despite the high attrition, outcomes suggested significant reduction in problem behavior and parental distress at posttreatment. However, improvement was significantly greater for non-Aboriginal families, with the least change observed among urban Aboriginal families. Despite highly flexible strategies of engagement and cultural adaptation of the intervention, results suggested the adapted program still had limited reach and impact on urban Indigenous families.

Discussion

In summary, the research base on cultural adaptation in the area of parenting interventions is relatively mature. The four most frequently cited PT interventions—Triple P, IY, PCIT, and Parent Management Training–Oregon model—have all been subject to cultural adaptations. In addition, other extensive adaptations and culturally grounded PT interventions have been developed and evaluated. We now have ample data suggesting that culturally adapted PT can be efficacious, yielding positive effects in the improvement of parenting behaviors and the prevention and treatment of externalizing as well as internalizing child behavior problems. Thus, the effects of PT interventions appear robust to cultural adaptations.

Enhancing Engagement: Remaining Questions

Most PT adaptations tested to date target changes to promote engagement of underserved or culturally diverse groups. However, as yet there is no conclusive evidence that these engagement-focused adaptations improve the attendance and retention of ethnocultural groups for whom disparities in engagement in standard PT have been observed. Benchmarking studies may be called for since it typically would be neither pragmatic nor ethical to randomize to conditions in which PT is not optimized to engage targeted ethnocultural groups (Cardemil, 2010). Only a single small controlled trial has addressed this question, with negative results on engagement outcomes. McCabe and her colleagues (2008, 2012) found culturally adapted PCIT (GANA) did not outperform standard PCIT in terms of promoting attendance or retention even though adaptations focused on engagement through enhanced treatment orientation, framing PCIT skills based on a pretreatment values assessment, or situating PT as educational rather than therapeutic.

Moreover, although positive engagement results were found in many studies, our review noted examples of trials of PT adapted for engagement that yielded disappointing recruitment, commencement, and completion rates. For example, the CPP adaption of IY yielded a

recruitment of 37% of African American and Latino parents in low-income preschools, and the average family attended only 39% of sessions (Gross et al., 2009). Once recruited into the trial, there was high attrition from the Indigenous adaptation of Triple P for Australian Aboriginal families with nearly 40% of families failing to attend a single session in the immediate treatment group (Turner et al., 2007). Even lower commencement and attendance rates were found in the Exploring Together PT program also targeting Aboriginal families in urban and rural Australia (G. Robinson et al., 2012). These and other findings demonstrate that even complex and concerted efforts to connect with families and communities are at times insufficient for reducing barriers to PT.

Indeed, engagement may remain an impediment to the public health impact of PT. It can also be argued that modifications to intervention content and process do little to address problems with low recruitment and intervention commencement rates. Parents' perceptions of acceptability of PT when they do arrive at treatment may help to explain low retention, which may be a smaller part of the implementation problem. Triple P developer, Sanders (2012), argues that the single major threat to the reach of PT stems from the fact that they are commonly restricted to small numbers of vulnerable parents with problems. As such, the interventions are seen as for "failed" parents, such as those involved in child protection or mental health systems, and participation is stigmatized. Thus, he argues that a public health approach offering PT to all can result in greater engagement at the population level and that cultural adaptations to intervention content need not be emphasized.

Reliance on self-referred parents and mass media outreach may result in self-selected samples who are motivated and able to attend and whose parenting may more closely resemble PT skill targets (G. Robinson et al., 2012). These recruitment strategies may screen out disadvantaged groups with high need. When Triple P moved beyond universal outreach to target a disadvantaged underserved group with an Indigenous adaptation of the program, substantially lower commencement rates were observed than in general community trials (Turner et al., 2007). Again, the challenge may be getting parents into the room rather than engaging them once they arrive.

Augmented Intervention Content: Paucity of Data

Relatively few PT interventions have been augmented to address the etiological context of parenting dysfunction or child behavior problems in diverse families. Frameworks guiding cultural adaptation often mention the need to address unique etiological factors but provide little guidance on the development of this content. The few examples of augmented PT interventions have addressed: (a) the protective factor of racial socialization in African American families (Coard et al., 2004; Myers et al., 1992); (b) the school achievement context of ineffective discipline in Asian American immigrant families (Lau et al., 2011); and (c) the risks associated with differential acculturation between immigrant parents and their children (Lau et al., 2011; C. R. Martinez & Eddy, 2005; Renhazo & Vignjevic, 2011). Although the absolute efficacy of these augmented PT interventions has been established, dismantling and process studies are needed to understand whether the additional content remediates the risk processes targeted and whether those changes facilitate ultimate outcomes on child psychopathology.

Additional Directions for PT Adaptation

Although some models of cultural adaptation stress that changes to the pacing, sequence, and length of standard PT should not be made (Kumpfer et al., 2008), these proscriptions appear to guard against unwanted omission of core content. However, some observations from controlled trials suggest that pacing and dosing of PT might be an explicit focus of cultural adaptation to help bridge the cultural distance between cultural traditions of diverse families and prescribed changes to parent-child interactions in PT. In general, controlled trials have revealed dose-response effects associated with standard and culturally adapted PT (e.g., Baydar, Reid, & Webster-Stratton, 2003; Gross et al., 2007; Renhazo et al., 2008). In trials of PCIT, which uses mastery-based criteria to determine length of treatment, trials have shown that the number of sessions required for ethnic minority families to reach performance criteria on CDI and PDI skills exceeded that found in trials of predominantly European American families (Fernandez et al., 2011). For example, in Matos et al.'s (2009) trial, the investigators adapted their mastery criteria using different criterion goals that they felt could be more easily attained by the Puerto Rican families in their sample, and hoped to limit CDI to eight sessions and PDI to nine sessions (doses that are still above published averages), but many families required additional sessions above this limit. McCabe and colleagues (2008) likewise found that Mexican American parents required four to five– more sessions than is typical to complete PCIT. Differences in treatment duration may reflect the need for more behavioral rehearsal of practices that are

unfamiliar and culturally foreign. These problems may be pronounced for immigrant and ethnic minority parents who, given their diverse upbringing, are unacquainted with skills like child-directed play, labeled praise, differential attention, and time-out. Qualitative data from group leaders in Lau et al.'s (2011) trial of IY adapted for Chinese Americans suggested that slowing the pace of skill lessons and increasing the dosage of behavioral rehearsal may be a promising adaptation to achieve meaningful and enduring changes in parenting in immigrant families. This is, of course, not a culturally specific proscription for enhancing PT and can be said of parents from across cultural groups. The issue of dosing may be vital in implementation of PT with diverse parents domestically and internationally, and yet this consideration has generally not entered discussions of cultural adaptation.

YOUTH RISK PREVENTION PROGRAMS

National data from the 2011 Youth Risk Behavior Survey revealed that youths in grades 9 to 12 participated into multiple risky behaviors. During the 30 days before the survey, 38.7% had drunk alcohol, 23.1% had used marijuana, 47.4% of the students had ever had sexual intercourse, 33.7% had had sexual intercourse during the 3 months before the survey, and 15.3% had had sexual intercourse with four or more people during their life. Further, 18.1% of high school students had smoked cigarettes and 7.7% had used smokeless tobacco (Eaton et al., 2012). Studies also consistently find that youth's risky behaviors co-occur; specifically, drinking, smoking, and risky sexual behaviors might have occurred in the same situation because youth lost control of themselves. The co-occurrence of substance use and risky sexual practices has been associated with increased prevalence of HIV/AIDS among youth. In 2009, youth ages 13 to 29 accounted for 39% of the new cases of human immunodeficiency virus (HIV) infection, but they represented only 21% of the American population. African American youths disproportionately represented 65% of the new youth HIV infection cases (Centers for Disease Control, 2011).

Further, the report published by the Centers for Disease Control and Prevention in 2011 showed that, among all new cases of HIV infection in the United States, more than 45% are African American adolescents and adults and more than 20% are Hispanic/Latino adolescents and adults. African American females are particularly at higher risk, representing 63% of all new female cases of HIV infection. More than 50% of the new cases were caused by male-to-male sexual contact (38.2% are African American, 23.5% are Hispanic/Latino), with other new cases due to heterosexual contact (65.3% are African American, 18.1% are Hispanic/Latino) and injection drug use (47% are African American, 25% are Hispanic/Latino).

One unambiguous implication of these statistics is that African Americans and Hispanics are confronted with high risk of HIV infection. Consequently, they are in more urgent need of access to HIV/AIDS knowledge, skills to negotiate and refuse, and support from family and peer leaders. A second clear implication is that unprotected sexual intercourse and drug use are the primary causes of HIV/AIDS infection among minority youth. Whenever these behaviors co-occur, the risk grows tremendously. Multiple sexual partners worsen the situation as it increases the risk of exposure for youth who do not have a direct relationship with an HIV/AIDS-infected partner (Santelli, Lindberg, Abma, McNeely, & Resnick, 2000). It has been suggested that the consequences of poverty and racism are the most salient predictors of risk-taking behaviors. Education, urbanization, social norms, values, and life goals influence academic aspirations and future orientation. Lack of opportunities for success may cause these youth to seek nontraditional methods of achieving adult status, such as early sexual initiation and the initiation and escalation of substance and drug use (Bakken & Winter, 2002; Stanton et al., 1994). African American and Hispanic youth have traditionally reported high rates of these risk behaviors (Eaton et al., 2008). For example, among adolescents surveyed in 2007, only 67.3% of African Americans and 61.5% of Hispanics reported using condoms during the last time they had sexual intercourse. Additionally, greater percentages of African American (27.6%) and Hispanic (17.3%) youth have had four or more sex partners than non-Hispanic Whites (11.5%). Studies also show that Hispanic and African American youth report higher rates of lifetime drug use than do non-Hispanic White youth (Johnston, Bachman, O'Malley, & Schulenberg, 2008). For example, 25.0% of Hispanic, 19.4% of Black, and 17.9% of non-Hispanic White eighth graders report using drugs in their lifetime (Johnston, O'Malley, Bachman, & Schulenberg, 2009).

Racial-ethnic substance and drug use comparison data that include American Indians and Alaska Natives, however, also show that these youth initiate tobacco, alcohol, and other drugs earlier, at higher rates and with more severe health, social, and economic consequences than adolescents of other ethnic-racial groups in the United States. The prevalence rate of smokeless tobacco use is

especially high among American Indian and Alaska Native children, adolescents, and young women (Schinke et al., 1986). Further, rates of cigarette smoking and heavy use of cigarettes—consumption of at least a pack of cigarettes a day for the last 30 days—are dramatically higher among American Indian and Alaska Natives, exceeding rates for every other ethnic-racial group (Schinke, Moncher, Holden, Botvin, & Orlandi, 1989). Drunkenness and use of substances, including alcohol and nearly all other drugs, is higher among American Indian youth compared to youth in other racial-ethnic groups (Nelson & Nazbah, 2011; Young, 1988). Collectively, these findings underscore the importance of identifying effective ways to prevent engagement in high risk behaviors that compromise the health and well-being of all youth and especially that of racial-ethnic minorities.

A plethora of youth risk preventive intervention programs have been developed and have taken many forms, including school-based prevention programs, mass media campaigns, youth clubs and activities designed as alternatives to substance use, family interventions, and comprehensive, community-wide prevention strategies (Sloboda & Bukoski, 2003). Earlier school-based substance abuse prevention approaches included either resistance-skills training, alone or in combination with competence-enhancement or life-skills training (Botvin, Baker, Dusenbury, Tortu, & Botvin, 1990), that were based on social influence models of risk taking and Bandura's (1977) social learning theory. In this approach, drug use and abuse were conceptualized as socially learned and functional behavior resulting from an interplay between social (e.g., modeling, imitation, reinforcement, pro-drug norms) and individual (e.g. personality) factors. In contrast to drug-specific resistance strategies, competence-enhancement approaches aim to teach a repertoire of skills that adolescents can use to deal with many of the challenges confronting them in their everyday lives, not just drug and alcohol use, such as decision-making and problem-solving skills, cognitive skills for resisting interpersonal and media influences, skills for enhancing self-esteem (goal-setting and self-directed behavior-change techniques), adaptive coping strategies for dealing with stress and anxiety, general social skills (conversational skills and skills for forming new friendships), and assertiveness. These skills are typically taught using a combination of proven cognitive-behavioral methods, such as instruction and demonstration, group feedback and reinforcement, behavioral rehearsal, and extended practice through behavioral homework assignments.

Although resistance and life skills training remain central features, prevention programing expanded over the years to better address the co-occurrence of multiple risk-taking behaviors (e.g., alcohol and drug use, sexual risk taking, HIV) and a widening range of risk and protective processes identified as possible targets (Hawkins, Catalano, & Miller, 1992). Programming enhancements also were informed by developmental and social learning research and theories suggesting that adolescents face pressures to engage (or motivations to avoid) in risk taking from multiple sources and transactions outside of school (e.g., peers, parents, other adults in the community, mass media, community policies) and by evidence that single-channel programs (e.g., school-based drug prevention) may not be powerful enough to produce lasting prevention effects against these broader influences (Dryfoos, 1993). Alternative models, particularly family interventions to be used as the primary approach (Dishion, Kavanagh, Schneiger, Nelson, & Kaufman, 2002) or in combination with youth-focused programs (Spoth, Redomond, & Shin, 2001) were developed to strengthen family relationships, bonding, communication about difficult topics (e.g., sex, drugs) and parent management practices and to engage parents in supporting skills taught in youth programs (Anderson et al., 1999). Comprehensive prevention strategies that combine school-based interventions with those affecting the family, social institutions, and the larger community (e.g., Pentz et al., 1989) were recommended in the National Institute of Drug Abuse (1997) publication titled *Preventing Drug Abuse Among Children and Adolescents: A Research-Based Guide* that is recognized for marking the beginning of the evidence-based drug abuse prevention movement. This report identified the tailoring of interventions to address risks specific to ethnic minority populations as one of 14 principles guiding the field.

In this section we assemble the scattered collection of culturally adapted youth risk prevention programs that have been evaluated to date, all but one published since the 1997 NIDA report, and the effectiveness of such programs for preventing and reducing risky sexual behavior and alcohol and substance use among racial/ethnic minority adolescents. As in the prior section on PT, our review is organized to distinguish culturally adapted programs, including those that might be more aptly described as "culturally tailored" (Bernal & Domenech-Rodríguez, 2012), from culturally grounded programs in which community members were involved throughout the initial program inception, design and evaluation, although we acknowledge again that these are not precise distinctions.

Cultural Adaptations of Youth Risk Preventive Interventions

Aban Aya Youth Project

Aban Aya Youth Project is a 4-year-long culturally tailored intervention that is designed to prevent multiple risky behaviors among urban African American youth (Flay, Graumlich, Segawa, Burns, & Holliday, 2004). The program screened the public schools in metropolitan Chicago and built the initial sampling pool based on these standards: enrollment greater than 500; more than 80% of the students are African American and less than 10% are Latino or Hispanic; not on probation or slated for reorganization; not a special designed school; and moderate mobility. The 155 schools selected were then stratified into four quartiles of risk (based on school report card data, such as enrollment, attendance and truancy, mobility, family income, and achievement scores), and 12 of them were sampled (nine inner city schools and three near-suburban schools).

The participants were 153 fifth graders in the 1994–1995 school year. Using schools as units, the students were randomly assigned to one of the three conditions: The social development curriculum (SDC), the school/community intervention (SCI), and the control condition. Students in the SDC arm received 16 to 21 lessons each year, which taught them cognitive-behavioral skills to avoid drug use, risky sexual behaviors, and other risky behaviors. SDC is the Afrocentric arm intervention and was based on *Nguzo Saba* (a Swahili term that means the Seven Principles), which emphasizes the importance of promoting "unity, self-determination, and responsibility" (Flay et al., 2004, p. 377) in youth risk prevention approaches (Flay et al., 2004, p. 377). Instructional methods were based on oral traditions of African American heritage including storytelling and the use of proverbs, history, and literature. Finally, the project assigned homework that aimed at encouraging parental involvement and communicative skill building. The authors did not indicate whether community members and parents were involved in the curriculum development and design of SDC.

The SCI arm is a comprehensive intervention designed to enhance the SDC classroom intervention by providing community empowerment sections that include programs for parents, school staff, and youth. This component of the intervention also has an overarching community element to promote positive connections among parents, schools, local businesses, and agencies. Parent support sought to increase skills to boost children's learning in school and to enhance parent-child communication. Students in the control condition received similar amounts of classes as those assigned to the SDC with topics focused on promoting healthy behaviors, such as nutrition, physical activities, and general health care. The intervention classes were taught by university-based health educators. Data were collected at multiple points for each condition. The pretest was done in the fall of 1994, and the follow-up posttest was done in the fall of 1995. Further follow-up tests were done annually until 1998.

Results revealed intervention effects differed for boys and girls. For boys, both the intervention arms (SDC and SCI) led to a salient reduction on drug use and recent sexual intercourse and improved condom use compared to boys in the control condition. It was worth noting that boys exposed to the SCI intervention arm fared better than those assigned to the SDC arm. Neither intervention condition was shown to be effective for girls (Flay et al., 2004). Lack of program effectiveness for girls was attributed to low baseline risk compared to males, as boys demonstrated higher baseline levels than girls on each of the targeted outcomes (Flay et al., 2004).

Adult Identity Mentoring

Adult Identity Mentoring, or Project AIM, is a school-based intervention program designed to reduce risky sexual behaviors among African American youth. The primary goals of Project AIM include delaying initiation of first sexual intercourse, promoting abstinence, and increasing condom use (Clark et al., 2005). The conceptual framework was based on the theoretical tenets of the Possible Selves program (Oyserman & Markus, 1990), which posits that people's current lives are motivated by their mental images of their future selves. Such mental images can be enhanced by a balance between positive images (desired selves) and negative images (selves to be avoided). AIM was delivered in small groups in which role modeling was used as a teaching strategy to highlight negative connections between desired future life and risky behaviors. Project AIM targeted seventh-grade, primarily low-income African American families in a suburban town near a southeastern metropolitan area. African American students who were previously enrolled in a required 9-week health education class were enrolled in the program. A total of 248 students completed pre-intervention assessment, and 6 were dropped due to missing data; 211 completed posttest, 19 weeks after baseline, and 156 completed 1-year follow-up assessment.

In terms of implementation, AIM consisted of 10 sessions delivered over the course of 6 consecutive weeks during the school year and offered in 20 health education

classes. Of the 20 classes, 11 were randomly assigned to receive AIM intervention, and 9 were assigned to receive standard health education curriculum. AIM sessions were conducted by trained African American college students, while the health education classes were taught by the regular classroom instructor. Besides inclusion of African American educational facilitators, Project AIM also had a session that focused on the importance of "legacy, positive role models, and peers" for youth identity development. In this session, African American youths saw examples of African Americans who left legacies, and each participant was required to compose thank you letters to the visiting positive role models and peers. The inclusion of positive role models and peers was based on the premise that African American youth "lack strong role models and mentors to guide them through the explorations that naturally occur as a part of adolescent self-identity development" (Clark et al., 2005, p. 337). Youth also participated in discussions on topics such as how peers, family, and other environmental factors influence their lives and how their choices affect future goals. The authors gave limited information about ways in which the program was specifically tailored for African American youths. There were no details, for example, on how the role models were recruited to visit the classes. Findings revealed that adolescents in the intervention group reported higher rates of abstinence and less sexual intentions than those in the control group when assessed 19 weeks after the baseline survey. For the youth who did not have any sexual behaviors before the start of the study, those in the intervention groups were less likely to report the initiation of sexual activity than were controls. At 1-year follow-up, the abstinence effect was still significant among the male participants in the intervention group.

The Strengthening Families Program

The Strengthening Families Program (SFP) is a family skills training approach developed in the United States that uses 2-hour-long sessions with parallel Parent Skills Training and Children's Skills Training groups in the first hour, followed by multifamily family skills training groups in the second hour. This multicomponent approach combines youth enhancement with a focus on family strengthening and improve parenting to support and guide youth. Designed to increase resilience and reduce risk factors for a broad range of behavioral, emotional, academic, and social problems in children 3 to 16 years old, the program is widely recognized as an effective substance abuse prevention program. SFP has been evaluated many times by independent researchers in randomized control trials or health services research with very positive results in reducing substance abuse and delinquency risk factors by improving family relationships (e.g., Aktan, Kumpfer, & Turner, 1996; Gottfredson, et al., 2006; Kumpfer, Alvarado, Tait, & Turner, 2002; Spoth & Molgaard, 1999).

During the 1990s, cultural adaptations of SFP were made and evaluated among five ethnic minority groups (African, Hispanic, Asian, Pacific Islander, and Native American). Findings generally supported the efficacy of these adapted versions; however, important insights were gained. Although the culturally specific adaptations did not yield better effects compared to the core version, improvements were shown on recruitment and retention. Kumpfer et al. (2002) also reported that an adaptation of SFP for Hawaiian families (Kameoka, 1996) resulted in weakened prevention effects when behavioral skills training was curtailed to allow for extended focus on Hawaiian cultural values. This was an early exemplar of the principle of maintaining fidelity of deep structure or core intervention components while including adaptations to promote engagement. In 2003 the Cochrane Collaboration Reviews published a meta-analysis identifying SFP having demonstrably larger effects than other alcohol prevention programs (Foxcroft, Ireland, Lister-Sharp, Lowe, & Breen, 2003). This prompted international dissemination efforts in a number of nations. Several international adaptations that have used the Kumpfer model of cultural adaptation (see Table 17.1) have been subject to controlled trials, and all have demonstrated positive results among families with substance using parents (Kumpfer et al., 2008).

The Multiethnic Drug Abuse Prevention Program

The Multiethnic Drug Abuse Prevention Program was developed by Botvin, Griffin, Diaz, and Ifill-Williams (2001) using a cognitive-behavioral approach to enhance risk resistance skills among youth. Specific components of the curriculum include building self-esteem, resisting advertising pressure, managing anxiety, communicating effectively, developing personal relationships, and self-advocacy. The project was first tested on White youths in the state of New York in the 1990s and adapted for multicultural implementation with African American and Hispanic youth in 2001. Although the curriculum content and core elements of both programs were similar, several adaptations were made in preparation for delivering the program to youth of color. Focus groups were used to obtain feedback on ways to modify the intervention manual and adopt culturally appropriate and relevant teaching strategies. Adaptations included multiple strategies, such as creating graphics that contained the image

of minority youth, translating and adjusting the reading levels of program materials and questionnaires, and adding culturally relevant stories and role-play scenarios to the curriculum.

To test the culturally adapted program, participants were recruited from 29 public schools in New York City. Of the 5,222 seventh graders recruited, 3,621 completed the pre-intervention test, the posttest, and the 12-month follow-up survey. More than 60% of the participants were African American, and 22% were Hispanic. The schools were randomly assigned to an intervention condition or a control condition. Students in the intervention arm were taught by trained classroom teachers in 15 sessions in the seventh grade and 10 booster sessions in the eighth grade, while youths in the control group did not receive any project interventions (Botvin et al., 2001). The findings in the 3-month and 12-month postintervention tests revealed that the youth assigned to the drug prevention program reported greater reduction in smoking, drinking, and use of inhalant and polydrugs compared to youth in the control group. Programmatic effects observed in the culturally tailored program were similar to what Botvin et al. found among White, middle-class youth (Botvin et al., 1990; Botvin, Baker, Dusenbury, & Botvin, 1995). This program is one of few to advocate for programs that are multicultural rather than monocultural. Further, Botvin et al.(1995) found positive programmatic effects for both inner city minority and White, middle-class youth by making surface changes to the generic curriculum. These surface structure changes included inserting language and words to ensure that the reading level was appropriate for the targeted audiences and using photos of each racial/ethnic group to increase a sense of program relevance for each targeted audience.

Life Skills Training for Native American Youth

Schinke, Tepavac, and Cole, (2000) adapted the core curriculum from the Life Skills Training Program (Botvin et al., 1990, 1995, 2001) to prevent drug abuse among Native American adolescents. The program aimed to teach cognitive and behavioral skills to resist smoking of cigarettes or smokeless tobacco, drinking alcohol, and marijuana use. The participants (n = 1,396) were recruited from 27 tribal and public schools in 10 reservations in five states: North Dakota, South Dakota, Idaho, Montana, and Oklahoma. Participating schools were randomly assigned to one of three arms: two intervention arms (a skills-only intervention group and skills plus community involvement intervention group) and a control arm. Youth assigned to the two interventions attended fifteen 50-minute weekly sessions. The intervention sessions were designed to contain the important common cultural elements of Native American tribes, including values, legends, and stories that reflected issues in the Indian society. Specific consideration was given to including cultural content that celebrated Native American traditions, which were further tailored to be reflective of various reservations, tribes, and Indian groups. Similar to other culturally tailored programs, Schinke et al. (2000) included role-playing, storytelling, programmatic activities, and small-group discussions to foster cognitive-behavioral skill development. In addition, homework was assigned to encourage youth to use lessons learned in sessions in their everyday lives. Native American leaders facilitated the group sessions and also served as coaches and to facilitate resistance skills usage and efficacy. Family and community members who had frequent contact with youth also were involved in the intervention to elevate their awareness of substance use prevention and ways to support and encourage youth to avoid drugs and substances. Youth in the intervention arms received boosters semiannually, delivered in two 50-minute sessions. Youth in the control did not receive any intervention. The authors did not provide detailed descriptions of how the curriculum itself was culturally tailored or pilot-tested prior to implementing the program.

All youth completed a pretest, immediate and 6 months posttests, and follow-up assessments every 12 months over the course of 3 years. Outcome analyses showed lower levels of alcohol, smokeless tobacco, and marijuana use among youth exposed to the skills-only intervention compared to those assigned to the skills plus community involvement arm and those in the control group. The absence of intervention effects for the skills plus community involvement condition was thought to have been associated with potential dilution of the program effectiveness. The skills-only program allowed youth to focus more on internalizing core elements of the program, thereby enhancing resistance skills to prepare youth to avoid risky situations. Given the prior lack of culturally sensitive interventions for Native American youth, these findings were important for demonstrating that benefits of culturally tailored risk prevention programs for tribal communities. There remains a great need for conceptual models to guide the development and testing of new prevention approaches and to refine existing interventions for Native American youth.

Keepin' It R.E.A.L.!

Keepin' It R.E.A.L. is a program designed to reduce sexual risk among African American adolescents, with specific

emphasis on relationship development between mothers and sons (DiIorio et al., 2006). Mother-son dyads are randomly assigned to one of two conditions: a program based on social cognitive theory (SCT) or the life skills program (LSK) based on problem behavior theory. Participants in both conditions meet for seven sessions over 14 weeks for 2 hours each session. In the SCT condition, mothers and adolescents attended joint sessions together for four of the seven sessions and separately in concurrent sessions for the remaining three. Sessions included information about reducing HIV transmission, general communication skills, as well as specific communication about sex, values, decision making, and peer influence. In the LSK condition, participants attended separate concurrent sessions, except for a portion of the first and last sessions, where they attended joint sessions. In addition, mothers participated in a stress reduction activity and discussion about ways to apply session topics to personal life. Youth also received a stress reduction activity at the beginning of session accompanied by discussion about a specific risk behavior. The LSK condition also included community service activities, such as an overnight trip to a historically Black college or university. Both the SCT and LSK conditions were highly interactive, and home practice exercises were assigned at each meeting.

Keepin' It R.E.A.L.! was evaluated in a RCT with the two described intervention conditions (SCT: n= 194; LSK: n = 187) and a control condition (n = 201) that received 1 hour of training on HIV prevention. Assessments were given at baseline, followed by 4-, 12-, and 24-month postintervention assessments. Results revealed greater change in HIV knowledge and more recent conversations about sex with their sons among mothers assigned to the SCT condition compared to those in the LSK and control conditions. Mothers in the SCT and LSK conditions, however, scored higher on intent and comfort about discussing sex with their sons than mothers in the control group. Regardless of conditions, sons demonstrated significant increases in sexual behavior over time and increased sense of self-efficacy for abstinence. Further, SCT youth reported greater increase in HIV knowledge, twice the rate reported by those in the LSK condition. Further, compared to youth in the control condition, youth in both SCT and LSK conditions who were sexually active were more likely to use condoms and reported having intentions to end their sexual activity until they were older.

Keepin' It R.E.A.L.! was subsequently adapted as a father and son program, based on the SCT approach, which was similar in format and content to the mothers' program (DiIorio, McCarty, Resnicow, Lehr, & Denzmore, 2007). The father-son program was evaluated with a randomized cluster design comparing effects of the SCT condition (n = 141) with a control condition focusing on nutrition and exercise (n = 132). Fathers in the SCT condition reported more communication and greater intent to communicate. Sons in the SCT condition reported less sexual behavior and more condom use among those who were sexually active. Increased condom use was a more robust finding than abstinence, despite being addressed in only one of the program sessions. The authors suggest that for African American male adolescents, condom use may be a more acceptable HIV prevention strategy than abstinence. The implications of cultural tailoring for study findings were not addressed.

Culturally Grounded Interventions

Strong African American Families

Strong African American Families (SAAF) is a family-based preventive intervention program, specifically designed for rural African American families to delay sexual debut and prevent the onset and escalation of alcohol and substance use during early adolescence. SAAF's theoretical and empirical underpinnings were based on data that Murry, Brody, and colleagues (Brody et al., 1994; Brody, Flor, & Neubaum, 1998; Brody, Murry, Kim, & Brown, 2002; Brody Murry, Gerrard, et al., 2004; Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004; Wills, Gibbons, Gerrard, & Brody, 2000; Wills, Gibbons, Gerrard, Murry, & Brody, 2003) gathered for more than a decade from the target population. Community members were involved in numerous aspects of SAAF's design, development, and implementation. Community members, who are residents of the counties in which SAAF families live, act as contacts between Murry's research group and the prevention-targeted communities. These individuals are selected on the basis of their positive reputations and extensive social contacts in their communities. Their feedback is sought on the cultural relevance and sensitivity of measures, protocols, and procedures for rural African American parents and youth. They also provide feedback about families' and communities' cultural identities, meanings, customs, religious practices, languages, expectations, worldviews, and cultural values, all of which impact the successful design and implementation of the SAAF program. Community members reviewed and provided feedback on each session, and the program was pilot tested with rural African American families and refined prior to implementation. Further, to enhance rapport, minimize cultural bias, and enhance cultural understanding, African

American community members serve as home visitors to collect data, and African American community members were trained to implement the program.

The SAAF program consists of 2-hour sessions that take place for 7 consecutive weeks. After a meal catered by local African American providers, caregivers and children attend concurrent breakout sessions and then join together for the last hour of large group discussion. Parent sessions focus on both general (e.g., monitoring and communication with children about sex) and racially specific (e.g., racial socialization) parenting practices via videotaped vignettes and group discussions designed to foster social support. Adolescent sessions focus on topics such as dealing with difficult situations (e.g., racism), images of risk behaviors, and peer pressure resistance strategies via games and activities. Family sessions reinforce the messages from parent and adolescent sessions and build mutual understanding and communication. Each session includes videotapes of African American family interactions that were specifically produced for the SAAF program to illustrate key points. Further, each participating family receives program worksheets, homework assignments, and publications designed to reinforce program content. Every session includes a review of homework, didactic presentation of information, group discussion, and skills training activities designed to reinforce learning.

The SAAF program was evaluated by randomizing counties in the rural South to either the SAAF condition or a minimum-control condition in which parents were mailed information about early adolescent development, stress management, and techniques to promote exercise. Pretest assessment occurred prior to SAAF exposure, followed by 3-month posttest, with follow-up assessments at 9, 27, 54, and 65 months postintervention. The trial included 677 families with an 11-year-old child and has yielded favorable behavioral outcomes and supported SAAF's efficacy in delaying sexual debut and substance and drug use avoidance 54 months postintervention (Murry, Berkel, Brody, Miller, & Chen, 2009), with sustaining effects 65 months postintervention (Murry, Berkel, Pantin, & Guillermo, 2011) among SAAF youth. The researchers tested the mediating mechanisms of the program and found that participating in SAAF evoked increases in regulated-communicative parenting and intrapersonal protective processes in youth (racial identity, self-esteem, self-regulation, and positive self-image). SAAF-induced effects on parenting behavior deterred not only precursors to risk behavior, such as risk-related attitudes, future orientation, self-regulatory capacity, and resistance efficacy, but also immediate HIV-related risk behavior, including early onset of substance use and sexual intercourse and alcohol use trajectories (Berkel et al., 2009; Brody, Murry, Gerrard, et al., 2004; Brody, Murry, McNair, et al., 2005; Murryet al., 2011; Murry et al., 2012;).

Mexican/Mexican American Keepin' It R.E.A.L.

Mexican/Mexican American REAL is a school-based program to reduce drug/substance use, alcohol use and other risky behaviors that included a multicultural version and a specific adaptation of Keepin' It R.E.A.L.! for Hispanic youth. The developers describe the program as a culturally grounded intervention (Hecht et al., 2003) because the core elements of the curriculum were selected and designed to specifically reflect narratives and stories of indigenous youth (Hecht, Graham, & Elek, 2006). The curriculum focuses on five core components: communication competence, narrative knowledge, motivating norms, social learning, and resistance skills. In addition, cognitive skills, appropriate behaviors, and communication for effective use of four "REAL" resistance strategies (*r*efuse, *e*xplain, *a*void, and *l*eave are emphasized (Kulis et al., 2005).

Multiple strategies were used to adapt the curriculum to fit the ecological culture of the targeted audience. Each session was translated into Spanish for the Mexican American version, while English was the language included in programs targeting White and African American youth. Local youth were involved in the production of curriculum videos, as part of the development team, and also served as actors for the videos. Examples from local mass media also were included as supplemental materials. For the boosters, activities were added that were developmentally appropriate for eighth graders, such as group poster projects, mural paintings, neighborhood nights out, and an essay contest (Kulis et al., 2005). The adapted curricula were subsequently tested on the three ethnic groups.

Three versions of Keepin' It R.E.A.L. were taught by trained classroom teachers of seventh graders in an efficacy trial to address the question as to which version was most effective for Mexican American youth: a Mexican American–focused version, a White and African American version, and a multicultural version. The program was delivered in ten 40- to 45-minute sessions to a sample of 3,402 seventh graders from 35 middle school in Phoenix, Arizona (Hecht et al., 2006; Kulis et al., 2005). Participants in the multicultural version received half of the lessons from the Mexican American–focused version and the other half from the White and African American version. After the intervention sessions were conducted, the youth in the intervention group received monthly boosters for the following year. Youth in the control group were not

exposed to programmatic materials or information. Data were collected at four time points, with a pre-intervention survey and three follow-up surveys. Results revealed significant reduction in substance and drug use, intentions for future drug/substance use, and positive images of peers who use drug/substance among participants across each of the program versions. Further, Hecht et al. (2006) noted that Mexican youth exposed to the program, regardless of version, delayed onset of drug/substance use and reported lower rates of increase in drug/substance use, over time, compared to youth in the control groups. On the contrary, the White and African American version had no significant effect. The authors highlighted the importance of cultural inclusion rather than exclusion in program content, targeting risk reduction among Mexican American youth. The positive behavioral outcomes manifested in a multicultural risk prevention curriculum suggests that programs narrowly tailored to each specific subgroup, in this instance Mexican Americans, may not be necessary.

Familias Unidas

Familias Unidas is a preventive intervention for Hispanic youth based on ecodevelopmental theory (Pantin, Schwartz, Sullivan, Prado, & Szapocznik, 2004) that promotes four major family processes that are protective against substance use and unsafe sexual behavior: positive parenting, parent-adolescent communication, parental involvement, and family support (Pantin et al., 2003; Prado et al., 2007). Consistent with Hispanic cultural expectations, Familias Unidas places parents in positions of leadership and expertise in helping to prevent problematic outcomes in their adolescents.

Familias Unidas has been evaluated in two separate RCTs, and a third and a fourth are ongoing. In the first RCT, Pantin, Coatsworth et al. (2003) found that Familias Unidas was efficacious (in a sample of 167 Hispanic youth), relative to a no-intervention control group, in (a) increasing parental involvement, parent-adolescent communication, and parental support for the adolescent; and in (b) reducing adolescent behavior problems, a risk factor for drug use and HIV risk behaviors. Results also indicated that increases in parental investment were related to decreases in behavior problems. In the second RCT, Prado et al. (2007) evaluated the efficacy of Familias Unidas relative to a family-centered HIV preventive intervention and a family-centered adolescent cardiovascular health intervention over a 3-year period. The results of the study found that, over time, Familias Unidas was efficacious in reducing illicit drug use relative to the cardiovascular preventive intervention. Familias Unidas was also found to be efficacious in reducing cigarette use over time when compared to both the HIV preventive intervention and the cardiovascular preventive intervention. Finally, Familias Unidas was efficacious in reducing unprotected sexual behavior and preventing the incidence of sexually transmitted diseases. The effects of Familias Unidas on smoking and illicit drug were partially mediated by improvements in family functioning. Specifically, improvements in positive parenting (reward contingencies offered by parents) and in parent-adolescent communication explained some of the effects of intervention condition on cigarette and illicit drug use.

CHAMP Family Program

CHAMP was designed in close collaboration with community members, who played major roles in the program's design, implementation, and evaluation to reduce HIV risk among urban African American adolescents (McKay et al., 2004). CHAMP utilized a community participatory approach and framework to design, develop, and implement the program. The framework focuses on several core principles: (a) linking collaborators from outside and within a setting to design a program; (b) creating a stakeholder advisory group to oversee program activities; (c) designing programs that integrate scholarly and indigenous knowledge and perspectives relevant to a setting to shape prevention messages and activities; and (d) using credible messengers, such as those already connected to a setting, to implement interventions in their own neighborhoods (Baptiste et al., 2006).

All CHAMP participants (n = 227 families) were chosen randomly from a roster of 550 youth attending four inner city public elementary schools. Families were recruited via research staff making presentations to fourth- and sixth-grade classes, personal contact with parents at schools, telephone calls, or home visits to parents. As with other family-based interventions, CHAMP was designed as a multiple-family group format. This delivery format was thought to be especially useful in increasing social support and mutual aid, creating strategies to deal with common problems, and reducing the stigma associated with talking about sensitive issues (McBride et al., 2007). The format is somewhat unique in that pretest data collection occurs in session 2, after the participants have had the opportunity to meet facilitators and other families and find out more about the goals of the program. Posttest data collection occurs in session 11, before the celebration in the final session. In the non–data collection sessions, families meet for 20 minutes to discuss the topic of that night's meeting and then break out for 45-minute concurrent parent and

child sessions. In youth sessions, participants learn and role-play peer-pressure scenarios and communication with parents. The parent sessions focus on monitoring, social support, problem solving, and communication with young people about sensitive topics. At the conclusion of each meeting, parents and children reconvene to make an action plan for their home practice activities.

CHAMP was initially evaluated with a pretest-posttest design that included a no-treatment comparison group from the CHAMP longitudinal study (McKay et al., 2004). Results from parents demonstrated a positive increase in family decision making relative to the comparison group, as did comfort in communicating about sensitive topics with their children. Among adolescents, those in the intervention group were less often exposed to mixed-gender settings without parental supervision (McBride et al., 2007). Youth in the intervention condition reported higher family conflict, perhaps because the intervention encouraged them to communicate more with their parents about sensitive topics. In addition, CHAMP has demonstrated effects on externalizing behaviors. Moreover, the CHAMP Family Program has been adapted for and piloted in several other contexts, including HIV-positive youth (McKay et al., 2007), in multiple international settings, such as South Africa (Bell et al., 2008) and Trinidad and Tobago (Baptiste, Voisin, Smithgall, Martinez, & Henderson, 2007). The program developers attribute positive results to the use of core community participatory principles to inform and guide efforts to refine a disease prevention and health promotion model and to refine research methods that embed culture as well as context in the design, development, and implementation of the CHAMP program.

The initial CHAMP outcome study did not include a control arm, but subsequent adaptations of the program have added experimental control comparisons, showing continued strong programmatic effects on increased HIV transmission knowledge, less stigmatizing attitudes toward people with HIV, increased sexual conversation between parents and youth, and increased community protective influences, via more social control and the promotion of social action to foster health-enabling communities for youth (McBride, Baptiste, Traube et al., 2007).

Puentes a la Secundária/Bridges to High School

Puentes a la Secundária/Bridges to High School (Puentes/Bridges) is a family-based program originally intended to prevent mental health disorders and prevent school dropout among Mexican American adolescents attending schools in low-income, urban communities (Gonzales, Dumka, Millsap, et al., 2012); however, it also produced reductions in adolescents' overall substance use, sexual risk taking, and alcohol use disorder (Germán, Gonzales, West & Dumka, in review; Gonzales et al., 2012; Gonzales, Jensen, Wong et al., in review; Gonzales Wong, Toomey, Millsap, Dumka, & Mauricio, 2014; Jensen, Wong, Gonzales, et al., 2014). Content and structural elements of Puentes/Bridges were based on: (a) qualitative interviews and focus groups with Mexican-origin families including Spanish-speaking and English-speaking parents who were born in the United States or Mexico; (b) key informant interviews with school personnel and service providers; (c) more than a decade of programmatic, longitudinal research on risk and protective processes within the targeted communities (Dumka, Gonzales, Woods, & Formoso, 1998; Gonzales, Dumka, Mauricio, & Germán, 2007); and (d) extensive pilot testing and refinement with schools and families in these communities (Dumka et al., 1998; Gonzales, Dumka, Deardorff, Jacobs-Carter, & McCray, 2004). The program's nine weekly sessions and two home visits targeted parenting practices, child coping, family cohesion, and school engagement. Puentes/Bridges was guided by an ecodevelopmental framework (Szapocznik & Coatsworth, 1999) that recognizes unique cultural factors and experiences that impact youth development at multiple levels and the challenges they encounter in their families, neighborhoods, and schools and with peers. In particular, school engagement can be a challenge for Mexican American youth in the United States. For example, since 1980, Mexican Americans have had the lowest rates of high school completion compared to Whites, Blacks, Asian, and Pacific-Islander groups and also compared to youth from other Latino groups (U.S. Census Bureau, 2010). Mexican American youth in low-income communities find it difficult to envision positive future possibilities (possible selves) in a context of low-wage jobs, unemployment, experiences of discrimination, and reduced expectations directed at them (Oyserman & Markus, 1990). These constraints combine with other features of low-income communities, such as the availability of drugs, deviant peers, and parents' diminished capacity for effective parenting, to reduce investment in education and increase risk for mental health problems (Barrera et al., 2002). Immigrant youth also encounter cultural conflicts in their schools and families, and their parents often have a poor understanding of U. S. schools and are therefore ill prepared to monitor and intervene when they have academic difficulties (Suarez-Orozco & Suarez-Orozco, 1995). Puentes/Bridges aimed to promote family and youth competencies shown in the general literature to protect against youth risk behaviors while also

empowering families to address these unique challenges and support their adolescents' school engagement across the middle school and high school years. In addition to program content specifically designed to increase knowledge and engagement of families in promoting their adoelscents' educational success, the program integrated the values of *familismo* (e.g., strong orientation and commitment to family) through both content (cohesiveness, coparenting, adolescent family support seeking) and structure (recruiting multiple caregivers, joint sessions with parents and children). Furthermore, traditional values were used as a motivational tool to encourage parents and adolescents to internalize and incorporate elements of the program into regular practice (Gonzales et al., 2007).

Puentes/Bridges was evaluated via an RCT with 516 families from four middle schools in Phoenix, Arizona (Gonzales et al., 2012). An efficacy trial showed desired effects on adolescent externalizing, internalizing, substance use, school disciplinary actions, and grades and also provided evidence that these effects were mediated by targeted changes in parenting, adolescent coping efficacy, family cohesion, and school engagement. However, tests of moderation also showed that effects on program mediators varied on the basis of family acculturation level. Greater changes in parental monitoring and family cohesion were found for more acculturated English-dominant families, whereas the less acculturated Spanish-dominant families showed greater intervention effects to reduce harsh parenting and to increase adolescent coping efficacy and school engagement. Patterns of engagement also varied, with less acculturated families enrolling and attending at higher rates. However, despite acculturation-related differences at immediate posttest, long-term follow-up showed similar improvements across groups on the quality of parent-child relationships (Jensen et al., 2014) and school engagement (Gonzales et al., 2014) following transition to high school (ninth grade), and these changes mediated subsequent effects to reduce internalizing and externalizing symptoms substance use, diagnosed alcohol use disorder, and school dropout at 5 years posttest when most adolescents were in the twelfth grade (Gonzales, Jensen, Wong et al, in review).

Be Proud! Be Responsible!

Be Proud! Be Responsible!, developed by Jemmott, Jemmott, and Fong (Jemmott, 1992; Jemmott, Jemmott, Fong, & McCaffree, 1999; Jemmott, Jemmott, Fong, 2010), was designed to increase minority youth knowledge on sexually transmitted diseases (STDs), HIV, and acquired immune deficiency syndrome (AIDS); to affect their attitudes and beliefs about safer sex (condom use and other prevention strategies); to inspire their understanding on individuals' vulnerability to STDs, HIV, and AIDS; and to build their skills on negotiation and resistance to risky sexual behaviors. This culturally grounded intervention was subsequently adapted and evaluated with different ethnic groups and subpopulations. Be Proud! Be Responsible! The African American Male version (Jemmott, 1992) sampled 157 Black male adolescents (mean age 14.4 years) from three sites in Philadelphia, Pennsylvania: a medical clinic, a local high school, and a local YMCA. Following a pretest evaluation, a total of 27 small groups were formulated of which 14 were assigned to the intervention condition and 13 to the control condition. Both conditions consisted of small group interventions lasting 5 hours in which the curriculum was delivered via videotapes, small-group discussions, exercises, and games. Prior to program implementation, curriculum materials were pilot tested and revised to fit the interests of African American boys in urban regions. Although limited information was provided about specific adaptations for African American males, it appears that the cultural tailoring primarily involved the use of African American images in the videos and a gaming format to deliver program content. For example, they revised the AIDS knowledge content to be delivered as "AIDS Basketball," with the game organized around how to avoid risky sexual behaviors. The program developers also characterized the selection of program implementers as evidence of cultural tailoring; all were African American adults with at least a 4-year college degree and were employed as educators, social workers, or health professionals. Posttests were administered immediately after the intervention, and a follow-up assessment was conducted 3 months later. Findings revealed that intervention targeted youths reported greater change in AIDS knowledge, less favorable attitudes toward risky sexual behaviors, and fewer intentions to participate in such behaviors. Intervention effects remained significant at 3 months follow-up.

Be Proud! Be Responsible! The New Jersey version (Jemmott et al., 1999) targeted 496 African American youth (male and female) residing in Trenton, an economically distressed urban community with high prevalence rates of unintended pregnancies and sexually transmitted infections (STIs). The participants were recruited from local public schools in seventh and eighth- grades (mean age 13.8 years). Similar to the original version, the students were randomly assigned to the intervention groups (HIV reduction intervention) and the control groups (general health promotion intervention). Each small group

contained six to eight adolescents, with youth attending a 5-hour session in one day. The intervention targeted "hedonistic beliefs about the positive consequences of condom use on sexual enjoyment and self-efficacy to implement condom use" (Jemmott et al., 1999, p. 168). Prior to implementation, this curriculum was pilot tested to ensure that the program content and activities were sensitive to urban African American adolescents' interests. For instance, the videos selected for the program included multiethnic actors talking about AIDS, such as Ruben Blades, a Latino actor, demonstrating how to put on a condom using a banana as a prop (Jemmott et al., 1999, p. 168). Participants in the general health promotion intervention groups were taught about nutrition, exercises, and diseases. Local African Americans were hired to deliver the program. Posttest data collection occurred immediately after the intervention, and follow-up tests were conducted 3 and 6 months postintervention. Results from the immediate postintervention test revealed more positive beliefs about condom uses, stronger condom use intentions, and higher self-efficacy among the participants in the intervention groups compared to those assigned to the control condition. However, no group differences on targeted behaviors were observed at 3-month follow-up. Finally, the 6-month follow-up tests found decreased HIV-related unprotected sexual behaviors and fewer sexual partners compared with youth in the general health promotion intervention groups.

The Children's Health and Responsible Mothering—Project CHARM

The Children's Health and Responsible Mothering—Project CHARM is another adaptation of Be Proud! Be Responsible! specifically designed to reduce repeated pregnancy among Hispanic and African American adolescent mothers. CHARM is based on the core elements of Be Proud! Be Responsible! Project, which aims to reduce the number of episodes of unprotected sexual intercourse and number of sexual partners as well as to facilitate increased willingness and intentions to use condoms in order to prevent repeated pregnancies (Koniak-Griffin et al., 2003). A total of 572 adolescents, age 16.7 on average, who were mothers or pregnant were recruited, with a total of 497 retained for all the data collection cycles. The evaluation sample was primarily Hispanic (78%), with a smaller representation of African American females (18%). Youth were grades 7 through 12 from four school districts in Los Angeles County, California. Schools were randomly assigned to treatment (HIV program) or control conditions (general health program). Each program consisted of four 2-hour sessions.

Compared to the original curriculum, Project CHARM focused more on the impact of STDs and HIV on the lives of pregnant girls and their babies, including STI prevention during pregnancy and the importance of avoiding risky sexual practices postpartum. Similar to the original program, supplemental materials included culturally and developmentally relevant videos, skill-building activities, and role-playing. In addition, an HIV-infected adolescent mother was invited to speak in the second intervention session to motivate participants to make healthy sexual decisions and to encourage them to be sexually responsible and accountable as well as politically aware of the effects of HIV/AIDS on inner-city communities and their children (Koniak-Griffin et al., 2003). Assessment occurred immediately after the intervention sessions ended, followed by 3-month, 6-month, and 1-year postintervention assessments. Findings revealed that at 6-month follow-up, compared to females in the control group, those assigned to the HIV program demonstrated greater change in AIDS knowledge, scored higher in behavioral intentions to use condoms, and reported greater reduction in number of sexual partners.

Following several demonstrations of positive program effects with varying subpopulations in the context of efficacy trials, Jemmott, Jemmott, Fong & Morales (2010) launched an implementation effectiveness trial of Be Proud! Be Responsible! wherein members of community-based organizations (CBOs) were randomly assigned to different training conditions to test the role of different program implementation training strategies on intervention effectiveness. The Be Proud! Be Responsible! effectiveness trial was a implemented through CBOs with 1,707 youth age 13 to 18 residing in Philadelphia, Pennsylvania, and Trenton, New Jersey. There were three training conditions: (1) CBOs received the two project manuals (HIV prevention and health and wellness curricula) and no face-to-face training; (2) CBOs received the project manual and attended a 2-day face-to-face training session; and (c) CBOs received the project manual, 2 days of training on the manual, followed by a practice intervention-implementation session and 2 days of additional training in which program implementers were videotaped and received feedback on their intervention implementation practice sessions. Similar to their other program designs, Jemmott et al. randomly assigned youth to one of two conditions: Youth in intervention group received the HIV/AIDS prevention program, and those in the control group received general health promotion intervention sessions. Subsequently, trained CBOs at each site were randomly assigned to each youth group.

Preintervention data were collected and follow-up tests were administered at 3, 6, and 12 months postintervention exposure. However, results revealed no statistically significant program impacts on frequency of sexual intercourse in the past 3 months or condom use at last intercourse, and there were no effects of training condition on intervention effectiveness. The researchers concluded that there was no evidence that the amount of time training community members improved facilitators' efficacy in program delivery. Further, they offered several explanations for lack of significant program effects. First, they surmised that there may have been a selection bias among CBOs, as many who declined to participate held strong values about teaching abstinence that conflicted with the program's philosophy. Further, they speculated that the community-based delivery site may have affected study findings as prior school-based evaluations consistently showed expected benefits on risk behaviors for youth that received the intervention compared to those in the control group.

Respeto/Proteger

The Project Respecting and Protecting Our Relationships (Respeto/Proteger) is an adapted version of Be Proud! Be Responsible! designed to prevent HIV/AIDS among Latino adolescent couples who are new parents. The program focuses specifically on enhancing parental protectiveness as a mechanism to foster resiliency and motivate youth to reduce risky sexual practices (Lesser, Koniak-Griffin, Huang, Takayanagi, & Cumberland, 2009). Respeto/Proteger was informed by results from Project CHARM, which revealed that young Latino mothers felt less empowered to negotiate condom use, compared to their male partners. Lesser, Koniak-Griffin, Huang, Takayanagi, and Cumberland (2009) concluded from these findings that there is a need to include young fathers in pregnancy and sexual risk reduction program to increase sexual protection among young mothers.

Adolescent mothers and their partners were recruited from 28 Women, Infants, and Children (WIC, a federal assistance program of the Food and Nutrition Service of the United States Department of Agriculture (USDA) for healthcare and nutrition of low-income women, infants, and children) sites, eight alternative schools, two community-based organizations, and one community-based clinic in Los Angeles (Lesser et al., 2009, p. 92). Through randomization, 84 couples were assigned to the treatment condition and 86 couples were assigned to the control condition. The mean age was 20 years for males and 18 years for females; 78% of the male parents and 86% of the female parents were Latino. Young parents in the intervention group received a 12-hour curriculum (six 2-hour sessions) while their counterparts in the control group received a 1.5-hour didactic HIV prevention education program. A total of 41 program series were held in local settings, such as CBOs and health clinics. Evaluative surveys were conducted at pre-intervention, immediately after the intervention, and during follow-up periods.

Respeto/Proteger program design and development were informed by qualitative data received from Latino mothers attending health promotion projects for young mothers, and intervention approaches and strategies adopted from Project CHARM, Project EL Joven Noble, and Project Con los Padres. The Project EL Joven Noble and Project Con los Padres were programs designed to influence Latino youth understanding of romantic relationships, the "macho" man stereotype, and strategies to deal with daily challenges. Prior to implementing Respeto/Proteger, the program was pilot tested with groups similar to the targeted audience. Programmatic changes were made based on pilot test results. Findings revealed that the couples, both adolescent mothers and their partners in the intervention arm of the study, reported less unprotected sexual behaviors 6 months after the intervention sessions. Further analysis indicated that, compared to the adolescent mothers in the control group, those in the intervention group whose male partner scored higher on protectiveness at the baseline reported even less unprotected sexual behaviors. Interestingly, female protectiveness did not show significant influences on males' unprotected sexual behaviors.

¡Cuídate!

¡Cuídate! (English translation means: take care of yourself) is a program to increase parent-child communication about sex in Mexican-heritage families (Villarruel, Cherry, Cabriales, Ronis, & Zhou, 2008). The theory of planned behavior was combined with a focus on Mexican cultural values, including familism and religiosity, in the design of the program. Familism was utilized as a motivational impetus to frame the importance of talking with children about sex. Religiosity was considered for its influence on decision making about sexual behavior, for example, whether to address condom use or abstinence. The 6-hour program was conducted with separate sessions for parents and adolescents on two consecutive Saturdays. The intervention group (n = 404) was provided with information about the prevention of HIV and pregnancy as well as support for general and sexual communication with children. The control group (n = 317) received a 6-hour general health intervention, which also emphasized the principal

role of parents in determining adolescents' health but did not discuss parent-child communication. Both groups were assigned homework to complete with their adolescents. Participants in the intervention group reported more communication, communication about sex, and comfort in communication than parents in the control group. Moreover, this effect was mediated by the perceived utility of communication about sex; attitudes of the adolescent, family, and church related to communication about sex; and parents' comfort in discussing sex with adolescents. Effects were not moderated by familism, religiosity, or the gender of parents or children.

Discussion

Several observations emerged from our review of youth risk prevention programs. The majority of programs were delivered and tested in school based settings, with a significant proportion using community- and family-based approaches, and the majority of programs included multiple intervention components. Our review also revealed that the majority of programs targeting African Americans and Hispanics were designed to prevent risky sexual behavior and its consequences (e.g., STIs and HIV/AIDS). The program targeting Native American youth focused solely on substance and drug use prevention. Findings are generally positive in showing that these programs fostered significant reductions in risky sexual practices, increased sexual and HIV/AIDS knowledge, and reduced youth intentions to participate in risk behaviors, including reduced intent to use drugs/substances. Evidence of condom use and positive attitudes about condoms as a means for protecting against unintended pregnancies, STIs, and HIV was also noted. We also can conclude these programs foster sustained effects, extending from 12 months to 6 years after the intervention, on outcomes such as sexual debut, substance and drug use, number of sexual partners, and diagnosed substance use disorder. Thus, our review offers support for the usefulness of culturally tailored programs to prevent the consequences of early sexual activity onset and substance and drug use among youth of color. Finally, while each of the programs included in our review focused on the prevention of sexual initiation, there was a lack of consideration given to the inclusion of culturally tailored alcohol and substance use programs for youth of color.

Content of Adaptations: Beyond Surface Structure

In contrast to adaptations of PT interventions that have augmented well-established EBIs previously validated with White samples, the majority of programs reviewed here were originally designed and developed for targeted youth of color. Only two programs, Life Skills Training (Botvin et al., 1990, 1995, 2001) and the SFP (Spoth, Redmond, & Shin, 2001), were first evaluated with White youth prior to being adapted for other ethnocultural groups (African American and Hispanic). In addition, our review determined that 10 of the 16 programs emerged from culturally grounded strategies involving extensive, in-depth community involvement and input on program design, measures, and various aspects of the program's deep structure. The integration of cultural values, beliefs, norms, and information about legacy and ancestry were apparent in most of the adapted and culturally grounded program. In addition, role-playing, role models, the use of storytelling, and the inclusion of culturally relevant materials, videos with images familiar to targeted audiences, and games were incorporated in the cultural adaptations. A noteworthy observation, however, is that none of the studies in this review, with the exception of SAAF program developers (Berkel et al., 2009; Murry, McNair, Myers et al., 2014), included measures to assess cultural dimensions in summative assessments of program effects.

Subgroup Differences

Our review also revealed evidence of subgroup differences in program responsiveness. For example, the Aban Aya Youth program demonstrated greater improvements in sexual risk and drug reduction among males than females. Projects that involved both teen mothers and fathers indicated that the intervention is more effective on the young fathers for condom use. In the one study that examined within-group variability based on culture, Puentes/Bridges showed differences in levels of engagement and program effects between low-acculturated (primarily immigrant Spanish-speaking) and high-acculturated (English-speaking) families. However, it was noteworthy that similar long-term effects on targeted mental health, substance use outcomes, and school dropout were found across levels of acculturation, suggesting that diverse families may benefit in different ways, depending on their unique needs when participating in comprehensive, multicomponent interventions. This finding underscores the need for greater attention to within-group variability in tests of efficacy and effectiveness in order to determine whether and how EBIs can address subgroup differences for racial/ethnic groups that are neither monolithic nor static on cultural dimensions.

Remaining Gaps and Questions

To further advance this area of research, there is a need to address several gaps and unresolved questions. Several groups are not visible in preventive intervention research—namely Alaska Native, Asian Americans, and Asian Pacific Island adolescents. No programs targeting these youth emerged in our comprehensive literature search, and very few have been evaluated with American Indian youth. American Indians and Alaska Natives are disproportionately affected by all major youth risk behaviors, including alcohol, tobacco, drug use, risky sex, and suicidal behaviors. Further, available studies have shown that while Asian Pacific Island youth are less likely to engage in risky sexual practices than any other group of adolescents (Grunbaum, Lowry, Kann, & Pateman, 2000), when this population has been included, findings reveal greater endorsement of having used alcohol or drugs at last intercourse compared to other racial/ethnic groups. Sexual risk protection was comparable to other ethnocultural groups in reports of using a condom at last intercourse. That there is a major void in targeting these subgroups in preventive interventions is of great concern. That the majority of risk prevention programs have been developed and tested on urban youth suggests the need to determine how to translate these programs in rural contexts. This information can further our understanding of the utility of developing programs to specifically address the needs of rural youth. The paucity of studies in our review that targeted rural youth is of concern, given that rural youth are at increased risk for using a variety of substances, including tobacco (Zollinger, Saywell, Overgaard, Przybylski, & Dutta-Bergman, 2006), alcohol (Hutchison & Blakely, 2003), and methamphetamines (Johnston et al., 2009). Several researchers have noted that rural Whites, especially those living in the Appalachian region, appear to be at greater risk for early onset of substance use than their more frequently studied urban counterparts (Johnston et al., 2009; Pruitt, 2009; Spoth et al., 2001; Zollinger, Saywell, Overgaard, Przybylski, & Dutta-Bergman, 2006). Not only are these youth infrequently included in epidemiological studies, but, to our knowledge, few programs specifically target White youth residing in southern rural communities.

Finally, only one study included in the current review directly compared whether a culturally adapted program is more effective than a generic or multicultural program (Keepin' It R.E.A.L.), and the findings did not support the cultural adaptation with Hispanic youth. Notwithstanding these limitations, our review offers support that it is possible to provide effective programming for youth from a variety of cultural backgrounds with proven, culturally generic, evidence based programs. However, it remains unknown when, how, for whom, and under what circumstances culturally tailored youth risk prevention program will foster targeted programmatic effects.

PREVENTION OF ANXIETY AND MOOD DISORDERS

Anxiety and mood disorders are prevalent among children and adolescents, causing significant impairment at home, with peers, and at school (e.g., Kessler, Avenevoli, & Merikangas, 2001; Pina, Zerr, Gonzales, & Ortiz, 2009). Data from the National Comorbidity Survey Adolescent Supplement showed that among youth 13 to 17 years old, anxiety disorders were the most prevalent class of disorders (24.9%) with mood being the third most prevalent class of disorders (10%) (Kessler et al., 2012). In addition, Kessler, Avenevoli, and Ries Merikangas's (2001) seminal review of epidemiological and large-scale prospective longitudinal studies (e.g., Costello, Angold, & Keeler, 1999; Kovacs, Gastonis, Paulauskas, & Richards, 1989) revealed that anxiety disorders were not only the conditions most commonly comorbid with depression but that about three-fourths of depressed youth had a history of at least one anxiety disorder. There also are data suggesting some variations in the prevalence and co-occurrence of anxiety and mood problems (e.g., age, sex), albeit epidemiological or large scale studies focusing on ethnicity-race are scant.

In the adult literature, for example, Karnoet al. (1989) found that the lifetime prevalence for any anxiety disorder was higher among U. S.-born Mexican Americans compared to Mexican Americans born in Mexico (22.6 versus 13.7), based on the Los Angeles Site of the National Institute of Mental Health Epidemiologic Catchment Area study. In another study using data from the National Epidemiologic Survey on Alcohol and Related Conditions, Grant et al. (2004) found that the lifetime prevalence of any anxiety disorder was higher for U. S.-born Mexican Americans (16.3%) than for foreign-born Mexican Americans (9.1%). In addition, for any mood disorder, the lifetime prevalence was higher for U. S.-born Mexican Americans (19.3%) than for foreign-born Mexican Americans (10.2%). Turning to the National Health and Nutrition Examination Survey-III, Riolo, Nguyen, Greden, and King (2005) found that Mexican Americans and Caucasians had a significantly earlier onset of major depressive disorder compared to African Americans. In addition, education (less than 8 years of school) was associated with

major depressive disorder for Mexican Americans only. Also, dysthymic disorder was greater among Mexican Americans and African Americans, even after controlling for the effects of poverty and education. (No age by ethnicity data were presented, albeit the youngest responders were 15 to 19 years old.) No comparable research focusing on Native Americans and Asian Americans has examined variations in the prevalence and co-occurrence of anxiety and mood problems.

When it comes to ethnic minority children and adolescents, there also is a scarcity of anxiety and depression disparities research from large-scale and methodologically robust studies; the little work that has been conducted has focused on African American and Hispanic/Latino youth. Bird (1996), for example, reported prevalence rates of psychiatric disorders in children and adolescents (age 4–16 years) in Puerto Rico. Findings showed that depression was the second most common diagnosis (5.9%) with only separation anxiety disorder and specific phobias emerging from the anxiety disorder modules at 4.7% and 2.6%, respectively. More recently, Alegría et al (2012) reported data from the National Comorbidity Survey Adolescent Supplement. Findings showed that for non-Latino Black youth, the lifetime prevalence of separation anxiety disorder was significantly higher (10.8%) compared to non-Latino Whites (6.8%) or Latinos (7.9%). No additional differences relevant to ethnicity and anxiety-depression were found.

The high prevalence of anxiety and depressive disorders in children and adolescents (Costello, Egger, & Angold, 2005), coupled with the fact that these conditions also are typically chronic and lead to significant impairment (including early initiation of the use of alcohol, tobacco, and other illicit drugs; Conger & Rueter, 1996; Glantz & Leshner, 2000), has prompted much interest in developing EBIs (Beidel & Turner, 2007; Silverman, Pina, & Viswesvaran, 2008). In addition, data showing some ethnic variations in the prevalence of these disorders prompted some research focused on culturally adapted interventions focused on reducing and preventing disparities in these psychiatric conditions among youth (Cardemil, Reivich, & Seligman, 2002; Cooley-Strickland, Griffin, Darney, Otte, & Ko, 2011).

In the clinical child and adolescent area, several randomized, controlled prevention trials have been published at the universal, selective, and indicated levels focusing on anxiety and/or depression. In the anxiety area, most anxiety prevention studies have been conducted at the universal level, and only a handful of studies have tested selective or indicated protocols. Indicated programs have been directed at children due to a family history of anxiety (Ginsburg, 2009), a known predisposition (e.g., behavioral inhibition; Rapee, Kennedy, Ingram, Edwards, & Sweeney, 2005), or some anxiety symptoms (Pina, Zerr, Villalta, & Gonzales, 2012). Selective or indicated depression prevention programs have been directed to youth at risk for depression due to a family history or diagnosis of depression (Beardslee, Gladstone, Wright, & Cooper, 2003) or exposure to stressors that place them at high risk, such as urban poverty (Cardemilet al., 2002) or the loss of a parent (Sandler et al., 2003). Anxiety prevention strategies show content overlap with prevention protocols, typically focusing on negative cognitions, social skills training, and problem-solving skills (Barrett & Turner, 2001; Dadds, Spence, Holland, Barrett, & Laurens, 1997; Essau, Conradt, Sasagawa, & Ollendick, 2012; Lock & Barrett, 2003; Lowry-Webster, Barrett, & Dadds, 2001; Pina et al., 2012; Simon, Bogels, & Voncken, 2011; Warner, Weissman, Fendrich, Wickramaratne, & Moreau, 1992).

In a nutshell, research shows that pathological levels of childhood and adolescent anxiety and depression may be preventable. Using meta-analyses, Fisak, Richard, and Mann (2011) found a significant overall mean weighted effect size of about .18 as well as a slightly greater effect for targeted (i.e., selective or indicated) anxiety prevention over universal protocols. In another meta-analysis, Teubert and Pinquart (2011) found significant effect sizes on anxiety at posttest (about .22 for symptoms and .23 for diagnoses) and follow-up (about .19 for symptoms and .32 for diagnoses) as well as significant variations of program effects, giving targeted programs an advantage over universal programs. When it comes to the prevention of depression, targeted (selective/indicated) programs also appear to be more effective than universal programs. In Horowitz and Garber's (2006) meta-analyses, the pretest-to-posttest effect size for targeted programs ranged from about .23 to .30 compared to only .12 for universal programs. At follow-up, the effect size for targeted programs ranged from about .31 to .34 compared to .02 for universal programs. Similarly, Stice, Shaw, Bohon, Marti, and Rohde's (2009) meta-analyses found an average effect size ranging from .14 to .23 for targeted programs compared to .06 to .04 for universal programs. It is important to note, however, that there was some overlap in the trials included in the anxiety and depression meta-analyses, making these effect size evaluations nonindependent. For example, the FRIENDS for Life program was included in both anxiety and depression meta-analyses (e.g., Barrett, Farrell, Ollendick, & Dadds, 2006). Nonetheless, based on these findings, preventing anxiety and depressive disorders appears to be both an

effective and an efficient way to reduce the incidence of these psychiatric conditions, especially when the protocols are targeted.

Cultural Adaptation and the Prevention of Anxiety and Depression

Despite the promising overall effects of childhood anxiety and depression prevention programs, evidence seems to suggest that prevention efforts need to be strengthened, particularly for ethnic minority or culturally diverse child populations (e.g., Barrett, Sonderegger, & Xenos, 2003; Cardemilet al., 2002; Cooley-Strickland et al., 2011; I. D. Miller et al., 2011). Studies testing cultural adaptations of anxiety and depression prevention programs are far less common than for substance use, externalizing problems, or other youth risk behaviors. In this section we highlight the few prominent exemplars that have been evaluated to date.

The Penn Resiliency Program

The Penn Resiliency Program is a school-based depression prevention program that teaches cognitive and social problem-solving skills to groups of middle school students who might be at risk for developing depressive symptoms by virtue of their low-income status. The program is an adaptation of an EBI established with predominately middle-income Caucasian children (Gillman, Reivich, Jaycox, & Seligman, 1995) that Cardemil et al. (2002) applied to low-income African American and Latino children. In their study, the original structure of the program was maintained, but cultural modifications were made. In particular, the characters and examples used in the program were made culturally and contextually relevant by illustrating the skills in the context of challenges associated with growing up in a single-parent home and managing peer conflict in urban settings. For Latino youth, fewer depression symptoms, negative automatic thoughts, and hopeless thoughts were found from pretest to posttest and at 6-month follow-up. In addition, at the follow-up only, Latino youth also evidenced higher self-esteem over time compared to no-treatment controls. For African American youth, however, findings were not encouraging. There were no differences between the intervention and the control conditions on any of the measures or at any measurement point. At the 2-year follow-up (Cardemil, Reivich, Beevers, Seligman, & James, 2007) Latino youth continued to show program-related gains but African American youth did not. The finding with African American children was interpreted as possibly being related to six potential factors, two of which seem especially plausible: cross-ethnic differential reporting of depressive symptoms and/or differential expression of depression symptoms. However, with no data about the measurement equivalence of the assessment tools used in the study, it is difficult ascertain the viability of these possibilities (Pina, Gonzales, Holly, Zerr, & Wynne, 2012).

FRIENDS for Life (African American Youth)

In another study focusing on African American youth, Cooley, Boyd, and Grados (2004) and Cooley-Strickland et al. (2011) described their adaptation of the FRIENDS for Life childhood anxiety prevention program developed in Australia to prevent anxiety and depression (Barrett et al., 2006). The original EBI is a school-based intervention shown to reduce risk of anxiety disorders by teaching cognitive and emotional skills to cope with feelings of fear, worry, and depression. In the cultural adaptation work of Cooley and colleagues, modifications focused on replacing references specific to Australian culture and including examples relevant to the contexts of inner city African American youth. In terms of language, for example, the word *vegemite* was replaced with *peanut butter*, *sugar glider possum* was replaced with *bat*, and *tucker* was explained as *food*. Also, relaxation exercises were modified, and references to animals indigenous to Australia (e.g., koalas, cattle dogs, crocodiles) were replaced with those found in urban America (e.g., pigeons, mice, dogs, kittens). As far as incorporating the contexts of inner-city African American youth into the intervention, children drew pictures of real-life violence that had occurred in their communities, and examples of incidents relevant to living in violent and chaotic environments (e.g., fights, gangs, drugs, low resources) were integrated into the sessions. In their trial, Cooley-Strickland et al. found no statistically significant program differences compared to waitlist on any of the primary outcome variables including anxiety symptom levels (not even for those children with higher levels of pretest community violence exposure or as a function of the child's sex).

FRIENDS for Life (Aboriginal Children in Canada)

Focusing on Aboriginal children in the West Coast Nations of Canada, I. D. Miller et al. (2011) implemented and tested a culturally adapted FRIENDS for Life protocol. This adaptation focused primarily on cultural enrichments, such as adding a new character (Rusty the Raven) and narrative to facilitate the use of storytelling as part of the protocol. The adaptation also entailed: introducing the craft and use of a medicine pouch decorated with Aboriginal symbols; replacing a support team activity with a circle

of support activity that focused on family, community, culture, and natural and spiritual world resources: and adding a "FRIENDS Wheel" modeled after the medicine wheel. In this study, the FRIENDS program was delivered to elementary school students in Canada (including many Aboriginal children). Findings showed that, for both Aboriginal and non-Aboriginal children, no statistically significant reductions in anxiety levels could be attributed to the intervention.

Acercamiento

Pina et al. (2012) reported on an indicated prevention and early intervention for childhood anxiety trial (about 48% of Latinos who were Spanish speaking and requiring services in Spanish) that included a significant proportion of Mexican-origin families. As such, services were made available in Spanish, and interventionists were trained in a culturally prescriptive protocol (Pina et al., 2009) that calls for personalizing or tailoring program implementation strategies to the unique cultural characteristics of the client. This is achieved by including in the protocol references to norms and values (e.g., *familismo*) that can help the client engage in the use of core program components, such as gradual exposures via motivational procedures. In terms of culture, a focus was on developing cultural enrichments and implementing them prescriptively with high fidelity in the application of standard cognitive and behavioral procedures. The cultural adaptation was conceptualized in terms of program materials and program implementation strategies. In terms of program materials, for example, child and parent handouts were available in Spanish, and cultural enrichments focused on incorporating *dichos* (sayings), proverbs, and refrains that could assist content delivery. In terms of strategies, interventionists were trained both to be attuned to various terminology used by children and families and to use such terminology during the sessions, and to identify "windows of opportunities" to use key cultural values (e.g., *familismo*) potentially relevant to promoting program engagement and practice of program skills, as necessary. Two conditions were compared, "child-only" or "child plus parent," in Pina et al. (2012), based on knowledge gained from parent focus groups and in-depth interviews showing that Mexican-origin caregivers prefer parental involvement in child-focused interventions (similar findings have been reported by others; Dumka et al., 1998), perhaps because Hispanic/Latinos place great emphasis on caregiving and family. Significant program effects were found in terms of child anxiety symptoms based on a diagnostic interview schedule, parent and child rating scales, and clinically significant change, although the child-plus-parent condition showed slightly greater gains in terms of child self-reported anxiety and depression levels as well as parent-reported anxiety symptoms about the child. No program moderation effects were found for ethnicity or language (Spanish versus English).

Discussion: Limited Evidence

Despite efforts made to develop culturally robust anxiety and depression prevention programs, overall findings have been somewhat unsuccessful. This appears to be true when regarding African American children in particular (Cardemil et al., 2002; Cooley-Strickland et al., 2011). In contrast, the evidence for Latino youth seems to be more encouraging (Cardemil et al., 2002; Pina et al., 2012). It is important to highlight, however, that the literature is limited to two studies focusing on African American youth and two studies focusing on Latino youth, both exploratory in nature and lacking statistical power for the analyses conducted. For African American youth, deep-level adaptations might be necessary as current findings are not very encouraging. For example, given the importance African Americans place on the family and the caregiving roles grandparents often play, it might be important to enhance anxiety and depression prevention efforts by providing caregivers with substantial PT sessions that focus on evidence-based mediators of child outcomes (e.g., parenting, family functioning variables). Turning to other groups, there was little to no representation in the literature of programs focusing on Asian and/or Pacific Islander children (Barrett et al., 2003; Yu & Seligman, 2002). Barrett et al. (2003), for instance, implemented the FRIENDS program (original nonmodified version) to former Yugoslavian, Chinese, and multi-ethnic children residing in Australia. At posttest, former Yugoslavian youth in FRIENDS showed greater gains than their Chinese counterparts on self-reported anxiety and self-esteem compared to waitlist (along secondary outcomes measures, FRIENDS showed similar cross-ethnic gains including at the 6-month follow-up). Also, there are no anxiety or depression prevention studies focusing on Native American youth, although there is some encouraging research focusing on the prevention of posttraumatic stress reactions in this population (Goodkind, LaNoue, & Milford, 2010).

As we move forward to advance prevention methods focusing on anxiety and depression among ethnic minority children, it would be important to identify program adaptation parameters beyond language and contextually relevant examples. For example, when it comes to Latino children, it would be important to test the extent to which

cultural values such as *familismo* are likely to enhance program effects. Emerging tailoring work by Beardslee and colleagues (D'Angelo et al., 2009) in the area of depression suggests there might be a need to focus on immigration history, adaptation to the host culture, and consideration of key cultural values (trust, respect) during the intervention. However, substantial data about the impact of these types of modifications have not been published to date (D'Angelo et al., 2009; Feinberg et al., 2012). For Asian American children, focusing on cultural values also might hold promise. For instance, Huey and Pan (2006) reported on a small randomized demonstration trial with clinically anxious/phobic Asian American adults. Findings revealed that Asian Americans benefited slightly more from a culturally adapted protocol that considered traditional Asian values compared to a standard protocol. This was true in terms of catastrophic thinking and behavioral approach, two core features of pathological anxiety. Building on these data, it appears that "culture" might definitely need to be considered when targeting anxiety and depression in ethnically and/or culturally diverse children and adolescents. We caution, however, that it might be possible to saturate a program and distract away from critical change processes by infusing too much culture into an intervention (Pina et al., 2009).

HEALTH-FOCUSED INTERVENTIONS

Health disparities for subcultural group children and adolescents are well documented (Flores, 2010; Flores & Tomany-Korman, 2008). In the most extensive analysis of childhood health disparities, Flores (2010) reviewed 111 articles published between 1950 and March 2007. Consistent with the definition provided by the U. S. Department of Health and Health Services, disparities covered by that review included subcultural group differences in disease prevalence, health outcomes, and access to health care. African American, Asian/Pacific Islander, Latino, and Native American children showed disparities relative to non-Hispanic White children in one or more categories of mortality, injuries and illnesses, obesity, physical activity, proper nutrition, and medical care. Culturally adapted interventions often are initiated with the primary intention of reducing disparities by promoting cultural elements that are healthful or modifying those that are associated with health risks. Culture influences health through a variety of mechanisms, such as food preferences, traditional methods of food preparation, celebrations involving food and beverage consumption, perceived desirability of certain body shapes, consumption of alcohol, and norms for physical activity (MacLachlan, 2006). Understanding how culture influences the health of children informs the development of interventions that incorporate cultural beliefs and practices. By focusing on children's health, cultural adaptations of childhood interventions can not only affect proximal child health outcomes but also can change the trajectory of health outcomes into adulthood. There is a developmental component to some health behaviors and illnesses (such as Type 2 diabetes and cardiovascular disease) that justifies early intervention efforts (Berenson, 2002; Guo & Chumlea, 1999; Magarey, Daniels, Boulton, & Cockington, 2003; Must, Jacques, Dallal, Bajema, & Dietz, 1992; Serdula et al., 1992). Thus, it is worthwhile to develop culturally informed health interventions for children and adolescents that reduce health disparities, incorporate an understanding of culture's influence on health, and disrupt risky health behaviors that threaten to extend from childhood into adulthood.

The Cases of Obesity and Physical Activity

Research on the interrelated topics of obesity and physical activity illustrates the need for culturally adapted interventions and their thorough evaluation. Obesity is a prominent preventable risk factor in the major illness categories of heart disease, cancer, and Type 2 diabetes (Eyre, Kahn, & Robertson, 2004). Unfortunately, across various national studies, there are consistent ethnic group disparities on the prevalence of obesity. For adults, the combined prevalence of overweight and obesity was 64.2%, 76.1%, and 75.8% for non-Hispanic Whites, Blacks, and Mexican Americans, respectively (Wang & Beydoun, 2007). For children, African American, Latino, Native American, and some Pacific Islander subgroups (e.g., Filipinos) show elevated rates of obesity when compared with non-Hispanic Whites (Flores, 2010; Wang & Beydoun, 2007). Wang and Beydoun (2007) reported that the combined prevalence rates for overweight and obesity were 28.2%, 35.4%, and 39.9% for non-Hispanic White, African American, and Mexican American children and adolescents. Disparities were particularly apparent for girls. For instance, in their justification for a targeted preventive intervention, T. N. Robinson et al. (2010) noted that since the 1960s, obesity among African American girls has tripled; they differ from non-Hispanic White girls on body mass index (BMI) as young as age 6, and obesity disparities increase as girls mature into adolescence and young adulthood.

There is a suggestion in the literature that disparities on obesity for African American girls cannot be explained

readily by SES differences (Gordon-Larsen, Adair, & Popkin, 2003). Utilizing data from a nationally representative sample of U. S. adolescents, one report focused on a subsample of over 13,000 that included non-Hispanic White, Hispanic, African American, and Asian American males and females who were 12 to 20 years of age. Ethnic-racial disparities were evident in the prevalence of overweight girls: Asian American: 10.37%; non-Hispanic White: 22.24%; Hispanic: 29.59%: and African American: 37.94%. It was particularly interesting that there was a negative relation between overweight status and SES for non-Hispanic White and Hispanic girls but not for African American girls, whose prevalence of being overweight was relatively elevated at higher levels of SES. For African American girls, it appears that factors such as income and education might increase risk rather than lessen risk as they do for other subcultural groups. Subcultural group differences in risk and protective factors are intriguing because they suggest possible differences in modifiable variables that could be included in culturally adapted interventions for childhood obesity (Barrera et al., 2013).

One chronic illness associated with obesity, Type 2 diabetes, disproportionately affects African Americans, Latinos, and Native Americans (Cowie et al., 2006; Fagot-Campagna et al., 2000; Gahagan & Silverstein, 2003) and is a leading cause of death, blindness, heart disease and amputations (Wong et al., 2005). Particularly disturbing are the estimates of the prevalence of diabetes for the next generation, an anticipated development largely attributable to the rise in obesity. Forecasts suggest that for those born in the year 2000, 45.4% of Latino men, 52.5% of Latino women, 40.2% of Black men, and 49% of Black women will be diagnosed with diabetes within their lifetimes (Narayan, Boyle, Thompson, Sorensen, & Williamson, 2003). Those projections are substantially higher than projections for White men (26.7%) and women (31.2%), which are, nevertheless, still disturbing in their magnitude.

Physical Activity

Comparative research on the physical activity of ethnic minority children is less developed than research on obesity (Flores, 2010). When compared with non-Hispanic White youth, African American and Hispanic youth had lower aerobic fitness, less vigorous physical activity among girls, and more television viewing during weekdays (Flores, 2010). Those conclusions were based primarily on findings from the well-known Monitoring the Future annual surveys (Delva, O'Malley, & Johnston, 2006). The report by Delva, O'Malley, and Johnston (2006) used surveys from 1993–19–94 to 2001–2003 for eighth and tenth graders and surveys from 1986–1988 to 2001–2003 for twelfth graders. Results indicated that for boys, only one of 14 grade-by-survey year comparisons on frequency of vigorous physical activity showed ethnic/racial differences. For girls, the results were drastically different. African American and Hispanic girls reported less vigorous physical activity than non-Hispanic White girls on all annual surveys and for all grade levels. For hours of TV viewing, African American and Hispanic boys and girls reported more TV viewing than non-Hispanic White boys and girls on all annual surveys and for all grade levels. These findings indicate the clear need for interventions that are designed to increase physical activity and decrease sedentary behavior among African American and Hispanic children and adolescents.

Exemplary Research Programs Integrating Culture and Children's Health

Several model health interventions illustrated extensive and systematic cultural adaptation efforts. In this section we highlight three that are exemplary in the procedures they implemented to become informed about relevant cultural considerations, integrate those considerations into intervention designs, and then evaluate adapted interventions' engagement and efficacy. Other important controlled studies on interventions designed to improve the diet and physical activity of ethnocultural group children have been conducted, but published reports lack detailed descriptions of cultural adaptation procedures (Crespo et al., 2012; J. N. Davis et al., 2012; de Heer, Koehly, Pederson, & Morera 2011; Klesges et al., 2010; Nadar et al., 1999; Resnicow,Taylor, Baskin, & McCarty, 2005; Treviño et al., 2004; D. K. Wilson et al., 2011).

Stanford GEMS

The Stanford GEMS (Girls health Enrichment Multi-site Studies) was a culturally adapted after-school dance program and an in-home sedentary behavior (television and other screen viewing) reduction intervention for African American girls (T. N. Robinson et al., 2010). Stanford GEMS emphasized physical activity as a means for body weight reduction. The research team described their programmatic research in key articles that contained literature reviews, theoretical considerations, pilot research, and a randomized controlled trial efficacy study (Kumanyika et al., 2003; T. N. Robinson et al., 2003, 2008, 2010). Many features of exemplary cultural adaptation procedures (Barrera et al., 2013) were illustrated in the development of Stanford GEMS.

An initial report described a literature review that identified special considerations for obesity interventions directed at African American youth (T. N. Robinson et al., 2003). The authors noted that because African American girls, family members, and men might be less concerned about thinness than White counterparts, African American girls and women might be less motivated to achieve distal goals of weight loss and fitness. They surmised that intervention activities might need to be intrinsically and immediately appealing to sustain engagement of African American girls. The authors explained the considerations they made in identifying dance as a gratifying, culturally appropriate after-school physical activity. They conducted other extensive formative research that they summarized in this way: "The treatment and control interventions were developed through extensive formative research, including focus groups with girls; focus groups with parents/guardians; written questionnaires; interviews of community youth workers and community leaders; and testing the feasibility of the dance classes and TV reduction lessons with small groups of girls and individual families" (T. N. Robinson et al., 2003, S1–67 to S1–77.).

Cultural adaptations included surface structure elements, such as culturally matched participants and staff and participant-selected music and dance as the featured physical activity. The intervention developers indicated that deep structure elements associated with African American culture (e.g., collectivism, importance of family, present orientation, religiosity, sense of historical racism and prejudice, and use of social support) were infused into the intervention. The early cultural adaptation phases of Stanford GEMS contained a 12-week pilot study (T. N. Robinson et al., 2003), another feature of high-quality adaptation efforts (Barrera et al., 2013). Goals of the pilot were to evaluate the recruitment strategy and participants' satisfaction with intervention activities' and the intervention's effects on BMI, physical activity, screen (TV, video) viewing, and other outcomes. Sixty-one African American girls age 8 through 10 were recruited through community centers and after-school programs in low-income neighborhoods of Oakland and East Palo Alto California. To be eligible, girls had to have a BMI that was greater or equal to the fiftieth percentile for their age group and/or one overweight parent or guardian with a BMI of greater or equal to 25. Girls who were randomly assigned to the active intervention could attend dance classes that were offered 5 days per week at neighborhood community centers. They could attend dance classes as often as they liked for the 12 weeks of intervention. In addition, intervention participants received 5 in-home lessons that were designed to reduce TV and video viewing. Participants assigned to the control condition received a health education program that emphasized healthful eating and physical activity. They also received newsletters containing information about health risks that might lead to obesity, heart disease, and diabetes.

The pilot showed that the researchers were successful in enrolling more than their targeted number of participants, and participants met eligibility criteria. They also retained all but one of the participants over the 12 weeks of the pilot. Satisfaction with the intervention and participation in it were very good with one exception. The lack of affordable transportation in one community resulted in less than half the dance class participation that was achieved in the other community. Due to a lack of power, the intention was to estimate effect sizes rather than to show statistically significant intervention effects. Encouraging effect sizes were found for BMI, waist circumference, physical activity, and TV viewing that favored the intervention condition. Overall, the pilot study demonstrated the feasibility, appeal, and potential efficacy of the combined dance and TV-viewing-reduction intervention.

Ultimately, the Stanford GEMS team conducted a 2-year randomized controlled trial with 261 African American girls and their parents or guardians (T. N. Robinson et al., 2010). As in the pilot, participating girls were between the ages of 8 and 10 and were either overweight or had at least one parent/guardian who was overweight. Participants randomly assigned to the active intervention had access to after-school dance classes 5 days each week for 2 years and received up to 24 in-home sessions for reducing screen viewing. Over the 2-year period, the control condition included health education, monthly newsletters, and quarterly lectures at community centers. Despite the exemplary methods for creating a culturally adapted intervention, extending the intervention period to 2 years, and attracting an adequate number of participants, there was not a statistically significant treatment effect on the primary outcome measure, BMI. However, there were statistically significant intervention effects on total cholesterol, low-density lipoprotein cholesterol, and depression. In tests of moderation when BMI was the outcome variable, the intervention was more effective when parents or guardians were unmarried and when baseline television viewing was high. The research team suspected that treatment effects were not stronger because of barriers participants encountered in attending dance classes due to transportation difficulties and episodes of violent crime near the sites where dance classes were held.

Hip-Hop to Health Jr.

A second exemplary program of research, Hip-Hop to Health Jr., was a community-based obesity prevention program that was culturally adapted for African American and Latino Head Start preschool children (Fitzgibbon et al., 2002). It was an adaptation of Hip-Hop to Health, an intervention for African American 6- to 10-year-old children (Fitzgibbon et al., 1998). In an article that described the rationale and design of Hip-Hop to Health Jr., the research team reviewed the literature on diet and exercise of African America and Latino children to identify specific characteristics (e.g., fat and fiber consumption) that might account for disparities in childhood and adult obesity. They also explained that the theoretical framework guiding intervention development was an integration of social learning theory (Bandura, 1986), self-determination theory (Deci, 1992; Deci, Driver, Hotchkiss, Robbins, & Wilson, 1993), and the transtheoretical model (Prochaska & DiClemente, 1992). Consistent with the guidelines for cultural adaptation phases (Barrera et al., 2013), this first phase of information gathering included a literature review.

Also consistent with adaptation guidelines, the Hip-Hop to Health Jr. research team conducted a 3-week pilot study to test the feasibility and appeal of both the parent and child intervention components. The child portion of the pilot intervention contained three 40-minute sessions per week. The first half of each session was devoted to nutrition, and the second half was devoted to physical activity. In the nutrition lessons, "go and grow" foods (healthful) were contrasted with "slow" foods (unhealthful). In the parent component, parents attended one 30-minute nutrition class and two 30-minute aerobics classes each week.

Several changes were made to the intervention following the pilot study. The distinction between "go and grow foods" and "slow foods" was difficult for preschool children to understand. For the revised intervention, researchers created puppets to represent the food groups (Ms. Grain, Ms. Fruit, Mr. Vegetable, Mr. Fat, Ms. Sugar) in nutrition lessons. They also recognized the need for greater emphasis on the importance of physical activity. In the pilot parent component, nutrition lessons were attended poorly. Based on focus group recommendations that followed the pilot study, weekly newsletters and homework assignments replaced the in-person nutrition lessons in the revised parent intervention component.

A revised intervention was evaluated in two RCTs, one conducted with primarily African American families (Fitzgibbon et al., 2005) and one conducted with primarily Latino families (Fitzgibbon et al., 2006). The intervention was provided for 14 weeks. Children received 20 minutes of nutrition instruction (utilizing puppets) and 20 minutes of physical activity three times each week. Parents received weekly newsletters that were coordinated with the content of their children's instruction. In addition, parents could participate in 30-minute aerobic classes twice each week at their children's Head Start facilities.

The authors summarized the five special considerations they made in developing the intervention for African American and Latino preschoolers and their parents:

1. Offer the sessions in locations that are safe and that can be reached easily.
2. Establish personal relationships between participants and intervention staff.
3. Reduce barriers (e.g., negative attitudes, competing responsibilities) that interfere with improvements in nutrition and exercise.
4. Provide behavioral demonstrations of strategies for lifestyle change.
5. Make intervention accessible for participants at all levels of literacy.

The RCTs found significant intervention effects in predominantly African American Head Start centers (Fitzgibbon et al., 2005) but not in predominantly Latino centers (Fitzgibbon et al., 2006). In African American centers, children in the intervention condition showed smaller BMI increases than children in the control condition 1 year and 2 years after the end of the intervention, and less saturated fat consumption at 1-year follow-up. In contrast, there were no significant intervention effects for children and parents who attended primarily Latino Head Start centers. The researchers noted that children in the Latino centers had higher BMI levels at baseline than children in the African American centers. They speculated that relatively high initial levels of overweight and obesity might have made it difficult for children in the Latino centers to modify their eating and weight. Overall, they recognized that additional changes were needed to assist unacculturated Latino parents in making changes to diet and physical activity. On a positive note, retention of participants was quite high and did not differ between intervention and control groups. The retention rates were 97%, 86%, and 85%, at posttest, Year 1, and Year 2 follow-ups, respectively.

Pathways

Pathways was a multifaceted, multisite obesity prevention program for American Indian schoolchildren, which

started in grade 3 and continued through grade 5. It was developed and evaluated in two 3-year phases. The first 3-year phase was used to systematically develop culturally appropriate intervention and assessment methods. An entire supplemental issue of the *American Journal of Clinical Nutrition* (1999) was devoted to detailed descriptions of the formative research (e.g., S. M. Davis et al., 1999; Gittelsohn et al., 1999; Teufel et al., 1999). An additional 3 years was required to conduct a randomized controlled trial to assess intervention effects on body fat, dietary fat intake, physical activity, knowledge of the diet and physical activity curriculum, and self-efficacy for physical activity and healthful food choices (Caballero et al., 2003). Articles in a special supplemental issue of *Preventive Medicine* (2003) reported detailed results of the massive project.

The intervention consisted of four components: a classroom curriculum, school food services, physical activity during and after school, and family support and involvement. Formative research groups were created to develop each of the components. Unusually thorough input from many constituencies was obtained throughout intervention development. Each section of the intervention was reviewed by "tribal representatives, American Indian members of the Pathways study, intervention committee members, and the Pathways steering committee, composed of the principal investigators from all five participating institutions, the National Heart, Lung, and Blood Institute project scientist, and two American Indian representatives" (S. M. Davis et al., 1999, p. S798).

They instituted an information gathering phase when information relevant for understanding the communities, risk factors, and potential intervention strategies were obtained from school staff members, students, and their caregivers in detailed interviews, focus groups, and direct observation. That information informed a culturally adapted intervention that incorporated American Indian concepts and traditions pertinent to nutrition and physical activity. For example, the classroom component integrated "stories, games, music, artwork, foods, family activities, videos, and events contributed by members of the seven tribes" (S. M. Davis et al., 2003, p. S26). An initial version of the intervention was pilot tested in six American Indian communities. Observers made notes of the intervention's implementation, and researchers interviewed intervention staff members (e.g., teachers, food service workers) to ascertain strengths, weaknesses, and recommendations for changes. A revised intervention was evaluated in a randomized controlled trial of 1704 children in 41 schools in seven American Indian communities in Arizona, New Mexico, and South Dakota (Caballero et al., 2003). The intervention began in third grade and extended to fifth grade. Retention from baseline to follow-up assessment was 83% in both the intervention and control conditions.

Despite rigorous cultural adaptation methods, the comprehensive intervention was not more successful than the control condition in reducing body fat, the primary outcome measure. Motion sensor measurement of physical activity also did not show significant intervention effects. Significant intervention effects were found for self-reported and observed dietary fat intake and for self-reported physical activity. In discussing their results, the researchers noted that several other comprehensive interventions used diet and physical activity outcomes but did not treat children's body weight and adiposity as endpoints (e.g., Luepker et al., 1996; Simons-Morton, Parcel, Baranowski, Forthofer, & O'Hara, 1991).

Stanford GEMS, Hip-Hop to Health Jr., and Pathways were exemplary in their illustration of cultural adaptation procedures. As noted previously, several other studies on the nutrition and/or physical activity of ethnocultural group children did not provide substantive descriptions of cultural adaptation considerations and procedures. For instance, Bienestar was a large-scale study that involved 13 intervention elementary schools and 14 control schools in which 713 fourth-grade students participated in the intervention and 706 students participated in the control condition (Treviño et al., 1998, 2004; Treviño, Hernandez, Yin, Garcia, & Hernandez, 2005). Eighty percent of the participants were of Mexican heritage. Much like Pathways' comprehensive intervention, the Bienestar comprehensive intervention involved four social systems: parents, school classrooms, school cafeterias, and after-school programs. However, unlike Pathways, it is not certain if formative research was funded to conduct systematically a cultural adaptation of the intervention. The other studies of nutrition and/or physical activity interventions that were directed at subcultural group children (Crespo et al., 2012; J. N. Davis et al., 2012; de Heer et al., 2011; Klesges et al., 2010; Nadar et al., 1999; Resnicow et al., 2005; D. K. Wilson et al., 2011) might have included cultural adaptation phases, but detailed descriptions of adaptation methods did not appear in the literature we were able to locate and review. Many of these studies showed significant intervention effects on physical activity and healthful nutrition measures (Crespo et al., 2012; de Heer et al., 2011; Nadar et al., 1999; Treviño et al., 2004).

Discussion

The three exemplary studies we highlighted—Stanford GEMS, Hip Hop to Health Jr., and Pathways—were

pioneers in using intervention development procedures that we now recognize as high-quality features of cultural adaptation stages: information gathering with literature searches to document health disparities and to identify subcultural risk and protective factors that should be considered in intervention development; formative studies that include focus groups as well as quantitative surveys; pilot studies to test the feasibility and effects of a draft intervention; satisfaction surveys to gauge the appeal of recruitment and intervention procedures; and formal RCTs of adapted interventions. The exemplary projects benefited from funded, multiyear developmental stages that permitted thorough cultural adaptation efforts.

Despite those systematic efforts, culturally adapted interventions were not always successful in changing primary endpoints of BMI or adiposity (see Fitzgibbon et al., 2005, for an exception). Those outcomes are notoriously resistant to change, particularly in primary prevention interventions with nonclinical populations (Caballero et al., 2003). In a meta-analysis of school-based obesity interventions in the United States and United Kingdom, Kanekar and Sharma (2009) found that the interventions were not successful in reducing BMI. Similarly, a review of 20 after-school obesity prevention interventions concluded that the results were generally unfavorable when obesity-related variables were the outcomes (Branscum & Sharma, 2012). Nevertheless, culturally adapted interventions were often successful in improving secondary (yet important) outcomes, such as dietary fat consumption, fiber consumption, and physical activity. Childhood obesity and its subcultural group disparities will persist for some time. They have such critical importance for the nation's health that research must continue to seek solutions that will reach children in all segments of communities.

One of the lessons from the Stanford GEMS project (T. N. Robinson et al., 2010) is that well-conceived interventions must include effective methods for overcoming barriers to participation in intervention components. The GEMS' goal for attendance at after-school dance classes in community centers was three of five school days, but by the end of the intervention, participants averaged only one of five school days. Of 24 in-home TV reduction visits, participating families received an average of 12.4 lessons over a 2-year period. In-school interventions avoid the participation slippage that occurs when children are required to travel to intervention venues or when family participation is required. However, true lifestyle change occurs during school hours and after school hours when the family has a key role in influencing food consumption and physical activity. Cultural adaptation efforts should continue to address both engagement methods and intervention content (Barrera & Castro, 2006).

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

The cultural adaptation of interventions for youth is a maturing and still-vibrant topic in developmental psychopathology. There is a persistent need for interventions to reach and engage ethnic and racial minority youth just as there are persistent disparities in youth problem behavior and health risk. This chapter has highlighted the most influential work on cultural adaptations that has been done to date, leading to several conclusions about what we have learned, limitations to our knowledge, and ways we might advance our understanding in the near future. Basic conclusions and future research directions are integrated in the next sections.

Adaptation Effectiveness

In this chapter, as well as in other reviews (Benish, Quintana, & Wampold, 2011; Griner & Smith, 2006; Huey & Polo, 2008; Ortiz & Del Vecchio, 2013), the emphasis was on evaluating intervention efficacy. Are cultural adaptations effective? That question should be qualified by another question that has been raised repeatedly: Compared to what? There is interest in the question not only of the efficacy of cultural adaptations relative to benign control conditions but also relative to unadapted, recognized interventions, such as the original versions of interventions. For some, demonstrating the value added by modifications to original EBIs is of critical importance (Ortiz & Del Vecchio, 2013). Yet calls for research that compares the effectiveness of culturally adapted EBIs to their original versions are qualified by skepticism: It is hard to imagine providing unaltered original EBIs to ethnocultural groups without making basic adaptations, such as language translations or delivery by bilingual staff; and it would be costly to launch an adequately powered study comparing an original EBI, a culturally adapted intervention, and a control condition, particularly if differences between the original and adaptation are expected to be modest (Barrera et al., 2013). Lau, Chang, Okazaki, and Bernal (in press) questioned the value of original EBI-adaptation comparisons, also citing the substantial statistical power required for such comparisons, the need for at least some cultural adaptations to effectively engage

ethnocultural participants into comparative research, and potential ethical concerns about withholding culturally sensitive care from participants who receive unadapted EBIs. Given the onerousness, methodological challenges, and ethical quandaries of conducting adequately powered relative efficacy trials of adapted EBIs (Cardemil, 2010), Domenech Rodriguez and Bernal (2012) noted that researchers are subject to a catch-22 when expected to demonstrate relative efficacy prior to pursuing questions about mediators and moderators of change within the clinical trials tradition. From our qualitative review of culturally adapted interventions for internalizing disorders, externalizing and high-risk youth behaviors, health, and PT, there was good evidence of absolute intervention effects when compared to control conditions. However, substantial heterogeneity was observed in the efficacy of culturally adapted EBIs across the diverse outcomes that have been studied. Although some outcomes (e.g., obesity) have been notoriously intractable to remediation or prevention even for majority group youth, it was still disappointing when well-conceived, systematic, and community-informed adaptation efforts were unsuccessful in achieving goals.

Our analysis of the literature was qualitative and not intended to be exhaustive or capable of supplying quantitative answers to questions of relative efficacy. Fortunately, four meta-analyses of culturally adapted interventions (Benish et al., 2011; Griner & Smith, 2006; Huey & Polo, 2008; Smith, Domenech-Rodriguez, & Bernal, 2011) and a formal review of PT interventions (Ortiz & Del Vecchio, 2013) have been published. There was some overlap in the studies that were analyzed in these reviews, but the reviews differed in their inclusion and exclusion criteria. Using relatively broad inclusion criteria, Griner and Smith (2006) evaluated 76 published and unpublished studies that made at least some reference to adaptation because of culture, ethnicity. or race. Only studies of EBIs with children were reviewed by Huey and Polo (2008). Psychotherapy studies conducted with children or adults (excluding preventive interventions) were the foci of the meta-analysis by Benish et al. (2011). That review also contrasted effect sizes that were obtained when culturally adapted interventions were compared to some other treatments or benign control conditions and when cultural adaptations were compared to just other bona fide psychotherapies. Bona fide psychotherapies were defined by "a relationship with a therapist tailored to the client and is evidenced by the inclusion of two or more of the following conditions: use of an established psychotherapy approach, incorporation of the use of psychological processes, use of a manual or training as a guide for therapists, and/or identification of the active ingredients of the therapy" (Benish et al., 2011, p. 280). Smith et al. (2011) conducted a meta-analysis of studies concerned with mental health outcomes. That review excluded research on health, substance abuse, and educational outcomes. Ortiz and Del Viccho's (2013) review dealt exclusively with PT interventions. Because of differences in scope and reference groups used in comparisons, it is understandable that there were differences in conclusions regarding adaptation efficacy.

The five most basic findings from these reviews are summarized next.

1. Overall, culturally adapted interventions were moderately effective (average effect size was $d = .45$) but were less effective for children than they were for adults (Griner & Smith, 2006).
2. For interventions conducted with ethnic minority children, culturally adapted treatments and unadapted treatments showed comparable effect sizes (Huey & Polo, 2008).
3. On mental health outcomes, culturally adapted therapies showed a moderate effect size (average effect size $d = .46$) (Smith et al., 2011). Similar to the age effect found by Griner and Smith (2006), participants older than 35 appeared to benefit more from adapted therapies compared with benefits for children, adolescents, and young adults. The number of cultural adaptations made in interventions was positively correlated (.28) with intervention efficacy.
4. Analyses comparing culturally adapted psychotherapies to other bona fide (unadapted) psychotherapies showed an average effect size of .32. In contrast to other reviews (Griner & Smith, 2006; Smith et al., 2011), the average effect size was comparable for adults and children (Benish et al., 2011).
5. In studies of parent training, the reviewers concluded that "treatment outcomes from adapted PT interventions are not superior to those unadapted interventions typically achieve" (Ortiz & Del Vecchio, 2013, p. 452).

In general, cultural adaptations show moderate effect sizes when compared with control conditions, but there was some evidence that effects might be attenuated for research conducted with children and adolescents. Age might moderate effects if cultural adaptations are most beneficial for the least acculturated participants who are often older adults rather than children (Griner & Smith, 2006). It was notable, however, that no age effects were observed in

what was arguably the most rigorous comparison, that is, when adapted interventions were found to be moderately more effective than unadapted bona fide therapies (Benish et al., 2011).

Two additional observations provide important context for interpreting these findings. First, there was considerable heterogeneity in treatment effects, which calls for caution in making broad generalizations about efficacy. Second, some analyses were based on a small number of studies. We agree with Smith et al.'s (2011) conclusion that because the full assessment of efficacy "depends on the consistent replication of supportive findings, the single greatest need of the research on culturally adapted interventions is for more evidence to accumulate" (p. 171). They noted that a consistent rate of about two studies each year was produced since 1981 that met the inclusion criteria for their meta-analytic review. Even Ortiz and Del Veccio (2013), who questioned the evidence supporting the value of cultural adaptations, acknowledged that ethnic minority children and families (particularly Hispanics) were underrepresented in controlled, peer-reviewed studies of parent training.

Cultural Adaptation Process

Researchers and program developers turn to the literature to inform decisions about pursuing cultural adaptations and to learn strategies for conducting them. That literature shows large variability in the thoroughness of adaptation descriptions—descriptions ranging from cryptic accounts of seemingly modest tailoring efforts to extensive efforts that required several years to craft interventions that subsequently were evaluated in controlled trials. Multiyear projects to culturally adapt children's health interventions (e.g., T. N. Robinson et al., 2003) were innovative during their time, implementing sequential steps that are now reflected in the stage models listed in Table 17.1 for developing culturally adapted versions of EBIs. We have learned that when EBIs are identified for modifications, there are generally accepted procedures for conducting them. An alternative approach to tailoring EBIs was exemplified with approaches that began with basic developmental psychopathology research to identify the risk factors that appear to contribute to psychopathology or youth problem behaviors (e.g., Gonzales et al., 2007; Murry et al., 2007). In the future, greater structure in the procedures used to culturally adapt interventions might decrease the heterogeneity in effects that were found in our review and recent meta-analyses. Many of the studies included in reviews were conducted prior to published conceptual models of adaptation procedures.

Reach and Engagement

Lau (2006) made the distinction between the ability of interventions to change outcomes, such as disability and distress, and their ability to draw participants into interventions, engage them in intervention activities, and retain them throughout treatment and maintenance phases. As shown in this review, the effects of cultural adaptations on reach and engagement have not been studied and reported as systematically as intervention efficacy, yet there are examples of how tailoring can improve engagement. Kumpfer and Alvarado (1995) found that original versions of Strengthening Families had slightly better outcomes than adapted versions. However, recruitment and retention of participants receiving culturally adapted versions were 41% better, instantiating the potential of cultural adaptations to substantially improve involvement in interventions for ethnic minority families. Unfortunately, there are countervailing examples of well-conceived efforts to boost the intervention engagement of ethnic minority youth and parents that were not successful (e.g., McCabe et al., 2012; T. N. Robinson et al., 2010). The exigencies of living in stressful, low-resource environments will continue to present barriers to ethnic minority participants in intervention research. Developing and evaluating methods for improving reach, engagement, and sustained participation in interventions are among the most important topics for future research.

Understanding Cultural Components Added to Culturally Adapted Interventions

Several reviewers were critical of cultural adaptations that lacked theoretical frameworks for specifying why cultural concepts could be added to interventions to improve reach, engagement, or efficacy (Castro et al., 2010; Ortiz & Del Vecchio, 2013; B. D. M. Wilson & Miller, 2003). Little progress has been made on this front. When cultural adaptations are explicitly designed to influence a cultural construct that could operate as a mediator of change (e.g., enhancing cultural identity), studies could inform culturally relevant theory by evaluating whether the intervention succeeded in changing that construct and whether that change affected the outcome (e.g., Murry et al., 2007). Toward this important aim, the designers of culturally relevant interventions should be explicit about the hypothesized roles of specific cultural variables and should design evaluation research that tests theoretical assertions. This approach was illustrated in the study by Lau et al. (2011) that included special therapy procedures to reduce negative parenting strategies of immigrant Chinese parents.

Problematic parenting practices identified in preliminary research (Lau, 2010) were improved in a culturally adapted version of an EBI, and those improvements mediated the intervention's beneficial effects on children's externalizing problems (Lau et al., 2011). Murry et al. (2007) provided a mediation analysis of the Strong African American Families Program that could serve as another model for future research on the cultural mechanisms that mediate the effects of cultural adaptations.

Accommodating Within-Group Diversity

A major impetus for conducting cultural adaptations is to address special needs and characteristics of ethnocultural groups that were not addressed adequately by the original versions of the interventions. However, ethnocultural groups are not homogeneous. Within-group diversity is derived from differences in acculturation, nativity, language use, immigration experiences, skin color, religion, and a host of other factors that might be related to adversity exposure and responsiveness to interventions. For example, Gonzales and colleagues (2012) reported differential program effects on the basis of family linguistic acculturation, yet program benefits were nonetheless shown over time for both low- and high-acculturated families (Jensen et al., in 2014). A complexity in designing culturally adapted interventions is to accommodate within-group diversity. It is not feasible to create fixed interventions that are relevant and effective for narrow segments of an ethnocultural group. Instead, there is promise in creating assessment and intervention procedures that guide individualized tailoring within the context of a standardized intervention. Standardized decision rules for varying the content and dosage of treatment, depending on the characteristics of participants is the essence of adaptive intervention designs (Collins et al., 2004). In the same spirit of adaptive interventions, Pina et al. (2009) described a culturally prescriptive intervention framework that guides the tailoring of childhood anxiety interventions depending on the cultural features of the individual child or family. Rather than applying a fixed set of adaptation activities, their treatment manual describes a uniform set of guidelines to assist interventionists in determining how to attend to language and other cultural considerations (e.g., familism) in tailoring the intervention. McCabe et al.'s (2005) use of an initial assessment of participants' attitudes and preferences to guide the individualized application of treatment elements was innovative and merits additional research and development as a strategy for addressing within-group diversity.

International Application and Dissemination

It could be said that the strongest test of the need for cultural adaptation may come from international dissemination of interventions to non-Western and developing nations. The need for linguistic adaptations and other cultural considerations is likely to be magnified in international applications with non-Western developing countries in Africa, Asia, and the Middle East. Earlier in the chapter we noted the emerging trend for international dissemination of EBI, including several PT interventions that have been adapted for international dissemination. The same has been true of programs to prevent HIV/AIDS (Wingood & DiClemente, 2008). Undoubtedly, the best examples of international adaptations were concerned with the SFP, a family skills intervention for the prevention of substance abuse (Kumpfer et al., 2008). SFP was initially developed and tested in the United States and subsequently evaluated in non-RCT studies in about 17 countries and RCTs in nine countries (United States, Canada, Australia, United Kingdom, Sweden, the Netherlands, Spain, Italy, and Thailand). Kumpfer and her colleagues (2008, 2012) detailed 10 steps shown in Table 17.1 that should be followed in creating international adaptations of SFP and perhaps other evidence-based programs. In Kumpfer et al. (2008), the steps were illustrated with examples from their extensive experience in many countries. That informative paper is filled with general guidance and best practices for those who are planning international adaptations of EBIs.

International adaptation of interventions is a prime topic for future research and practice. However, in their recent review of PT interventions that have been implemented and evaluated internationally, Knerr et al. (2013) noted that the four PT interventions with the strongest evidence base have been replicated in RCTs in many developed Western countries, but these major programs have not been implemented in low-income or developing countries. On the contrary, many PT interventions transported to these contexts lacked strong efficacy data in the countries in which they originated. Thus, it is unclear whether international efforts to deploy PT or other types of interventions will be informed by domestic efforts in cultural adaptation.

It is important to note that although some EBIs are gaining traction in usual care settings, and the recent federal emphasis on prevention services as outlined in the Affordable Care Act (U.S. Department of Health and Human Services, 2010) has potential to accelerate this pattern, there is little evidence that their culturally adapted counterparts have been adopted outside the original efficacy trials and the occasional dissemination trials.

Zayas et al. (2012) argued that one of the shortcomings in the cultural adaptation literature is the inattention to the multiple service contexts that influence the implementation of interventions and the critical features that enhance the uptake of interventions and services. Larger contextual factors, in addition to sociocultural factors, must be considered in the adaptation process, such as the different service sectors (e.g., child welfare, education, juvenile justice, medical) and the organizational contexts (e.g., agencies, hospitals, clinics, health care) in which interventions are implemented, and the types of modifications required at different levels of the service delivery and implementation chain. It is possible that, in each context, cultural adaptations must be conceptualized and operationalized differently (Schoenwald 2008). An integrated approach to cultural adaptation, which includes the careful consideration of both the service contexts as well as the cultural diversity represented among the families and children within these contexts, may be necessary (Wolchik et al., 2009; Zayas et al., 2012). As the field of child, youth, and family prevention services pushes forward to solve the problem that EBIs have not been adopted broadly and are not accessible, scalable, replicable, and sustainable, intervention adaptation will be a major thrust in the next generation of efforts to design and diffuse EBIs (Rotheram-Borus, Swendeman, & Chorpita, 2012). The role that culture and the cultural adaptation processes described in this review will play in this agenda has yet to be determined.

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CHAPTER 18

The Effects of Early Psychosocial Deprivation on Brain and Behavioral Development: Findings from the Bucharest Early Intervention Project

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PRÉCIS

Centuries ago many women died in childbirth or at a young age, often leaving the care of their infants or young children in doubt. War, disease, poverty, and, in some cases, government policies have replaced, in many instances, maternal mortality as a major contributor to abandoned children. Historically, a common societal response to these children, at least since the eighteenth century, was to place them in institutions. From the nineteenth century, literature has many portrayals of the grim plight of orphans—Oliver Twist and David Copperfield—cared for in structured but bleak facilities. However, institutional care for orphaned and abandoned children still exists, especially in Central and South America, Africa, the Middle East, Asia, and Eastern and Western Europe. Worldwide estimates are that as many as 8 million children are being raised in institutions (Save the Children, 2009).

Despite the millions of children cared for in this way over the centuries, until the past decade or so, studies of institutional rearing were quite limited. In the middle of the twentieth century, small descriptive studies comparing children in foster care to children in institutions began to appear in the literature. These studies uniformly found that children in foster care had better physical, behavioral, and psychological outcomes than did children in institutions. The British child psychiatrist and psychoanalyst John Bowlby was among the first to note the effects of maternal separation and abandonment during infancy and early childhood. In his 1944 paper describing 44 juvenile thieves, he called attention to early experiences of maternal separation and asserted its relation to subsequent deviant behavior. After World War II he authored a report for the World Health Organization in 1952 describing the plight of children being

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raised in institutions and advocated for their removal into family or foster homes.

More recently, children adopted out of institutions have been studied and, consistent with past work, have been found to suffer from a variety of developmental sequelae, although the severity of the effects covary with the duration of institutionalization (Chisholm, 1998; Rutter et al., 2010). Specifically, these studies find significant gains for children who are adopted out of institutions in infancy with more adverse consequences for those adopted later in childhood. Although these studies uniformly suggest that being raised in families is better for children's development than being raised in an institution, these results must be tempered by the fact that children were not randomly selected for adoption. This bias makes it challenging to determine how much recovery is possible for the modal institutionalized child.

We developed the Bucharest Early Intervention Project (BEIP)—the primary focus of this chapter—in part to address the limitations of previous studies about children reared in institutions and to address important questions about the mechanisms by which institutional rearing affects children's development. In addition, we also sought to shed light on a number of key developmental processes, including the role of experience in brain-behavioral development and, in particular, the role of sensitive periods. This project, now entering its second decade, has yielded a wealth of information not only about children reared in institutions versus families but, more broadly, about the effects of early experience on brain and behavioral development. As Cicchetti and Gunnar (2008) have noted, there is great value in including measures of biological processes in preventive intervention trials. We adhere to two basic principles in neuroscience: that many elements of postnatal brain development are dependent on experience for their full elaboration; and that, in many domains, such experiences need to occur during sensitive periods of development, when experience exerts its greatest effects. Experiences that occur after a sensitive period have a more limited chance of influencing development.

We begin this chapter with a brief review of the history of institutionalization in Romania. Then we discuss what we have learned from the past 50 years of research about the sequelae that follow a history of institutional care. Because there are recent reviews of this literature (see Nelson, Fox, & Zeanah, 2014), we summarize the major findings. We next turn to what lies behind the creation and implementation of this project. We describe the experimental design that was adopted, followed by a discussion of the many ethical issues that we confronted at the outset of the project and continue to confront. We conclude this section by describing our foster care intervention.

Finally, we turn our attention to the findings to date in the BEIP. Here we organize the chapter topically, beginning with cognitive development, then brain development, then social-emotional development, and finally, psychopathology. With this review behind us, we turn our attention to several knotty theoretical issues, including the mechanisms that underpinned our intervention, including the role of sensitive periods. A second challenging issue is the implications this work has had for understanding key developmental processes, notably the development and importance of attachment relationships during early childhood. We conclude our chapter with a general discussion of the implications this work has for domestic and international policy regarding the care of orphaned, abandoned, or maltreated children.

HISTORY OF INSTITUTIONAL CARE IN ROMANIA

Institutionalization during the twentieth century in Romania has its own unique history. In 1965, Nicolai Ceaușescu assumed leadership of Romania. At that time, the country had a low birth rate, abortion was legal, and women had access to contraception. Ceaușescu decided to change these policies, reasoning that the best way to increase human capital (and perhaps his own authority) was to increase the birth rate across the country and organize the social structure so that families could have many children but not have to worry about their care. Ceaușescu implemented a set of policies designed to increase the population, ban abortion, make contraception inaccessible, and reward families for having many children. To enforce these policies, Ceaușescu assigned doctors and nurses involved in gynecology to "demographic control units." These units (which became known as the menstrual police), conducted interrogations and gynecological exams in women's workplaces or schools to ensure that if they were pregnant, they would carry the baby to term. In addition, infertility treatment was recommended to infertile couples, and miscarriages were to be investigated (Bachman, 1991).

At the same time, because of deteriorating economic conditions, Romania set up a network of institutions that were designed to care for the overflow of children produced as a result of these new policies. The institutional system had a number of tiers that were organized both by the age of the child and a judgment as to whether the child would have a future as a worker in Ceaușescu's state. Infants and young children were placed in institutions called *leagens*

(this means "crib" in Romanian). Infants and children were raised there until around the age of 3, at which time, via a pediatrician, nurse or administrator, their status was reviewed. Those judged to be capable of growing up to be participating workers were allowed to stay on while those judged to be defective (either handicapped, with some genetic syndrome, or often of Roma ethnicity) were sent to one of two types of institutions. If there was a chance the child could be rehabilitated they would be sent to a *Camin Spitale* (essentially an institution for handicapped children or children who were considered to be handicapped based on a superficial pediatric exam) if there was no hope of recovery, they were sent to an Institute Neurologie (essentially an institution where children received next to no care or services and, in some cases, were left to die).

All of these institutions were run by the state. The administrators were generally physicians, and the staff was untrained in child development or special education. Children judged fit who remained in the *leagans* were sent to local schools; older children were sent to vocational schools to learn a trade. Children assigned to the rehabilitation institutes or to institutions for the irrecoverable lived in unspeakably horrible conditions with lack of sanitation, medical care, and even food (see, e.g., http://www.youtube.com/watch?v=ZgZJ-IV8Et0).

Once Ceauşescu was overthrown in 1989, evidence of neglect and mistreatment of children began to surface in the West. Media reports described the housing of thousands of young children with no apparent disabilities in institutions around the country. In December 1989, estimates of the total number of children living in institutions varied from 50,000 (by the Romanian Department of Child Protection) to 150,000 by the U.S. media and nongovernmental organizations (NGOs). (Many current authorities in Romania and in UNICEF place the real figure at closer to 170,000.) Reports about specific institutions in the early 1990s consistently described a variety of substandard living conditions in various orphanages. Infants in *leagans* were forced to spend most of their time in cribs; as they got older, they spent their time in huge rooms of 10 to 50 children (Zamfir, 1998). An example can be seen in Figure 18.1.

In sum, as the plight of children gradually became known to countries in the West, thousands of previously institutionalized children were adopted into families who more often than not were unaware of what these children had undergone. As a result, these families (most of whom resided in the United Kingdom, Canada, and the United States) were unprepared for the range of developmental problems that afflicted these children. It is this topic—the developmental sequelae of institutional rearing—to which we next turn our attention.



Figure 18.1 Example of Congregate Care in One Romanian Institution. *Source:* Photo courtesy of Michael Carrol.

Developmental Sequelae of Institutional Care

There is a large literature on the developmental sequelae of institutional care. For purposes of this chapter, we review only that literature that is directly relevant to the findings we report on the BEIP (for reviews, see Nelson, Furtado, Fox, & Zeanah, 2009; Nelson, Fox, & Zeanah, 2013, 2014; Nelson, Westerlund, McDermott, Zeanah, & Fox, 2013).

Cognitive Development

The effects of institutionalization on cognitive functioning have been well documented. As early as 1957, Dennis and Najarian described significant impairments in IQ scores for Lebanese children living in an orphanage as compared to a community sample. Similar findings had previously been

reported by Goldfarb (1945) and Spitz (1945) and later by Provence and Lipton (1962).

In an important longitudinal study conducted by Tizard and colleagues (e.g., Tizard, 1977; Tizard & Hodges, 1978; Tizard & Rees, 1974; Hodges & Tizard, 1989), IQ was examined for children living in British institutions in which there was an adequate environment that included toys, books, and stimulation but did not involve the establishment of warm interpersonal relationships between caregiver and child. Tizard assessed the children at 8 years of age and found that children adopted before 4.5 years of age had normal IQ scores while those adopted later were delayed (Tizard & Hodges, 1978).

In a meta-analytic review, van IJzendoorn, Luijk, and Juffer (2008) found across 75 studies that children reared in orphanages had consistently lower IQ scores when compared to their peers reared in foster families. The authors attempted to identify what factors could be pinpointed to affect IQ scores. They found that children from orphanages assessed before 4 years of age performed less well compared with children assessed after their fourth birthday. Age at entry into the children's home was also a relevant moderator. Children placed into the orphanage before 12 months of age did less well than their peers reared in families, and this delay was significantly larger than with children who entered the orphanage after 12 months. The authors also examined whether a longer stay in the orphanage would lead to larger intellectual delays. Contrary to their initial hypothesis, they did not find an overall significant effect such as between children staying less than 12 months in the children's home versus children who remained longer. A cutoff at 24 months did not make a difference either. Finally, differences in caregiver-child ratio between the orphanages were not significantly related to differences in effect sizes. Even the contrast between the most favorable caregiver-child ratio (maximum of 3 children per caregiver) versus other orphanages did not lead to a significant difference. Thus, while there was a definite effect of institutional care on IQ, the reasons for this effect were not evident from the meta-analysis of the studies reviewed. In part, this is a function of the great variability in caregiving contexts across the 75 studies as well as differences in the reasons children were placed into institutions.

In post-1989 Romania, many families in the United States, United Kingdom, and Canada began to adopt Romanian children then living in institutions. A number of studies have followed up on these adopted children; perhaps the largest and most comprehensive was one in the United Kingdom, initially directed by Michael Rutter, called the English Romanian Adoptees Study (ERAS). The ERAS compared infants and young children with a history of institutionalization in Romania who were adopted into U. K. homes to infants and young children born in the United Kingdom and adopted into U. K. homes (Rutter & the English and Romanian Adoptees Study Team, 1998, Rutter et al., 2010). These studies report that infants adopted before 6 months of age were indistinguishable in their IQ scores from U. K.-born adoptees or a typical control sample. However, infants and children adopted at later ages displayed impairments in IQ with remediation a function of age of adoption (later adoption, less remediation of IQ scores at follow-up). These findings persisted on through 11 years of age (Beckett et al., 2006).

In sum, in conditions of severe psychosocial deprivation, such as the institutions in Romania, there are significant effects on the IQ of young children. The ERAS data suggest that while very early exposure to such conditions does not have long-term effects, living in institutions past 6 months of age leads to long-term decrements in intelligence.

EFFECTS OF INSTITUTIONALIZATION ON NEUROPSYCHOLOGICAL FUNCTIONING

Although IQ is a general measure of intelligence, psychologists have long realized the importance of assessing basic cognitive processes in order to understand a child's cognitive development. These processes include attention and what is known as executive functions (EFs). Most researchers agree that EFs (e.g., working memory, inhibitory control, planfulness, attention shifting) play a critical role in the emergence of adaptive cognitive and social behavior. These processes appear to be linked to particular areas of the prefrontal cortex (PFC) and begin to emerge in early childhood, with a large increase in capability during the preschool and early school period. A number of studies have evaluated these processes in postinstitutionalized, adopted children. Pollak and colleagues (2010), for example, assessed memory, attention, and EF using two well-validated test batteries, the Cambridge Neuropsychological Test Automated Battery (CANTAB), a computerized series of neuropsychological tests, and the NEPSY, a developmental neuropsychological assessment. Internationally adopted children between the ages of 8 and 10 years with a history of prolonged institutionalization performed worse on tests of memory, visual attention, and learning than early-adopted or nonadopted control children. More time spent in an institution was associated with poorer performance on tests of inhibitory control, visual attention, and visual memory.

Colvert et al. (2008) in the ERAS examined theory of mind (ToM) and EF in their sample of adopted postinstitutionalized children. The Romanian adoptees displayed deficits on both measures, with the effects strongest among those who had experienced more than 6 months of institutional deprivation. Deficits in both domains (ToM and EF) were associated with quasi-autism, disinhibited attachment, and inattention/overactivity. Both ToM and EF mediated quasi-autism, although mediating effects of EF for inattention/overactivity were less marked. However, neither ToM nor EF accounts fully for the overall pattern of deprivation-related difficulties.

Finally, Loman et al. (2013) extended these earlier findings to the domain of attention, inhibitory control, and error monitoring. These authors reported that postinstitutionalized children showed both behavioral and electrophysiological impairments in all domains, and they drew an analogy between these findings and those of nonadopted children with attention-deficit/hyperactivity disorder (ADHD).

Neuroanatomical Correlates of Institutionalization

One approach to understanding the mechanisms by which institutionalization affects behavior is through an examination of the neural correlates of cognitive and social functioning among children who experienced institutionalization. A number of investigators have examined these issues. Chugani and colleagues (2001) used positron emission tomography (PET) to study ten 8-year-old children who had been adopted from a Romanian institution. Nearly all children had been placed in the institution before age 18 months and had lived in the institution an average of 38 months before being adopted. These children were compared to a group of healthy adults and a group of 10-year-old children with medically refractory epilepsy. The authors reported that the adoptees showed significantly reduced brain metabolism in select regions of the PFC (e.g., orbitofrontal cortex) and the temporal lobe (e.g., amygdala).

In a follow-up, white matter connectivity was examined using magnetic resonance imaging (MRI) (Eluvanthingal et al., 2006). Eluvanthingal et al. (2006) reported that white matter connectivity was diminished in the uncinate fasciculus in the early-deprivation group compared with controls. The uncinate fasciculus is a major pathway of communication between brain areas involved in higher cognitive and emotional function (e.g., amygdala and frontal lobe).

In a third study by this group (Govindan et al., 2010), tract-based spatial statistics (TBSS) was employed to evaluate white matter changes in children with a history of early deprivation. Seventeen children with a history of institutional care since birth and subsequent adoption were compared to 15 typically developing nonadopted children. The postinstitutionalized adopted children were found to have reduced organization of portions of the bilateral uncinate and superior longitudinal fasiculi, with the magnitude of white matter disorganization significantly associated with duration of time spent in institutional care.

Also using MRI, Bauer, Hanson, Pierson, Davidson, and Pollak (2009) completed a structural imaging study of 31 postinstitutionalized children, most from institutions in Eastern Europe (Romania, Russia), China, and other European countries. Their average age at adoption was 31 months. Children were also administered a set of neuropsychological tasks from the CANTAB. The researchers found that the postinstitutionalized children had smaller volumes of the superior-posterior cerebellar lobes and had poorer performance on memory and EF tasks compared to typically developing children who served as controls. These structural differences in cerebellum mediated the relation between institution history and cognitive performance.

Tottenham and Sheridan (2009) and Tottenham and colleagues (2011) published two imaging studies with postinstitutionalized children. In the first study, the authors split the group of postinstitutionalized children into those adopted early versus those adopted late. The median age of adoption was 15 months, resulting in one group of 17 early-adopted children (16 from Asia and 1 from Eastern Europe) and a second group of 17 late-adopted children (11 from Asia and 6 from Eastern Europe). The authors found no differences in cortical volume or gray matter between the two groups of children. But the late-adopted children had larger amygdala volume compared to the early-adopted children and compared to the typically developing controls. There also was a modest but significant correlation between age adopted out of the institution and amygdala volume that could not be explained by variations among the sample in IQ.

In their second study, Tottenham and colleagues (2011) utilized functional MRI to examine amygdala activity in response to faces in a modified Go No Go task. In such a task, subjects have to press a button to a frequently presented stimulus (in this case a face posing a neutral expression) and inhibit pressing the button when a less frequent face expression (the emotion of fear) appears. The study reported finding greater amygdala activity in the postinstitutionalized (PI) group to the fear stimuli with amygdala activity mediating the relation between early institutional care and eye gaze pattern (PI children

showed less direct eye fixation on faces). These two studies emphasized the importance of this subcortical structure and its apparent sensitivity to deprivation experiences in children. Importantly, in both studies, the imaging took place years after the children had left the institutions and were now adopted into stable families in the United States, thus emphasizing the effects of early experience on amygdala volume and activity.

Finally, Gee et al. (2013) examined functional connectivity between the medial prefrontal cortex and the amygdala, a key connection that has important implications for emotion regulation. Average age of the sample was 11 years, but both preadolescent and adolescent children were included. Compared to never-institutionalized control children, the post-institutionalized children had a more mature pattern of connectivity, more closely resembling the typically developing controls. The authors argued that this more mature pattern was mediated by cortisol, a finding consistent with their hypothesis that early institutionalization is a form of adversity that leads to dysregulation of the hypothalamic-pituitary-adrenocortical axis.

The third group completing neuroimaging on a post-institutionalized sample was led by Michael Rutter. A paper from the ERAS by Mehta and colleagues (2009) used structural MRI to explore the influence of early institutional care on the hippocampus, amygdala, and corpus callosum, three key brain structures that previous research identified as sensitive to early adverse experiences. Study participants were adolescents and included 14 Romanian adoptees, all with a history of severe early institutional deprivation, and 11 noninstitutionalized, healthy controls. The authors found that the adoptees had significantly reduced total gray and white matter volumes compared to the control group. After correcting for brain volume, the adoptees had enlarged relative amygdala volumes compared to the control group, particularly in the right hemisphere. However, further analyses found that the left-amygdala volume correlated significantly with the duration of institutional care, with longer stays in an institution correlated with a smaller left-amygdala volume.

Attachment and Institutional Care

The formation of an attachment relationship between an infant and caregiver(s) is one of the essential tasks of the first years of life. An attachment relationship between a young child and caregivers requires sufficient ongoing interaction between the two so that the child learns to seek comfort, support, and nurturance selectively from those caregivers. Institutional care, which limits the child's opportunities to form selective attachments, therefore, might be expected to be associated with disturbances of attachment.

The effects of institutional care on attachment were first examined by Tizard and her colleagues (Tizard and Hodeges, 1978; Tizard and Rees, 1974) in a study of 65 young children placed in residential nurseries in London. Compared to institutions in many parts of the world, these facilities were smaller, with more favorable caregiver-to-child ratios, and more adequate toys and stimulation. Tizard does make the point that caregivers were told not to establish emotional bonds with any of the children but rather to remain aloof and distant (Tizard & Rees, 1974). Among the 26 continually institutionalized children, most had seriously disturbed attachments (Tizard & Rees, 1974). Ten of these children were "overly friendly"; that is, they approached unfamiliar adults as often as familiar adults. Evidence of reticence around unfamiliar adults was absent, and these children sometimes exhibited separation protest from strangers. They displayed attention-seeking behavior and were indiscriminate in seeking comfort. The children's attachment to others seemed superficial since adults seemed to be interchangeable. Eight children from the continuously institutionalized group had even more seriously disturbed relatedness. They were emotionally withdrawn, odd, and unresponsive. They tended not to seek comfort when distressed and did not respond to comfort when it was offered. They demonstrated disturbances of emotion regulation as evidenced by diminished positive affect and outbursts of fearfulness, irritability, or sadness for which precipitants were unclear.

These patterns of disturbed attachment had been observed in institutionalized children in older descriptive studies (e.g., Provence & Lipton, 1962), and they have been observed in more rigorous contemporary studies (Smyke, Dumitrescu, & Zeanah, 2002). In fact, these patterns of emotionally withdrawn, unresponsive behavior and indiscriminate behavior became the basis for the clinical phenomenology of disorders of attachment. In a sample of infants in a Greek institution, Vorria et al. (2003) reported that a majority of these infants (65%) had "disorganized" attachments to their caregivers. This is a classification of attachment derived from aberrant behavior that the child displays in the paradigm developed to assess attachment in young children, the Strange Situation Procedure, and is associated with substantially increased risk for subsequent maladaptive behaviors.

Three studies have examined patterns of attachment in preschool children adopted out of Romanian institutions. These studies all have found a high proportion of

unusual classifications. Marcovitch et al. (1997) found that only 30% of young children adopted from Romania were securely attached (compared to 42% in a Canadian-born, never-institutionalized comparison group), and 42% were insecure/controlling (compared to 10% in the comparison group). Chisholm (1998) reported more insecure attachments in Romanian adoptees (63%) than in Canadian-born comparison children (42%). Additionally, more than 21% of the Romanian adoptees displayed atypical insecure patterns while none of the Canadian children did so. Finally, O'Connor et al. (2003) found that at age 6, following adoption into the United Kingdom out of Romanian institutions, 51% of children were classified as insecure/controlling or insecure/other compared to only 17% of children adopted within the United Kingdom (but never institutionalized). In addition, 36% of children adopted out of Romanian institutions, compared to only 13% of intra-U.K. adopted children, exhibited nonnormative behavior in separations and reunions, such as extreme forms of emotional overexuberance, nervous excitement, silliness, coyness, and excessive playfulness more typical of a much younger child.

Emotion Recognition

The ability to identify basic emotional expressions and the ability to match emotional expressions with appropriate social contexts are important skills necessary for adaptive social behavior. Although relatively little research has been conducted specifically with institutionalized children, Pollak, Cicchetti, Hornung, and Reed (2000) reported that in a sample of children who experienced neglect, this history was associated with an overall impairment in the ability to recognize and discriminate between different facial expressions of emotion. A study by Wismer Fries and Pollak (2004) was among the first to examine these skills in children who experienced institutionalization. Postinstitutionalized children from Russia and Romania were given two tasks, one in which they had to identify photographs of facial expressions of emotion and the second in which they had to match photographs of facial expressions of emotion with certain emotional situations. The postinstitutionalized children had difficulty identifying facial expressions of emotion. More interestingly, they had trouble matching the facial expressions of emotion of happy, fear, and sadness to specific situations that were described to them. They performed as well as controls only in matching photographs of angry facial expressions of emotion to descriptions of situations involving anger. These results speak to two parts of the difficulty postinstitutionalized children may have in social situations. First, they may have difficulty interpreting facial cues in the social environment, and second, they may focus more intently on situations eliciting anger rather than those eliciting other emotions.

Psychopathology

Much like the research on development of attachment relationships to caregivers, the findings on children's social and emotional functioning have identified common cross-study themes and some inconsistencies. The consistent finding across studies is with regard to inattention/hyperactivity (e.g., Doolittle, 1995; Goldfarb, 1944; Roy, Rutter, & Pickles, 2004; Wiik et al., 2011). Inconsistencies, though, emerge regarding other aspects of social or emotional behavior, such as peer relationships and emotion identification. Goldfarb (1943) suggested that children who first experienced institutional care and were then transferred, at around age 36 months, into foster care were more likely to experience externalizing behaviors. These included aggression, hyperactivity, and destructiveness, and have difficulty appreciating the feelings and needs of others and difficulty in forming attachments. Children who had been institutionalized for the first 3 years of life demonstrated consistently greater levels of problem behaviors, ranging from feeding and sleeping difficulties, to problems with aggressive behavior and hyperactivity, to marked overdependence on adults characterized by attention-seeking behavior (Goldfarb, 1943).

The findings of hyperactivity and difficulty with attention among previously institutionalized children have been linked with difficulty in establishing and maintaining selective attachments (Roy et al., 2004). At age 6, children who were raised in institutions for the first 3 years of their lives displayed more hyperactivity, anxiety, and difficulty with attention than did their counterparts raised exclusively in foster care, as reported by social workers familiar with them (Goldfarb, 1944). Lowrey (1940) noted a pattern of hyperactivity, particularly as formerly institutionalized children were transferred into "boarding" or foster homes (Lowrey, 1940). In the Tizard study, adopted children were less distractible and restless than children either remaining in the institution or reunified with their families (Tizard & Rees, 1974).

The ERAS group has argued for an institution syndrome that includes inattention and hyperactivity. Descriptions of the children from this study affirm early reports of restlessness, hyperactivity, and difficulty with attention (Doolittle, 1995; Kreppner, O'Connor, & Rutter,

2001; Roy et al.2004; Rutter et al., 2001), difficulties that have been proposed as a possible link to problems in establishing and maintaining selective attachments (Roy et al., 2004).

Autistic Spectrum Disorders

Based on clinical observations of hundreds of institutionalized children in Russia and Romania, Federici (1998) reported that some of the children appeared to display an unusual constellation of behaviors, including cognitive impairment, stereotypies, and socially withdrawn and unresponsive behaviors. He described this constellation as "institutional autism." Rutter and colleagues (1999) used state-of-the-art diagnostic procedures to evaluate 4-year-old children in their sample of Romanian orphans adopted into the United Kingdom. They found that 6% met diagnostic criteria for autism and that another 6% had mild, often isolated, features of the disorder. Given that most children were placed in institutions at or shortly after birth, and given the proportion of children affected, it did not seem that the likelihood of meeting criteria for an autism spectrum disorder reflected a placement bias but rather that the experience of institutionalization produced a phenotype that was indistinguishable from autism. Interestingly, when reevaluated at age 6, most of the children in this sample were much improved and no longer met criteria for autism, although some continued to exhibit unusual behaviors. Because the children had responded so dramatically to more favorable caregiving environments, the investigators described the syndrome as "quasi-autistic." What vulnerabilities in individual children might lead to such a clinical picture among institutionalized children and the processes through which the caregiving environment ameliorates such symptomatology remain to be elucidated.

The Bucharest Early Intervention Project

The BEIP was the product of a MacArthur Foundation research network that the three authors belonged to from 1997 to 2005. The mission of this network was to examine the effects of early experience on brain development. In keeping with a long tradition in neuroscience, some of the work of the network was focused on what happens to the developing brain when it is deprived of experience. The BEIP followed on the heels of a monkey project being overseen by network member Judy Cameron, who was raising monkeys that had been separated from their mothers at different points in development. That work was instrumental in shaping the experimental design of the BEIP, which is discussed next.

EXPERIMENTAL DESIGN AND METHODOLOGY

Participants

Institutionalized Group

At the time we launched the BEIP, there were approximately 100,000 children living in institutions in Romania. We decided to recruit our sample from the institutionalized infants and young children living in Bucharest. The city has six sectors and each sector had an institution. For the institutionalized group (IG), inclusion criteria were all children living in institutions in Bucharest who were younger than 31 months of age and who had spent at least half of their lives living in an institution. Children were administered a pediatric/neurological exam by a pediatrician and a pediatric nurse practioneer, and growth (height, weight and head circumference) was ascertained as was an assessment of any physical abnormalities. We excluded children with known genetic syndromes (e.g., Down syndrome), frank signs of fetal alcohol syndrome, and microcephaly (see Zeanah et al., 2003, for details).

We originally screened a total of 187 institutionalized children but excluded 51 based on our exclusionary criteria. The remaining 136 children were judged to be in reasonably fair health (at least at the time this assessment was performed) and met our inclusion and exclusion criteria.

Of the final sample of 136 children, 57% were of Romanian ethnicity, 27% were Roma (Gypsy), one child was Turkish, one was of subcontinent Indian extraction, and the remaining 15% were mixed or could not be classified. All children at the time of the baseline assessment had spent between 51% and 100% of their lives in the institution, with 52% having spent their entire lives institutionalized.

Birth records indicated that children were born between 30 and 42 weeks, and birthweight ranged from 900 g to 4150 g (M = 2767 g, standard deviation [SD] = 609 g), which differed somewhat from the community control children (M = 3338 g, SD = 467 g). Finally, the average age at baseline assessment for the institutionalized children was 22 months.

Never-Institutionalized Group

Our initial research question involved examination of the 136 children while they still lived in the institution. We wished to assess them on multiple standardized measures, and it was important for us to recruit a typically

developing Romanian comparison sample. Most of the measures we used had never before been used in Romania, and we needed to know if typically developing children in Romania performed similarly or differently than typically developing children in the United States, on whom most of these measures were normed.

With this in mind, we recruited 72 children who had never been institutionalized (never-institutionalized group—NIG) and who had been born at the same maternity hospitals where the foster care group (FCG) and care-as-usual group (CAUG), meaning continued institutional care, had been born. We matched to the other groups by child age and gender, and they underwent a similar screening as the children who had been institutionalized. All community children fell within 2 SD of the mean for physical growth (weight, length, occipitofrontal circumference). Ninety-two percent of the sample was Romanian, 6% were Roma, one child was Spanish, and one child was Turkish.

Fortunately, on nearly all measures we employed, the Romanian community children's were very similar to U.S. norms. As a result, we then had an in-country comparison sample of typically developing Romanian children against whom to compare both children in foster care and those receiving care as usual.

Randomization

Following a comprehensive baseline assessments, children in the institutionalized group were randomly assigned either to the FCG or the CAUG. Random assignment was determined by drawing pieces of paper from a hat (each piece had the name of one of the children, but four pieces had two siblings each). We compared children in the two groups, and no differences were observed in gender distribution, age, birth weight, or percentage of life spent in an institution.

Assessing children prior to randomization ensured that the intervention and control groups were comparable and increased our confidence that any differences in outcome would reflect true intervention effects. Importantly, randomization prior to intervention increased the likelihood that prenatal and other risk factors (e.g., iron deficiency, lead exposure, drug exposure), which could not be ascertained with certainty, would be evenly distributed across the two groups.

As a result of our experimental design, children ranged in age from 6 to 31 months at baseline. Half were then assigned to different foster care homes. They thus varied in their age of placement, which allowed us to examine the outcome data for the presence of sensitive periods (age after which placement into foster care no longer affected outcome). Age at placement was related to length of time in institutionalization. With age of assessment (42, 54, and 96 months), we could calculate length of time the child was exposed to intervention.

Children were initially evaluated at 42 and 54 months, at which point we ended the intervention phase of the trial (i.e., we concluded financial support of our foster care network); however, we followed up the sample at 8 and 12 years, and we have received support to conduct an additional assessment at age 16 years. In later sections of this chapter, we report our findings through age 8, as our 12-year follow-up is not complete as of this writing.

Measures

Because we viewed this project as a once-in-a-lifetime opportunity, we tried to study as many domains of function as possible, ranging from simple height, weight, and head circumference to telomere length. The tables later in the chapter illustrate the many measures and constructs we included.

Summary of Design

The BEIP is the first-ever randomized controlled trial (RCT) of foster care as an intervention for early institutionalization. Its five strengths as a study include: (1) baseline assessments while the children resided in an institution; (2) randomization; (3) a focus on both neural and biological methods; (4) the use of an assortment of state-of-the-art and multimodal psychological methods and measures; and (5) an in-country comparison group. In addition, certain limitations must be noted. First, because of the child protection system at the time the study began, abandoned children were not transferred from maternity hospitals to institutions until they were about 6 months of age. As a result, the children in our study already had experienced many months of institutional rearing. Thus, any claims we make about sensitive periods must be qualified by the fact that no children were less than 6 months old at the onset of the study (and conversely, none was older than approximately 31 months). Second, although we were able to randomly assign children to foster care, we were (obviously) unable to randomly assign children to institutional rearing. We must consider the possibility that children who are abandoned at birth and placed in institutions are likely different from children born into comparably poor families who were not abandoned. Third, for ethical reasons (see the next section), over the course

of the study, children moved from one setting to another (e.g., an institutionalized child was reunited with his/her biological family). Although we have dealt with this issue by continuing to adopt an intent-to-treat approach to our data analyses, this likely underestimates effects of the settings on children's development. In attempting to juxtapose the effects of early experience against those of subsequent life experience, the small sample we have will prove limiting in this regard.

Ethical Issues

We considered a number of ethical issues from the outset of the study, and we have been mindful of others throughout the study. First and foremost is the issue of the vulnerability of the study participants. There are two components to this issue: whether vulnerable participants were being studied for others' benefit, and whether the methods used posed only minimal risk. In regard to whether vulnerable participants were being studied for the benefit of others, rather than themselves, the beneficiaries of the RCT would be children placed in institutions—in other words, populations similar to the study sample. In regard to whether measures and methods of more than minimal risk were being used in a vulnerable population, the answer is that none of the measures used in this study presented more than minimal risk. All were standard measures used in child development research in many parts of the world, and they had been used previously by the three principal investigators in hundreds of children with parents. There is also a legitimate question as to whether we could ethically randomize children to "care as usual," because then only half of the children would receive the putative benefits of foster care. Our answer is that because there was essentially no foster care in Bucharest when we started the study, no children would benefit if we did not conduct the study. An additional concern is whether the course of children's placements were altered by the study—specifically, whether children were to be maintained in institutional settings so that they could be studied. The answer is that once children were randomized to the CAUG or FCG, we adopted a policy of noninterference. This meant that if the authorities elected to change the placement status of a child, we did not interfere. (The same applied to families who sought to take their child out of the institution.) Not surprisingly, over time, many of the children in the CAUG left the institution and were reunited with their biological family, placed in government foster care, or adopted (see Figure 18.2). The one exception to noninterference is that we worked with various NGOs and government authorities to ensure that any child we placed in foster care would not be returned to an institution.

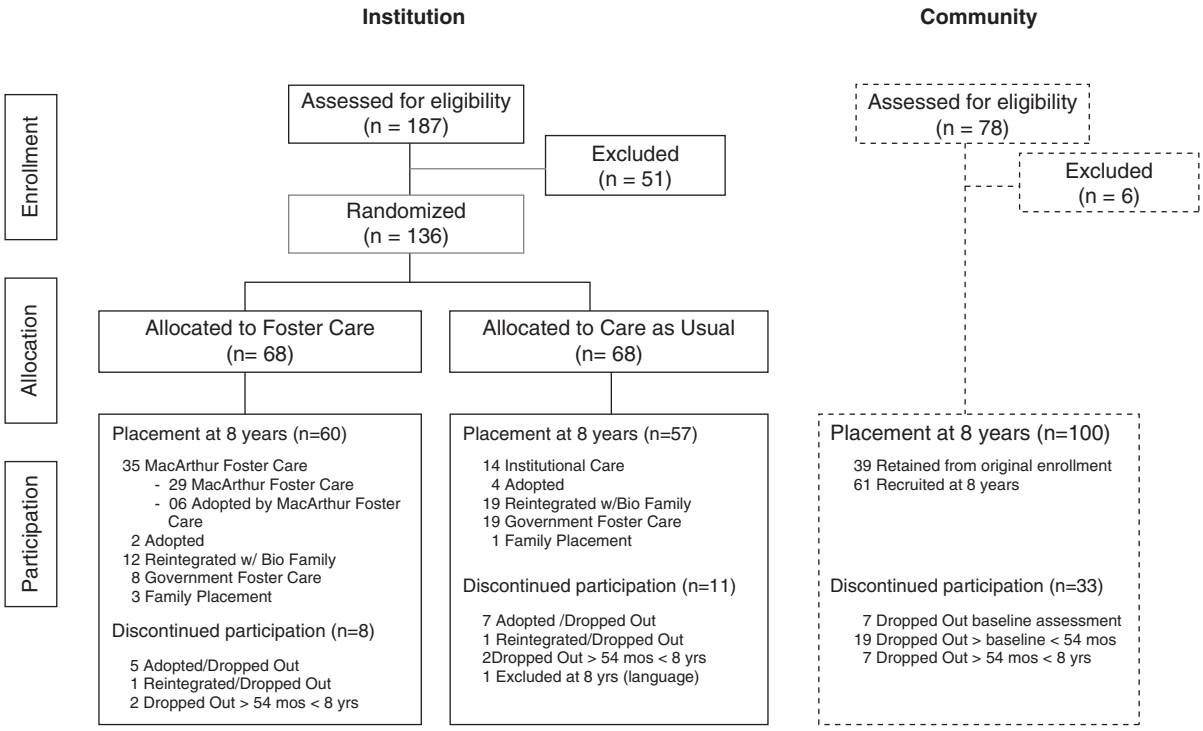


Figure 18.2 Illustration of the initial recruitment of children into the study and over time, their placement status at age 8 years.

For oversight, we sought and received permission to conduct the study from the U.S. universities of the three principal investigators as well as the local authorities in Bucharest and children's legal guardians. After the study began, the Romanian government appointed an ethics commission to review the study, and they deemed it ethically sound. In the past several years, we have also been overseen by an ethics committee at Bucharest University.

A final issue we confronted was that once we realized that children in the FCG were doing better than children in the CAUG on a variety of developmental measures, we faced the conundrum all clinical investigators face: Do we continue the study knowing that one group (FCG) is benefiting more than another (CAUG)? In drug or device RCTs, for example, if the intervention is proving efficacious, one typically stops the trial and offers the treatment to all participants. We could not do this, as we lacked the resources to support or even identify additional foster families. As a result, if we stopped the study, all the children we placed in foster care would likely be returned to the institution.

Instead, we elected to call a press conference, to which relevant government authorities were invited, along with the media. At this event, hosted by the then U.S. Ambassador to Romania, we announced preliminary findings, which we hoped would lead to policy changes regarding abandoned children (a topic we take up later in this chapter). We also established a Data Safety Monitoring Board, which would enable all study participants and their families to express concerns about the study to an impartial third party. Finally, our team of social workers and psychologists worked closely with the families to improve the care our study participants received and to offer referrals, when possible, to children who required medical or psychological care.

We and others have written extensively about BEIP ethics. The interested reader is referred to Miller and Brody (2003); Millum and Emanuel (2007); Nelson et al. (2007, 2009, 2014); Nelson, Fox, and Zeanah (2013); Rid (2012); Wassenaar (2006); Zeanah, Fox, and Nelson (2012); and Zeanah et al. (2006a,b)

Foster Care Intervention

As mentioned earlier, there were virtually no foster homes in Bucharest in 2000 when we started our project. However, legislation passed in 1997 had encouraged the development of foster care, and it existed in some parts of Romania. The government had adopted a French model of foster care in which "maternal assistants" or foster parents were full-time employees of the government, receiving salaries rather than subsidies to care for children. As established in Romanian legislation, all foster care parents were licensed and had received didactic training.

We hired three BEIP social workers who recruited and screened foster parents. With considerable effort, we identified 53 foster parents to care for the 68 children. Ten foster parents agreed to care for two children each. For four parents, this involved two siblings, whereas each of the remaining six parents agreed to care for two unrelated children.

These foster mothers ranged in age from 29 to 65, and most (29/53) were married and living with their spouses. Another 11 were widowed, 9 were divorced, and 4 had never married. A few of the mothers had fostered children previously (12/53), mostly because they had been hired by NGOs dealing with international adoption. These previous foster children typically had stayed in care only for a few months.

Of course, we understood that there were risks of implementing a model of foster care in Romania that was simply imported from other countries and applied in Romania. In order to ensure cultural appropriateness, we were able to use a foster care training manual that had been developed by a large NGO, World Vision. This manual had been written by and for Romanians, derived from and modeled after similar manuals in the United States. Our administrative partner, SERA Romania, had had several years of experience implementing foster care in other parts of Romania. We vetted our training and consultation model with SERA Romania, as well as with our own social work staff, to ensure the cultural appropriateness of the approaches we were implementing.

The training provided to foster parents was conducted over 6 weeks. It included 22 hours of information about children's rights, recent reforms in Romanian child protection, and the rights and obligations of foster parents. Another 20 hours covered child development, including information from educational and child psychology. Finally, 18 hours were devoted to managing children's challenging behaviors and disabilities as well as social challenges. Additional time was spent with foster parents on common characteristics of children living in institutions, and they visited institutions to observe the children and, when possible, they visited with the children they would foster before the placement (see Nelson, Fox, et al., 2014; Smyke, Zeanah, Fox, Nelson, & Guthrie, 2010, for more details).

Our approach during the training and throughout the intervention was to make the parent-child relationship the central component of the intervention, in keeping with contemporary research and practice (Dozier et al., 2006; Zeanah et al., 2011). Therefore, we advocated that BEIP foster parents care about and for the children as if they were their own. Drawing from contemporary literature on parenting maltreated children, we incorporated several

points of emphasis for our foster care intervention. First, BEIP social workers encouraged foster parents to make a full psychological commitment to the children in their care (Dozier & Lindheim, 2006; Lindheim & Dozier, 2007). Second, we wanted parents to provide sensitive care to the young children assigned to them (Bick & Dozier, 2013). This meant getting to know the child as an individual and emotionally investing in him or her, in the context of a long-term commitment. Third, because of limited infant mental health resources in Bucharest in 2001, the BEIP team had to provide interventions for typical behavioral and regulatory issues that present in young, maltreated children—oppositional and aggressive behavior; social withdrawal; toileting difficulties; bedtime struggles and waking at night; refusal to eat, stuffing, or hoarding; hyperactivity; and indiscriminate behavior, all of which are common (Smyke, Zeanah, Fox, & Nelson, 2009).

One of the striking differences in foster care in Romania and foster care in the United States was the commitment for a particular duration: In the United States, foster care is a temporary condition, intended to keep children safe while parents remediate the problems that led to the children's removal. In Romania, however, foster care was not viewed as a temporary placement.

Another important issue was that social work had been banned as a profession in Romania in the communist era. In 2000 when the BEIP began, the School of Social Work at the Bucharest University had been open only for a few years, and the faculty included almost no senior social workers. Therefore, BEIP social workers had not received much in the way of mentoring and had no experience with foster care prior to their project participation. In order to provide them with experienced mentoring, they received weekly consultation by video from clinicians experienced in working with maltreated families in the United States. The social workers learned about parent and child characteristics that might impede, limit, or diminish a close and engaged parent-child relationship as well as interventions to enhance the relationship.

We provided extensive support to the families, including all material and medical support; moreover, we provided staff support so that staff members could better help the families. We linked foster care placement to permanency planning, and, indeed, nearly a third of our foster care families ultimately adopted their children. Each family was monitored—specifically, our social workers visited the families roughly every 10 days initially and at longer intervals as the intervention continued on, and were available for consultation in between visits. (For details about our foster care program, see Smyke et al., 2009.)

The Findings

The BEIP represented a unique research opportunity, and as such we elected to study multiple domains of development. In part this was because we believed that the risks associated with early deprivation were likely to affect many domains but not necessarily affect all of them in the same way. We were interested in delineating outcomes and in identifying mechanisms underlying the process of exposure to psychosocial deprivation and these outcomes. Tables 18.1 through 18.9 provide a complete listing of all measures used to date.

In this chapter, we focus on a number of key domains. Even within those domains, we provide only broad overviews of our findings; again, the interested reader

TABLE 18.1 Attachment-Related Measures

Domain & Name of Measure			Measures Administered at Ages:					
Attachment and Child/ Caregiver Relationship	Description	Source of Data	Baseline	30 mos	42 mos	54 mos	8 yrs	12 yrs
Crowell Play Procedure	Caregiver-child interaction	Observation of caregiver/child	x	x	x			
Disturbances of Attachment Interview (DAI)	Attachment disturbances & disorders	Caregiver report	x	x	x	x	x	x
Expressed Emotion Interview	Warmth, criticism, emotional over involvement	Caregiver report						x
Fostering Experience Interview	Challenges/rewards of fostering a child	Caregiver report						x
Observational Record of Caregiving Environment (ORCE)	Quality/frequency of caregiver behavior	Observation of caregiver/ child	x	x	x			
Security Scale Interview Stranger at the Door (SAD)	Attachment security Indiscriminate behavior	Child report Observation of child				x	x	x
Strange Situation Procedure (SSP)			x	x	x			
This Is My Child Interview–Revised	Commitment, acceptances, & degree of influence	Caregiver report						x

TABLE 18.2 Illustration of Social Emotional Assessment Battery

Domain & Name of Measure			Measure Administered at Ages:					
Attention	Description	Source of Data	Baseline	30 mos	42 mos	54 mos	8 yrs	12 yrs
Dot Probe Task	Attention bias to threat	Examination of child					Behav only	Behav only
Flanker Task	Cognitive control	Examination of child					x	x
Go No Go	Inhibitory control	Examination of child					x	x
Posner Cued Attention	Attention systems of vigilance and orienting	Examination of child					x	

TABLE 18.3 Illustration of Brain-Based Measures Designed to Examine the Neural Correlates of Different Cognitive Functions

Domain & Name of Measure			Measures Administered at Ages:					
Brain	Description	Source of Data	Baseline	30 mos	42 mos	54 mos	8 yrs	12 yrs
Coherence, Laterality & Power (EEG)	Brain electrophysiology	Examination of child	x	x	x		x	
Emotional Intensity (ERP)	Emotional intensity discrimination	Examination of child			x			x
Facial Emotion Discrimination (ERP & VPC)	Emotion discrimination	Examination of child	x	x			ERP only	
Facial Emotion Identification Task (behav)	Emotional intensity discrimination	Examination of child					x	x
Familiar-Unfamiliar Face Recognition (ERP & VPC)	Caregiver-stranger face recognition	Examination of child	x	x	x			
Flanker (ERP)	Cognitive control	Examination of child					x	x
Go No Go (behav)	Inhibitory control	Examination of child					x	x
MRI	Brain structure	Examination of child					x	
Mismatch Negativity (ERP)	Error monitoring	Examination of child	x	x				
Morphed Emotion Discrimination (ERP)	Emotion discrimination	Examination of child						x
Posner Cued Attention (ERP)	Attention systems of vigilance and orienting	Examination of child					Behav only	

Legend: EEG: electroencephalogram.
ERP: event-related potential.
Visual Paired Comparison (VPC).

TABLE 18.4 Illustration of Various Physical Growth and Biological Measures (Including Genetics)

Domain & Name of Measure			Measure Administered at Ages:					
Biology	Description	Source of Data	Baseline	30 mos	42 mos	54 mos	8 yrs	12 yrs
Genetics	List specific genes evaluated? Telomeres	Buccal swab					x	x
Head Circumference	Physical growth	Examination of child	x	x	x		x	x
Height	Physical growth	Examination of child	x	x	x		x	x
Morris & Udry Pubertal Scale	Pubertal status	Child report						x
Weight	Physical growth	Examination of child	x	x	x		x	x

TABLE 18.5 Illustration of the Cognitive Measures Used in the First 4.5 Years of the Project

Domain & Name of Measure			Measure Administered at Ages:					
Cognition	Description	Source of Data	Baseline	30 mos	42 mos	54 mos	8 yrs	12 yrs
Bayley Scales of Infant Development	Mental, motor, & behavioral development	Examination of child	x	x	x			
Wechsler Preschool and Primary Scale of Intelligence (WPPSI)	Verbal and performance IQ	Examination of child				x		
Wechsler Intelligence Scale for Children–Fourth Edition (WISC-IV)	Full scale IQ	Examination of child					x	x
Demographics and Health								
Demographics	Demographic information	Caregiver report	x					x
Life Experience Interview	Significant relationships (caregiver, friend)	Child report						x
Placement Disruptions	Timeline of major/minor life events	Child protective records	x	x	x	x	x	x

TABLE 18.6 Illustration of Various Language-Based Measures

Domain & Name of Measure			Measure Administered at Ages:					
Language	Description	Source of Data	Baseline	30 mos	42 mos	54 mos	8 yrs	12 yrs
Language Sample	Grammar, vocabulary, usage	Transcripts of play episodes, peer relations & interviews		x	x		x	x
Non-Word Repetition	Vocabulary predictor	Examination of child					x	
Rapid Naming	Vocabulary predictor	Examination of child					x	
REEL	Receptive & expressive language	Examination of child		x	x			
Reynell	Verbal comprehension & expressive language	Examination of child		x	x			
Sentence Repetition	Grammar	Examination of child					x	

TABLE 18.7 Illustration of the Measures Utilized at the Different Phases (Subject Age) of the Study

Domain & Name of Measure			Measures Administered at Ages:					
Mental Health	Description	Source of Data	Baseline	30 mos	42 mos	54 mos	8 yrs	12 yrs
Infant Toddler Social Emotional Assessment (ITSEA)	Behavior & emotional problems	Observation of caregiver/child	x	x	x			
MacArthur Health Beahvior Questionnaire (HBQ)	Behavior & emotional problems, health, adaptation	Caregiver report	x	x	x	x	x	x
Preschool Age Psychiatric Assessment (PAPA)	Psychiatric symptomatology	Caregiver report						x
PAPA/CAPA	Psychiatric symptomatology	Caregiver report						x
Diagnostic Interview Schedule for Children–Version IV (DISC-IV)	Psychiatric symptomatology	Observation of caregiver/child	x	x	x			
Motor Skill Bruininks-Oseretsky Test of Motor Proficiency, Second Edition (BOT-2)	Gross and fine motor skills	Child report Observation of child				x	x	x
Neuropsychological Function		Observation of caregiver/child	x	x	x			
Bear-Dragon	Neuropsychological function	Caregiver report						x
Cambridge Neuropsychological Test and Battery (CANTAB)	Executive function and memory							

TABLE 18.8 Illustration of the Measures Utilized that Address Children's Risk Taking Behavior

Domain & Name of Measure			Measures Administered at Ages:					
Risk-Taking Behavior	Description	Source of Data	Baseline	30 mos	42 mos	54 mos	8 yrs	12 yrs
Balloon Analogue Risk Task (BART)	Risk-taking behavior	Examination of child						x
Behavioral Indicator of Resiliency to Distress	Distress tolerance	Examination of child						x
Brief Sensation Seeking Scale (BSSS)	Sensation seeking	Child report						x
Youth Risk Behavior Surveillance (YRBS)	Risk taking behaviors. Drug & alcohol use	Child report						x

TABLE 18.9 Illustration of the Social Emotional Development Battery that Was Deployed at Different Ages

Domain & Name of Measure			Measures Administered at Ages:					
Social-Emotional Development	Description	Source of Data	Baseline	30 mos	42 mos	54 mos	8 yrs	12 yrs
Early Social Communication Scales (ESCS)	Nonverbal communication	Examination of child	x	x	x			
Friendship Quality Questionnaire	Friendship quality	Child report						x
Happy-Angry Task	Social preference- emotional expression	Child report					x	
Interpersonal Competence Questionnaire	Social competence	Child report						x
Laboratory Temperament Assessment Battery (LAB-TAB) Puppets & Peek-a-Boo	Attention & positive/negative affect	Examination of child	x	x	x			
Peer Relations	Relationship with peers, cooperation	Observation of child					x	
Resistance of Peer Influence Questionnaire	Peer influence	Child report						x
Self-Report Coping Questionnaire	Coping abilities under stress	Child report						x
Social Skills Rating System	Social behaviors	Caregiver & teacher report					x	x
Trust Approach Task	Social preference-trust/ approach	Child report					x	

is referred to our published work. (For key summaries, see Fox, Almas, Degnan, Nelson, & Zeanah, 2011; Leiden Conference on the Development and Care of Children without Permanent Parents, 2012; Nelson, Fox, et al., 2013; and Zeanah, Gunnar, McCall, Kreppner, & Fox., 2011.)

Cognitive Development

In the BEIP, we were interested in evaluating children's cognitive abilities using a combination of standardized measures of intellectual function (e.g., developmental tests, IQ tests) and experimental measures that permit us to draw inferences about specific cognitive functions (e.g., inhibitory control and working memory) and their relation to underlying brain circuitry.

IQ

We administered the Bayley Scales of Mental Development to the children living in the institutions prior to randomization to the two arms of our study. In follow-up visits at 30 and 42 months, we continued to use the Bayley Scales because of the children's level of performance. We switched to the Wechsler preschool version of the IQ test at the 54-month session (Weschler preschool and Primary Scale of Intelligence; WIPPSI) and to the Wechsler Intelligence Scale for Children (WISC) when children were tested at age 8.

Baseline scores revealed that the institutionalized children had a Mental Development index (MDI) of 62 while community children had an MDI of 102. Immediately after the baseline assessments, the children were randomized

into the two arms of the study. The MDI is a standardized score with a mean of 100 and an SD of 15. Thus, infants and young children (ages 6–31 months) living in institutions were severely delayed as assessed on this measure of infant IQ. Our next three assessment points occurred when the children were 30, 42, and 54 months of age. Since children entered the intervention at ages ranging from 6 to 31 months, children would vary in the length of time they were exposed to the intervention at each of these immediate follow-up points. A child who went into the intervention at the age of 28 months might have had only 2 months of the intervention at the 30-month assessment while others who were 8 months at placement would have had 22 months of exposure to the intervention.

We asked two questions of the IQ data collected at these three age points: at each age, first, was there an effect of intervention? That is, did the children randomized to the foster care group outperform the children randomized to the institution? Second, in the foster care group, was there an effect of age of placement or duration of intervention on IQ?

The children placed into foster care outperformed their age-mates who had remained in more prolonged institutional rearing. Although this finding confirmed our hypothesis about the efficacy of our intervention, it is important to point out that at each age, the children placed into foster care still lagged behind typically developing community children from Bucharest.

We next examined the relations between age of placement and IQ at each age as well as length of time in intervention and IQ at each age for the children placed into foster care. We found that only age of placement (more than duration of time in foster care) was positively related to IQ scores at each age. That is, it was more important how old the children were when they left the institution and were placed into foster care than how long they spent in the foster care home. Of course, both these factors—age at placement and length of time in care—confounded (i.e., highly correlated with one another). But we could examine which factor was a more powerful a predictor of IQ; age of placement was. Indeed, within the confines of the distribution of ages in our sample (ages of children at placement), we could identify a cut point for age of placement before which children placed into foster care outperformed their institutionalized age-mates and after which there was little difference between a foster care child and a child randomized to remain in the institution.

If children were younger than 24 months at placement, then at each of the three ages—30, 42, and 54 months—they were more likely to outperform children older than 24 months at placement. This finding strongly argued for a sensitive period in cognitive recovery—at least with regard to IQ in early childhood—such that children placed after the age of 24 months more closely resembled institutionalized children and those placed before the age of 24 months begin to approximate never-institutionalized children.

The next assessment point for the children in the study was when they were 8 years of age. At that time, we administered the WISC, which provided us scores for each child in full-scale IQ as well as four subscales (processing speed, verbal comprehension, perceptual reasoning, and working memory). Our first analysis approach was the intent-to-treat analysis in which children who were originally assigned to either the foster care or institution groups were analyzed as if they had remained in their original caregiving settings. We found when using this approach that there were no differences in any of the subscales or in full-scale IQ between the two groups. The full-scale IQ of the foster care group was 81.5; for the CAUG, it was 76.2. It appeared that while the IQ scores of the foster care children remained stable over time, the scores of the children randomized to the institution began to catch up. As before, the scores of both groups were significantly below the mean scores of the community controls. As well, the timing effects we had identified at 30, 42, and 54 months were no longer evident.

There are several plausible explanations to account for the failure to replicate the timing effects observed at earlier ages. First, if we examine the changes in context for the children in our study at age 8, we find that only 14 of the original 68 children randomized to remain in the institution still lived in this setting. The remainder had been reunited with their biological parents, placed into government foster care, or adopted by Romanian families. Similarly, of the 68 children randomized to our foster care intervention, 31 were still in these homes; the other children had either been adopted or reunited with their biological families. So, there was a great deal of movement in the lives of the children in our study between 4.5 and 8 years of age. Also, most all the children started school at age 6 so that by the time we tested them, they had 2 years of schooling.

We decided to investigate further the pattern of IQ data in our sample by examining scores of children based on their current placement status. For example, we wondered whether children who were originally assigned to BEIP foster homes and who remained there would do better than children who remained in the institution or who were placed into government foster care. These analyses showed that children who remained in our foster homes had higher scores than the children in the two other groups

on three of the four subscales (working memory, verbal comprehension, and processing speed) and significantly higher full-scale IQs. As a further check, we found that among our foster care group, those who had remained in the homes did better than those who left. These two sets of results clearly show the benefit of a stable positive family environment on IQ scores. Although the initial uptick in IQ scores was due to our intervention, sustaining those intervention effects was a result of the child remaining in a stable placement over time.

We then decided to make use of the longitudinal nature of our data, examining the pattern of IQ scores in both the FCG and CAUG groups. In each group, there were two obvious trajectories over time. One involved children who had stable but low scores across age while the other involved higher stable scores over time. We examined predictors of these different trajectories and found for the FCG group, attachment security and positive responsive caregiving at 42 months predicted a high and stable pattern of IQ. In addition, strong language skills at 42 months contributed to these stable high patterns. We could not, however, find predictors of patterns within the CAUG group, except for poor language abilities at 42 months related to low and stable trajectories in IQ.

SUMMARY

When we survey our results from baseline to age 8, two key findings emerge. First, leaving children in institutional care, or even spending the first 2 years of life in institutional care, leads to a dramatic reduction in cognitive performance. Second, placing children in families *before* the age of 2 years dramatically improves cognitive performance, at least through age 4.5 years. By age 8, our foster care effects are maintained, but group differences (between CAUG and FCG) diminish, likely due to an upward shift in IQ among the CAUG. Nevertheless, the general conclusion that children raised in families versus institutions have higher IQs is beyond dispute, and consistent with decades of earlier research.

Neuropsychological Functioning at 8 Years

We felt it essential to include measures of cognitive function that would permit reasonable inferences to be drawn about underlying brain architecture, because the BEIP was conceptualized as a project designed to examine experiential effects on brain development. We were particularly interested in tasks that tapped the functioning of the PFC, as the PFC is the primary seat of higher cognitive functions, so-called EFs, and it is highly sensitive to early experience and stress. Executive functions (EFs) represent a collection of skills and abilities, including working memory, planning, cognitive flexibility, inhibitory control, and attention, to name just a few (Blair, Zelazo, & Greenberg, 2005; Nelson & Luciana, 2008; Zelazo et al., 2003).

Based on previous research by other investigators, as well as our own previous findings at earlier ages (including IQ), we anticipated that we would find impairments in planning behavior, inhibitory control, and learning and memory among children with a history of early institutional care compared to children without such a history. Similarly, given what is known about the protracted development of the PFC, we expected that our FCG would show improvements in EFs compared to the CAUG (although the FCG performance might not be equivalent to that of the NIG); however, we were less sure about timing effects. As for memory, given the well-known plasticity of the hippocampus and surrounding cortex (which makes learning and memory possible for much of the life span), we expected that the CAUG would show much worse performance than our other two groups, but that the FCG would show an improvement in memory, although again, we were unable to make predictions about timing.

To test these hypotheses, at 54 months we performed the Bear-Dragon test, which evaluates a form of inhibitory control, and at 8 years, we performed an event-related potential (ERP) test of inhibitory control (Go No Go) and also drew from an automated battery of neuropsychological tasks that one of us (CAN) has made extensive use of in the past (e.g., Luciana & Nelson, 1998; McDermott, Westerlund, Zeanah, Nelson, & Fox, 2012). We discuss each of these in turn.

Inhibitory Control at 54 Months: Bear-Dragon

The child's ability to inhibit a prepotent motor response (i.e., one built up over time) develops over the preschool period. It is seen as an essential skill for adaptive social behavior as well as behavior necessary for learning. We used the Bear-Dragon paradigm, in which a child is told that whatever the Bear puppet says to do ("touch your nose"), the child should do, and whatever the Dragon puppet says to do, the child should ignore. The child and experimenter then play Bear-Dragon. The child has 20 trials with two-thirds being Bear trials and one-third being Dragon trials. We count the number of correct responses across both types of trials. When we examined the children's performance, we found that the care as usual children were able to follow directions, but unable to inhibit responses. Foster care children were significantly better at inhibiting responses although not nearly as accurate as typically developing children from the community. Thus,

children assigned to the CAUG show the worst inhibitory control, the NIG the best, and the FCG were in between.

Inhibitory Control at 8 Years (Go No Go)

Inhibitory control, which is critically involved in learning and is also involved in both the cognitive and social functioning elements of school success (e.g., the ability to sit at one's desk and do one's work without distraction; the ability to inhibit saying hurtful things to one's friend) was of particular interest, given the high rate of ADHD that has been observed among ever-institutionalized children.

Inhibitory control is conceptualized as the ability to inhibit a response in the face of potentially distracting stimuli. It is often assessed using tasks that require participants to respond to a particular type of stimulus, while inhibiting a prepotent response to another type. Inhibitory control increases throughout middle childhood (Cragg & Nation, 2008), and this improvement has been linked to the development of prefrontal neural circuitry (e.g., Casey et al., 1997; Durston, Thomas, Worden, Yang, & Casey, 2002; Hwang et al., 2011).

In our 8-year follow-up, we administered a well-known task of inhibitory control, the Go No Go task, while recording both button press accuracy and ERPs (see McDermott et al., 2012). This task begins by presenting the same stimulus repeatedly, asking the child to push a button on every trial (i.e., all "Go" trials). The purpose is to prime children to respond quickly and on every trial, so that they develop a tendency to push (i.e., they develop a so-called prepotent response). We then present an interleaved sequence of Go and No Go trials, in which children were instructed to press a button for when they see a certain stimulus and not to press a button when they see another stimulus. In our case, 70% of the trials were "Go" trials (all letters of the alphabet except the letter "X") and 30% of the trials were No Go trials (when they see an "X," they should *not* press the button).

Overall, children who remained in care as usual were less accurate and exhibited longer ERP latencies (i.e., slower neural responses) compared to children in the FCG or NIG. However, children in both the CAUG and FCG exhibited diminished processing of No Go cues as inferred from one particular ERP component—the P300—which serves as an index of staying on task. Foster care children also showed an enhanced ERP component that reflects error monitoring (the so-called error-related negativity, or ERN) compared to children in the CAUG, which suggests they were better at monitoring their performance and more sensitive to errors. Collectively, these results supported the hypothesis that institutional care led to performance deficits in inhibitory control and in error monitoring and that being placed in foster care appeared to bring inhibitory control into alignment with that of the never-institutionalized children, although there remained some deficits in brain activity.

Having demonstrated that institutional rearing has a negative impact on inhibitory control, we were also interested to see if other EF skills might be affected. Here we drew from the CANTAB, similar to the research by Pollak and Loman reviewed earlier in the chapter (Pollak et al, 2004 and Loman et al 2013). The CANTAB represents a collection of more than 12 neuropsychological tests, many drawn from the experimental neuropsychology literature of human patients. Unlike a clinical neuropsychological battery, many of the CANTAB tasks have reasonable neural specificity. What makes the CANTAB ideally suited to young children is that the tasks are all done on a touch-screen monitor, in the form of a game, and do not require very sophisticated motor or language ability.

We were unable to perform all of the CANTAB tasks due to limited time, but instead focused on a subset that included tests of simple motor learning (motor screening), memory (delayed match to sample, paired associate learning), planning (stockings of Cambridge, a variant on the well-known Tower of London planning task) and spatial working memory. Unfortunately, the results can be summarized very briefly. First, although the groups performed similarly on a simple test of motor function (motor screening), we found no difference on any other task between the CAUG and the FCG—basically, both groups (which we refer to as ever institutionalized) performed more poorly than the NIG on all other CANTAB tasks. This finding suggests, of course, that (a) institutionalization had a negative impact on both memory and some aspects of EF and that (b) the foster care intervention failed to have a positive effect on performance on any of these tasks.

Collectively, it appears that ever-institutionalized children experience a decline in performance in both memory and EFs compared to never-institutionalized children. Moreover, placing such a child in foster care appears not to improve their performance in these domains, with the exception of inhibitory control (see McDermott et al., 2012).

Brain and Biological Development

One of our major interests was in the effects severe psychosocial deprivation may have on the developing brain and whether removing a child from a deprived institutional environment, and placing that child in a foster family changed brain structure and functioning. We also hoped to explore whether the timing of the intervention would have an impact on outcome; specifically, is there a

period during which intervention would have its greatest impact? These questions had not been addressed previously in children who were living in institutions, or in those systematically removed and placed in foster care.

To explore these questions, we used brain imaging methods that were suitable for infants and young children—the electroencephalogram (EEG), and the ERP. By the time the children were 8 years old, we had gained access to a 1.5 Tesla scanner and could use MRI to perform structural imaging on the sample. Table 18.1 illustrates our brain-based battery.

Electroencephalogram

We recorded the EEG prior to the children being randomized, when they were still living in the institutions, and then again after randomization at 30 and 42 months and at 8 years. EEG was recorded while children viewed bingo balls rotating in a bingo cage (the goal of which was to engage the child's attention for a few minutes, standardizing attention to the wheel and minimizing movement).

At baseline, we observed large differences in EEG between the children living in institutions and community controls. The children living in institutions had greater slow-frequency activity (theta) and less high-frequency (alpha and beta) activity relative to the community controls (Marshall, Fox, & the BEIP Core Group, 2004). This less mature profile was maintained through the initial period of the intervention.

When we recorded EEG at the 8-year assessment, children in the FCG had been in their foster care families for between 5.5 to 7.5 years. At age 8 years, there was a strong intervention effect and a timing effect in the EEG data. Children placed into our foster care intervention before the age of 24 months displayed a pattern of brain activity that was indistinguishable from the NIG. The children who were taken out of the institution before age 24 months showed a pattern of higher mature alpha activity and lower less mature theta activity (Vanderwert, Marshall, Nelson, Zeanah, & Fox, 2010). Foster care children also had more significant high-frequency beta activity compared to children randomized to the institution. Indeed, like the alpha power finding, there was both an intervention and a timing effect for beta power at age 8.

These findings suggested two important conclusions. First, there appears to be a sensitive period for the development of neural structures underlying increased alpha and beta power in the EEG signal, with amelioration of the deprived environment prior to 2 years of age being critical for remediation. Second, although this developmental "catch-up" was made possible by placement into foster care before the age of 2, it required years of exposure to foster care to emerge.

Although we had recorded EEG at 30 and 42 months, we found little change over that period of time. Of course, since the mean age of the children placed into foster care was 22 months, the average duration of intervention at 30 months was only 8 months and at 42 months, 20 months, perhaps not long enough to affect brain activity as detected by our measures. By 8 years of age, children had experienced the intervention and other life events that may have facilitated brain changes, particularly among those who received the initial intervention. Thus, the intervention and timing effects could reflect subtle combination of age of placement *and* duration of intervention. But as time went on and children began to spend more time out of institutional care (e.g., the CAUG who is removed by the child protection authorities at age 3 and reunited with his/her family), the effects of current life experience began to weigh more than the effects of early life experience.

Event-Related Potentials

ERP Studies of Familiar versus Unfamiliar Faces. The characteristics of institutional care make it likely that institutionalized children have atypical experiences with faces compared to children reared in typical families. Examples include a high child-to-caregiver ratio, high caregiver turnover, and limited adult-child interactions within institutions (as reviewed in Zeanah et al., 2003). These factors may lead to more limited exposure to adult faces among institutionalized compared to family-reared children. It is also possible that institutionalized children have access to a more limited range of facial expressions of emotion or have disproportionate experience with particular facial expressions (e.g., negative or neutral expressions) compared to children reared in typical homes. It is undoubtedly the case that the quality of social interactions of institutionalized children and the quality of facial affect during those interactions differ from family-reared children. We therefore sought to examine two aspects of BEIP children's responses to faces: their ability to discriminate a familiar from an unfamiliar face and their ability to discriminate different facial expressions of emotions. Both elements of face processing were examined at baseline and at follow-up.

To address these questions, we conducted a simple test: Children were presented with alternating images of their primary caregiver's face and the face of a stranger, and ERPs were recorded during this time. We examined a series of ERP components across groups, both at baseline

(S. W. Parker, Nelson, & the BEIP Core Group, 2005a) and at later ages (see Moulson et al., 2009a,b). We discuss the baseline findings first, followed by the 30 and 42 month findings.

Baseline Three major observations were made at baseline. First, for all ERP components examined, the NIG showed much larger amplitude responses than the IG. Second, for the critical component of interest—the negative component (NC), which reflects allocation of attention—both groups showed the same response, with a larger NC to the stranger's face compared to the caregiver's face. Third, for the Positive Slow Wave (PSW) which reflects the updating of memory, the IG displayed a greater amplitude response to the familiar face (versus the novel face), whereas the NIG showed no ERP difference. Collectively, the amplitude differences we observed between the IG and NIG are consistent with what we observed in the EEG. In addition, the PSW difference suggests that the children in the IG were attending more to the caregiver's face, implying that this face was not well encoded into memory, whereas the NIG responded equally to both familiar and unfamiliar faces (suggesting both were equally well encoded).

Overall, the reduction in amplitudes among the IG is consistent with the EEG findings reviewed earlier, in which we observed a dramatic reduction in brain activity. In terms of facial discrimination, it appears that for one component (NC), the IG and NIG performed identically, but for another (PSW), the IG displayed a very different response than the NIG. This finding suggests that institutionalization leads to subtle differences in processing familiar and novel faces. The next question was whether such differences carried forward to the 42-month follow-up. In other words, if there were slight differences in processing faces early in life, would these be magnified over time so that later in life, there would be substantial differences?

Follow-up testing (to examine intervention effects) when children were 42 months of age was identical to baseline testing: Children were presented with alternating images of their caregiver's face and the face of a stranger while ERPs were recorded. Several findings were noteworthy. First, as we observed at baseline, the CAUG displayed markedly smaller ERP amplitudes. This finding suggests that the hypocortical arousal observed at baseline persisted at 42 months, suggesting that this brain pattern is a result of early experience, not subsequent life experience. Second, for most components, both the CAUG and the NIG displayed very similar profiles of ERP differentiation of caregiver versus stranger faces: specifically, larger amplitude and shorter latencies to stranger versus caregiver faces. Again, consistent with the baseline findings, this suggests that, much to our surprise, early institutionalization has relatively little impact on discriminating caregiver versus stranger faces. That is, children raised in institutions are as capable of distinguishing familiar and unfamiliar faces as are children who have never been institutionalized. This may be because the development of face processing may require relatively little input in order to proceed normally (Righi & Nelson, 2012). Perhaps just being around other children and a multitude of caregivers is sufficient exposure for the neural circuitry that underlies faces to develop in a typical fashion.

Finally, we observed that the amplitude of a key ERP component that has face-sensitivity—the P1—was enhanced among children in the FCG compared to the CAUG, although it was not quite as large as among children in the NIG. This finding suggests that the foster care intervention had, by 42 months, begun to normalize this aspect of visual processing (although we cannot say for certain that this was an improvement in face processing specifically), which is very encouraging. This result is consistent with our EEG data, in that placing children in families, following early institutionalization, leads to a reduction in the hypocortical arousal observed at baseline among the IG children. Interestingly, no timing effects were observed, suggesting that normalization occurs regardless of when a child is placed in foster care.

Summary First, as is the case with EEG, children assigned to remain in institutional care showed a marked reduction in all ERP components. This cortical hypoarousal is of some concern, as it suggests that the brains of institutionalized children (and children who spent the first part of their life in institutional care but eventually went into care of families) are developing differently from never-institutionalized children. (We return to this issue when we discuss our MRI findings.) Second, unlike virtually every other domain observed in the BEIP, institutional rearing appears to have had relatively little effect on the ability to distinguish familiar from unfamiliar faces. In other words, for only a single component, and only at baseline, did institutionalized children differ from community children—both groups discriminated a familiar face from an unfamiliar face. This finding, in turn, argues that there is sufficient facial information in the institutional environment to support the typical development of the neural circuitry that underlies face processing. Of course, it remains to be seen whether more complex forms of face processing are observed at later ages.

ERP Studies of Facial Emotion Processing. As alluded to earlier, it is well established that experience has a powerful effect on the development of face processing. The development of face processing most probably reflects an experience-expectant, activity-dependent process, in which cortical specialization for face processing is driven by experiences with faces over the first years of life (Nelson, 2001). Particularly relevant to the BEIP are studies that have examined facial emotion processing in children experiencing early institutionalization followed by adoption (e.g., Wismer Fries & Pollak, 2004).

At both baseline and follow-up, we utilized a very simple experimental design: Infants/children were presented with four facial expressions—happy, sad, angry, and fearful—posed by the same female model. These four expressions appeared equally often, during which we recorded ERPs.

Baseline Several findings are noteworthy (see S. W. Parker, Nelson, & the BEIP Core Group, 2005b). First, as we observed in our familiar-unfamiliar face task, the amplitude of all ERP components was dramatically reduced among the IG compared to the NIG. This is what we would anticipate since the EEG power amplitudes were similarly reduced. Second, the NIG displayed greater N170 amplitudes to the sad expression, whereas the IG exhibited greater N170 amplitudes to the fear expression. In addition, the NIG and IG exhibited greater P250 amplitudes in response to the sad and fearful expressions, respectively. Thus, for the early components, N170 and P250, the NIG and IG displayed different ERP patterns in response to the different emotion expressions, particularly fearful and sad. Finally, hemispheric differences were observed between the groups, with the NIG showing greater right than left activation among several ERP components and the IG showing virtually no hemispheric differences. The lack of such a laterality effect suggests that the IG children show less cortical specialization for emotion processing than the NIG.

Follow-up This same experimental paradigm was administered at 42 months following randomization to foster care (Moulson et al., 2009b). As was the case at baseline, at 42 months, institutionalized children showed markedly smaller amplitudes and longer latencies for the P1, N170, and P400 components compared to family-reared children (NIG). And, as was the case for our familiar-unfamiliar face task, by 42 months, ERP amplitudes and latencies of children placed in foster care were intermediate between the CAUG and NIG, suggesting that foster care may be partially effective in ameliorating adverse neural changes caused by institutionalization. The age at which children were placed into foster care was unrelated to their ERP outcomes at 42 months. Finally, for all three groups of children (CAUG, FCG, and NIG), fearful faces elicited larger amplitude and longer latency responses than happy faces for the P250 and NC components. This last finding (greater responses to fearful than to other expressions) is consistent with past research with typically developing children (e.g., de Haan & Nelson, 1997) and suggests that institutional rearing appears to have limited impact on discriminating facial expressions of emotion.

Collectively, through 42 months, we observed a number of differences in emotion processing between institutionalized and never-institutionalized children, although these differences by and large were quite subtle. As was the case in our familiar-unfamiliar face task, this finding suggests that the ability to perceptually discriminate different facial expressions is relatively unperturbed by institutional rearing, a finding we have also observed across the first 42 months of life using a behavioral task of emotion processing (Jeon, Nelson, & Moulson, 2010; Nelson, Parker, Guthrie, & the BEIP Core Group, 2006). However, as was also the case in our familiar-unfamiliar face task, in our emotion discrimination task, we also observed marked reduction in the amplitude of all ERP components recorded, which was partially remediated by our foster care intervention. This finding suggests reduced brain activity despite intact skills to detect facial expressions of emotion.

ERP Studies of Emotion Processing at Age 8 The two tasks discussed thus far place relatively few demands on higher social-cognitive processes, and we were therefore curious what might be observed when our children were a bit older, confronted with a more demanding test of face processing. In other words, perhaps more basic perceptual-discrimination abilities of face processing are relatively unaffected by institutional rearing, but how would our children perform on a task that required them to recognize facial emotions, not just discriminate one expression from another?

Children were presented with angry, fearful, and neutral faces modeled by eight different female actresses (for details, see Nelson, Fox, et al., 2013). Each expression was presented equally often. ERPs were recorded, and children were instructed to push a button whenever they saw an angry face.

Several findings of interest emerged. First, all three groups were equally accurate at recognizing anger, which suggests there were no group differences in being able to follow task instructions. Second, all three groups had a more difficult time recognizing fearful faces, which

is consistent with the observation that fear is the last expression to be recognized at adult levels (generally in adolescence; see Thomas, De Bellis, Graham, & LaBar, 2007). Third, the NIG and FCG were both better at inhibiting a button press to neutral and fearful faces than the CAUG, suggesting either that the CAUG was generally less accurate at recognizing these two emotions or that they had more difficulty with inhibiting a response generally. This finding also suggests that the foster care intervention was effective in improving previously institutionalized children's ability to recognize the emotions neutral and fear. Finally, there were no group differences in reaction time.

Regarding the ERP data, several intriguing findings emerged. First, the P1, a component that possesses some face sensitivity, was largest to angry faces for the NIG, smallest among the CAUG and intermediate for the FCG. In addition, as we observed more generally with ERP amplitudes at 42 months (Moulson et al., 2009b discussed earlier), this finding also supports the notion that foster care improved the ability to process facial emotion.

In contrast to the P1, the N170 and the P300 were biggest to fear in all groups. So, although all three groups were equally good at recognizing anger, the task-relevant stimulus, and showed comparable P300 amplitudes to anger, their ERP responses (for both the N170 and P300) were biggest to fear. This finding supports the assertion put forth by Leppänen and Nelson (2009, 2012) that fear is of high signal value (even as early as 7 months of life; see Nelson & de Haan, 1996), and responses to this emotion are unperturbed by institutional rearing.

Although the children in foster care showed improvements in their ability to recognize fear and neutral faces (to a comparable level of performance as never-institutionalized children) and their P1 to angry faces was midway between the NIG and CAUG, we observed no timing effects. On the whole, this finding is identical to what we observed at 42 months, both for face processing generally and for processing facial emotion.

These findings stand in contrast to the perceptual discrimination observed at earlier ages. Whereas at earlier ages we observed relative sparing in the ability to discriminate facial expressions (as well as differentiating familiar from unfamiliar faces), here we observed differences among the CAUG in processing facial emotion, both behaviorally and electrophysiologically. Moreover, we observed a number of subtle improvements in processing facial emotion among the foster care group, although their performance did not become comparable to the never institutionalized group. The fact that no timing effects were observed suggests that children placed in foster care improve, although they do so regardless of the age at which they were placed in foster care. Of course, the fact that the average age of placement was 22 months urges caution in this interpretation, for earlier placement might have revealed timing effects.

Conclusions Regarding Face and Emotion Processing. When we reflect on the studies focused on face processing, we conclude that basic perceptual abilities are affected only modestly by institutionalization, although higher-level recognition abilities do seem to be impacted by early institutionalization. Second, in line with our EEG findings, it appears that institutionalization leads to dramatic reductions in ERP amplitudes; by 8 years, these reductions appear to be remediated among children placed in foster care, regardless of age of placement. Thus, we have intervention effects in this domain but no demonstrable timing effect.

Magnetic Resonance Imaging

The EEG findings of pervasive reductions in power have intrigued us since our initial observations, when we first began the study. Over the years, we have entertained a number of possible interpretations of these data. In an examination of physical growth, we found that the children from the institution had smaller head circumferences than the NIG. This initial finding did not change with the intervention, at least for those children placed after 12 months. Thus, if smaller heads correlate with smaller brains, what exactly is it about the brain of the institutionalized child that is smaller? Is it the loss of neurons of neuronal elements, such as axons and dendrites, or of synapses? Might it be that the normal process of apoptosis—programmed cell death—has gone awry, such that there has been an overpruning of neurons? Finally, might there be less white matter—the portions of neurons that contain myelin and that lead to short- and long-distance connections among neurons—which might contribute to our EEG and ERP observations (i.e., the brain might be less well interconnected and, as a result, the brain's electrical activity might be reduced)?

When the sample was between 8 and 10 years of age, we performed structural MRIs. We evaluated 78 BEIP children, 20 from the NIG, 27 from the FCG, and 31 from CAUG. We observed a number of significant differences across groups, which are summarized below.

1. We observed a reduction in total cortical volume among ever-institutionalized children (CAUG and FCG), compared to never-institutionalized children.
2. In terms of gray matter, we also observed a reduction in the CAUG and FCG compared to NIG.

3. With regard to white matter, we found that the NIG had significantly more white matter than the FCG and CAUG, but the FCG had significantly more than the CAUG.
4. Although there was some regional variation within the corpus callosum, we observed a general reduction in volume of this structure in the CAUG compared to the other two groups (which do not differ from each other).

   These last two findings collectively suggest that the foster care intervention is having a beneficial effect on white matter volume but not on gray matter, which would be consistent with the experience-dependent nature of white matter (which permits the inference that children in the CAUG may have a less myelinated brains).
5. We did not observe any differences across the three groups in either the hippocampus or the amygdala, and only very subtle (and yet to be confirmed) changes in one or two regions of the basal ganglia.

The findings about brain structure helped explain our EEG and ERP findings. Indeed, when we performed a mediation analysis, we found that white matter differences mediated the relation between deprivation and EEG power.

Summary. This section of the chapter has been concerned with the neural sequelae of psychosocial deprivation in the BEIP sample. The findings suggest that across multiple biological domains, institutional rearing exerts a heavy toll on brain development. Children reared in institutions have smaller brains and show dramatic reductions in the brain's electrical activity compared to never-institutionalized children. Children reared early in institutions but then assigned to foster care, by contrast, show significant increases in brain electrical activity and in white matter volume relative to children in the CAUG. However, children in foster care do not show the same catch-up gray matter volume.

In those domains where intervention effects were noted, some, such as EEG, had sensitive periods attached to them, whereas others, such as ERP to faces, did not. This finding suggests either that (a) some domains are more experience-dependent than others or (b) the *relatively* late age of placement did not permit us to detect sensitive periods that might have been evident at earlier ages.

Social-Emotional Development

Abnormalities in social and emotional behavior in children raised in institutions have been described for more than 100 years (see Zeanah, Smyke, & Settles, 2006). They were the most striking atypical behaviors in the descriptive studies of Spitz (1945) and Goldfarb (1943, 1944, 1945 a,b) in the mid–twentieth century about children living in institutions.

These descriptive studies were important in drawing attention to the significant effects of psychosocial deprivation on socioemotional development, but they did not systematically assess social and emotional behavior in institutionalized children other than descriptively. The adoption of large numbers of children from Romania and other Soviet bloc countries that began 20 years ago led to renewed interest in the topic in the psychological and pediatric literature (e.g., Chisholm, 1998; Chisholm, Carter, Ames, & Morison, 1995; Marcovitch et al., 1997; O'Connor, Bredenkamp, Rutter, & the English and Romanian Adoptees Study Team, 2000; Wismer Fries & Pollak, 2004) among children who had been adopted out of institutions. Our study extends these findings by examining children while they were still living in institutions and following randomization to foster care versus more prolonged institutional care. Our goal was to determine experimentally the effects of placement in families on these children's expressions of social and emotional behavior.

Based on our observations and on previous research, we assumed that because young children raised in institutions have reduced exposure to appropriate social stimulation and contingent sensitive and responsive caregiving, their social development would be compromised. In particular, we were curious about three potential areas likely to be affected: attachment, social skills, and relations with peers.

We were curious about the effects of institutional rearing on children's attachment behaviors because the context of institutions does not lend itself to facilitating attachments (see Zeanah et al., 2003) and because serious disturbances in attachment have been reported in children raised in such environments (see Tizard & Rees, 1975). Discriminating a significant caregiver or caregivers from others and preferring these caregivers for security and social support is crucial for development and this can be severely compromised by conditions of extreme neglect. In addition, some of the most compelling descriptions in the psychological literature of children lacking attachments were of those being raised in institutions (see Provence & Lipton, 1962; Tizard & Rees, 1975). Thus, this was a major area of interest for our research. We also investigated social skills and peer relationships among institutionalized children, because as children enter middle childhood and adolescence, peer relationships are perhaps the most important indicator of their social functioning. Further, a previous study had noted significantly impaired

peer relations among formerly institutionalized children (Hodges & Tizard, 1989).

Attachment in Institutionalized Children

Attachment is defined in different ways, but we are referring to the organization of a young child's behaviors that involve seeking comfort, support, nurturance, and protection from selected caregiving adults. In ordinary rearing conditions, infants who reach 7 to 9 months of age begin to exhibit clear preferences for certain caregivers when they are frightened or distressed. Infants protest separation from selected caregivers, and they exhibit reticence that had not been present before with unfamiliar adults. The hallmark of infants' capacity to form attachments is their ability to seek comfort and security from specific caregivers. Once these behaviors appear, an infant is described as "attached" to those caregiving adults to whom the infant turns preferentially.

The BEIP afforded us an opportunity to study the attachment behaviors of young children living in institutions with standardized assessments and to examine the effects of a family-based intervention on these behaviors. We wanted to determine if validated measures of attachment would replicate observations about serious attachment disturbances among many children raised in institutions that had been made in older descriptive studies. Another goal was to examine young children's capacity for recovery, having been raised at least initially with what we presumed were limited opportunities to form selective attachments. Caregiving quality has long been asserted to be necessary for healthy development of attachment, so institutional rearing provided a stark test of that assertion. Finally, we wanted to determine if aberrant attachment is predictive of the emergence of psychopathology, as it has been shown to be in noninstitutionalized children.

The child-caregiver attachment relationship may be assessed by observing the young child's behaviors in a paradigm known as the Strange Situation Procedure (Ainsworth, Blehar, Waters, & Wall, 1978). An infant between the ages of 1 and 2 years is observed with a parent/caregiver in a series of brief separation and reunion episodes designed to assess the infant's exploratory and comfort-seeking behavior with an attachment figure and an unfamiliar adult. Infant behavior, particularly during reunion episodes with the attachment figure, is noted for degree of proximity seeking, contact comfort and calming of any distress that the infant might express in the prior separation episode. The organization of the child's responses during these separation and reunion episodes, based on these behaviors, allows trained coders to determine the quality of the child's attachment relationship to the caregiver. Infants in the Strange Situation Procedure (SSP) are classified as securely/insecurely attached to their caregivers or to have an organized or not organized attachment to their caregivers.

Patterns of Attachment in Institutionalized Children. The BEIP was the first study of patterns of attachment in Romanian infants and toddlers. It was also the second study of patterns of attachment in young children living in institutions. We were initially unsure whether using the SSP as a method was appropriate because it assumes an attachment exists and yields qualitative differences, whereas many of the institutionalized children might not even have attachments. We could not be sure at the outset whether institutionalized toddlers raised in large and impersonal institutions even had attachment figures. We selected the caregivers to assess by asking the staff if the child had a "favorite" caregiver. If so, we used that caregiver in the Strange Situation. If the child had no discernible favorite, we assessed the child with a caregiver who worked with the child regularly and knew the child. We also restricted the procedure to those children with a cognitive age of 11 months or higher to be sure that all children assessed had the capacity to form a selective attachment.

We determined that among the community children in Bucharest who had never been institutionalized, 74% had secure attachments, 4% had avoidant attachments, and 22% had disorganized attachments to their mothers. This is a slightly higher percentage of secure and disorganized patterns than we might expect within a typically developing sample in the United States. Among the institutionalized children, assessed with their favorite caregivers, only 18% had secure attachments, 3% had avoidant attachments, 65% had disorganized attachments, and 13% of the children had so little attachment behaviors that they were designated unclassified (Zeanah et al., 2005). This latter designation is exceedingly uncommon and has never been reported in children living in families.

These remarkable differences between institutionalized children and noninstitutionalized children were similar to what another group of investigators reported after the BEIP began from their study of Greek infants raised in institutions (Vorria et al., 2003). They also reported that 66% of the institutionalized children had disorganized attachment patterns, whereas only 25% had secure attachment patterns. A subsequent study of infants and toddlers raised in Ukrainian institutions revealed similar distributions of patterns of attachment. Institution-reared children positive for HIV were 28% secure, with 45% disorganized and 27% unclassified (Dobrova-Krol,

Bakermans-Kranenbury, Van Ijzendoorn, & Juffer, 2010). The similarities of findings in these other two studies regarding attachment contrast with IQ scores, which were much lower in the BEIP than in the Greek or Ukrainian children. This difference suggests that attachment may be a more sensitive indicator of a deprived environment than IQ. An important older study of residential nurseries in London in the 1970s also described modest effects on IQ but profound effects on young children's attachment (Tizard & Rees, 1974). The convergence of our results with other studies increased our confidence that the Strange Situation Procedure had yielded meaningful results.

We were also curious about whether we could predict which variables were important for developing an organized attachment to a caregiver in the extraordinary setting of an institution. Therefore, we contrasted organized attachment (secure and avoidant) with not organized (disorganized and unclassifiable) in this sample using the same predictors. Even when controlling for cognitive level, perceived competence, and quantitative ratings of caregiving behavior, we found that quality of caregiving predicted organized attachment. An increase of 1 unit in quality of caregiving was associated with an increase in the odds of an institutionalized child having an organized attachment by a factor of 1.29 (Zeanah et al., 2005). These results importantly suggest that individual differences in caregiving experienced by children in institutional settings (and other environments characterized by severe deprivation) matter a great deal.

Degree of Development of Attachments. Despite the remarkable differences in patterns of attachment between institutionalized and community Romanian children, other results more starkly illustrated the profundity of differences in attachment in children in institutions and children in families. Elizabeth Carlson, who coded the Strange Situation Procedure without knowing which children were institutionalized and which were not, developed ratings of the degree to which the child had developed an attachment to the caregiver in the procedure. She based this coding solely on attachment behaviors (or their lack) that the child exhibited during the procedure. A "5" indicated fully formed attachments, consistent with traditional classifications of attachment. Ratings of "4" indicated evidence of formed attachment behaviors but accompanied by extreme or pervasive behavioral anomalies (beyond the scope of traditional disorganization coding). Ratings of "3" were used when there were fragmented or incomplete sequences of attachment behavior that were directed toward the caregiver more than the stranger. At the next level, a "2," there was only a barely discernible difference in the child's behavior toward the familiar caregiver, with isolated attachment signals and responses. Finally, children who exhibited no discernible attachment behaviors were assigned the lowest rating of "1." Carlson's ratings converged with those of another attachment expert, Alan Sroufe.

With no knowledge about the children whose behavior they coded, the raters identified all 50 of the community children as Level 5—fully developed attachments. In contrast, they identified only 3 of 95 children in the institutionalized group as having fully formed attachments. In fact, 62 of the 95 children (65%) in the institutionalized group were Level 3 or below, meaning clearly incompletely formed attachment. And 10% of the institutionalized children had no discernible attachment behavior whatsoever (Zeanah et al., 2005).

These results illustrate the extraordinarily deprived caregiving setting that institutions represent and are among the first to describe young children in the second year of life who have not formed meaningful attachments to the adults in their lives. A subsequent study of institutionalized children in the Ukraine (Dobrova Krol et al., 2010) replicated our findings of most institutionalized children having incompletely formed attachments, although their children had a higher proportion of fully formed or Level 5 attachments than ours (24% versus 3%).

A number of points of interest emerged from comparing ratings of degree to which attachment had formed and patterns of attachment. First, all of the 9 children with ratings of "1" (no discernible attachments) were rated as unclassifiable. Second, 7 children (29%) whose attachment was rated as Level 2, 7 children (24%) whose attachment was rated Level 3, and 3 children (10%) whose attachment was rated Level 4 were securely attached. This means that when we forced the classification, they most resembled secure attachments—displaying a preference for the familiar caregiver rather than the stranger. But clearly, secure classifications in institutionalized children mean something other than what secure attachments in family-reared children mean.

To try to clarify what led children to have incompletely formed attachments, we examined several possible candidate variables. The only factor that we could identify was quality of caregiving. It appears that what was missing in these children's lives was a sensitive, responsive, loving caregiver who could provide them contingent positive social interaction. In the absence of such persons, these children did not form attachments to the human caregivers they had.

Disorders of Attachment

As we have seen, under typical rearing conditions, all infants form attachments to adult caregivers. In more extreme rearing conditions, such as institutions for young children, attachment may be seriously compromised or even absent. The work we have described up to now on patterns of attachment derives from the tradition of basic developmental research. Now we turn to another tradition of work in attachment, also having its roots in John Bowlby's work. This tradition is rooted more in clinical literature describing serious symptomatology in children raised in institutions, including a defined psychiatric disorder of aberrant attachment behaviors.

The term *reactive attachment disorder* (RAD) describes a constellation of deviant attachment behaviors believed to be the result of social neglect and deprivation. Two clinical patterns have been described: an emotionally withdrawn/inhibited pattern and an indiscriminately social/disinhibited pattern. In the emotionally withdrawn/inhibited pattern, the child demonstrates no discernible attachment to anyone, even when distressed. In addition, the child fails to seek comfort from caregivers for distress or to be comforted when distressed. These children have difficulties regulating their emotions and show emotion regulation difficulties, such as unexplained outbursts of irritability, fear, or withdrawal. In the indiscriminately social/disinhibited pattern, designated in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (American Psychiatric Association, 2013) as disinhibited social engagement disorder, the child exhibits lack of expected social reticence with unfamiliar adults, fails to check back with the caregiver in unfamiliar settings, and demonstrates a willingness to accompany strangers with little or no hesitation.

The BEIP was an opportunity to examine a number of questions about these disorders that had been previously studied, primarily in small, descriptive studies. We were able to evaluate attachment disorders systematically among currently institutionalized children, using state-of-the-art contemporary measures. We were thereby able to evaluate the natural history of attachment disorders within this extremely high-risk sample. We were also able to examine interrelationships between the developmental patterns of attachment—secure, avoidant, resistant, and disorganized—and clinical disorders of attachment. Individual differences in genes—polymorphisms—had not been examined previously as vulnerability factors for the disorders. Most important, we were able to determine if foster care—putatively an enhanced form of caregiving—is an effective intervention for disordered attachment. No intentional intervention for attachment disorders had ever been conducted previously, much less an RCT. Finally, we were interested to examine effects of timing of placement in foster care and determine the degree to which that mattered.

We found that young children living in institutions were rated by their caregivers as having significantly more signs of both emotionally withdrawn/inhibited and indiscriminately social/disinhibited RAD compared to the community children (Zeanah et al., 2005). Within the children living in institutions, however, there was no apparent relationship between length of institutionalization and signs of either type of disorder.

For children living in institutions, continuous ratings of the degree to which an attachment had formed were moderately correlated with caregiver ratings of emotionally withdrawn/inhibited attachment disorder, but they were not related to ratings of indiscriminately social/disinhibited attachment disorder. These findings are compatible with other evidence that indicates that that emotionally withdrawn/inhibited RAD describes young children who lack attachment relationships with caregivers, whereas children may be attached or not and still show high levels of indiscriminate behavior (Smyke et al., 2012).

Interrelations among Attachment Measures. Among institutionalized children at baseline, Strange Situation classification patterns were unrelated to signs of RAD at baseline, suggesting that these two are different indices of attachment in young children. However, continuous ratings of the degree to which attachment had developed were moderately correlated with caregiver ratings of emotionally withdrawn/inhibited RAD (as expected) but unrelated to ratings of indiscriminately social/disinhibited RAD.

Taken together, these results suggest that clinical disturbances of attachment, as reflected in signs of RAD, indicate incomplete development or expression of attachment behaviors in children cognitively able to form selective attachments. These attachment disorders are distinct from patterns of attachment, which are more properly considered risk and protective factors. Evidence to date indicates that young children with attachment disorders are more likely to have disorganized or aberrant attachment patterns than organized patterns, but the two constructs of attachment disorders and patterns of attachment are distinctly different indices (Smyke et al., 2012).

Intervention Effects: Patterns of Attachment. At 42 months of age, we readministered the Strange Situation Procedure. We predicted a higher proportion of secure attachments and higher ratings of security for children assigned to the

FCG versus those in the CAUG. We also predicted fewer atypical patterns among the children in foster care.

In keeping with predictions, at 42 months, only 18% of the CAUG were securely attached, but 49% of the FCG and 65% of the community children were securely attached. When security was coded continuously, community children were significantly more secure than the other two groups, but children in the FCG also were significantly more secure than children in the CAUG. So, if these results hold, even following extreme deprivation, it is clear that children can form secure attachments, although not to the same degree as if they had not experienced such severe deprivation.

We also examined the effects of timing of foster care placement on children's forming secure attachments. In other words, was there an age of placement after which the chances of a child developing a secure attachment began to diminish? We found that children placed in foster care before 24 months of age were significantly more likely to develop secure attachments than children placed after 24 months. More than two-thirds of the children placed before 24 months developed secure attachments whereas less than one-third of those placed after 24 months developed secure attachments. Later placement did not preclude the child developing a secure attachment to the foster parent, but it did significantly reduce the likelihood of that happening.

Intervention Effects: Disorders of Attachments

Whereas Strange Situation Procedure classifications of attachment were assessed only at baseline and at 42 months of age, caregiver reports of emotionally withdrawn/inhibited and indiscriminately social/disinhibited attachment disorders were obtained at every age and supplemented by observation at 54 months. The effects of the intervention on these outcomes were different for the two types of attachment disorders.

For the emotionally withdrawn inhibited type of RAD, significant positive effects of placement in foster care were evident at the very first assessment age—30 months—and at every subsequent assessment. That is, the FCG showed significantly fewer signs of emotionally withdrawn/inhibited RAD compared to the CAUG, and the levels of this type of attachment disorder were indistinguishable from the levels in the community children. This means that all of the signs of disorder were effectively eliminated at the earliest possible age of assessment. By 30 months of age, the children in foster care had received somewhere between 1 (the oldest children at the time the study began) and 23 (the youngest children at the time the study began) months of intervention, with an average of 8 months. We also should point out that there were no timing effects—signs of emotionally withdrawn/inhibited RAD disappeared regardless of the age at which the child was placed in care. It appears that these behaviors are plastic and can be remediated with intervention (see Smyke et al., 2012).

For the indiscriminately social/disinhibited type of attachment disorder, the response to the intervention was more complicated but also quite interesting. Based on caregiver and parent reports of indiscriminate behavior, and examining all data points from baseline through 8 years, children placed in BEIP foster care had fewer signs of indiscriminate behavior than those in the CAUG but more signs than children who had never been institutionalized. In addition, there were different recovery curves for indiscriminately social/disinhibited RAD in the foster care group and the CAUG, with decline of these signs in the FCG evident between each pair of assessment times, with the lone exception of no change between 42 and 54 months. In the CAUG, differences were noted only between 54 months and 8 years (Smyke et al., 2012).

We were also interested in supplementing caregiver reports with an observational measure of indiscriminate behavior. In typically developing children, stranger wariness appears at 7 to 9 months of age. Once evident, some degree of reticence with strangers is apparent for the next few years. In addition to our own frequent observations of indiscriminate behavior among children living in institutions, it is also one of the most persistent and common abnormalities reported in children who have been adopted out of Romanian (and other) institutions (Chisholm,1998; Hodges & Tizard, 1989). Therefore, we developed a procedure intended to capture individual differences in indiscriminate behavior.

When the children in the BEIP reached 54 months of age, we scheduled three home visits. At the conclusion of the first home visit, the mother/caregiver was instructed about what would occur during the second visit. A research assistant, unknown to the child, would appear at the door at a designated time of the second visit. Mother/caregiver and child were instructed to be present when the mother/caregiver opened the door. Mother/caregiver was told that she could look at the child but not to give verbal or nonverbal directions about how to respond to the "stranger." The research assistant looked at the child and said, "Hello, my name is Florin, what is your name?" Then the research assistant, still looking at the child, said, "Come with me, I have something to show

you." The mother/caregiver was instructed not to give any directions to the child about what to do. We coded whether the child left with the stranger or declined to leave. If the child did leave with the research assistant, the two walked a short distance, and then the child was greeted by a familiar research assistant from the week before who said, "Hello, I have returned to play more games with you this week." This became known as the Stranger at the Door Procedure (see Gleason et al., 2014). We anticipated that 4-year-old children would not likely leave their homes to accompany a stranger, and the response of the community children suggested that we were correct; only 1/28 (4%) community children accompanied the stranger. However, 13/31 (42%) of the CAUG readily accompanied the stranger. The foster care group was in between the other groups, as 7/29 (24%) left with the stranger. Not all children participated in the procedure because we added the procedure to the protocol after the 54-month assessments were already under way. A small number of caregivers declined or gave instructions to the child about what to do, and these were not included in data analysis. Although these group differences appeared striking, there was actually no statistically significant difference between the proportion of the CAUG and the FCG who left with the stranger, in part because the groups were small. Both CAUG and FCG children were more likely to leave than the community children. Importantly, there was a substantial convergence between caregiver reports of the children's indiscriminate behavior and observational coding of indiscriminate behavior from this procedure ($k = 0.70$), indicating that they were assessing the same phenomenon.

We observed timing effects (i.e., age of placement) for indiscriminately social/disinhibited RAD. For children placed earlier (<24 months), scores were generally lower, with the exception of 42 months and 8 years. For this early-placed group, scores dropped quickly between baseline and 30 months and then appeared to remain stable. For the later-placed group, a modest decrease in scores was noted between 30 and 42 months whereupon scores became stable again until the 54 months–8-year comparison, when they decreased.

Findings from longitudinal assessments of signs of attachment disorders indicate that placement in families eliminated signs of emotionally withdrawn/inhibited RAD among young children raised in institutions but had a less powerful effect on indiscriminately social/disinhibited RAD. This finding indicates that additional interventions beyond family care may be necessary to reduce or eliminate signs of social/disinhibited RAD of young children with high levels of indiscriminate behavior.

Peers, Social Skills, and Social Competence

As children get older, their social worlds expand from the immediate family to the school, classroom, and peers. In the BEIP, opportunities for social interaction were available at school and within institutional settings. We were curious about the emerging social skills and social competence of children raised in institutions as they interacted with same-age peers. In order to study this, we asked parents/caregivers as well as teachers to report on the children's social skills, and we also observed each of the children in the BEIP with a same-age, same-sex peer in our laboratory. We structured the interaction and videotaped it. We then had these tapes coded for behaviors that were indicative of social skills and competence by coders who were unaware of group status.

It is important to understand the influences of institutionalization on children's social development throughout childhood for a number of reasons. Most important, early social behaviors set the stage for children's success at negotiating the increasing social demands and social changes that occur later in development. Social rejection or exclusion can lead to adolescents' involvement in delinquent or risk-taking behaviors (Ollendick, Weist, Borden, & Greene, 1992). Indeed, Erol, Simsek, and Münir (2010) found that those institutionalized adolescents who reported fewer friends and poorer relations with friends also reported higher problem behavior scores on the Youth Self-Report. Furthermore, difficulties with peer relationships in early childhood have been linked to difficult adjustment in adulthood (see J. Parker, Rubin, Erath, Wojslawowicz, & Buskirk, 2006, for a review). In order to avoid such negative outcomes, it is important to determine whether foster care intervention can potentially remediate some of the negative social effects of previous institutional care.

In order to assess social skills, children's primary caregivers and teachers were asked to report on the children's social skills using the Social Skills Rating System (Gresham & Elliot, 1990).

We compared children's social skills as reported by caregivers and teachers in the three groups: children who were randomly assigned to care as usual, children who were randomly assigned to foster care, and children from the community. We showed positive effects of the intervention on children's social behavior at age 8 years, which was 3.5 years after the intervention ended. Specifically, children in foster care were rated as more socially skilled by their caregivers than were children assigned to institutional care. Interestingly, teachers rated children in both the FCG and the CAUG as having fewer social skills than did biological parents or foster caregivers (Almas et al., 2012).

Another important finding was a significant effect of age at placement into foster care on teacher ratings of social behavior. That is, children who were placed before 20 months of age were rated by teachers as more socially skilled than those who were placed later. These results highlight the value of early intervention on the social skills of institutionalized children. However, foster care children were not rated as socially skilled as the community children, indicating a continued effect of early deprivation on development at age 8 years (Almas et al., 2012).

Children's interactions with an unfamiliar peer were assessed in the laboratory using six interactive tasks designed to assess each child's self-presentation skills, cooperative play skills, and competitive interactions. The children's behavior was videotaped and subsequently coded independently by a team of Romanian research assistants who were blind to the identity of the children. Individual behaviors were coded (such as duration of speech, cooperation), and composites were formed. This process allowed us to examine the children's social competence, social reticence, and anxious behaviors.

We also found group differences in how the children behaved in these tasks with peers. Rated blindly, foster children were rated as more competent and less reticent than institutionalized children. Children in the CAUG also showed significantly higher levels of speech reticence, while children in the FCG showed significantly higher levels of speech competence. These results highlight the positive effects of intervention on the competence of children while interacting with unfamiliar peers in two socially demanding tasks.

Further, using the Actor-Partner Interdependence Model, we demonstrated that the behavior of children in the CAUG, but not in the FCG, had negative effects on the behavior of unfamiliar peers. Specifically, CAUG children's reticent behavior during the initial task was related to less social engagement in the community children during the competitive tasks and somewhat during the cooperative tasks. There were no effects of the behavior of FCG children on the subsequent behavior of community children. Finally, there were no timing of foster care placement effects on the behavior of FCG children with unfamiliar peers (Almas et al., 2012).

A number of aspects of these findings deserve highlighting. First, we continue to see intervention effects on social behavior and social competence 6 years after the study began and 4 years after the intervention was completed. As in our other analyses, we used an intent-to-treat approach, so the positive intervention effects that we found are actually a conservative estimate of the true effects. Second, there appears to be a timing effect for the intervention effects, with children taken out of the institution before 20 months of age displaying better social skills than those placed into our intervention after age 20 months. What is also clear is that there are lasting effects of exposure to social deprivation among the sample. As a group, FCG children at age 8 still display lower social skills compared to typical community children.

Psychopathology

Previous reports of psychiatric disorders in children with histories of institutional rearing typically focused only on a single disorder (Hoeksbergen et al., 2003; O'Connor et al., 2000; Roy et al., 2004) or relied on parent checklist reports of behavior problems without systematic diagnostic interviews (L. Fisher, Ames, Chisholm, & Savoie, 1997; Marcovich et al., 1997). Other than ADHD, disruptive behavior disorders had not received systematic study, nor had anxiety disorders beyond posttraumatic stress disorder. Precursors of psychopathology also had received little attention. Finally, mechanisms through which psychopathology emerge in children reared in institutions had not been addressed. We considered all of these gaps in our understanding of psychopathology associated with institutional rearing to which the BEIP could potentially contribute.

When children were 54 months of age, we were able to use a structured psychiatric interview, the Preschool Age Psychiatric Assessment, Version 1.3 (PAPA; Egger, Ascher, & Angold, 1999), rather than behavior problem checklists. PAPA had been used previously with 2- to 5-year-old children in a large study of children attending primary care visits in North Carolina, demonstrating test-retest reliability comparable to that of structured psychiatric interviews used to assess older children and adults (Egger et al., 2006).

We took several steps to ensure that the psychopathology and impairment data were collected properly. The lead interviewer was trained in administration of the PAPA by the group at Duke University who developed the measure, and he subsequently trained other Romanian interviewers. After the PAPA was translated into Romanian, it was back-translated into English and assessed for meaning at each step by bilingual research staff.

Caregivers and parents were interviewed in detail about signs of psychiatric disorder in each child and about the degree to which these signs impaired the child's school and social functioning. For children living with biological parents or foster parents, the mother reported on the child's behavior. For children living in institutions, an institutional

caregiver reported on the child's behavior. As with other measures, the caregiver chosen was the one considered the child's favorite, according to staff consensus; if the child had no favorite, a caregiver who worked with the child regularly and who was reported to know the child well was chosen. Interviewers asked detailed questions about the frequency, duration, and dates of onset of symptoms of a large number of psychiatric disorders. Algorithms were then applied to responses to determine whether each child met diagnostic criteria for specific disorders. Further, caregivers and parents were interviewed about the degree to which symptoms interfered with the child's functioning at home, at school, and in close relationships. For purposes of the study, we derived diagnoses to examine prevalence of psychiatric disorders; derived symptom counts for constructs such as internalizing, externalizing, inattention, and aggression; and summed impairment ratings about each different setting to determine degree of functional impairment.

Children with a History of Institutional Rearing

We found that institutional rearing is an extraordinarily powerful risk factor for psychopathology. The majority of 4.5-year-old children with a history of institutional rearing had diagnosable psychiatric disorders (53%), whereas never-institutionalized children from the community were significantly less likely to have a disorder (22%). In addition, more than half of the children with a history of institutional rearing had two or more psychiatric diagnoses, whereas only 20% of the community children had multiple diagnoses.

Intervention Effects

To examine the effects of placement in foster care, we looked at prevalence of disorders in children in FCG versus those in CAUG. Children in foster care were significantly less likely to have a disorder (46%) than those who received care as usual (62%). Although there were no significant differences in externalizing disorders between the groups, there were clear group differences in internalizing disorders (22% in FCG versus 44% in CAUG). So, although the intervention reduced psychopathology, the differences between the groups were explained entirely by the differences in internalizing disorders.

Unfortunately, there are few comparable intervention studies that might help us understand this selective effect of foster placement on reducing internalizing but not externalizing disorders in preschool children. We identified one study of preschool children in foster care, however, that found that those who had been exposed to drugs prenatally and those who had lost multiple primary caregivers seemed to demonstrate consistently greater levels of aggression and had greater difficulties in developing trusting connections with their caregivers, even when intensive behavioral treatment was provided to foster parents (P. A. Fisher, Ellis, & Chamberlain, 1999). Obviously, many children in the BEIP likely had prenatal drug exposures, and all had multiple caregivers.

Moderators of the Intervention

Virtually all interventions are effective only for some participants who receive it, so an important question is: Who responds and who does not? We were interested in identifying moderators of the intervention (i.e., putative characteristics of participants that might affect the direction and/or strength of the relation between group status and various outcomes). Next we describe three moderators, gender, age at which the child was placed in foster care, and specific genes that may moderate the effects of early experience, as variables that we thought might help define who did and did not respond to the intervention with fewer signs of psychopathology.

Gender. At 54 months, boys in the FCG and CAUG were more symptomatic than girls in these groups, regardless of their caregiving environment. Moreover, unlike girls, boys had no reduction in total signs of psychiatric disorders following foster placement. These results were surprising because we had had found few differences based on gender.

We considered a number of possible explanations for this finding. First, boys are known to be more vulnerable biologically than girls; for example, the prevalence of pre- and perinatal complications tends to be higher in boys than in girls, and boys suffer from more neurodevelopmental disorders (e.g., autism) than girls (Volkmar, Lord, Klin, Schultz, & Cook, 2007). Boys are also less mature in early childhood, and therefore the abilities needed for adaptive behavior regulation may be underdeveloped, increasing their vulnerability in deprived environments. Indeed, this immaturity continues through the adolescent years, when boys' brain development tends to lag behind that of girls by 1 to 2 years. It is therefore notable that among the community children, boys also had more symptoms, more disorders, and more impairment than girls (Zeanah et al., 2009). This finding suggests that the institutional rearing environment may exacerbate a difference that is already evident.

It is also possible that caregivers "preferred" girls to boys. Hence, caregivers might have responded differently to externalizing behaviors in boys and girls. We explored

interactive differences of foster parents with boys and girls, but we could detect no differences in behaviors during unstructured activities based on gender. Nevertheless, boys may require different experiences with caregivers than girls to develop better emotion-regulation strategies.

Timing of Placement in Foster Care. A central theme in the BEIP has been our interest in whether timing of the foster placement was related to intervention effects. For IQ, EEG, security of attachment, and language skills, earlier placement was associated with more favorable outcomes. In the case of psychiatric symptoms, disorders, and impairment, there were no timing effects. So, getting into foster care mattered greatly for reductions in psychopathology, but whether it was at 7 months, when our youngest child was placed, or at 33 months, when our oldest child was placed, did not matter. There are a number of possible reasons for the lack of finding here. First, as mentioned earlier, the youngest infants in our study at the start of intervention were 6 months of age. The sensitive period for behavioral outcomes of internalizing and externalizing may be prior to that. Hence, because of the characteristics of our sample, we may have missed identifying this period. Second, the effects we identified may be a function of prenatal exposure to alcohol, stress or genetics of the biological family and less susceptible to intervention than other domains. As we show in the next section, individual differences in the child's genetic makeup may play a role in differential intervention outcomes.

Genetics. We wanted to explore whether individual differences in susceptibility as reflected in genetic polymorphisms might relate to variability in outcomes. For some time, the diathesis–stress model dominated formulations of understanding vulnerability. More recently, Belsky and colleagues (Belsky et al., 2007; Belsky & Pluess, 2009) have proposed a differential susceptibility model. In this model, specific polymorphisms confer a differential responsiveness to the environment instead of conferring risk or resilience per se. Responsivity alleles are hypothesized to enhance positive outcomes in what would be considered by most to be positive environments but also to amplify adverse outcomes in what most would be considered to be negative environments. In contrast, those individuals with the less responsive allelic variant are predicted to demonstrate much more limited variability in outcomes (i.e., exhibit less sensitivity).

To test for differential susceptibility, we decided to examine indiscriminate behavior, one of the most common social abnormalities reported in young children raised in institutions (Zeanah, 2000). Indiscriminate behavior also was not especially responsive to early foster care. We examined whether the interaction between functional polymorphisms in brain-derived neurotrophic factor (BDNF) and the serotonin transporter gene (5-HTT) interacted with group placement to predict indiscriminate behavior.

When we examined indiscriminate behavior as an outcome, we found cumulative differential susceptibility in children defined by the presence of plasticity alleles—the s/s genotype of the 5HTT and the met carriers of the val66met polymorphism of the BDNF gene. Specifically, CAUG children with the more responsive allelles had the highest levels of indiscriminate behavior whereas FCG children with the same allelles had the lowest levels of indiscriminate behavior. Children with the l/* allelles of 5-HTT and val/val allelles of BDNF had intermediate levels of indiscriminate behavior regardless of whether they were in the CAUG or the FCG. These findings are the first report of genetic associations for indiscriminate behavior and provide additional evidence for the differential susceptibility model for early development (see Bakersman-Kranenberg & van IJzendoorn, 2007; Belsky et al., 2007).

Mediator of the Intervention. An important issue in intervention studies in developmental psychopathology is identifying mediators, the methods through which outcomes are obtained. The question was whether we could identify a pathway through which foster placement in the first 30 months of life reduced internalizing symptomatology and disorders at 54 months.

We decided to examine security of attachment as a potential mediator of the intervention on internalizing and to test our attachment-informed foster care intervention to determine if it was involved in symptom reduction as we hoped.

We had already demonstrated that security of attachment was significantly more likely in the FCG versus the CAUG (Smyke et al., 2010). We next determined that security of attachment at 42 months predicted lower levels of internalizing symptoms and disorders at 54 months of age. When we tested whether security of attachment at 42 months mediated the relationship between foster placement and reduction in internalizing symptoms and disorders in girls, we found that it did. With security of attachment at 42 months included in the model, the direct pathway between group placement and internalizing disorders was no longer significant, meaning that there was a full mediation of the intervention effects on internalizing disorders in girls.

This clarified that boys did not show reductions in internalizing disorders at 54 months because they were

significantly less likely than girls to form secure attachments to their foster parents, at least at 42 months of age.

IMPLICATIONS OF THE BEIP FOR DEVELOPMENTAL PSYCHOPATHOLOGY

Cicchetti and Toth (2009) defined developmental psychopathology as an interdisciplinary scientific discipline that aims to elucidate the complex ongoing interplay of biological, psychological, and social/contextual aspects of typical and atypical development during the life course. Focusing on experience in the early years, the BEIP illustrates many of the major features of the conceptual model proposed by Cicchetti and Toth, including developmental process, adaptive and maladaptive trajectories, multiple levels of analysis, and prevention strategies. We consider selected aspects of the BEIP relevant to these core considerations of the discipline.

Developmental Process

Equifinality offers an explanatory mechanism for the observation that there may be multiple pathways for any given outcome (Cicchetti & Rogosch, 1996). For example, there are multiple paths to a diagnosis of ADHD. One may be heritability (one or both biological parents having this diagnosis). A second may be prenatal exposure to substances. A third may be the atypical experiences that young children have in conditions of extreme psychosocial neglect, such as institutions. All three pathways have a similar diagnostic outcome. As an example of an alternate pathway toward ADHD symptoms, we were able to demonstrate widespread cortical thinning in children raised in institutions (McLaughlin et al., 2013) similar to the cortical thinning that has been described in children attending clinics who have a diagnosis of ADHD. Further, we showed that cortical thinning in a priori selected key brain regions of children in the BEIP mediated the effects of institutional rearing on impulsivity and inattention as rated by teachers without specifying the genes involved. This finding provides evidence of equifinality in ADHD symptom outcome found in BEIP data. That is, ADHD symptoms may be a result of multiple different pathways or etiologies, including the experience of deprivation found in the BEIP.

Adaptive and Maladaptive Trajectories

Inherent in considering psychopathology from a developmental psychopathology perspective is to consider how pathology represents a disturbance, distortion, or deviation from typical development (Cicchetti & Toth, 2009). Thus, one must consider both typical and atypical experiences and how these may affect different domains of development.

An important contribution of the BEIP is to add to the growing literature that demonstrates that genetic predispositions neither increase nor decrease risk uniformly. We demonstrated that the same biological disposition may be more or less susceptible to environmental input. For example, based on previous findings and knowledge of neural circuitry, we examined genetic risk for indiscriminate behavior (Drury, Gleason, et al., 2012). We examined functional polymorphisms in BDNF and 5-HTT on levels of indiscriminate behavior over time. We found that at 54 months, children with either the s/s 5httlpr genotype or met66 BDNF allele carriers demonstrated the lowest levels of indiscriminate behavior if they were in the FCG but the highest levels of indiscriminate behavior if they were in the CAUG at 54 months.

In addition, we showed that the serotonin-transporter-linked polymorphic region (5-HTTPLR) exerted its effect on indiscriminate behavior earlier in development than the BDNF genotype. The difference may reflect developmental differences in the impact of these genes or differences in the mechanisms through which they influence indiscriminate behavior. Also of note, genetic sensitivity to change in the caregiving environment did not occur immediately. Instead, the reduction in indiscriminate behavior occurred over time as children's experiences accumulated in different caregiving environments.

Conceptualizing gene by environment interactions in terms of "differential susceptibility" (Belsky et al., 2007)—that is, considering genetic influences as fixed effects—this approach considers dispositions as neither "good" nor "bad" but rather as more or less responsive to environmental changes. That these biological characteristics may function as risk or protective factors is in keeping with established complexities of biological systems and is illustrative of the emphasis of developmental psychopathology on trajectories.

Multiple Levels of Analysis

A major contribution of the BEIP is its comprehensive focus on the effects of experience, in general, and of *sensitive periods of development*, in particular, on multiple domains of development. By systematically altering experience through an RCT design, we examined effects of early experience on a range of processes—from the molecular level, such as examining telomere length (Drury,

Theall, et al., 2012), to the level of endophenotypes, such as set shifting (Bos et al., 2009) and response monitoring (McDermott et al., 2012), to large-order constructs, such as attachment (Smyke et al., 2010) and psychiatric disorders (Zeanah et al., 2009). In addition to assessing intervention effects at multiple levels of analysis, we also have intentionally been mindful about including measures of brain structure (Sheridan et al., 2012) and brain functioning (Vanderwert et al., 2010) to enhance our understanding of the neural substrate of developmentally relevant processes. What we showed was that timing of intervention was especially relevant for some developmental domains, such as IQ, security of attachment, and language, but less so for other domains, such as executive functioning and psychopathology (Nelson, Fox, et al., 2014).

Prevention Strategies

There was no opportunity to attempt primary prevention because the children who participated in the BEIP already had experienced both prenatal and postnatal adversity. Rather, the BEIP was aimed at assessing recovery from early adversity and addressing questions of whether developmental trajectories can be altered and how timing of intervention effects outcomes.

Outcomes of the BEIP have implications for understanding the science of development as well as for social policies that address early childhood adversity.

CONCLUSIONS

The BEIP is the first RCT of a foster care intervention for infants and young children who have an early life history of institutionalization. In setting up this project, we intended to ask three questions about the effects of early experience on brain and behavioral development.

1. Are the effects of early psychosocial deprivation long lasting, or are they amenable to remediation?
2. Are there sensitive periods during which intervention is more successful than at other times?
3. Are there domains that appear unaffected (i.e., that have been spared) and others for which intervention does not work?

In order to answer these questions, we designed a study with random assignment, and we assessed multiple domains of functioning. We also assessed brain function and structure in addition to standard and experimental behavioral measures.

Unsurprisingly, we found that exposure to early psychosocial deprivation had profound consequences for children's cognitive and social behavior as well as for brain function and structure. Yet we did find that some domains were unresponsive to intervention, such as head circumference, externalizing behavior problems, and EFs assessed by the CANTAB. At least one domain seemed relatively unaffected by exposure to deprivation: face and face-emotion processing.

Perhaps the most surprising and novel finding from the study was that social and emotional functioning exhibited the greatest plasticity and was most responsive to intervention. Indeed, our data provide novel and unique information about the importance of the formation of attachment relationships and the power that secure attachment had for mediating outcomes as children got older. We found that some infants and young children exposed to institutional care, with its lack of consistent caregiving, showed absence or incompletely formed attachment behaviors. There have been case reports of young children in foster care who lack attachment (Heller et al., 2006), but it is not yet known how prevalent this may be in other high-risk samples, such as maltreated children. Even more remarkable, we found that these young children were able to form attachments, even secure attachments, especially if they were placed before 24 months into our foster care intervention. This finding illustrates the remarkable plasticity of the attachment system in the first years of life.

In addition to this plasticity, across multiple domains of social competence and psychopathology, we have found that developing a secure attachment once placed into the intervention was a powerful predictor of resilience in the face of adverse early experience. Hence, forming a secure attachment relationship, even after initial adverse experiences, had a significant effect in mediating outcomes.

The other area in which we have made significant discoveries is in the domain of brain function. From our initial observations of decreased alpha power in the EEG of the institutionalized children, we wondered what the origins of this finding were. Two findings inform our answer. First, we found that by 8 years of age, those children placed into our intervention before the age of 24 months were indistinguishable in terms of their EEG power from community controls. Thus, our intervention appeared to remediate this effect. The second finding that illuminated these patterns was when we conducted structural (MRI) imaging of the sample. We found that the children who were randomized to the institution had significantly less white matter volume compared to community controls. White matter volume fully mediated the relation between

institutionalization and EEG power. This finding provides a plausible mechanism of how early deprivation leads to reduced brain connectivity, which results in reduced brain electrical activity.

In closing, with its RCT design and measures of psychological, behavioral, neurological, and biological development, the BEIP is a unique project from which to draw conclusions about the effects of early experience on brain and behavioral development. To date we have studied our cohort from infancy through the transition to adolescence. We hope soon to conduct at least one more investigation as our sample reaches midadolescence and, if possible, as they make the transition to adulthood.

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CHAPTER 19

Preventing Sensitization and Kindling-like Progression in the Recurrent Mood Disorders

ROBERT M. POST

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INTRODUCTION

The high degree of illness progression in the recurrent affective disorders is generally underappreciated, particularly in bipolar disorder. We review evidence that recurrent depressive and bipolar illness tends to run a deteriorating course involving multiple mechanisms and facets of the illness. Thus, this view is high compatible with Cicchetti's (2010) developmental psychological perspective. This includes: increases in responsivity to stressors (stress sensitization); increases in vulnerability to relapse after successive episodes (episode sensitization); and increases in pathological behavioral responsivity to repeated bouts of substance abuse, particularly involving psychomotor stimulants (stimulant-induced behavioral sensitization) (Post, 1992, 2002a,b). Not only does each of these processes manifest an increase in behavioral pathology upon repetition, but the processes can show cross-sensitization to the others such that increased responsivity in one domain can convey increased responsivity in the other two domains as well (Post, Fleming, & Kapczinski, 2012; Post & Kalivas, 2013).

Some of the neurobiological mechanisms underlying behavioral sensitization are reviewed, including long-lasting alterations in gene expression based on epigenetic mechanisms. The illness also tends to run a kindling-like

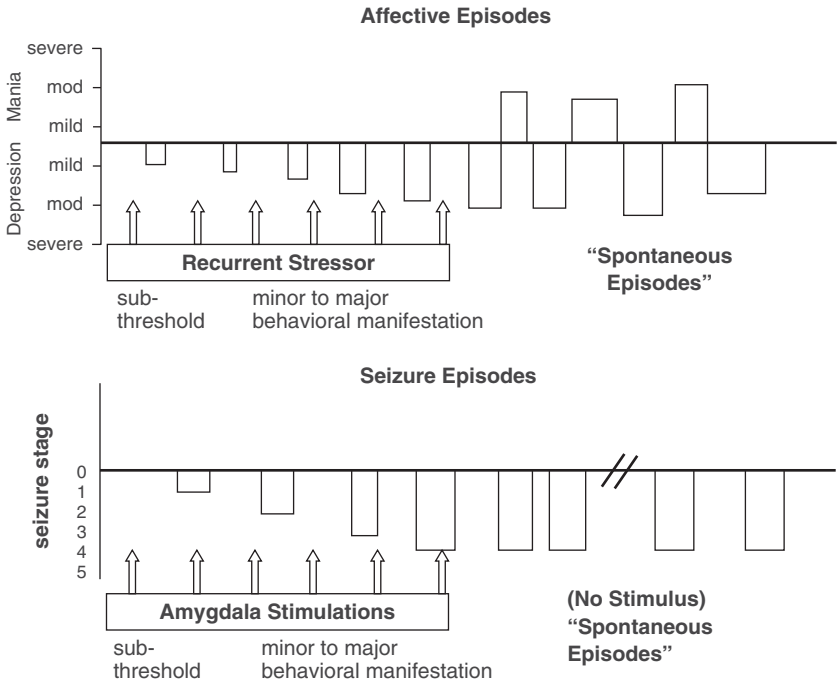


Figure 19.1 Parallelisms in Kindling of Seizures and Affective Episodes.

progression. In amygdala kindling, increasingly full-blown seizures are induced upon repetitive, once-daily stimulation of the amygdala. Following a sufficient number of triggered seizures, spontaneous seizures in the absence of exogenous amygdala stimulation begin to emerge (Goddard, McIntyre, & Leech, 1969; Racine, Steingart, & McIntyre, 1999). In a parallel fashion in the affective disorders, repeated stress-induced minor affective episodes can yield more major episodes upon stressor repetition (see Figure 19.1). Often there is a period of stressor-induced episode recurrence during which each episode tends to mirror that of the previous episode. However, with sufficient numbers of repetitions, episodes can also begin to emerge spontaneously in the absence of psychosocial precipitants (Post, 1992, 2002a,b).

These recurrences tend to be accompanied not only by increased autonomy from stressors but by an increase in the rapidity and unpredictability (chaos) of mood fluctuations and episode recurrence. This kind of temporal progression, from minor to major episodes, faster recurrences, and episodes that are initially precipitated by psychosocial stress to ones that also occur autonomously, bears considerable similarity to that occurring in the process of electrical kindling of the amygdala. However, the induced and then spontaneous behaviors of kindled seizures on one hand and of mood episodes on the other are obviously not behaviorally homologous, and the kindling model is useful only for conceptualizing the progressive temporal evolution of a syndrome upon repetition.

Yet some of the mechanisms underlying kindling evolution may have relevance for a similar spatiotemporal progression in the neural processes and substrates mediating the recurrent mood disorders. Given the potentially progressive and deteriorating course of inadequately treated unipolar and bipolar disorders, one would assume that there would be a variety of neurobiological alterations that correlate with either the number of prior episodes or duration of illness (Post, Fleming, & Kapczinski, 2012). We review the emerging evidence for these biological alterations in the hope that their consideration will further enhance the rationale for early intervention and long-term prophylaxis, to attempt to ameliorate both the clinical manifestations of recurrent illness and their neurobiological concomitants.

This view of the potentially deteriorating course of the recurrent affective disorders and some of the potential mechanisms should give a new impetus to clinical and public health measures aimed at prevention. (Cicchetti, 2010; Cicchetti & Toth, 2009). We discuss some of the sociopolitical issues involved in the reluctance and/or inability of medicine and psychiatry in the United States and elsewhere to adequately embrace these data and concepts and to change therapeutic strategies and paradigms accordingly.

One of the major difficulties has been in the recognition that bipolar disorder is an illness of childhood and adolescent onset, in the majority of instances (Perlis et al., 2004; Post, Leverich, et al., 2010), and all too often, inadequate treatment begins early in the illness (Geller, Tillman, Bolhofner, & Zimerman, 2010; Post & Kowatch, 2006) and, to some extent, continues throughout adulthood. This pattern has deleterious effects on the individual and society because multiple complications in the psychiatric and medical realm accumulate with the potential for enormous personal, social, and economic losses.

We also review evidence that many aspects of illness progression are more pernicious in the United States than in some European countries (Post et al., 2014a), and this view of the malignant progression of the illness in the United States compared with other locations further heightens the need to revise our typical treatment paradigms in the United States to attempt to intervene in a more judicious fashion.

TYPES OF SENSITIZATION MECHANISMS IN THE RECURRENT AFFECTIVE DISORDERS AND THEIR CROSS-REACTIVITY

Both clinical and basic studies reveal an increased responsivity to repetition of (a) stressors (Antelman, 1988); (b) stress-induced behavioral aberrations with depressive-like features (Miczek, 1999) and depressions themselves (Kessing, Mortensen, & Bolwig, 1998; Post, 1992); and (c) bouts of psychomotor stimulant administration (Post & Kalivas, 2013; Post, Weiss, & Pert, 1987). At the same time, there is considerable evidence for cross-sensitization among these three phenomena. Stressful life experiences can predispose to stimulant-induced behavioral sensitization, and the latter can be associated with increased stressor reactivity as well. In rodents, depressive-like behavior induced by repeated defeat stress can result in this depressed and anxious behavior generalizing to other environments as well leading to increases in drug self administration.

Clinical Evidence of Episode Sensitization

The general pattern of an acceleration of the rate of recurrence of episodes in bipolar disorder has been described since the initial observations of Kraeplin (1921) more than 100 years ago. Perhaps the most cogent evidence emanates from the work of Kessing and collaborators (1998) in the Danish case registry whereby they observed that the likelihood and the latency to relapse into another depression was directly proportional to the number of prior episodes/hospitalizations for either unipolar or bipolar depression. Kraeplin described this as a shortening of the well interval between successive episodes; others have labeled it as cycle acceleration or, in the absence of regular cyclicity, a pattern of faster recurrences. In some instances, this can progress from rapid cycling (four or more episodes per year) to ultra-rapid cycling (four or more episodes per month), and then to ultra-ultra-rapid (or ultradian) cycling in which dramatic mood shifts can occur within a 24-hour period with durations of manic and depressive phases lasting minutes to hours.

Although it is often cited that some 10% to 20% of individuals with bipolar illness have a rapid cycling pattern, more recently we have observed a very much higher proportion of 64.1% of 919 patients having rapid cycling (Kupka et al., 2005; Post, Altshuler, Kupka et al., 2014a) and approximately 20% even showing periods of ultradian cycling.

There are many potential explanations for this apparent general increase in rapidity of recurrence of the illness. One is that there appears to be evidence of a cohort (year of birth) effect, where each birth cohort since World War I has shown an increased incidence and earlier age of onset of both unipolar and bipolar disorder (Lange & McInnis, 2002). Early-onset disorder is associated with a more severe and rapidly cycling course of illness (Perlis et al., 2004, 2009; Post, Leverich, et al., 2010). In anticipation (a generational effect), if a parent had the onset of bipolar illness at age 25, and the child developed the illness, it would tend to occur at approximately age 15, or on average some 10 years earlier (Lange & McInnis, 2002). Faster patterns of illness recurrence and cycling, greater severity, and treatment resistance could likewise be associated with either the cohort or anticipation effects (Lange & McInnis, 2002).

It is important to note that the episode acceleration effect is the modal one and is not invariant in that with adequate treatment intervention, it can be halted or reversed. Moreover, some patients may from the outset begin their illness with a pattern of rapid or continuous cycling. Thus, the different patterns of course of illness are similar to that observed in multiple sclerosis, where some are benign, others recurrent and slowly progressive, and still others rapidly progressive. Although there is a subgroup of unipolar and bipolar patients with benign illnesses and rare recurrences, the majority of patients fit the category of recurrent progressive and show the pattern of episode sensitization.

Clinical Manifestations of Stress Sensitization

Kraepelin (1921) also noted that episodes early in the course of illness are often precipitated by psychosocial stressors, but episodes later in the course of illness could occur in both a precipitated fashion and also in the general absence of stressors or in the presence of minor, anticipated, or imagined stressors. Three studies in recurrent unipolar depression perhaps present the most specific and explicit data supporting this proposition. The studies found that following the first five to seven episodes of illness, in which stresses were often implicated in the onset of these depressions, subsequent episodes appeared to have less close links to psychosocial precipitants (Kendler, Thornton, & Gardner, 2000, 2001;Slavich, Monroe, & Gotlib, 2011). It is not that psychosocial stresses are no longer able to precipitate episodes; in fact, the opposite is the case: There is increased sensitivity to stressors to the point where minimal or conditioned stressors might be able to trigger these later episodes.

In the bipolar disorders, there appears to be not only stress sensitization but also stressor accumulation. We documented this in our series of patients in the Bipolar Collaborative Network, in that those with early psychosocial adversity in childhood subsequently had more negative stressors both prior to the onset of their first episode and prior to the last episode before Network entry, at average age 40 (Leverich, Perez, Luckenbaugh, & Post, 2002). Thus, early stresses predict a greater burden of later negative stressors in life. To the extent that there is also increased reactivity to these stressors (sensitization), one would expect more of both triggered and spontaneous episodes as the illness progresses.

Stimulant-Induced Behavioral Sensitization

In the preclinical model, animals given repeated similar doses of psychomotor stimulants show increased behavioral hyperactivity and stereotypy in response to readministration of the same dose of drug. There is also a context dependency or conditioned component to this sensitization, because animals show increased responsivity when the test dose of drug is administered in the same environmental context in which the animal previously received it, but not when the environmental context is changed (Post, Weiss, Pert, & Uhde, 1987; Post & Kalivas, 2013).

In this context-dependent behavioral sensitization, it appears that there are different biochemical and pharmacological mechanisms involved in the initial phases of the acquisition of the behavioral sensitization as opposed to when the already sensitized animal is later tested for the expression of sensitization. For example, antipsychotic drugs that block dopamine (DA) receptors are able to block the development of sensitization if they are delivered concomitantly with the initial doses of cocaine. Yet if the animals are sensitized to repeated cocaine administration and then given a DA blocker prior to the test injection, the expression of sensitization is not blocked (Weiss, Post, Pert, Woodward, & Murman, 1989).

Other drugs, including those that are alpha-2 agonists, such as clonidine, will, however, block the expression of sensitization. These observations are of some clinical importance in treating patients with comorbid substance abuse. Once an individual is sensitized to the effects of stimulants, different psychopharmacological agents (such as N-acetylcysteine [NAC] as discussed later) may be required to suppress the expression of this increased behavioral reactivity, as opposed to drugs (such as the antipsychotics) that can block only the acquisition of sensitization.

There appears to be cross-sensitization among stressors and stimulants, in that animals exposed to early stresses are more reactive to psychomotor stimulants (Post & Post, 2004) and more likely to adopt psychomotor stimulant self-administration. Conversely, once animals are sensitized to the effects of psychomotor stimulants, they appear to be more reactive to some stressors than animals not exposed to prior stimulant administration (see Figure 19.2).

With increasing numbers of repetitions of cocaine administration, animals appear to progress from predominantly hyperactivity to more frantic and disorganized stereotypic repetitive movements. This process may have clinical parallels. It is common experience for those who utilize stimulants to initially have euphoric and positive responses, with increased mood, energy, and social contacts, resembling euphoric hypomania. However, with longer-term administration, many of the positive elements of the cocaine experience become transmogrified.

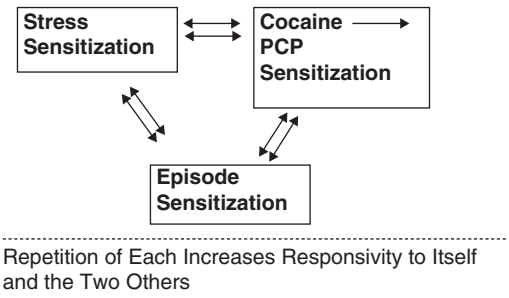


Figure 19.2 Cross-Sensitization among Stressors, Drugs of Abuse, and Episodes.

Instead of pure euphoria and pleasant physical sensations, there appear to be increasing amounts of dysphoria, anger, irritability, and anxiety, a syndrome closely resembling that of dysphoric hypomania. A history of drug abuse is a risk factor for developing dysphoric hypomania. Further in the evolution of stimulant use, there can be context-dependent paranoia and even the emergence of a paranoid psychosis, resembling many aspects of full-blown psychotic mania.

Thus, the progression of behavioral responsivity to cocaine appears to evolve over time and involve increasing amounts of dysphoria and disorganization. In the clinic, this sensitization effect cannot be separated readily from what is often a concomitant dose-escalation effect, but at least preclinically, it is clear that even administration of the same dose over time can lead to an altered pattern of behavioral reactivity. This progression to dysphoria and psychosis also appears to be the case with other psychomotor stimulants, such as amphetamine or methylphenidate, as well as with psychotomimetic drugs that block the glutamate receptor N-methyl-D-aspartate receptor (NMDA), such as phencyclidine (PCP), which can also produce dissociative symptoms and a schizophreniform psychosis.

Cocaine-Induced (Local Anesthetic) Kindling of Panic Attacks and Seizures

In electrophysiological kindling, the amygdala, for example, is stimulated electrically once daily for 1 second with a current that is initially subthreshold for afterdischarges or behavioral manifestations. However, with repeated stimulation, afterdischarges of increasing duration and complexity emerge and spread to other areas of brain, accompanied sequentially by altered behavioral responsivity starting with Stage 1, behavioral arrest and chewing movements, Stage 2, head nodding, Stage 3, unilateral minor motor seizures that then evolve into Stage 4, full-blown bilateral tonic-clonic seizures of the forepaws, and Stage 5 associated with a rat showing rearing and falling. As noted, following sufficient numbers of these induced seizures, spontaneous seizures can also begin to occur.

Cocaine is a potent local anesthetic in addition to its amphetamine-like properties as a psychomotor stimulant based on its ability to block the reuptake of DA. The local anesthetic effects of cocaine and lidocaine, dependent on blockade of sodium (Na+) channels, evoke increases in the reactivity of limbic areas of the brain, particularly the amygdala and anterior cingulate cortex, and doses of cocaine or lidocaine that were previously subconvulsive begin to produce increases in afterdischarges in the amygdala and, ultimately, full-blown behavioral convulsions resembling those of the electrical kindled variety.

Not only do animals become more seizure prone to the same dose of drug, but with repeated induction of lidocaine-induced seizures, spontaneous seizures also begin to emerge, similar to the progression seen with electrical kindling of the amygdala. In cocaine seizures, this transition to spontaneity is less likely to be observed, because both rodents and primates often succumb to the first or second cocaine-induced seizure and do not experience enough of the induced variety to ultimately show spontaneous seizures. We have dubbed these progressive effects of local anesthetics pharmacological kindling (Post, 2002b; Post et al., 1987).

What patients most readily do demonstrate with repeated use of cocaine is a kindling-like progression of panic attacks. Repeated bouts of cocaine use can be associated with progressive increases in anxiety, and eventually cocaine can begin to consistently precipitate full-blown panic attacks. Following a series of cocaine-induced panic attacks, the attacks can then begin to occur spontaneously, and this can be associated with considerable agoraphobia because they are occurring unpredictably (Post et al., 1987; Post & Leverich, 2008). In these individuals, spontaneous panic attacks can continue to occur even if cocaine use is stopped completely. Thus, it appears that the stimulant component of cocaine is associated with behavioral sensitization based on increases in motor reactivity to DA, while anxiety, panic attacks, and seizures appear to be progressively kindled by cocaine's local anesthetic properties with a major focus in the amygdala.

Adolescents with bipolar disorders are at approximately 7-fold increased risk, compared with adolescents in the general population, to develop substance abuse and addiction (Wilens et al., 2004). This occurs almost always after the onset of their bipolar illness. Therefore, engaging adolescents who have had an initial manic episode in educational and primary preventive approaches to attempt to avoid their beginning substance use would appear indicated. Considerable data suggest that those with substance abuse have a more difficult course of illness compared with bipolar patients without this comorbidity (Strakowski, DelBello, Fleck, & Arndt, 2000), which would certainly be in accord with the notion that substance use and mood episode can compound each other as well as generate more stressors which can then trigger further relapses of affective episodes and substance use (Post & Kalivas, 2013). Substance abuse sensitization, as we have indicated, thus appears to cross-sensitize to both stressors and episodes.

Patients with substance abuse are more likely to switch into mania on antidepressants (Goldberg & Whiteside, 2002), and episodes of affective illness can result in the relapse into substance use in those who had previously been abstinent (Kalivas & Volkow, 2005).

NEUROBIOLOGICAL COMMONALITIES IN STRESS, EPISODE, AND SUBSTANCE ABUSE SENSITIZATION

Stressors are able to decrease brain-derived neurotrophic factor (BDNF) in the hippocampus (Smith, Makino, Kvetnansky, & Post, 1995). Stressors occurring early in life are also capable of decreasing BDNF in the prefrontal cortex (PFC), and these BDNF reductions remain throughout an animal's lifetime (Roceri et al., 2004; Roth, Lubin, Funk, & Sweatt, 2009). Roth and collaborators (2009) have shown that poor maternal rearing behaviors during the first 10 days of a rat pup's life are associated with these persistent decrements in BDNF based on an epigenetic mechanism. The promoter for *Bdnf* is methylated following the early stressful life experiences, and this methylation results in lesser degrees of *Bdnf* transcription and lower amounts of BDNF protein in the brain. Roth and colleagues showed that if the methylation of the *Bdnf* promoter is prevented with a drug called zebularine, the decrements in cortical BDNF based on early life stresses do not occur. Preliminary data are analogous in humans. Adults with bipolar disorder who had early childhood experiences of abuse had lower levels of BDNF measured in blood compared with those without such early abuse histories (Kauer-Sant'Anna et al., 2007).

Episodes of both mania and depression are associated with decrements in BDNF in the blood in proportion to the severity of the episode (Post, 2007a). In this sense, BDNF appears to be a marker of episode severity, and it returns toward normal during well intervals. There is a useful animal model of depression in adult rodents subjected to repeated bouts of defeat stress. In these instances, rodents are repeatedly exposed to a home-cage mouse that is not only bigger than the intruder but aggressively defends its territory. If the intruder animal is left exposed to the resident, the intruder may be severely injured or even killed. Thus, after a short introduction to the resident animal, a glass partition is placed so that the intruder sees and smells the home-cage resident but is protected from attack.

The repeated experience of this anxiety-provoking situation for 10 days is associated with the emergence of depressive-like behaviors in the intruder that are manifested not only in this environment but in others as well (Miczek, 1999). This defeat stress is associated with decrements in BDNF in the hippocampus. If the BDNF decreases are prevented with treatment with antidepressants, the defeat stress depressive-like behaviors do not occur (Berton et al., 2006).

In addition to the hippocampal decrements in BDNF associated with repeated defeat stress, there are opposite changes or increases in BDNF in the ventral tegmental area and nucleus accumbens (NAc) (also called the ventral striatum), the dopaminergic reward area of brain. Here, too, if the BDNF increases are prevented, defeat stress behaviors do not emerge (Berton et al., 2006; Tsankova et al., 2006). Thus, the BDNF alterations—both the decrements in the hippocampus and the increases in the NAc—appear necessary and sufficient to produce the depressive behaviors.

These preclinical findings parallel those from autopsy specimens of depressed suicide victims who also show decrements in BDNF in the hippocampus and increases in BDNF in the nucleus accumbens compared with controls (Krishnan et al., 2007). In addition, there are similar dissociations in BDNF in animals given chronic cocaine. Cocaine sensitization is associated with increases in BDNF in the NAc; sensitization does not occur if the BDNF increases are prevented in that area of the brain. The stimulant-induced BDNF decreases in the hippocampus are dependent on the timing of withdrawal from cocaine.

Thus, it appears that stressors, cocaine, and defeat stress depressive-like behaviors are each associated with decrements in BDNF in the hippocampus and increases in BDNF in the NAc (Post and Kalivas, 2013). Given these common neurobiological mechanisms, one wonders whether these biochemical changes could in part contribute to the phenomenon of cross-sensitization among stressors, episodes, and substances of abuse. From a pathological perspective, such sensitization and cross-sensitization is likely to yield more problematic aspects of affective illness progression (see Figure 19.2).

THERAPEUTIC IMPLICATIONS

N-acetylcysteine: Efficacy in Multiple Syndromes

From a theoretical perspective, such common mechanisms such as BDNF alterations also raise the possibility that single treatments targeted at one type of sensitization may be of therapeutic utility in other domains as well. This theoretical possibility has not yet been demonstrated based on epigenetic mechanisms, but it has with another compound

that suppresses cue-induced increases in glutamate in the NAc. N-acetylcysteine (NAC) is a substance that has an interesting spectrum of therapeutic effects in mood, substance abuse disorders, and other habits (Berk, Malhi, Gray, & Dean, 2013; Post & Kalivas, 2013). Kalivas (2013), at the Medical College of University of South Carolina, found that animals that were taught to self-administer cocaine were highly prone to relapse into cocaine use (called cocaine reinstatement) upon exposure to stressors, minute doses of the drug, or environmental cues signaling the potential availability of cocaine. These types of triggers for relapse also occur clinically in patients who believe that their cocaine craving and proneness to re-addiction have been extinguished.

This cocaine reinstatement in rodents was associated with high levels of glutamate in the NAc upon presentation of the cocaine cue or stressor. Kalivas (2013) reasoned that if the conditioned glutamate spike could be lessened, animals would be less prone to cocaine reinstatement. This is, in fact, what he found, and these preclinical data were rapidly taken to the clinic by Kalivas and collaborators where it was demonstrated that human cocaine abusers had decreased cocaine craving when they were administered NAC. The animal data indicate that NAC downregulated a hyperreactive glutamate signal in the nucleus accumbens at first thought to be related to effects on a cystine-glutamate exchange mechanism but now thought to be attributable to the induction of glutamate transporters in glial cells, which increase the clearance of synaptic glutamate.

As indicated in Table 19.1, NAC exerts a remarkably broad therapeutic spectrum of effects in a variety of syndromes that might be characterized by overactivity or overreactivity in the habit memory system (see Table 19.2). The range of therapeutic effects of NAC include placebo-controlled positive data in bipolar and unipolar disorder: cocaine and gambling addiction; obsessive-compulsive disorder; trichotillomania; and the stereotypy and irritability of autism in 8- to 17-year-old children. In addition, preliminary evidence suggests that it may have therapeutic effects in alcohol and marijuana avoidance as well.

What is particularly notable is that Berk and collaborators (2008) showed that after a period of 3 months compared with placebo, NAC exerted dramatic antidepressant effects in bipolar depression, and these were sustained for another 3 months until the drug was discontinued at 6 months. Berk and collaborators were using NAC based on its antioxidant properties as a glutathione precursor. However, it remains to be ascertained whether NAC's effect on decreasing conditioned glutamate hypersecretion

TABLE 19.1 N-acetylcysteine (NAC) Dampens Conditioned (Cued) Glutamate Release in the Nucleus Accumbens: Is this a Common Mechanism for Suppressing Habit-Based Psychopathologies?

NAC is reported effective in placebo controlled studies in I to VIII

I. DRUG ADDICTION
Cocaine (LaRowe et al., 2006; Amen et al., 2011)
Heroin (preclinical models only)
Marijuana (Gray et al., 2012)
Methamphetamine (Grant et al., 2010)
Nicotine (Knackstedt et al., 2009)

II. GAMBLING ADDICTION
(Grant et al., 2007)

III. TRICHOTILLOMANIA
(Grant et al., 2009)

IV. OBSESSIVE COMPULSIVE DISORDER (as an adjunct to serotonin selective reuptake inhibitors; LaFleur et al., 2006)

V. STEREOTYPY AND IRRITABILITY IN AUTISM
(Hardon et al., 2012; Nikoo et al., 2015; Ghanizadeh & Moghimi-Sarani, 2013)

VI. BIPOLAR DEPRESSION
(Berk et al., 2008a)

VII. UNIPOLAR DEPRESSION
(Berk et al., personal communication)

VIII. NEGATIVE SYMPTOMS IN SCHIZOPHRENIA
(Berk et al., 2008b)

TABLE 19.2 Common Effects of Stress-, Episode-, and Cocaine-Induced Sensitization on BDNF in Brain Systems Mediating Habit and Representational Memory

Type of Memory:	Habit Memory	Representational Memory
Substrate	Striatum	Medial Temporal Lobe
Components	**1.** Dorsal striatum **2.** Ventral striatum (i.e., nucleus accumbens, NAc)	**1.** Hippocampus **2.** Amygdala
Process	Repetition and procedural learning	Declarative memory and single-trial learning
Awareness	Unconscious	Conscious
BDNF	Increased in: nucleus accumbens with defeat stress, human depression (suicide), and cocaine sensitization	Decreased in: hippocampus with defeat stress, human depression (suicide), and cocaine sensitization
Consequences	Repetition of stress, depression, and cocaine may result in overlearned habits	Hippocampal dysfunction may induce biased retrieval of long-term memories and disinhibit the ventral tegmental area pathway to nucleus accumbens, increasing burst firing of ventral tegmental area, increasing BDNF, depression, and cocaine sensitization

in the NAc is the basis for its effects, not only in a variety of habits and addictions but also in recurrent affective disorders.

We had previously postulated that because bipolar recurrences move from those that are generally precipitated by psychosocial stresses to those occurring more autonomously, the memory mechanisms involved likely moved from the conscious representational memory system mediated by the amygdala and hippocampus to the more unconscious habit memory system mediated by the striatum (Mishkin & Appenzeller, 1987; Post, 2002a). Thus, the more autonomous or automatic occurrence of manic and depressive episodes later in the course of the illness may be encoded at an unconscious level in the dorsal and ventral striatum (nucleus accumbens), most closely linked to the mood, motivation, activity, and reward system of this dopamine-rich area. Dias-Ferreira et al. (2009) show in animals that "chronic stress leads to a bias in behavioral strategies toward habit" based memory mechanism.

In trichotillomania and completion of other compulsive acts, there is temporary relief of anxiety following the execution of the habit. The cue for initiating these actions may be like the conditioned cue seen in the cocaine habit reinstatement paradigm and may be associated with a markedly increased release of glutamate in the NAc. Hence, following chronic administration of NAC, NAC downregulates the increased glutamate reactivity (Kalivas et al., 2003).

Such a dampening of overreactivity of glutamate in the NAc could theoretically also be involved in the inhibition of the automatic triggering of mood episodes seen in the late stages of the recurrent affective disorders. This mechanism would also be consistent with the preliminary data that the glutamate NMDA receptor blocker memantine (Namenda) is able to induce a high rate of response and remission in those with highly treatment refractory bipolar disorder (Koukopoulos, Serra, Koukopoulos, Reginaldi, & Serra, 2012).

Although this formulation remains to be directly tested, the therapeutic effectiveness of NAC in a variety of syndromes thought to be based on altered reactivity in the habit/reward system of the NAc provides preliminary evidence that a single therapeutic modality holds the promise of being able to exert therapeutic effects across a variety of paradigms associated with habits and sensitization to stressors, mood episodes, and abused substances and their potential for cross-sensitization (Post & Kalivas, 2013). That is, we are postulating that NAC can dampen sensitization to stress, episodes, and cocaine, although such an effect has been unequivocally demonstrated only in the paradigm of substance abuse addiction.

Consistent with this formulation, Kalivas and colleagues (2003) have also found that enhancing glutamate removal and reuptake via glial transporter mechanisms can also decrease cocaine reinstatement, using an antibiotic known to enhance the effectiveness of the glial glutamate transporter. Glial deficits have also been documented in the recurrent mood disorders (Rajkowska, Selemon, & Goldman-Rakic, 1998), and enhancement of glial activity and glutamate clearance could have therapeutic effects in the affective disorder spectrum as well.

NAC is a glutathione precursor with antioxidant properties on its own. The anterior cingulate gyrus, which is another key cortical structure for the modulation of emotional function, is particularly sensitive to oxidative stress during selected periods of development (Berk et al., 2013). Fast firing interneurons containing the inhibitory neurotransmitter GABA and parvalbumin are critical to neuronal modulation and are especially sensitive to oxidative stress. NAC treatment reverses the oxidative stress in these interneurons and preserves their normal function. A variety of childhood stressors are known to disrupt anterior cingulate function; thus, a protective effect of NAC on these sensitive interneurons could be an additional potential mechanism for its therapeutic effects in bipolar disorder and schizophrenia.

Epigenetic Manipulations: A Future Treatment Direction

Finally, based on the NAC data, it is possible to also envision manipulations at the level of epigenetics that might be capable of downregulating an overactive habit system and thus provide clinical improvement across a variety of syndromes linked to the sensitization phenomenon. In this regard, it is of interest that in the repeated exposure to the defeat stress model for the induction of depressive-like behaviors, epigenetic manipulations that prevent BDNF decreases in the hippocampus or increases in BDNF in the nucleus accumbens are sufficient to block the emergence of the depressive-like behaviors.

Antidepressants, which increase BDNF in the hippocampus, also prevent the emergence of depressive behavior, but they do not reverse or remove the defeat stress–induced epigenetic mark, in this case a repressive trimethylation of the DNA of the promotor of the *Bdnf* gene, which is the fundamental mechanism for the long-lasting BDNF decreases (Krishnan et al., 2007). Thus, while the antidepressants increase BDNF by other mechanisms, they are not sufficient to remove the long-term memory trace of the defeat stress behavior encoded at the level of epigenetic changes in DNA. This trimethylation

could be part of the long-term behavioral and biochemical trace that confers long-lasting vulnerability to depressive recurrences, as evidenced by a vulnerability to relapse when antidepressants are discontinued, either clinically in humans or in animal models of depression. Similarly, early life stressors, likely on an epigenetic basis (Roth et al., 2009), can lead to lifelong vulnerability to stressor-induced depressions in adulthood in genetically susceptible individuals (Caspi et al., 2003).

To the extent that this formulation is accurate, it suggests the optimistic possibility that epigenetic manipulations that would remove the environmentally-induced epigenetic marks on DNA and histones might exert more long-lasting therapeutic effects, even after the treatment is discontinued. One then looks forward to the next generation of therapeutic maneuvers that could prevent or reverse the long-lasting sensitization encoded epigenetically, as has already been demonstrated in animal models involving cocaine sensitization (Anier, Malinovskaja, Aonurm-Helm, Zharkovsky, & Kalda, 2010) and stress sensitization in the work of Roth and colleagues (2009).

Exploiting Memory Revision During the Reconsolidation Window in Order to More Permanently Extinguish Habit-Based Memories

In short-term memory, the memory trace in the hippocampus under goes consolidation as it is shifted to cortical locations for long-term storage. If protein synthesis is disrupted in this consolidation phase, what is learned is not placed in permanent memory storage. Recent data now suggest that there is a second phase—memory reconsolidation—during which an actively recalled long-term memory becomes transiently labile (for 5 minutes to 1 hour) and subject to revision or even erasure with protein synthesis inhibitors. Because such memory erasure achieved in animal models is not clinically feasible in humans, neuropsychological approaches have been explored to intervene in the reconsolidation window in order to enhance new learning and extinction effects. The feasibility of this approach has been demonstrated in patients with anxiety disorders, posttraumatic stress disorder, and even substance abuse involving cocaine or heroin (Xue et al., 2012).

When animals or humans addicted to cocaine (or heroin) are repeatedly exposed to addiction-related cues in the absence of drug reward, extinction takes place, and bar pressing for the drug in rodents or cued craving for the drug in humans ceases (Kalivas & Volkow, 2005). However, this extinction of craving in one environment or in the clinical laboratory is subject to spontaneous and stressor-induced relapse as well as cued relapse in other environments. This finding indicates that the extinction learning is not completely effective in removing the original habit-based memory trace.

In conditioned avoidance paradigms and in instances of substance self-administration, active recall of the long-term memory of the shock stress or drug reward (induced by exposure to the cued environment) followed by the extinction trials is associated with a more persistent and long-lasting memory erasure. It is thought that the cued environment renews and activates the memory trace which then opens a reconsolidation window that lasts from 5 minutes to 1 hour during which the long term memory becomes labile and subject to permanent revision. The extinction training occurring during this reconsolidation window is much more robust and long lasting than extinction trials occurring outside of the reconsolidation window.

This extinction of the memory of drug reward has now been demonstrated in animals addicted to cocaine and heroin self-administration addiction, whereby the reexposure and opening of the reconsolidation window results in a more effective and persistent extinction process (Xue et al., 2012). What is remarkable about this extinction process is that when animals are transferred to other environments or experience cues that would normally elicit cocaine reinstatement, such as stressors or a whiff of the drug itself, they do not reinstate cocaine self-administration. These preclinical data have been directly applied to cocaine- and heroin-addicted humans with similar and remarkably robust findings of long-lasting (up to 180 days) complete extinction of drug craving, blood pressure increases, and drug use when the extinction trials occurred 10 minutes after active memory recall of the positive drug experience, i.e., within the reconsolidation window, but not after the window had closed 6 hours after recall (Xue et al., 2012).

We raise this issue in some detail in a chapter on bipolar disorder because substance abuse comorbidity is a common occurrence in the disorder. It addition, it is possible that such extinction learning could exert positive, long-lasting therapeutic effects in the triggering of habit-based depressive-episode relapses in the affective disorders. Although the appropriate therapeutic paradigms have not been adequately spelled out or even preliminarily tested, the idea would be to have the patient recall with a written script typical stress-related cues that might ordinarily be triggers for affective episodes and thereby open the reconsolidation window. Within this 1-hour time

frame, the patient could then work in cognitive-behavioral therapy aimed at extinction of the emotional hyperreactivity to these individualized cues. Parenthetically, such paradigms are already being considered in the treatment of posttraumatic stress disorder, in which reactivity to conscious and unconscious cues may be sufficient to trigger memory replays, flashbacks, and nightmares. These reactions can be ameliorated by reworking the traumatic memory after opening the reconsolidation window.

The neural substrates of this type of reversal of conditioned fear have been demonstrated in humans using functional magnetic resonance imaging (Agren et al., 2012). On day 1, subjects are exposed to 16 trials of presentation of a visual cue followed by a shock. On day 2, subjects receive extinction training (5 visual cues with no shocks) either 10 minutes or 6 hours after the cue-reminded recall. Upon cue presentation on day 3, the functional magnetic resonance imaging shows striking activation of the amygdala and connectivity to activity to the anterior cingulate and bilateral insula and hippocampus (the fear circuit) only in the 6-hour extinction group, whose members on day 5 continue to show robust retention of conditioned fear, as evidenced by increases in skin conductance. In contrast, members of the 10-minute group (who received extinction within the reconsolidation window) show erasure of the fear memory trace as evidenced by the findings that the amygdala and its connectivity to the fear circuit is no longer activated in response to the fear cure, and on day 5, there is no conditioned fear or increase in skin conductance.

MODULATION OF SENSITIZATION MECHANISMS

Sensitization to stressors, mood episodes, and substances of abuse thus have the problematic clinical implications that they likely both mediate and exacerbate illness progression by multiple interacting mechanisms. At the same time, their cross-sensitization effects suggest the possibility that single types of pharmacological treatments (such as NAC) or neuropsychological maneuvers (such as memory revision in the reconsolidation window) may be capable of exerting therapeutic effects on several types of sensitization based on their common principles of induction. However, the primary therapeutic message of this view of the progressive nature of recurrent mood disorders is clearly to attempt to avoid or minimize each type of sensitization in the first place to the extent that it is clinically possible.

Preventing Episode Accumulation

Preventing episode accumulation becomes a readily achievable therapeutic target because episode prevention is clearly the long-term goal of both the patient and the clinician. In addition, the earlier institution of long-term prophylactic medications to prevent recurrent episodes, and the accompanying episode sensitization may yield a more treatment-responsive illness (Post & Leverich, 2008; Post, Leverich, et al., 2012). Later intervention after multiple episodes have already occurred yields a more treatment-refractory illness, typically requiring more complicated treatment regimens to achieve successful therapeutic results (Post, Fleming, & Kapczinski, 2012; Post, Leverich, et al., 2010).

Modulation of Stressors

Similarly, stresses cannot readily be avoided in life, but stress immunization and working on coping mechanisms can have a remarkable effect in ameliorating stressors. This finding has been demonstrated most readily in the area of conditioned or learned helplessness. If an animal is exposed to inescapable shock in an unpredictable fashion but is able to cope by pressing a lever that turns the shock off, it does not develop the helpless-related, depressive-like behavior or the associated biochemical perturbations. In contrast, the yoked control animal that receives the same electrical stimuli but does not have control over them because it does not have access to a bar to terminate the stimulation does develop the depressive-like behaviors of learned helplessness (Amat, Paul, Watkins, & Maier, 2008).

It appears important for the animal to know that it can cope and can press the bar to terminate the shock. These observations are based on the findings that if the medial PFC of the animal that does press a bar to turn off the shock is anesthetized, the animal apparently is not consciously aware that it is achieving this endpoint, and it too develops learned helplessness (Amat et al., 2008).

Thus, the ability to cope with stress and the knowledge that one can cope may be of special clinical importance in reducing the effects of stress-induced behavioral aberrations. The preclinical findings are also of particular interest in regard to the finding that many depressed patients have deficits in the activity of their PFC during depressive episodes and may be at a further loss to evoke or formulate adequate coping strategies or even to know that they are able to develop such coping strategies. Therapists may thus have to play an active role in providing depressed patients a more flexible and active substitute PFC until the depression is ameliorated.

Avoiding or Treating Substance Abuse Disorders

In the third domain of substance abuse sensitization, it is obvious that substance abuse avoidance should be another major goal of patients with mood disorders, one that is all too often not achieved. Yet as we have attempted to illustrate, even in individuals with a more malignant progression of their mood disorder based on multiple recurrences of episodes, clinical and psychopharmacological interventions are possible. Similarly, an array of effective interventions exists even for those who have already become substance users. However, the neuropsychological mechanisms and neurobiological substrates of the addictions, as well as their pharmacological interventions appear to differ as a function of phase of sensitization development, expression, persistence, and reconsolidation. Typically, effective intervention late in the course of addictive illness and its progression is more complex and difficult to achieve than intervention earlier in the course.

Even though there are currently no pharmacological treatments approved by the Food and Drug Administration (FDA) to intervene in alcohol, marijuana, or cocaine addiction that occurs in concert with bipolar disorder, a number of positive placebo-controlled studies have shown efficacy in patients with primary addiction. Possible interventions for cocaine addiction, for example, include the antinarcoleptic drug modafinil (Provigil), the anticonvulsant topiramate (Topamax), and, as noted, NAC. Each of these would appear more preferable in patients with mood disorders than the $GABA_B$ agonist baclofen, which also has positive placebo-controlled data in primary cocaine abuse disorders, but earlier work from our group has indicated that baclofen can exacerbate depressive phases of the illness (Post et al., 1998).

LESSONS FROM THE NEUROBIOLOGICAL MECHANISMS INVOLVED IN KINDLING PROGRESSION

Initially, repeated 1-second stimulation of the amygdala on a once-daily basis does not have much behavioral or electrophysiological effect. However, the threshold for afterdischarges decreases with repeated stimulation, and afterdischarges begin in the amygdala and spread to the hippocampus and cortex, first unilaterally and then bilaterally as seizures evolve from unilateral then bilateral. The kindling paradigm shows robustly that there is a spatiotemporal extension of the kindled memory trace as the seizures evolve and generalize.

Different Anatomical Substrates Involved

Initially, the proto-oncogene or immediate early gene c-Fos (a marker for cell activation and gene expression) and some of its downstream effects, including the induction of thyrotropin-releasing hormone, are involved in a unilateral fashion in the area around the amygdala and hippocampus on the side of the stimulation (Clark, Massenbury, Weiss, & Post, 1994). However, as the hippocampus is involved bilaterally, the seizures develop bilaterally, and then, increasingly, cortical areas are also activated. Intriguingly, when spontaneous seizures are observed, the usual afterdischarges seen during stimulated-induced amygdala-kindled seizures no longer occur in the amygdala, suggesting that the spontaneous seizure is generated elsewhere in the brain.

This spatiotemporal evolution in the neural substrates altered by the kindling process is paralleled by differences in pharmacological responsivity (see Table 19.3). The initial or development stage of kindling prior to a full-blown seizure is not blocked by many anticonvulsants, such as carbamazepine or lamotrigine, which do inhibit the midphase or expression of fully kindled seizures, while other drugs show the opposite pattern. In a double dissociation, diazepam blocks the early development and midphase seizures but not the spontaneous ones, while phenytoin

TABLE 19.3 Differential Pharmacology as a Function of the Stage of Amygdala-Kindled Seizure Evolution

Stage/Phase (Timing)	a. Development (Early)	b. Completed (Mid)	c. Spontaneous (Late)
Stimulation Duration	1 second	1 second	None—nontriggered
Afterdischarges & Anatomy	Local in amygdala and Hippocampus	Spread to cortex	Suppressed in amygdala
Behavioral Seizure	No response; then behavioral arrest; then unilateral and finally bilateral seizures	Bilateral, full-blown seizures with rearing and falling	Bilateral, full-blown seizures with rearing and falling
Pharmacological Efficacy:			
Valproate	+++	+++	
Levetiracetam	+++	+++	
Diazepam	+++	+++	0
Phenytoin	0	±	+++
Carbamazepine	0	+++	
Lamotrigine	0	+++	
MK801	+++	0	
Clonidine	+++	0	
Atropine	+++	0	

Legend: +++ = effective; ± = equivocal; 0 = not effective.

shows the opposite pattern. Phenytoin is not effective on the fully developed stimulation-induced seizures but does inhibit the late-stage spontaneous ones (Pinel, 1983). These data indicate that the pharmacology of kindled seizure prevention, as well as the biochemistry just noted, differ as functions of the early, middle, and late stages of development of kindled seizures.

Very different neural substrates are likely involved in the expression of seizures that last seconds to minutes in the rodent compared to mood episodes that last weeks to months in humans with affective disorders. Moreover, motor seizures are obviously not a routine concomitant of mood disorders. However, to the extent that there is a progression of behavioral phenomena from triggered mood episodes to those that emerge spontaneously similar to that seen in amygdala-kindled seizure episodes, there may be some parallelism in the increased spatiotemporal spread of the underlying neurobiological alterations. In both instances, there may be increasing spread throughout the limbic system, involvement of the habit memory system of the striatum, and then into widespread areas of the cerebral cortex. Similarly, as mood episodes begin to emerge spontaneously, there may be a further migration of the memory trace and neurobiological substrates from those involved in triggered mood episodes to elsewhere in the brain, as seen in the kindled seizure model.

TABLE 19.4 Does Drug Effectiveness Vary as a Function of Stage of Bipolar Illness Evolution?

Stage	I. Initial Development	II. Mid-Completed	III. Late Spontaneous
Bipolar Mood Episodes Triggers	Minor to Major Episodes of Depression (Bipolar Disorder Not Otherwise Specified) Triggered by Stressors	Recurrence of Full-Blown Depressive (or Manic) Episodes Triggered by Stressors	Ultra-Rapid and Ultradian Cycling of Mania and Depression Independent of Obvious Stressors
Pharmacological Responsiveness[1]			
Antidepressants	++	+/−	− −
Lithium	+/−	+++	+
Carbamazepine	?	+++	+
Valproate	?	+++	+
Lamotrigine	?	++	+
Antipsychotics	?	+++	+
Nimodipine	?	+	(++)
Benzodiazepines	+	+	−

[1]Preliminary and provisional categorization of the degree of drug effectiveness in each stage.
Legend: +++ very effective; ++ moderately effective; + fairly effective; ± equivocal; ( ) with reservations; ? questionable; —worse; — −−much worse.

Different Pharmacology as a Function of Stage of Bipolar Illness Development?

If the neural substrates progressively evolve, one might expect that different pharmacological treatments would be effective in the initial (developmental), mid (intermediate), and late (spontaneous) phases of affective episode development and progression. A modicum of data support this proposition (Post, 2002b, 2008a), but the postulate requires further study (see Table 19.4). Nonetheless, the data offer a cautionary message that the different phases in the evolution and progression of mood episodes may require distinctly different therapeutic strategies.

For example, lithium is most effective in nonrapid cycling or midphases of illness evolution but is less effective in the late phases associated with ultra-rapid and ultradian cycling, and its ability to block the initial development of the illness is not known (Post & Leverich, 2008). Although much less well studied, nimodipine, in contrast, appears highly effective in the late, ultra-rapidly cycling phases of illness.

Interestingly, kindled seizure progression also appears to depend on BDNF alterations. If the BDNF receptor Trk B is inhibited or knocked out with molecular genetic manipulations, kindled seizure evolution does not occur (He et al., 2004). Thus, BDNF is involved in the kindled memory trace as well as in the defeat stress and cocaine sensitization memory trace in the nucleus accumbens. Not only are there decreases in BDNF with stresses in each episode of affective disorder (both depressions and manias in proportion to their severity), but there appear to be other, more active types of learning in the acquisition of repeated defeat stress–induced depressive-like behaviors. To the extent there are increasing widespread changes in gene transcription throughout the brain and increases in epigenetic alterations based on repeated environmental experiences, one can begin to view the recurrent affective disorders as progressive not only in their clinical manifestations but also in their underlying neurobiological substrates.

If sensitization to stressors, episodes, and abused substances involves epigenetic processes that convey the long-term memory traces involved, one would postulate that there would be an accumulation of epigenetic marks on the DNA and the histones around which DNA is wrapped in those with more complicated mood disorder progression. Preliminary investigations of this

possibility suggest this is in fact the case (Labonte et al., 2013; Rao, Keleshian, Klein, & Rapoport, 2012; Xin et al., 2012).

Early Treatment is More Effective than Later

The evolution and progression of the kindling paradigm also has other important implications for treatment timing. Early intervention in stopping the first few full-blown completed or midphase seizures is easier to achieve and sustain than waiting until many seizures have occurred. The number of prior mood episodes is also a risk factor for treatment nonresponse clinically (Post, 2007a; 2008).

Tolerance Can Develop to Repeated Treatment

Loss of drug effectiveness via a pharmacodynamic tolerance mechanism is readily demonstrated when some drugs are given repeated prior to kindled seizures. Tolerance develops more easily after many seizures have occurred (Post & Weiss, 2011; Weiss, Clark, Rosen, Smith, & Post, 1995). The kindled seizure model suggests many principles and manipulations that either slow or reverse tolerance to the anticonvulsant effects of drugs in kindling. These possibilities could be tested for their applicability and utility not only in epilepsy but also in the affective disorders. These manipulations could include treating earlier, with higher doses, and using combinations of drugs with different mechanisms of action that do not show cross-tolerance.

Cyclicity of Episode Recurrence May Be Driven at the Level of Gene Expression

Finally, the kindling model suggests new mechanisms for the development of cyclic emergence and suppression of seizure episodes based on changes in the ratio of pathological to adaptive alterations in episode-driven gene expression. In kindling, some neurobiological alterations are part of the primary pathological processes driving seizure progression (the bad guys), while other neurobiological alterations are seizure-induced compensatory adaptations, such as increases in endogenous anticonvulsant substances (the good guys), which include increased gene expression for inhibitory GABA and benzodiazepine receptors and anticonvulsant neuropeptides, such as thyrotropin-releasing hormone (Post, 2007a, 2008a; Post & Leverich, 2008; Weiss et al., 1995). When the ratio of pathological to adaptive alterations favors the primary pathological processes (i.e. the bad guys), seizures occur (see Figure 19.3). Conversely, when the endogenous compensatory adaptive mechanisms, (i.e., the good guys), are supplemented by the effects of exogenously administered anticonvulsant drugs, seizures are suppressed.

Such a changing and evolving ratio of pathological to adaptive alterations in gene expression may similarly be driving cyclicity in the recurrent affective disorders (Post, 2007a; 2008b). For example, increases in corticotropin-releasing hormone leading to cortisol hypersecretion may be part of the pathological processes (one of many

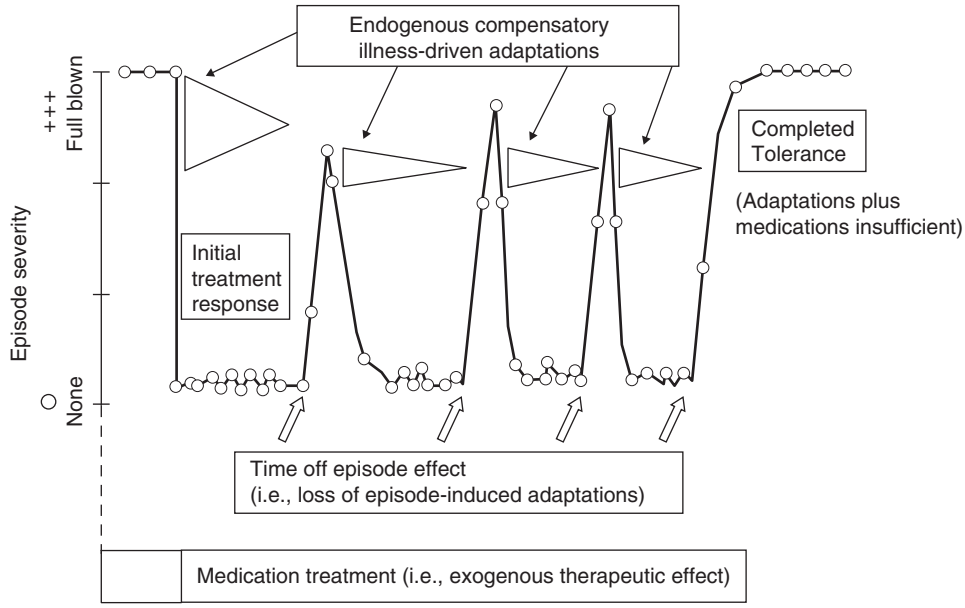


Figure 19.3 Postulate: The ratio of pathological versus adaptive changes accounts for cyclic emerge of episodes and tolerance development.

bad guys), while the increases in thyrotropin-releasing hormone during a depression may represent compensatory adaptations and attempts at increasing endogenous antidepressant mechanisms. Given this conceptual view, our job as clinicians is to prevent the sensitization of the pathological processes and treat them once an episode does emerge to add exogenous antidepressant and mood stabilizing mechanisms to the existing endogenous ones so that the ratio again favors the positive adaptations (i.e., the good guys predominate at least temporarily) and episodes are suppressed. As the multiple pathological processes sensitize and progress with the accumulation of stressors, episodes, and substance use, it may take increasingly vigorous therapeutic manipulations and multiple drug combinations to keep the ratio of pathological to adaptive factors persistently favoring the latter (good guys) to achieve effective long-term prophylaxis. The progressively diminishing ratio of adaptive to pathological changes in gene expression (based to a large extent on environmentally induced epigenetic changes) can be considered analogous to the progressive accumulation of somatic mutations mediating the loss of tumor suppressor factors and enhancing proliferative factors in the evolution of malignancies, such as colon cancer (Vogelstein et al., 2013). However, in the affective disorders, the accumulation would not be of somatic mutations in the tumor but of long-term yet potentially reversible epigenetic changes (epimutations) in the brain. Preliminary evidence supports this view of an increased number of epigenetic pockmarks in those with affective disorders complicated by stressors and early life adversity (D'Addario et al., 2012; Labonte et al., 2013; Mehta et al., 2013; Xin et al., 2012).

NEUROBIOLOGICAL CORRELATES OF ILLNESS PROGRESSION IN THE RECURRENT AFFECTIVE DISORDERS

If there are sensitization mechanisms that increase with illness progression, there should be direct or indirect evidence of them in the neurobiology of the illness. As illustrated in Table 19.5, a variety of neurobiological alterations appear to occur in proportion to surrogate markers of illness progression (i.e., the number of prior episodes or the duration of illness in unipolar and bipolar disorders) (Post, Fleming, & Kapczinski, 2012). These neurobiological abnormalities involve evidence of prefrontal cortical decrements in volume and/or function and increases in amygdala and nucleus accumbens activity. In addition, cerebellar alterations appear to occur as a function of number of prior episodes, as do a variety of neuroendocrine alterations. It remains to be determined which of these abnormalities reflect pathological processes (to be suppressed for positive clinical effects) and which may be compensatory and adaptive (to be further enhanced and supplemented for therapeutic benefit).

TABLE 19.5 Neurobiological Correlates of Number of Mood Episodes or Duration of Illness: Evidence of Illness Progression

Number of Mood Episodes	Neurobiological Abnormalities
INCREASED NUMBER OF MOOD EPISODES → via multiple epigenetic mechanisms, such as methylation of glucocorticoid receptors and the DNA promoter for pro-BDNF, and an overall 8 times greater methylation in depressed patients than in controls.	Decreased prefrontal cortex[1] structure, biochemistry, and function
	Increased amygdala reactivity and function[1]
	Endocrine dysregulation[1]
	Percentage of short telomeres
	Cortisol[1]
	Inflammation
	Decreased BDNF[1]
	Cognitive dysfunction[1]
	Early dementia

[1]Correlates of illness progression that could be further exacerbated by comorbid substance abuse.
See review in Post et al., 2013, for details; Labonte et al., 2013; Rao et al., 2012; Xin et al., 2012.

Remarkably, the percentage of short telomeres, which is a marker of aging, also decreases in bipolar II patients as a function of number of prior depressive episodes. This finding is of particular interest in relation to the estimated approximately 10 years of premature aging observed on the basis of the percentage of short telomeres in this study, which is convergent with the many years of lost life expectancy reported in patients with serious psychiatric illness, including both the unipolar and the bipolar mood disorders (J. C. Chang, Chen, Yen, Chen, & Lee, 2012; Colton & Manderscheid, 2006; Newcomer & Hennekens, 2007; Osby, Brandt, Correia, Ekbom, Sparen, 2001).

Although many of the correlational relationships illustrated in Table 19.5 may relate to number of episodes causing these abnormalities, we cannot definitively rule out that the causality is in the opposite direction and that some of these abnormalities are present in the first place and drive a more malignant course of illness. However, it would appear clinically wise to assume that the number of prior episodes and the concomitant increases in vulnerability to relapse are causally associated with some of these progressive neurobiological alterations so that greater efforts at pharmacoprophylaxis are fostered. In this fashion, one could hope to prevent the degree of cognitive dysfunction that emerges as a function of number of prior

episodes as well as the emergence of treatment resistance (Post, Fleming, & Kapczinski, 2012).

Moreover, if four prior unipolar or bipolar depressive episodes is the threshold for doubling the risk of acquiring a diagnosis of dementia in old age (Kessing & Andersen, 2004), it would appear prudent to attempt to prevent depressions after their second or third occurrence in the hope of never reaching this threshold for cognitive impairment. This conceptual viewpoint is in alignment with virtually all clinical treatment guidelines for unipolar depression, which recommend the initiation of long-term prophylaxis after two or three prior depressive episodes. As we have noted, most of the liabilities for illness progression by sensitization to episodes, stressors, and substance abuse are as great or greater in the bipolar disorders, are associated greater degrees of treatment resistance, and require even earlier efforts at long-term prevention.

In this regard, it is notable that all of the mood stabilizers (lithium, valproate, lamotrigine, and carbamazepine) and some atypical antipsychotics (such as lurasidone, olanzapine, and quetiapine) increase the neuroprotective factor BDNF. Moreover, lithium, via its ability to increase cell survival factors (BDNF and Bcl-2) and inhibit cell death factors (BAX and P 53), could have inherent neurotrophic and neuroprotective properties beyond its ability to prevent affective episode recurrence. Lithium increases hippocampal volume and volume in a number of cerebral cortical areas and may help delay the onset of dementia (Kessing, Sondergard, Forman, & Andersen, 2008; Post, Fleming, & Kapczinski, 2012). Lithium also increases telomere length, a critical correlate of good physical and psychiatric health (Martinsson et al., 2013).

A variety of other medical comorbidities appear to emerge as a function of number of prior episodes (Goldstein, Fagiolini, Houck, & Kupfer, 2009). Moreover, we have observed that the burden of medical comorbidities in patients with bipolar illness is correlated with indices of the severity of childhood adversity. The number of medical comorbidities patients have are associated with the degree of childhood adversity, as are 11 different individual medical conditions involving a wide range of somatic systems (see Table 19.6). These include allergy, asthma, migraine, chronic fatigue syndrome, menstrual-related irregularities, fibromyalgia, and arthritis. Thus, the long-term consequences of early stressful life events appear to convey a more adverse course of bipolar illness evolution and progression (Leverich et al., 2002: Post and Leverich, 2008); in addition, childhood stressors are involved in programming an increased risk for associated medical comorbidities (Post, Altshuler, et al., 2013; Shonkoff & Garner, 2012).

TABLE 19.6 Consequences of Childhood Adversity in Adulthood

I. Psychiatric	II. Medical[1]	III. Observed Changes
Retrospective findings:	Allergies	Altered central nervous system development, structure, function, and neurotrophic factors
A. Early onset	Arthritis	Inflammation
B. Anxiety disorder	Asthma	Oxidative stress
C. Substance abuse comorbidity	Chronic fatigue	Telomere shortening
D. Dysphoric mania	Chronic menstrual irregularities	Cortisol dysregulation
E. ≥ 20 episodes	Fibromyalgia	↓ BDNF in prefrontal cortex, Hippocampus
Prospective findings:	Head injury	↓ 5HT1A receptors
F. More time depressed	Hypertension	Reduced GABA transition from excitatory to inhibitory
G. More ultradian cycling	Hypotension	Corticotropin-releasing hormone transition from appetitive to Aversive
	Irritable bowel syndrome	Low oxytocin
	Migraine headache	
	Obesity	Obesity and metabolic syndrome

[1]See Post, Altshuler, et al., 2013.

Much of the loss of years of life expectancy is attributable to cardiovascular illness, and only a smaller component is due to loss of life expectancy based on suicide. Thus, the recurrent affective disorders are potentially lethal conditions, not only via suicide but also by the excess medical mortality associated with them.

MORE MALIGNANT AND PROGRESSIVE COURSE OF BIPOLAR DISORDER IN THE UNITED STATES COMPARED WITH SOME EUROPEAN COUNTRIES

Some clinicians and investigators have remarked about the possible over diagnosis of bipolar disorder in children in the United States compared with the Netherlands and Germany. However, recent epidemiological data indicate that some 2.2% of adolescents in the United States have a bipolar spectrum disorder (Merikangas et al., 2010, 2011, 2012). Moreover, the diagnosis of very early childhood onset bipolar illness may, in fact, be more common in the United States than in some other locales. In our

Bipolar Collaborative Network, we observed that 22% of the adults (average age just over 40) reported onset of illness before age 13, compared with only 2% in Europe (Post, Leverich, et al., 2010). Data from the full network cohort on childhood onset (<13) are now 31.0% from the United States compared to 5.4% from Europe (Post et al., 2014a). These data converge with the 28% of adult patients in the Systematic Treatment Enhancement Program for Bipolar Disorder (STEP-BD) sponsored by the National Institute of Mental Health who reported this early onset of illness (Perlis et al., 2004). Between our Network and that of the STEP-BD, it appears that some two-thirds of bipolar illness in the United States begins in childhood and adolescence (prior to age 19). In contrast, only about one-third of adults with bipolar illness in the Netherlands and Germany had this early onset of their first episode in adolescence (Post, Altshuler, Frye, et al., 2014a).

This earlier age of onset of bipolar illness in the United States has now been replicated in another sample of several thousand patients both in the United States (acquired by the Pittsburgh case registry) and in multiple European countries. Bellivier and collaborators (2011) reported a much higher incidence of childhood-onset bipolar illness in the United States that was isolated to their early-onset patient distribution and not evident in the intermediate- and late-onset groups. They found, on average, mean age of onset of about 5 years earlier in the United States compared with Europe in general, while we found a 7-year earlier mean age of onset of bipolar disorder in the United States compared to Germany and the Netherlands.

These data have multiple and important clinical implications. In our Bipolar Collaborative Network, the STEP-BD Network, and many other series, those with early-onset bipolar illness fared more poorly than those with adult-onset illness (Post, Leverich, et al., 2010). In addition, in our Network, we found that the earlier age of onset of illness was inversely related to the duration of untreated illness. Independent of early onset, the longer the illness was untreated with antimanic or antidepressant agents was directly related to a poor outcome in adulthood in terms of more severity and time depressed, more episodes, and less time euthymic (Post, Leverich, et al., 2010). The duration of untreated interval was also associated with a more adverse course in the study of Suominen et al. (2007). Thus, early-onset illness may be a more pernicious form of bipolar illness, either in its own right or because of its delay in onset of adequate treatment.

These data converge with a variety of other studies in the United States that have reported substantial incidences of bipolar illness in hospitalized children and large numbers of children followed in naturalistic treatment of their bipolar disorder. In long-term follow-up series, these children with mania (usually about an average at of 11) appeared to be particularly difficult to treat, and while they improved in the majority of instances, relapse rates are extraordinarily high. Some half to two-thirds of the children in long term follow up remained symptomatic and were markedly adversely impacted by their illness (Birmaher et al., 2006; DelBello, Hanseman, Adler, Fleck, & Strakowski, 2007; Geller et al., 2010; Wozniak et al., 2011).

In an 8-year follow-up study, Geller and colleagues (2010) found that children with mania were symptomatic some two-thirds of the duration of follow-up. There was considerable continuity from the childhood-onset manias diagnosed at average age 11 to those occurring throughout adolescence. In addition, they found that a substantial 37% of youngsters during the 8-year follow-up who were managed with treatment as usual in the community were never treated with any of the treatments recommended in consensus guidelines (i.e., lithium, atypical antipsychotics, or mood stabilizers (Kowatch et al., 2005). However, the youngsters who were treated with lithium did show the best long-term course and the longest periods of remission (Geller et al., 2010). Thus, the long-term follow-up data of Geller and colleagues raise the specter that some of the very difficult course of bipolar illness in children may in part be attributable to the late, inadequate, or inappropriate treatment they often receive.

The earlier age of onset seen in these comparative and U.S. studies is also concordant with the results of high-risk studies in children by virtue of their having a parent or first-degree relative with bipolar disorder. In the series of high- risk studies from the United States (Birmaher et al., 2009, 2010; K. D. Chang, Steiner, & Ketter, 2000), more of the offspring develop bipolar disorder than in studies from the Netherlands (Wals et al., 2004), Switzerland (Vandeleur et al., 2012), or even Canada (Duffy et al., 2011), where earlier onset of anxiety disorders and depression is more common. Vandeleur et al. (2012) also found that in Switzerland, parents with bipolar disorder, compared to those with unipolar disorder or control patients, had more comorbidities and complicated illnesses. Parents with bipolar disorder from the United States also appear to have more complicated illness than those from non-U.S. countries, and this could be a factor in the higher incidence of bipolar disorder in the offspring (Birmaher et al., 2009, 2010; Post, Altshuler, Kupka, et al., 2014a). Such differences could yield a greater genetic and/environmental vulnerability to bipolar disorder, especially if many of the comorbidities convey addition risk genes for the onset of bipolar disorder.

Increased Incidence of Risk Factors for Bipolar Disorder in Patients from the United States Compared with Germany and the Netherlands

Early-onset bipolar illness has been most closely associated with two phenomena:— increases in genetic vulnerability and in the incidence of childhood adversity. Our data suggest that both of these vulnerability factors are more prevalent in the United States compared with Europe (see Figure 19.4). Bipolar patients from the United States had a significant three times higher incidence of parents with a diagnosis of bipolar disorder and, in addition, had a higher incidence of both parents having a mood disorder, either unipolar or bipolar illness (Post et al., 2014a,b). Bilineal vulnerability results in a higher incidence (some 60% or more) of the offspring having a lifetime history of a mood disorder (Gottesman, Laursen, Bertelsen, & Mortensen, 2010; Lapalme, Hodgins, & LaRoche, 1997).

In addition to this genetic/familial vulnerability, we found more psychosocial adversity in childhood as well as in the year prior to the onset of the first episode. The incidence of physical or sexual abuse was approximately double in the United States compared to that reported in Europe. Verbal abuse was also higher in the United States (58.8%) compared to Europe (30.8%). In the year prior to illness onset, there were also many more negative psychosocial stresses and lack of social support compared with those observed in Europe. In addition, when the same negative stresses were reassessed in the year prior to the last episode before Network entry, there was a further increase in the United States over the course of illness in contrast to the Europeans, where stressors remained relatively low and stable. Thus, in the United States, as the illness emerges and progresses, there appear to be not only more stresses prior to illness onset but increasing amounts of stresses and loss of social, economic, and health care support compared to lower and stable levels of these difficulties in Europe.

More Adverse Bipolar Illness Course in the United States than in Europe

Patients with bipolar disorder from the United States also had a higher incidence of anxiety and substance abuse comorbidity than the European patients. In addition, the United States had a higher prevalence of individuals with more than 20 prior episodes and more rapid cycling (four or more episodes/year) prior to Network entry. Thus, those from the United States would appear to have multiple poor prognosis factors in terms of genetic/familial and psychosocial vulnerability, the accumulation of negative stressors over the course of the illness, more episodes

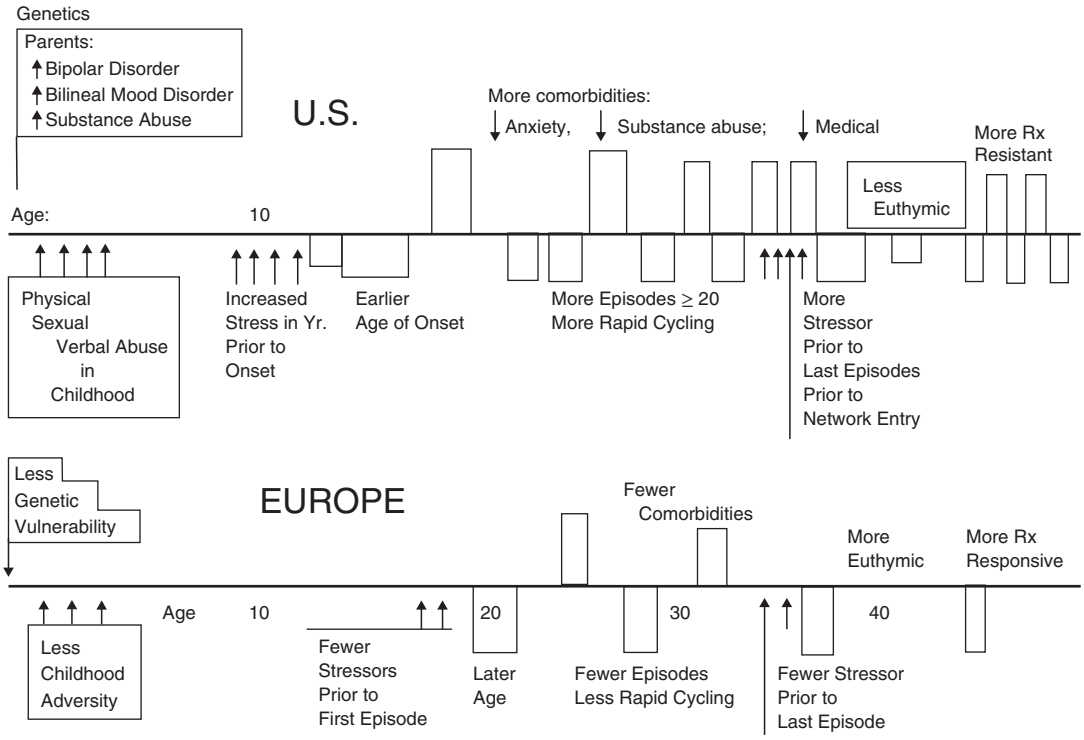


Figure 19.4 More Vulnerability Factors and Bipolar Illness Adversity in the United States Compared to Europe.

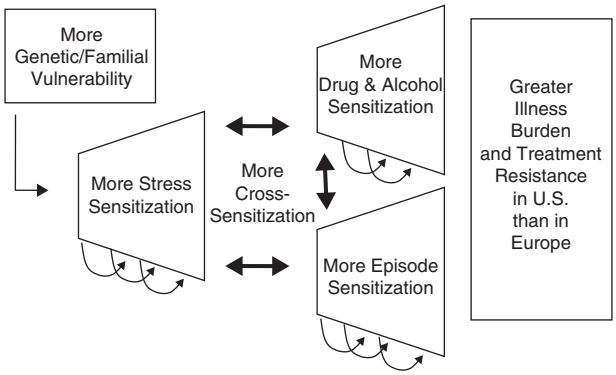


Figure 19.5 Bipolar Disorder in the United States Compared to the Netherlands and Germany.

and rapid cycling, and a higher incidence of anxiety and substance abuse comorbidity (Post et al., 2014a).

Thus, stress, mood episode, and substance abuse accumulation and sensitization would each appear to be feeding into a more difficult course of illness in the United States compared with Germany and the Netherlands. This was, in fact, documented because more patients from the United States (51.7%) failed to achieve a good long-term response to naturalistic treatment for a minimum of 6 months compared to only 31.1% of those from Germany and the Netherlands (Post, Altshuler, Frye, et al, 2010b).

These results are schematized in Figure 19.5, which illustrates the increase in psychosocial stressors, episodes, and substances of abuse in patients from the United States compared with Europe, and the likely increased degree of sensitization and cross-sensitization. Thus, while multiple factors interact in conveying the more adverse and treatment refractory course of illness in the United States compared with these two European countries, many are amenable to reduction or prevention.

PUBLIC HEALTH IMPLICATIONS

The public health implications of these findings are enormous. Since the accumulation of stressors, mood episodes, and bouts of drug abuse (and their likely sensitization effects) are each based on environmental processes, they are readily available targets for immediate attempts at treatment intervention, prevention, and remediation. However, there are a number of difficulties and impasses that make this desired set of approaches relatively unlikely to occur (Post, 2002a; Post & Kowatch, 2006; Post, Chang, & Frye, 2013) for a large portion of those with bipolar disorder—a group that makes up some 2 to 5% of the U.S. population and a much larger percent of those with recurrent unipolar depression (Merikangas et al., 2010, 2011).

What Are Some of These Complicating Factors?

First, some aspects of the diagnosis of childhood-onset bipolar illness remain controversial (although in reality there is more consensus among investigators than might be assumed). A few might argue that the illness is overdiagnosed in the community. There is certainly a subset of patients with severe mood dysregulation who do not meet full diagnostic criteria for bipolar disorder (Leibenluft, Blair, Charney, & Pine, 2003), and these are now called disruptive mood dysregulation disorder in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*. Some would argue that these individuals represent a particularly severe subgroup of those with attention-deficit/hyperactivity disorder and oppositional defiant disorder (Axelson et al., 2012; Biederman et al., 2010). However, there appears to be considerable agreement that these individuals, however they are labeled, do not have bipolar disorder, although the best treatment of these children remains uncharted.

Nonetheless, as noted, recent epidemiological data indicate that some 2% of the U.S. adolescent population does appear to have bona fide bipolar disorder (Merikangas et al., 2011). This results in an enormous number of people in the United States with a difficult-to-treat disorder that is associated with considerable disability and a marked increased risk of substance abuse. Thus, the field needs to move toward assessing the effectiveness of treatment interventions both for patients with bona fide bipolar illness and those with other nonbipolar variants.

Second, the conduct of systematic studies of the clinical effectiveness of different interventions for bipolar-like syndromes has lagged to an extraordinary degree in proportion to the need for these studies (Post, 2002b, 2009; Post & Kowatch, 2006). The lack of a large systematic treatment database is a crucial factor in youngsters not receiving timely or adequate treatment intervention. There are only several FDA-approved atypical antipsychotics for children with mania in the age range of 10 to 18, and lithium has been grandfathered into this approval for children 12 years and older. The mood stabilizers lithium, carbamazepine, valproate, and lamotrigine remain relatively unstudied in children with bipolar I disorder, and studies are virtually nonexistent in the youngest children with bipolar disorder who often have the very common form of bipolar not otherwise specified.

One way to break this impasse is to conduct relatively easier-to-complete and less expensive practical clinical trials using open, randomized designs to compare the efficacy and safety of different approaches to childhood-onset bipolar disorder (Post, 2009; Post & Kowatch, 2006; Post, Chang, Frye, 2013). Rather than these clinical

trials ending once the placebo or drug monotherapy phase is over as is the case in conventional, industry-sponsored randomized clinical trials, it would be particularly helpful to clinicians to have further crossovers and re-randomizations to other agents to ascertain what might be the next most appropriate drug and drug combinations for a given individual.

The recent clinical trial of Geller and colleagues (2012) is very much based on this paradigm and is extraordinarily clinically informative. They randomized patients to lithium, valproate, or the atypical antipsychotic risperidone and found that on almost all measures, risperidone was significantly superior to either lithium or valproate. However, it did convey a higher risk of side effects, including weight gain and prolactin increases. The study also had an add-on phase wherein the other agents could be explored in combination. When this was done, treatment regimens involving the atypical antipsychotic in combination with either lithium or valproate outperformed the combination of lithium and valproate when risperidone was not included.

The placebo-controlled clinical trials of different atypical antipsychotics in childhood-onset mania appear to produce a response rate in the 50% range compared with significantly lower rates with placebo (Geller et al., 2012). These data, along with the risperidone data just cited, suggest that the atypical antipsychotics as a class will all exert antimanic effects. This likelihood is further supported by the observations that all typical and atypical antipsychotics that have been approved for use in schizophrenia have been shown to be uniformly efficacious in adult-onset mania as well as in childhood-onset mania.

Therefore, it would appear important in the treatment of childhood-onset bipolar illness to select atypical antipsychotics on the basis of their safety profiles rather than on the basis of the number of times or the number of children in whom they have been studied. Weight gain appears to be a prominent side effect with some atypical antipsychotics, and the degree of weight gain and other indices of metabolic syndrome and extrapyramidal side effects are typically much more problematic in children and adolescents than in adults when studied on comparable drug regimens.

Given the epidemic of childhood obesity and the vulnerability of youngsters for dangerous degrees of weight gain when prescribed atypical antipsychotics, choosing the best drug within this class would appear to be paramount. This line of reasoning is reflected in recent guidelines (Kowatch et al., 2005) which recommend initiating treatment with agents that cause lesser degrees of weight gain compared with that of olanzapine or clozapine. In this regard, the weight gain associated with ziprasidone and lurasidone not only appears to be minimal in adults and children, but these agents are also associated with relatively benign metabolic side effect profiles in terms of their not increasing blood sugar, cholesterol, or triglycerides. Their comparative long-term effectiveness and tolerability versus other agents in pediatric patients deserve immediate study.

Third, all the data indicate that childhood bipolar disorder is difficult to treat and often requires combinations of medications.

The importance of combination treatment is further emphasized in the clinical trial of Findling et al. (2003) wherein they stabilized young children with mania on the combination of lithium and valproate and then randomized these individuals to monotherapy with either compound. A very high incidence of relapse was encountered during either monotherapy phase, and, importantly, there was an extremely high rate of re-responsiveness once the combination treatment was reinstituted. Many of these children were also maintained on psychomotor stimulants, indicating that a combination of three drugs often was required to optimally treat these individuals. Based on the available data with either an atypical antipsychotic or a mood stabilizer lead in (Geller et al., 2012), it would appear that combination treatment is most often required in childhood-onset bipolar disorder, and use of complex combination therapy in the community appears to be the clinical norm. Yet systematic approaches to combination and complex combination therapy in the literature are relatively sparse, with the few exceptions indicated in the text.

Delayed and inadequate treatment of bipolar illness in childhood and adolescence in the United States is creating an extraordinary personal burden of illness and disability as well as enormous social and economic costs. Adult-onset bipolar illness can be difficult to treat; shows a progressive course; and results in considerable dysfunction, disability, medical comorbidity, and premature mortality. Childhood-onset illness appears to run an even more difficult and adverse and complicated course, moving more rapidly through the different stages of illness progression (see Figure 19.6), as we have summarized. Thus, the treatment of childhood-onset bipolar illness needs to be enhanced in accord with its high prevalence in the United States and the seriousness of its clinical presentations and consequences.

There also needs to be increased clinical treatment and effectiveness research, allowing more adequate and rational choices among the drugs currently available. It is likely that this will happen only if there is a congressional mandate. I say this because virtually every investigator in

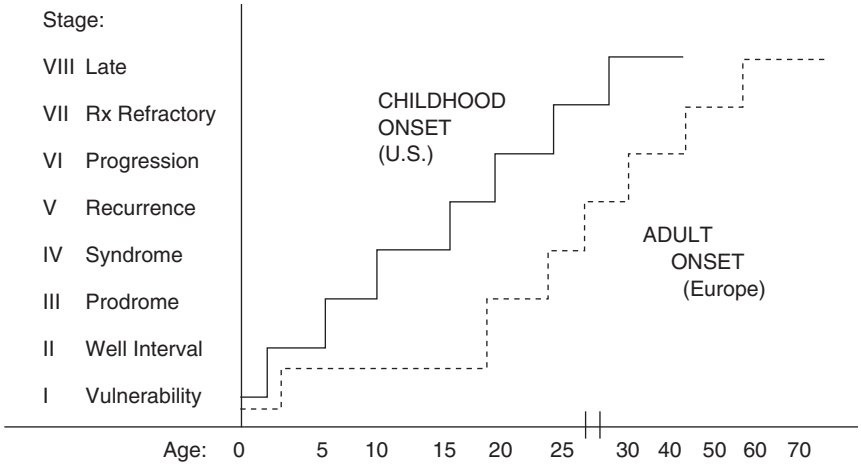


Figure 19.6 Bipolar Disorder Stage Progression in Childhood-Onset versus Adult-Onset Illness: Schematic Illustration.

childhood-onset bipolar illness of whom I am aware has urged that the field perform more treatment trials, yet these have not been forthcoming.

Fourth Funding of treatment research in bipolar disorder is inadequate. What are some alternative approaches and possibilities?

The National Institute of Mental Health is facing a budget crunch. Without monies specifically targeted for this kind of treatment research in bipolar disorder, the likelihood that rapid progress would be made under our current grant review system is virtually nil. Grants are typically reviewed on the basis of elegance of scientific question and scientific design. The treatment outcome studies required for elucidation of the best approaches to the treatment of childhood-onset bipolar illness rarely, if ever, fulfill these criteria. Nevertheless, they rank extraordinarily high on the criteria of need and public health import.

Although there has been a negative public outcry about the treatment of youngsters with multiple strong medications, exploration of milder and safer treatment options has not proceeded accordingly. Examples of this lack of appropriate study of relatively safer alternatives are plentiful. Mary Fristad presented a poster in 2010 reporting dramatic degrees of clinical improvement in open treatment of a small group of refractory manic children when they were given a complex vitamin and mineral preparation called EM Power, which is readily available on the Internet. Her request for funding of a controlled study was denied, and the field remains in the completely ambiguous posture of not knowing how safe or potentially effective this agent is. Similarly, there are multiple rationales for treatment trials with omega-3-fatty acids, since these agents have had some reported success in adults with unipolar and bipolar depression. Also, there has been 1 of 2 successful trials of primary prophylaxis of omega-3-fatty acids in those with prodromal schizophrenia.

There is considerable evidence for increases in inflammatory cytokines and other measures of inflammation such as C-reactive protein in childhood-onset bipolar disorder. Studying an agent such as omega-3-fatty acids, which has some anti-inflammatory properties, would appear highly indicated. In this regard, the antibiotic minocycline has received preliminary exploration in schizophrenia with positive results in adults with negative symptoms and improvement on some cognitive measures. This compound, with its anti-inflammatory and neuroprotective effects, deserves study in bipolar disorder. Similarly, NAC deserves extensive study in children in light of the literature discussed in this chapter about its efficacy in the treatment of unipolar and bipolar depression, anxiety disorders, and addictions in adults.

In schizophrenia, there have been multiple attempts in the past decade at achieving primary prophylaxis in those at very high risk. It is apparent that high-risk status can now also be estimated in bipolar disorder on the basis of: family loading for bipolar disorder; the occurrence of psychosocial adversity in childhood; the presence of prodromal symptoms, and other available clinical and neurobiological markers (Post, Chang, & Frye, 2013). In instances of high and ultra-high risk, the ability of agents with high degrees of safety to ward off illness onset (primary prophylaxis) or prevent its recurrence/progression (secondary prophylaxis) should be intensively explored. This is not supercreative science, which gets all the hype and the funds, but potentially mind- and person-saving practical clinical trials, which tend to get ignored or disparaged.

In addition to these ordinary but absolutely critical public health pharmacological approaches, there should be further implementation and adoption of psychosocial interventions that have proven effective in adult bipolar illness and have begun to be applied to childhood-onset illness as well. Not only has family-focused treatment been shown to help accelerate improvement in childhood-onset bipolar illness; in one high-risk study, it has been shown to prevent the development of full-blown symptomatology, suggesting potential utility of this approach in primary and secondary prevention. On the basis of his studies with David Miklowitz, Kiki Chang has indicated that he is already convinced that family-focused therapy with its psychoeducational component, family communication, and problem-solving techniques (or some other analogous type of focused intervention) should be given to all the families of children who are at the highest level of risk for the onset of bipolar disorder by virtue of a positive family history of the disorder and the presence of a depression or anxiety disorder or bipolar disorder not otherwise specified (Miklowitz et al., 2012, 2013). Cultivating resilience (Southwick & Charney, 2012) and increases in self-control (Moffitt et al., 2011) in those at high risk are also achievable possibilities.

As noted, when the high-risk studies of children of parents with bipolar illness are followed up longitudinally, they also show considerable differences between cohorts drawn from the United States and Europe. In Kiki Chang or Birmaher's cohorts, there appeared to be a moderately high incidence of bipolar disorder in young offspring of parents in the United States with bipolar disorder. In contrast, in similar high-risk offspring studies conducted outside the United States, there tends to a very low incidence of childhood-onset bipolar illness and a much higher incidence of initial presentations with anxiety disorders and then depression in children and adolescents (Duffy, et al., 2011, Post, Altshuler, Kupka, et al., 2014a).

Thus, it would appear appropriate to consider the possibility of differential interventions and timing of interventions in the exploration of potential modes of primary and secondary prophylaxis in those at high risk by virtue of a positive family history of bipolar disorder in the United States versus European cohorts. However, even in the European cohorts with more early anxiety and depression, the best treatments for these syndromes in high-risk children are not known and should be studied. These data, again, highlight the importance of early intervention studies in the United States where parental positivity for bipolar illness appears to convey a higher incidence of childhood-onset bipolar disorder.

These data on the early onset and pernicious course of illness in the United States have many other implications. Home visits (Eckenrode et al., 2001; Olds et al., 1999), group interventions (Lynch et al., 2005; Zlotnick, Miller, Pearlstein, Howard, & Sweeney, 2006), and early child care (Herba et al., 2013) have proven to have long-term positive effects on behavior in various high-risk populations (Eckenrode et al., 2001; Herba et al., 2013; Olds et al., 1999). These and related interventions should be considered in addition to family-focused treatment in children at risk for bipolar disorder (Post, Chang, & Frye, 2013).

CONCLUSIONS

The recurrent mood disorders - unipolar depression and especially bipolar disorder - are all-too-often misunderstood and assumed to be benign illnesses requiring only occasional intervention for more serious episodes. This view actually renders these illnesses much more malignant because of the failure to deal with them early and effectively with careful monitoring and long-term prophylaxis (Post, Altshuler, et al., 2010). Episodes beget more episodes with increasingly shorter well intervals. Eventually there is a failure to return to a euthymic baseline and the development of cognitive dysfunction and treatment resistance.

To a considerable extent, this typical adverse course is partially attributable to iatrogenic misadventures compounded by poor public health policy and medical access. The consequences can be disastrous for large numbers of individuals (Merikangas et al., 2011; Post & Kowatch, 2006). Inadequately controlled mood disorder is a huge risk factor for a patient both developing a substance abuse disorder and accumulating an increasing number of psychosocial stressors. Repetition of each—stressors, episodes, and bouts of substance abuse—can further exacerbate the condition and drive illness progression. Some of the increases in behavior reactivity to recurrent stressors, episodes, and substances are mediated at the level of epigenetics. Thus, epigenetic methyl, acetyl, and a host of other chemical marks accumulate on patients' DNA and histones, conveying further central nervous system dysregulation at the level of long-term changes in gene expression (D'Addario et al., 2012; Labonte et al., 2013; Mehta et al., 2013; Xin et al., 2012).

With such illness progression, not only do psychiatric symptoms worsen, but medical comorbidities accumulate, cognition deteriorates, and many years of life expectancy are lost compared to those in the general population.

Appropriate understanding of this wide range of untoward consequences of inadequately treated recurrent mood disorders should lead to the development of clinical and public health strategies that would help minimize these adversities and render the illness more tractable and benign. A call to prevent sensitization and kindling-like progression in the affective disorders does not adequately convey the importance of avoiding the accumulation of stressors, mood episodes, and substance abuse and their multiply interacting adversities. Perhaps the mantra "Prevent episodes; protect the brain" may better convey the urgency to change the paradigm toward earlier recognition, treatment, and consistent long-term prophylaxis. The benefits of early sustained expert treatment and patient psychoeducation are now amply documented in the study of Kessing, et al., (2013) where patients with a first hospitalization for mania randomized to 2 years of speciality clinic treatment resulted in many fewer relapses over the next 6 years compared to treatment as usual.

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CHAPTER 20

Mental Health Stigma: Theory, Developmental Issues, and Research Priorities

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Crucial events occurring over the past few years indicate that the field of mental health, including developmental psychopathology, is in the throes of a professional and public relations upheaval—with profound implications for stigma and for the entire future of mental health care. First, as of this writing, the U.S. public has been exposed over the past several years to a number of extreme and well-publicized acts of gun violence, highly likely to have stemmed from untreated or inadequately recognized mental illness: Jared Loughner in Arizona; James Holmes in Colorado; Adam Lanza in Newtown, Connecticut; and Aaron Alexis in Washington, DC (see Barron, 2012; Frosch & Johnson, 2012; K. Johnson, Kovaleski, Frosch, & Lipton, 2011; Shear & Schmidt, 2013), plus more recent, tragic shootings in Fort Hood, Texas; Isla Vista, California; and Charleston, South Carolina. In the public's mind, mental disorder has become, once more, indelibly linked with images of horrific violence. This association persists even though few forms of mental illness are associated empirically with violent behavior. In fact, most forms of mental illness are linked with a major risk for becoming *victimized* by violence (e.g., Glied & Frank, 2014; Hiday, Swartz, Swanson, Borum, & Wagner, 1999).

A second critical event was the publication of the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*, known as *DSM-5* (American Psychiatric Association [APA], 2013). *DSM-5*'s ever-expanding coverage of abnormal behavior has further blurred lines between normality and pathology. One salient example includes the removal of the bereavement exclusion for diagnosis of major depression (see discussion in Steka & Correll, 2013; Wakefield, Schmitz, First, & Horvitz, 2007). In brief, a person who has recently experienced a

major loss and shows relevant symptomatology can now be considered to have major depression, raising heated debate about the expanding bounds of mental disorder. Another example is the construct of autism spectrum disorders, which explicitly favors the dimensional/continuous as opposed to categorical nature of psychopathology. (McPartland, Reichow, & Volkmar, 2012, show that this conception has both expanded and contracted the domain of autism.) Regarding these examples, it is indisputable on one hand that most forms of mental disorder represent extremes of continua of impairing behavioral and emotional tendencies, belying the notion that one either has or does not have a certain mental disorder (e.g., Beauchaine & Hinshaw, 2013). On the other hand, this view has undoubtedly reinforced the view that the mental health community represents a profiteering effort—spearheaded by predatory pharmaceutical firms—intent on selling ever more medicines to an ever greater number of unduly pathologized individuals (e.g., Hinshaw & Scheffler, 2014; Hinshaw & Stier, 2008).

Moreover, recent data have documented (a) rapidly expanding diagnoses of such child-onset conditions as attention-deficit/hyperactivity disorder (ADHD; see Hinshaw & Scheffler, 2014; Visser et al., 2014) and autism spectrum disorders (Baio, 2012) and (b) a nearly 30% increase in suicide rates between 1999 and 2010 among U.S. adults (Sullivan, Annest, Luo, Simon, & Dahlberg, 2013). The first example concerns the fast-expanding rates of problem behavior, during childhood, that becomes branded as forms of mental illness. The second pattern raises the essential issue of structural/fiscal and psychological barriers to prevention and care for individuals at risk for suicidal thoughts and actions. Clearly, mental disorders—including their definitions, scientific status, treatments, and very legitimacy—are at the forefront of public health and public debate.

In many ways, progress in the mental health fields across the last half century has been stratospheric, as witnessed by the veritable explosion of research related to risk and etiologic factors and underlying mechanisms as well as evidence for validated treatments, both psychosocial and pharmacologic (see Nathan & Gorman, 2007). Distressingly, however, public attitudes have been surprisingly refractory to fundamental change with respect to mental illness. That is, despite the clear evidence for greater *knowledge* of mental health and mental illness today compared to the mid-twentieth century—revealed by a general increase in mental health literacy—public *attitudes* have not shown commensurate gains (for important data, see Pescosolido et al., 2010).

Thus, we must now confront the construct of stigma. Whereas the untreated symptoms of mental health conditions often produce considerable suffering and undermine the attainment of core developmental competencies, the contempt (both hidden and outright) toward persons with mental illness exponentially compounds these problems. It is essential to note that shunning, discrimination, and stigmatization constitute a fundamental social injustice (see Corrigan, 2005). Moreover, stigma thwarts treatment seeking and limits essential life opportunities. Indeed, current estimates are that the vast majority of children and adolescents with mental disorders in the United States never receive evaluation or treatment, and that all too few adults receive evidence-based intervention (e.g., Kazdin & Rabbitt, 2013).

This state of affairs reflects multiple factors, including (a) *ignorance* on the part of the general public that many behavioral and emotional problems reflect mental disorders; (b) *shame* on the part of individuals and families with respect to admitting that they or their children have a mental illness; and (c) *underfunding* for treatment, even if it is sought (Hinshaw, 2007). Furthermore, stigma erodes the potential for optimal educational and vocational functioning, meaningful interpersonal relationships, and social and economic autonomy (Thornicroft, 2006). Finally, stigma is an obstacle to the needed levels of research funding for fostering knowledge of the basic biological and social processes underlying mental dysfunction. It also undermines efforts to evaluate (and disseminate) treatments that can make recovery from mental illness possible (for an influential statement along these lines, see Sartorius, 1998).

As highlighted by Link and Phelan (2001, 2006; see also Bos, Pryor, Reeder, & Stutterheim, 2013 and Hatzenbuehler, Phelan, & Link, 2013), stigma occurs at the level of the general population (public stigma), within individuals and families (via stereotypes, beliefs, prejudicial attitudes, and discrimination), and at institutional levels in society (structural stigma, expressed through laws, cultural norms, and policies). Additional, salient constructs are (a) *self-stigmatization*, the process by which persons in denigrated groups internalize the negative messages they receive (Corrigan, 2004; Major & O'Brien, 2005) and (b) *courtesy stigma* (sometimes termed associated stigma), the castigation that often extends to individuals close to those in a stigmatized group, such as family members, friends, and even relevant professionals (see Goffman, 1963, for the original conception of courtesy stigma). Because mental illnesses are among the most debilitating diseases that exist worldwide in terms of creating disability and impairment (Collins et al., 2011), understanding the reasons for the

shunning, exclusion, and punishment of persons with mental illness is a research and clinical imperative. Indeed, without consideration of stigmatization, the entire effort to understand psychopathology and promote evidence-based prevention and treatment efforts will be greatly limited (Institute of Medicine, 2009).

Developmental factors are crucial to this discussion. First, many child and adolescent forms of mental illness incur impairments that persist well into adulthood, and most so-called adult forms of mental illness involve risk factors and precursors originating well before their adult years (see Hinshaw, 2013, for an overview). Thus, a life span perspective on mental illness—and its castigation—is of critical importance. Second, mental illness and maladaptive behavior are dynamic rather than static processes. Not only do symptoms and impairments fluctuate as a function of both context and development, but stigmatization encountered at a given age or phase of development is highly likely to have profound implications for future functioning (Hinshaw, 2005). Third, when parents suffer from mental illnesses, a host of processes (e.g., genetic, psychosocial, stigma-related) serve to adversely affect their children's development (Heflinger & Hinshaw, 2010; Hinshaw, 2005, 2007). Finally, the field still lacks crucial knowledge as to the developmental origins of stigma-related processes in young children and the mechanisms through which stigmatization matures (see subsequent sections). In brief, the stigma related to mental disorder is ripe for rich developmental theorizing and developmentally-oriented research efforts, both basic and applied.

In the following pages, we define stigma in greater detail and discuss key models and mechanisms, including psychological, social, and evolutionary perspectives. We then briefly consider historical themes related to stigma, particularly regarding children with mental disorders, to properly frame the salient issues of our current era. Next, we review both empirical data and broader information from general cultural practices with respect to the reach and impact of stigma. After considering developmental issues, we describe a theoretical model of stigmatization as it pertains to mental disorder. Finally, we raise key research questions that remain to be systematically elucidated by future investigators. Although overcoming stigma is a topic of clear importance, space limitations allow only brief coverage of prevention and intervention strategies related to stigma (see Corrigan, Morris, Michaels, Rafacz, & Rüsch, 2012, and Hinshaw, 2007, for reviews). To provide enduring benefits, we highlight that such strategies must be multilevel and continuous.

At the outset, we express our conclusion: Stigma is arguably *the* most fundamental issue in the entire mental health field (see Sartorius, 1998, 1999). It affects every participant in this enterprise, including basic scientists, clinicians, social theorists, and those contending with mental disorder, as well as their families and associates. Interrelated multilevel issues include research prioritization and funding, the dearth of appropriate clinical services that currently exist in most communities, and the dehumanizing attitudes that emerge from the long-standing, and pernicious, denigration of persons with mental disorder.

DEFINING STIGMA AND STIGMATIZATION

Stigma is a term originating from ancient Greece. Literally, it signifies an actual mark or brand burned or tattooed into the skin of members of castigated groups—such as slaves or traitors—thereby graphically signaling the devalued status of the carrier (Goffman, 1963). In present usage, the mark is typically symbolic and refers to the (a) social judgment placed on members of groups deemed deviant or immoral; (b) received discrimination; and (c) shame and degradation, as well as potential annihilation, likely to be experienced by those who are stigmatized.

Several key points are central to current notions of stigma. First, stigmatization exists as part of a series of interchanges within social settings, whereby a group carrying social power denigrates (and discriminates against) a group lower in power (Link & Phelan, 2001, 2006). Thus, stigmatization is inseparable from social hierarchies. Because what is considered proper and good is malleable—and subject to sociocultural input—there is reason to hope that mental illness stigma may diminish in the future. Indeed, some attributes or conditions formerly receiving high levels of stigma (e.g., left-handedness, cancer, gay/lesbian status) are now less likely to receive castigation, with some attributes/conditions revealing dramatic improvements and others to a lesser extent. Relevant processes include greater knowledge, changed cultural standards, contact with members of the formerly stigmatized groups, and the openness versus closed-off nature of particular societies with respect to acceptance of behavioral differences, disease states, or what are perceived as lifestyle choices.

Second, stigma carries particularly stressful consequences if the stigmatized condition is potentially concealable—as is the case for many if not most persons with histories of mental illness. A key reason relates to the ramifications of incessant decisions for the concealing

individual about whether to come out (Goffman, 1963; Jones et al., 1984; Karnieli-Miller et al., 2013; see also Pachankis, 2007). Unlike the overt nature of racial/ethnic characteristics, for example, the covert experience of mental disorder presents a host of choices: whether to maintain concealment or to disclose, and for the latter, to whom, when, and how. This iterative process may result in substantial anxiety for both individuals and family members, potentially straining social interactions. Thus, concealable stigmas are anything but benign.

Third, stigmatization can be viewed as a set of social processes (comparison, castigation, marking, long-term expectations) that lead to continuing denigration. One such process involves the nearly automatic social cognitions that are evoked when members of a society confront a member of an out-group (Myers, 2013). Another is the tendency for global attribution of negative traits to the individual's mark. Still another includes the potential for self-fulfilling prophecies, whereby the mere expectation of deeply dysfunctional behavior and interaction (on the part of both sides of a social encounter) may shape subsequent encounters with the individual. That is, when imperfections are automatically attributed to the flawed character of the affected person, the degraded individual's behavior may begin to conform to the initial stereotype (Jussim, Palumbo, Chatman, Madon, & Smith, 2000).

Fourth, at the level of social cognition and related behaviors, stigma shares elements with *stereotyping* (a fairly typical cognitive process of viewing groups in global terms), prejudice (an affective, negative prejudgment of members of a castigated group), and *discrimination* (the behavioral curtailing of rights of such a group; for distinctions, see Phelan, Link, & Dovidio, 2008). In terms of stereotypes, all humans use these to some extent to simplify the massive amount of social information related to daily interpersonal contact. In this sense, stigma-related processes can be considered part of normative social cognitive mechanisms. It is when stereotypes take on a negative valence (prejudice) and lead to indefensible and unjustified infringement of the rights of others (discrimination) that the major consequences of stigmatization ensue (Hinshaw, 2007).

Yet stigma transcends these three elements, as it also encompasses the strong tendency for perceivers to view *all* aspects of stigmatized individuals in terms of the fundamental flaw or deviance involved. Furthermore, as noted, there is a concurrent (although not inevitable) tendency for the stigmatized individual to internalize the aspersions that are made, a process called internalized or self-stigma (Major & O'Brien, 2005). For international perspectives on self-stigma related to mental illness, see Krajewski, Burazeri, and Brand (2013); linkages between public and self-stigma are analyzed in Evans-Lacko, Brohan, Mojtabai, and Thornicroft (2012). In sum, stigma processes are at once fascinating and complex. They are simultaneously related to principles of normative social interchange, linked to social power, and potentially iterative and pernicious.

A key underpinning of stigmatization was perceptively noted by Goffman (1963): The globalized, castigating nature of stigma often means that perceivers often come to believe that the marked person is less than human. When such an ascription is made, harsh punishment, exploitation, and even annihilation may follow (Sternberg, 2004). Later in the chapter we address the crucial issue, in terms of mental illness, as to the kinds of causal theories that may lead to perceptions of the fundamental humanity versus subhumanity of individuals with extremes of behavioral deviance (see Epley, Schroeder, & Waytz, 2013, Haslam, 2006, and Haslam & Loughnan, 2014, for essential considerations related to ascribed humanity and dehumanization).

A crucial question is whether stigma invariably portends negative self-image for members of stigmatized groups. In other words, is internalized stigma/self-stigma inevitable? Despite this classic view (see Allport, 1954), many stigmatized individuals, particularly those in racial/ethnic minorities, have relatively high self-esteem, even higher than individuals in the majority group (e.g., Crocker & Major, 1989; Major & O'Brien, 2005). Hence, lowered self-image is not an inevitable consequence. Yet in the case of mental illness—for which until relatively recently group support and solidarity have been abysmally low—internalized stigma may be a particularly likely occurrence. Crucially, internalized stigma among individuals with mental illness has been linked to nonengagement in treatment or early termination from intervention (see Sirey et al., 2001). Overall, self-stigmatization appears to be a crucial, although not inevitable, phenomenon in the developmental unfolding of stigma-related processes, with important implications for a lack of engagement in needed interventions.

Finally, is stigma universal or culturally specific? Increasing attention is being paid to the universal aspects of stigmatization, which may betray an evolutionary basis for at least some aspects of social exclusion (Kurzban & Leary, 2001). Indeed, mental illness has received consistent stigmatization across history, and across nearly all cultures, leading to intensive speculation as to the ingrained roots of fundamental social tendencies to exclude persons with

extreme behavioral deviance. If stigmatizing tendencies themselves are part and parcel of our shared humanity, the clear implications are that (a) evolutionary psychological views may be quite heuristic and (b) overcoming stigma will be a steep, uphill climb.

Yet human cultures vary dramatically in terms of acceptable behavioral and emotional styles. Moreover, traits or conditions that are stigmatized in one historical era may come to be valued in others. Take, for example, the fluctuating ideals of women's body size, in different nations and historical epochs, or the cultural variety regarding which parts of the human body are eroticized (see Farley, 2006). Moreover, racial/ethnic prejudice and stigma, which may also share automatic levels of bias, can be reduced over time via education, contact, and effort (Marsh, Mendoza-Denton, & Smith, 2010). Tolerance is demonstrably feasible and, in a just society, should be a fundamental goal. It may well be that, over time and through strong efforts linked to empathy promotion, and the fostering of equitable contact, stigmatization of mental illness can and will be reduced. Yet the belief that that such change will come about simply, swiftly, or easily is mistaken. As with nearly all other social problems related to perceptions of differences between groups (e.g., those with a different skin color, religion, disease process, or behavioral repertoire), altering entrenched attitudes and patterns of discrimination will be a long-term process.

THEORETICAL PERSPECTIVES ON STIGMA

Stigma is a vibrant topic in current research and scholarship in social-personality psychology, psychiatry, intergroup relations, evolutionary psychology, disability studies, and more. Although most research on stigma has focused on gender and racial/ethnic minority groups (Quinn & Chaudoir, 2009), evidence reveals (as noted) that mental illness is still highly stigmatized (Hinshaw, 2007; for a ranking of stigmatized attributes from 45 years ago, see Tringo, 1970). It is important to note, however, that whereas the overall construct of mental illness can and does receive strong stigma (e.g., Martinez, Piff, Mendoza-Denton, & Hinshaw, 2011), specific forms of mental disorder have unique stigma profiles. Whereas schizophrenia and substance abuse each attract substantial stigma, stigmatizing attitudes about depression are sometimes (but not always) more muted (Pescosolido et al., 2010). Thus, one should always consider specific forms of mental illness, in addition to the generic or global construct, when appraising findings and implications of stigma-related research. Indeed, given what appears by all counts to be more open attitudes toward difference among younger generations in today's world, it is particularly tempting to posit that stigmatizing attitudes and discriminatory practices have a strong chance of undergoing fundamental change in the coming years. Yet for the reasons noted already and discussed later in this chapter, the road ahead will not be smooth.

Our purpose in this section is to discuss some of the core themes from social psychological and evolutionary psychological perspectives on stigma and comment on their applicability to mental disorder. Research on stigma in recent years has been voluminous; see other sources for more comprehensive accounts (e.g., Crocker, Major, & Steele, 1998; Dovidio, Hewstone, Glick, & Esses, 2010; Gaertner & Dovidio, 2000; Heatherton, Kleck, Hebl, & Hull, 2000; Hewstone, Rubin, & Willis, 2002; Hinshaw, 2007; Link & Phelan, 2013; Thornicroft, 2006).

Social Psychological Approaches to Stigma

Half a century ago, most accounts from a psychological perspective were based on the view that prejudice and stigma stem from deep-seated, individual-difference proclivities, such as the authoritarian personality type (e.g., Adorno, Frankel-Brunswik, Levinson, & Sanford, 1950). However, evidence from taxometric studies suggests that prejudice is not categorical (Denson, Iyer, & Lickel, 2010). That is, the social world cannot be bifurcated into racists versus nonracists, given that prejudice and stigma exist on a set of continua. Current social psychological perspectives integrate notions of the ubiquity of stigmatization, the embeddedness of stigma in ordinary adaptive psychological processes, and the universality of social comparisons (e.g., see Fiske, 2011, and Pearson, Dovidio, & Gaertner, 2009). Social comparisons—that are sufficiently negative and harsh to earn the term *stigmatization*—emanate from common and pervasive social and developmental mechanisms. It is mistaken to view all aspects of stigma as pathological/morally flawed—or high stigmatizers as qualitatively distinct from other social perceivers. Thus, there is an intriguing parallel with conceptions of mental illness per se, for which dimensional views are now in ascendancy (e.g., Insel et al., 2010).

Social psychology begins with the axiom that the formation and maintenance of social groups is essential for survival (see Lewin, 1948). Accordingly, there is a fundamental tendency to identify with in-groups—those social groupings of which one is a member by birth or community—and to distinguish these fellow in-group

members from those in out-groups, those foreign social groupings, tribes, or communities posing a threat to survival (especially when resources are scarce). The deep-seated nature of in-group identification is revealed by minimal group research (Brewer, 1979; Tajfel, 1982). That is, even the apparently trivial act of flipping coin, or assigning different shirt colors, can elicit strong tendencies to align with like in-group members and castigate those in the out-group.

When an out-group member poses an actual or symbolic threat to the social perceiver, the likelihood of prejudice and stigmatization increases considerably (Stangor & Crandall, 2000). In the case of untreated, psychotic-proportion mental illness, the threat value of out-of-control, irrational symptoms may be palpable, even at the level of physical harm. Yet even in the case of forms of mental disorder that are not as overtly threatening, the very term *mental illness* connotes despair, weakness, and loss of reason, thereby posing symbolic threat. In pioneering research, Solomon, Greenberg, and Pyszcynski (1991) showed that harsh judgments against out-group members are intensified when thoughts of death or mortality are primed in perceivers (see Hayes, Schimel, Arndt, & Faucher, 2010, for a contemporary overview). This tendency may be especially strong when the out-group suffers from physical deformities or behavioral extremes, which may remind perceivers directly of the fragile and transitory nature of health and of life. The idea behind this provocative and replicated phenomenon of mortality salience incorporates existential, meaning-based perspectives into the types of situations that are likely to elicit harsh reactions against marked individuals—particularly those with the kinds of behavioral features consistent with mental illness.

Dimensions of Stigmatization

Several features of castigated traits and conditions have major implications for their propensity to be stigmatized (see the seminal and perennially relevant exposition of Jones et al., 1984). As noted, the *concealability* of a stigmatized attribute raises anxiety regarding decision-making with respect to openness versus disclosure (Goffman, 1963), clouding judgment and creating conflictual social interactions. Furthermore, the *threat* or *peril* induced by the mark has strong implications for stigmatization. Indeed, when strong and pervasive cultural stereotypes emphasize the dangerousness and violence potential of persons with mental disorders, the perception of threat—and of the likelihood for *disruptiveness* in social interchange—is magnified. Another core dimension is termed *aesthetics*: Conditions that lead to bodily disfigurements have often received great stigmatization (see section titled "Evolutionary Origins of Stigma").

The final dimensions from the taxonomy of Jones et al. (1984) are of clear relevance for mental disorder. First, the *course*, or longitudinal stability, of the mark in question is typically related to the propensity for stigmatization. Conditions viewed as long-lasting or chronic are far more likely to receive stigma than transitory states. In the case of mental disorder, a predominant view is that most forms are immutable, lifelong conditions, a perception that fuels high levels of stigmatization (see Martinez & Mendoza-Denton, 2011). The actual evidence for immutability and chronicity, however, is quite nuanced. For example, mood disorders are highly likely to be recurrent, meaning that great numbers of individuals with such conditions have protracted periods that are relatively symptom free (e.g., APA, 2013; Goodwin & Jamison, 2007). As for disorders of childhood onset, ADHD usually persists into adolescence, but adult outcomes show high variability (e.g., Hinshaw et al., 2012). The view that all types of mental illness yield immutable, chronic maladaptation is false; symptoms fluctuate, waning and waxing as a function of time, insight, and treatment engagement. Greater public knowledge of the malleability and treatability of mental disorders is an important goal, with high potential for stigma reduction. We note that the most important forms of such education are not likely to be strictly factual but instead should involve pointed personal examples that defy the pervasive stereotypes of mental disorder as permanent or incurable.

Second, a particularly crucial dimension is related to the *origin* or cause of stigmatized conditions as well as the closely linked feature of their perceived *controllability*. Attribution theory is clear in this regard: Negative behavioral traits or features that are believed to arise for reasons outside the individual's personal control should elicit sympathy and concern, whereas those that are directly controllable will engender anger and punishment (Weiner, 1985, 2006). In other words, if the deviant and threatening behavior is an individual's fault, society is highly likely to blame him or her (and in the case of children and adolescents, the parents). Weiner, Perry, and Magnusson (1988) presented clear experimental evidence in this regard: Disabling conditions viewed as out of the individual's control (i.e., physical deformities) were likely to be met with compassion, whereas those linked to personal blame (i.e., behavioral or mental problems) generated rejection and hostility (see Corrigan et al., 2000, for further extrapolation to mental disorder).

Along with the considerable advances in neuroscience and genetics of recent years, this attributional perspective presents a compelling reason for the promotion of efforts, across the past several decades, to portray mental illness in medical-model terms: as a set of conditions analogous to physical illnesses or, explicitly, as brain diseases (Insel et al., 2010; D. L. Johnson, 1989). Indeed, such views are strongly supported by many advocacy groups and even leaders in the mental health fields (for critical discussion, see Miller, 2010, who emphasized the theoretical, philosophical, and clinical implications of overfocused ascription of behaviors to brain-related mechanisms). In a nutshell, this perspective reasons that if mental illness is attributed to uncontrollable causes linked to genes and biological vulnerability, public attitudes should shift markedly toward reduced stigmatization.

We hasten to point out, however, that an unthinking rush to recast all mental disorder in reductionistic, biogenetic terms is no panacea for reducing stigma (Kvaale, Haslam, & Gottdiener, 2013; Rüsch, Todd, Bodenhausen, & Corrigan, 2010). For one thing, certain traits—most saliently, racial/ethnic characteristics—that are clearly beyond personal control have been among the most disparaged attributes throughout human history. Moreover, it may be a hard sell to convince the general public that constellations of behavior and affect result from genes and temperament, given the default cultural assumption that personal effort and volition are the sources of most behavioral displays. Yet even if a large segment of the public is convinced that strongly heritable, biologically based proclivities underlie mental disturbance, this altered attributional stance does not assure that benign attitudes will follow.

First, at its extremes, such a causal model is reductionistic, failing to account for the transactional nature of the development of nearly all forms of psychopathology (Hinshaw, 2013). Second, for reasons that should become clearer upon reading the section on evolutionary perspectives on stigma ("Evolutionary Origins of Stigma"), ascriptions to exclusively genetic etiologies and exclusively neural loci for mental illness may actually fuel a backlash, such that interpersonal responses will be harshly punitive (e.g., Mehta & Farina, 1997). Indeed, an exclusively biological/genetic perspective appears to promote the views that (a) mental disorder is immutable, unremitting, and hopeless (Martinez & Mendoza-Denton, 2011; Phelan, 2002; Phelan, Cruz-Rojas, & Reiff, 2002) and (b) mental illnesses are linked with genetic defects, rendering the individual less than fully human and categorically different from others (Haslam, 2011). The groundbreaking meta-analysis of Kvaale et al. (2013) revealed that whereas biogenetic attributions for mental illness tend to reduce perceptions of blame, they simultaneously evoke pessimism (with respect to the individual's eventual outcome) and may increase, rather than reduce, social distance. The well-intentioned push to emphasize the origins of mental illness as biological in nature may have unintended consequences, fueling rather than reducing stigmatization, especially when done in reductionistic fashion. Far more research needs to be done on the complex—and counterintuitive—relationship between control attributions and stigma related to mental illness.

Despite the undoubted psychobiological roots of mental disorder, we challenge the policy-related perspective that ascribing mental disorder to brain disease will automatically eradicate stigma. A realistic descriptive and explanatory account of mental health and illness is most accurately reflected in contextual, reciprocal, and transactional models—frameworks consistent with the developmental psychopathology perspective (Hinshaw, 2013). However, communicating this understanding to the general public may be difficult, in part because of its complexity, which renders it resistant to readily digestible sound bites.

Core Features of Stigma

There are several core features of stigma, extending from the psychological to the institutional. In the next section, we examine stigma's most central attributes.

Pervasiveness and Implicit Stigma

The most marked and castigated conditions or subgroups in a given society are likely to yield to widespread consensus from members of the culture as to their devalued status (Crocker et al., 1998). In other words, stereotypes about devalued groups are extremely pervasive. Especially given the access to print, visual, and electronic media in modern societies—but also through storytelling, literature, and folklore in many additional cultures—widespread consensus usually exists around the racial/ethnic, religious, subcultural, and behavioral subtypes that are shunned. As a result, nearly all members of a society are confronted with images of the stereotyped group: Children hear and see these portrayals at young ages, and the views of such negative characteristics are prone to become overlearned.

An upshot of such pervasiveness is that stereotypes and negative attitudes come to be automatically triggered when an out-group member is identified or recognized (Crocker et al., 1998). Furthermore, conscious efforts to

suppress the automatic stereotypes in question may backfire when the perceiver has limited or overtaxed cognitive resources, thereby fueling a paradoxical overaccessibility of the negative stereotype (see Wegner, 1997). Indeed, what are now termed *implicit* stereotypes and prejudices are those that are unconscious, automatic, and overlearned, as opposed to consciously and overtly expressed (Greenwald & Banaji, 1995; Greenwald, Poehlman, Uhlmann, & Banaji, 2009). A wealth of current research in social psychology relates to implicit stereotyping and prejudice, particularly with respect to racial/ethnic attitudes. Relevant investigations utilize reaction-time methods that capture automatic associations, made without conscious introspection or control.

In contrast to implicit processes involved in racial/ethnic stigma, the role of implicit processes in mental illness stigma is relatively understudied. What has been shown empirically thus far, however, is alarming. Among university student samples, evidence exists of strong implicit associations linking mental illness labels to negativity, helplessness/incompetence, and blameworthiness (Teachman, Wilson, & Komarovskaya, 2006, Study 1). People with mental illness may also harbor comparably negative biases themselves, suggesting internalized stigma (Teachman et al., 2006, Study 2). These latter findings (regarding implicit self-stigma) have been conceptually replicated by other investigative teams: Among people with mental illness, investigators have found, at the implicit level, decrements in self-esteem as well as effects of shame (Rüsch, Corrigan, Todd, & Bodenhausen, 2010; Rüsch, Todd, Bodenhausen, Olschewski, & Corrigan, 2010). Elucidating the causes and consequences of implicit associations in mental illness stigma—in social perceivers and the targets of stigma—warrants sustained and systematic research attention.

Ambivalence

A second core feature of stigmatizing reactions is the *ambivalence* inherent in their display (Hebl, Tickle, & Heatherton, 2000; Katz, 1981). A key argument is as follows: Social valuations of out-groups are inherently complex, balancing compassion on one hand ("people are down-and-out and have been mistreated") and harsh judgment ("but after all, they must not have displayed effort and hard work that we did") on the other. Moreover, many members of modern society hold two often-conflicting values: egalitarianism (the belief in the equal worth of all humans and the equal opportunities that should be available to all members of society) versus individualism (the belief that individual efforts are essential to personal advancement and are rewarded by social and monetary gains). Egalitarian views of members of disadvantaged out-groups should yield sympathy, identification with victims, and efforts to redress social injustices. However, individualistic views will turn this perception on its head, such that members of stigmatized groups will receive blame for insufficient efforts on their own behalf.

Thus, confrontation with an out-group member may well elicit ambivalence: the co-occurring or vacillating display of sympathy and castigation. As a result, reactions to stigmatized persons are likely to be unstable (oscillating between empathy and revulsion), extreme, and volatile across time. It may take only a small nudge—for example, witnessing one additional member of a stigmatized group—to shift an initially positive response to a hostile one, or vice versa (see Katz, 1981, for experimental evidence). This complexity makes for clear difficulties in investigating, much less reducing, stigma. Yet the presence of at least some initial compassion for stigmatized individuals provides reason for optimism.

With respect to racial/ethnic bias, as well as discrimination against women and sexual minorities, recent social changes have fostered new sets of social standards for the kinds of responses that are publicly acceptable to display. That is, current forms of racism or sexism (or even homophobia) may be far more masked than the overt, bigoted expressions that were formerly commonplace. Proponents of the concept of modern or symbolic prejudice or racism hold that such attitudes are expressed via conservative political views emphasizing individual responsibility or meritocratic beliefs, instead of direct antipathy toward an ethnic out-group. Pearson and colleagues (2009) described an important variant termed *aversive* prejudice or racism. Here, individuals consciously committed to nonstigmatizing views still hold overlearned, unconscious, negative attitudes that emanate from cultural exposure to negative stereotypes, which may leak when there is no clear set of cues to show egalitarian expression. Phenomena such as aversive racism reflect modern society's deep, even unconscious, ambivalence regarding out-groups, reflected in internally clashing attitudes and emotions.

Regarding mental health stigma, progress has been slow, meaning that it is still often permissible to explicitly stereotype and castigate persons with aberrant behavior patterns or mental illness. Yet as social mores and what are considered to be socially accepted responses change (i.e., when overt stigmatization is less and less tolerated), implicit and hidden attitudes may become the predominant means of castigating such individuals. These less-visible forms of aversive sentiments should predict greater display

of subtle exclusionary practices rather than overt bias. Given their complex interplay, both implicit and explicit attitudes and biases need to be assessed in comprehensive stigma research.

Motivations for Stigma: Cognitive Schemata, Self-Esteem Enhancement, and Institutional Supports

Why do members of in-groups stigmatize those in out-groups? As discussed by Allport (1954), in-group identification does not absolutely require out-group derogation. Nevertheless, several psychological and social tendencies often dictate that the two processes become intertwined.

Social Cognition

There is an overwhelming amount of information in our everyday social worlds. Humans have highly developed and efficient cognitive structures and processes for dealing with the deluge of social information that confronts them (see Myers, 2013, for a review). These methods include strong tendencies to categorize the social world through templates called *social schemas*. People make rapid judgments about individuals on the basis of these schemas.

Such modes of perceiving the world can quickly become stereotypes, preserving cognitive resources when perceivers are tired, pressed for time, or otherwise cognitively taxed. This kind of categorizing may lead people to see those from different social groups as all the same, exemplifying the out-group homogeneity effect (Ryan, Park, & Judd, 1996). Another cognitive tendency is to make linkages (or associations)—which become automatic—between negative attributes or events (e.g., violence, aggression) and socially determined categories, such as minority groups, including those with mental disorders (Greenwald & Nosek, 2008; Haghighat, 2001; Stroessner & Mackie, 1993). In short, some roots of prejudice and stigma do not require grossly unequal social conditions or discriminatory practices to be realized. Rather, they stem from normative aspects of social cognition. Note, however, that the presence of these tendencies does not imply that any resultant stigmatization is inevitable or immutable. Indeed, people can and often do invest the cognitive and emotional energy necessary for effortful social processing, integrating complex information to override stereotypes (see Devine, 1989).

Self-Esteem Enhancement

Evidence exists that derogation of out-group members serves to bolster not only social identity with the in-group but also one's self-esteem. In an intriguing series of studies, with troublesome implications, Fein and Spencer (1997) showed that individuals who had received information damaging to their own self-esteem made disparaging characterizations of members of stereotyped out-groups. Moreover, such negative evaluations of out-groups restored the disparagers' own self-image, at least temporarily. It is therefore tempting to posit that stigmatization can make one feel better about oneself, implying strong motivation to stigmatize.

Yet self-esteem enhancement cannot serve as the whole story regarding stigmatization. For instance, it does not explain the strong consensus that tends to develop within most cultures about who receives denigration and stigmatization. Moreover, it does not deal well with self-stigma—namely, the tendencies for out-group members to believe the stereotypes foisted on them and, at times, to display lowered self-worth in terms of the denigration they experience. Nonetheless, empirical findings that the putting down of devalued out-groups can at least temporarily bolster self-worth reveals at least some of the roots of the distressing tenacity of stigmatizing practices.

Institutional Supports

Cultures typically reveal *institutional supports* for discrimination. If segregation (or, indeed, slavery) is the law of the land, then system-justifying processes related to derogation of the disenfranchised group in question are likely. The reason is that such processes rationalize the officially sanctioned maltreatment. But other kinds of supports are part of cultural life. Dolls in the United States have also typically been white in color. During the middle of the last century, African American children were noted to prefer skin colors for drawings that were closer to the white norm than their own skin tone (Clark & Clark, 1950). Media portrayals provide another source of cultural modeling and strong institutional support for pervasive stereotypes. In this regard, the overwhelming portrayal of persons with mental disorders in the print and visual media is one of violence, unpredictability, and incompetence (Wahl, 1995, 2012). Clearly, societal and institutional factors motivate stigma.

An additional macro variable pertains to economics. In brief, it is likely that that there are harsher reactions to deviance during periods of difficult economic circumstances than during affluent times (Jones et al., 1984). In what is termed realistic group conflict theory, competition for scarce resources motivates high levels of out-group derogation (Sherif & Sherif, 1953; Stangor & Crandall, 2000). In a classic naturalistic investigation, Hovland and Sears (1940) found an inverse statistical association

between economic indicators (e.g., the price of cotton in the southern U.S.) and the number of lynchings of African Americans during corresponding periods. Lower prices (signifying economic downturns) were associated with a rise in such murders. Subsequently, Hepworth and West (1988) reanalyzed the same data with more sophisticated data-analytic techniques and concluded that, although the original findings may have exaggerated the magnitude of the relationship, the basic result held up. With respect to mental disorder, society provides sizable amounts of money and resources for individuals with serious mental illness as well as intellectual disabilities (although not to the extent of parallel expenditures regarding physical illness). During times of economic hardship, the willingness to provide such support may well wane.

A final macro variable to consider pertains to changes in the physical environment. A provocative, recent meta-analysis published in *Science* presented compelling evidence that climatic changes adversely affect intergroup conflict (Hsiang, Burke, & Miguel, 2013). A key implication is that rising temperatures related to anthropogenic sources may exacerbate tensions among a diverse array of social groups. These results are especially troubling to the extent that, across marginalized groups, people with mental illness might be considered the "lowest of the low," in the memorable phrase of L. T. Harris and Fiske (2006, p. 847). As global temperatures continue to climb, intergroup antagonism may intensify between neurotypical individuals and those with mental illness.

Evolutionary Origins of Stigma

It is increasingly evident that there could be a deeper, more fundamental way humans are universally predisposed to detect and shun fellow humans who show deviant behavior patterns. Specifically, evolutionary pressures may have hard-wired the capacity to stigmatize into the machinery of the mind (Kurzban & Leary, 2001). The near universality of the stigmatization of mental illness provides clear impetus to consider evolutionary processes as roots for such social exclusion. Furthermore, a preference for hierarchy—a feature of all primate groups, including humans—has specific neuronal underpinnings. Specifically, research implicates the left anterior insula and anterior cingulate cortices in such processes (Chiao, Mathur, Harada, & Lipke, 2009).

From an evolutionary theoretic point of view, humans have been selected over their history not only for prosocial tendencies but also for certain limitations on social interchange. Specifically, rampant sociability could foster exploitation. Framed somewhat differently, members of our species have always needed others for procreation, investment in parenting, and cooperation to achieve mutual goals. However, there are real costs to some social interactions, including (a) competition over shelter, economic resources, and mating partners; (b) the potential for aggression and violence; and (c) the contraction of parasites or contagious diseases. Underlying the evolutionary perspective is the assumption that humans require brakes on unbridled sociality because indiscriminate social contacts may compromise survival. Moreover, many other animal species display exclusionary strategies against conspecifics displaying certain forms of deviant behavioral patterns (Neuberg, Smith, & Asher, 2000).

The specific attributes most likely to engender naturally selected exclusionary mechanisms are those that presumably posed threats to early human societies. These include fellow humans who show parasitic infestation (revealing themselves through unsightly appearance or display of atypical behaviors), those who provide low social capital to or directly exploit social partners, and members of rival nationalities or cultures. Intriguingly, these three hypothesized types of social exclusion modules are isomorphic with the three kinds of stigmatized attributes originally posited by Goffman (1963): abominations of the body, character flaws, and tribal characteristics related to differences in skin color or place of origin.

Kurzban and Leary (2001) postulated that many characteristics of mental disorder can elicit the first two exclusionary tendencies. Specifically, behavioral and physical dishevelment (or even overly compulsive behavioral patterns associated with some forms of serious mental disorder) could trigger primitive fears of infestation or contagion. Birds and primates, in fact, signal parasites by excessive grooming. In addition, behavioral excesses and erratic behavior, along with poor inhibition, suggest both low social status and the potential for exploitation of others, putatively spawning the fear of being cheated. Yet the kinds of features related to tribal or nationalistic differences are not, on the face of it, linked to mental illness exclusion modules.

The specificity of implications from evolutionary models is noteworthy. First, emotional responses are postulated to differ across the three detection mechanisms. Those suspected of spreading parasites or disease will elicit disgust, violators of dyadic exchange are predicted to evoke anger (related to the violation of the social contracts), and members of tribal out-groups will tend to elicit fear and hatred (as a function of their threat to the home group or nation). Second, with respect to behavioral responses, the clear prediction is that those believed to be contagious will be shunned, those with character flaws will be punished for their social violations, and those in out-group tribes

will be economically and sexually exploited (Kurzban & Leary, 2001). In terms of mental illness—again, postulated to be linked to parasitic infection avoidance and social contract violations—the expected social responses would range from avoidance to punishment but not, presumably, the types of exploitative responses typical of national/tribal stigma.

Yet we urge further consideration. The surge of biogenetic research on the origins of mental illness yields strong evidence that many forms of mental disorder are moderately to highly heritable. Thus, as noted, there is advocacy for the explicit attribution of mental illness to reductionistic, biological medical models (such as brain disorder) by which mental disorders are assumed to be the product of defective genes or biochemistry (Insel et al., 2010; D. L. Johnson, 1989). Whereas attribution theory posits that such uncontrollable ascription should reduce blame, available experimental data suggest strongly that it can also induce punitive and distanced responses (see Mehta & Farina, 1997, and the meta-analytic review of Kvaale et al., 2013). One relevant mechanism may be that afflicted individuals come to be viewed not only as chronically diseased, and therefore beyond intervention, but also as a separate, inferior, and possibly even subhuman group (Haque & Waytz, 2012; Martinez, 2014; Martinez et al., 2011).

Indeed, when the issue at hand is irrational, potentially threatening behavior—along with a label (mental illness) that signals violence and incompetence (Ben-Zeev, Young, & Corrigan, 2010; Teachman et al., 2006)—attribution to a reductionistic, biological set of causes could fuel harsh and exploitative behavioral response. In other words, if the purveyor of threatening behavior has a genetic defect, he or she may now be branded as subhuman, even at the level of his or her very DNA (e.g., Dietrich et al., 2004; Phelan et al., 2002; Read & Harré, 2001; Rüsch et al., 2010; note that Corrigan & Watson, 2004, called for a balanced set of attributions, emphasizing biomedical and psychosocial risk factors for mental illness). Thus, one interpretation is that even though the tribal stigma module—initially theorized by Goffman (1963) and further elaborated by evolutionary psychologists (Kurzban & Leary, 2001)—does not initially appear related to mental disorders, it may be triggered by reductionistic, biogenetic accounts of mental illness, thereby fueling punitive and exclusionary tendencies.

Overall, although hard to test empirically, the evolutionary perspective represents an important effort to explain the apparent universality of many forms of stigmatization, particularly those related to mental illness. As currently proposed, it is not particularly developmental; understanding how children and adolescents come to their stigmatizing perspectives is an important research topic. Whereas the evolutionary theoretic viewpoint initially appears pessimistic—given its core tenet that human tendencies to exclude, shun, and even punish other persons with certain forms of behavioral deviance emanate from naturally selected tendencies—even advocates of evolutionary models agree that such proclivities do *not* mean that people must or should always act on these exclusionary modules (Kurzban & Leary, 2001). The presence of these potentially innate modules, however, deserves consideration when designing interventions to combat stigma, as overoptimism risks devolving into disillusionment (see Hinshaw, 2007). Indeed, regardless of the potency of evolved systems in shaping attitudes and behavior, the implication is *not* that they are correct or right in current times nor that they are inherently unmodifiable (see Mayr, 1974, for discussion of open programs). Even though stigmatization may in part be the product of evolutionary biological pressures, we need not succumb to the naturalistic fallacy—that is, the mistaken inference that an is requires deriving an ought, which in turn dictates social and moral action.

Summary

Stigma is multifaceted, complex, and overdetermined. The theoretical and empirical traditions of social-personality psychology have propelled understanding of basic stigma processes, the roots of which lie in social cognition, intergroup processes, and social hierarchies. In addition, natural selection may have shaped fundamental exclusion tendencies, some of which appear directly related to the propensity for the stigmatization of mental illness. Whereas the roots of stigma appear to lie deep within typical modes of functioning, the degrading, humiliating, and terrorizing aspects of prejudice and stigma are not predestined. Because stigma typically involves ambivalence—in which empathy and concern are intermingled with fear and hostility—promoting greater identification with, and compassion for, those with behavioral differences is an essential goal.

HISTORICAL PERSPECTIVES ON STIGMA: CHANGE AND CYCLICITY

Too often, historical accounts portray the past in sweepingly homogenous terms. For instance, the naturalistic, medical models of ancient Greece and Rome are juxtaposed with the chaos and ignorance of the Dark Ages; moralistic crusades against deviance in the middle of the seventeenth century (including witch hunting) are contrasted with the

humane treatment of the late Enlightenment or the current era. In fact, such global trends contain many distortions, as does the perspective that history moves inexorably toward increased progress. Closer to the truth are the presence of cycles of reform and retrenchment. Indeed, themes of biological versus environmental causation, personal control versus lack of control, and punitive treatment versus humane care have waxed and waned over time (Allderidge, 1979; Hinshaw, 2007). Despite the hope for linear models of progress, it is instructive to keep in mind the cyclic nature of social trends.

Still, the predominant theme across recorded history regarding the treatment of persons with mental disorder includes a strong tendency toward exclusion and punishment. Indeed, once people began to write down narratives of their cultural practices, descriptions of individuals with atypical behavior patterns soon followed. Ancient texts, such as the Bible, provide richly detailed accounts of mentally disordered behavior (Hinshaw, 2007).

Even though much unofficial history may have been characterized by attempts at home custodial care of persons with mental illness, official accounts are filled with cruelty and banishment as primary modes of response (Zilboorg, 1941). One fundamental theme is that views of and treatments for mental illness have lagged considerably behind mainstream scientific and humanistic advances. Moreover, the stigma surrounding the entire topic has greatly limited the spread of human knowledge (and scientific knowledge) on this subject (Hinshaw, 2007). During the Renaissance, for instance, the explosion of scientific and artistic advances was not matched by commensurate improvement in the understanding or care of those with mental illness. Instead, understanding of these individuals continued to be viewed with an amalgam of moralistic, superstitious, and deeply problematic biological perspectives (Zilboorg, 1941). When aberrant or threatening behavior was the subject matter, compassion did not always follow.

Adults with Mental Disorder

Across nearly all historical periods, a core perspective on disturbed behavior has involved the view that it emanates from demonic possession (see Zilboorg, 1941). Given their moralistic framework, such demonologic views have been associated with harshly punitive social responses. Yet in some instances, religious and moral perspectives have been linked to hopeful and humane care. Monasteries, for instance, were sometimes refuges during the Middle Ages, and the theory and practice of moral treatment in the early nineteenth century carried both humanitarian and religious overtones (Grob, 1994).

In terms of biological perspectives, one of the first recorded naturalistic views of mental disorder occurred in classical Athens with Hippocrates. He posited that mental illnesses originated from imbalances in one or more of the four major bodily humors. This theory was accompanied by his view that persons afflicted with such disturbances required careful diagnosis, compassion, and humane treatment that emphasized a restoration of bodily balances. Yet the lack of sophistication of the biological theorizing in such models meant that bloodletting and purging (through emetics) were primary treatments for the next two millennia. In addition, exclusively biological views have also been associated with the perception that mental illness is hopeless, chronic, and immutable, thereby fostering the belief that isolated custodial care in institutions should be the main treatment option.

History is replete with instances of cruelty and maltreatment toward persons with mental disorder. One of the predominant views of so-called insanity and lunacy in Western cultures has been that the afflicted individual had lost his or her fundamental abilities for exhibiting rational thought and reason, spurring the belief that he or she was less than fully human. Hence, many treatments involved terror and fright to spur the individual back to full mental faculties. At the level of physical sensation and pain, it was believed that such beatings, inductions of fright, or subjugation to extremes of cold in unprotected winter quarters did not affect "the mentally disordered" in the same ways as they would affect typical individuals (Zilboorg, 1941).

Institutional care, first in special wards of general hospitals and then in asylums created for the insane, spurred excursions by citizens of the nearby cities to observe (for an admission fee) the psychotic behavior of the inmates. Given the clear parallels with tours of zoos, the underlying belief was that the persons in the institutions were subhuman animals. Even some of the great liberators of those with mentally illness—Pinel in France, Tuke in England, Rush in the New World—held harshly authoritarian views of the childlike nature of persons with mental illness (Hinshaw, 2007).

A strong custom in many cultures was to force persons with mental illness outside of cities, towns, and villages to wander the countryside, begging for subsistence. Hence, shunning and exclusion were strong undercurrents of response to mental disorder (Zilboorg, 1941). As with institutional care in distant asylums, such banishment served to place mental disorder outside the everyday

awareness of most citizens, comprising another legacy of stigmatization.

The twentieth century was marked by the rise of increasingly secular—and increasingly scientific—views of mental illness, as demonstrated by the growth of the disciplines of psychology and psychiatry. Still, one important trend was the eugenics movement, which originated in the United Kingdom and rapidly spread to the United States (Black, 2003). The underlying belief in the genetic locus of intellectual disability and mental illness led to the passage of mandatory sterilization laws in a majority of states. This perspective set the stage for even more stringent measures in Nazi Germany, where hundreds of thousands of persons with mental illnesses (and intellectual disabilities) were not only sterilized but also annihilated (Kevles, 1985). Once again, reductionistic perspectives on biological loci of mental disorder have been associated with extremes of cruelty.

At the same time, psychological perspectives were emerging, most notably the psychoanalytic views of Freud and his followers. Although these perspectives (like the biological perspectives just discussed) tended to rid mental illness of demonologic overtones, for much of the century they directly implicated poor parenting as the cause of most forms of mental disturbance. In fact, conditions like autism and schizophrenia were held to result from faulty, cold, and unresponsive parenting. Such beliefs fueled decades of direct parental stigmatization regarding the mental disorders of their children (e.g., Bettelheim, 1967), representing a professionally sanctioned form of courtesy stigma.

We note the deinstitutionalization movement of the last 50 years. The advent of psychotropic medicine—plus the emergence of a community mental health model—led to the curtailing or closing of public hospital settings for children and adults with mental disorder from the 1960s through the present day (Grob, 1994). Whereas few would argue against the core tenets and intentions of this movement—including its goal of ending the dehumanizing, isolating conditions of mass institutionalization—the reality is that governments have often viewed deinstitutionalization as a means of cost saving. The absence of stable, long-term community-based services has allowed severely mentally ill individuals to exist in underfunded community residences—or in jails (or, far too often, on the streets). Tragically, these persons have become the face of mental illness in recent decades, in all likelihood fueling greater stigmatization.

Although it might seem self-evident that stigma has decreased in modern times—with its emphasis on science and reason instead of demonology—contrary views are worth considering. Indeed, Sartorius (1999) claimed that stigma has actually increased in the current era due to three key factors: (a) increased urbanization, which makes displays of deviance salient to more of the population; (b) increased educational and skill demands for technological and technocratic jobs, which renders failure in these domains due to mental disorder more noticeable; and (c) an extensive growth of a middle class in many societies, which intensifies social pressures toward behavioral standardization and conformity. Although speculative, this analysis gives reason for caution for those who assume linear reductions in stigmatization as modernization and Westernization proceed.

A key challenge for modern understanding is to appropriately blend current advances in neuroscience related to mental disorder with appreciation of social/contextual influences. These latter factors—which range from family interactions and school climate to neighborhood factors and the influence of the general culture—elicit and mold biological risk and vulnerability (Hinshaw, 2013). Even at the level of genetic risk, we must appreciate epigenetic factors and forces that shape gene expression (see Francis, 2009.) It is just as mistaken to retreat to the exclusively environmental views on causation from the middle of the twentieth century as it is to hold on to present-day biological reductionism—which at its worst can echo historical eras of humors, bloodletting, or phrenology. A balanced perspective may be difficult to turn into sound bites and 140-character Twitter feeds for public consumption, but (a) it has the advantage of scientific and clinically accuracy and (b) it may well have important implications for stigma reduction. Specifically, a transactional view may remove the personal or family blame for mental illness, emphasize biological vulnerability (but not inevitability or predetermination), and preserve the importance of personal and family responsibility for changing lifestyles, seeking treatment, and promoting strengths and resilience.

Children with Mental Illness

The plight of children—and, in particular, children with mental disturbances—across history is one that should elicit considerable shame. One sobering perspective is that relatively few children have survived childbirth, infancy, and childhood across most cultures and historical periods, limiting parental attachment to and investment in young children. Even as late as seventeenth- and eighteenth-century America and Europe, the clear majority of children did not survive until age 4 or 5 years (Donohue, Hersen, & Ammerman, 1995). Children have

also been viewed as miniature adults in many cultures, with childhood viewed as a brief period of time before youngsters were, of necessity, brought into the labor force (Aries, 1962). As a result, children's rights have been virtually nonexistent, with extremely high rates of exploitation, neglect, abandonment, and abuse (Phares, 2003). Indeed, a common practice throughout multiple cultures has been the practice of infanticide—the deliberate killing of babies and young children—when family size became too large and when providing for yet another mouth to feed was not possible. This practice was much more likely to occur when the child possessed physical or behavioral deviance. Short of the killing of deviant or disabled children, evidence is strong that such youth were stigmatized through treatment with scorn and derision (Donohue et al., 1995).

To assure economic well-being for families, youth were commonly put to full-time work by the age of 6 (e.g., in the fields) and marriages were arranged before adolescence. Children were often sold into slavery, and beatings were routinely accepted as discipline. As soon as children could provide labor in agrarian cultures, they typically did so (Donohue et al., 1995). With the advent of industry in the past several hundred years, children provided a cheap source of labor, until restrictions on such practices were recently instituted.

Only in the last several hundred years has childhood been viewed as a distinct developmental phase, and only in the last century and a half have there been movements to curtail child labor and mandate education. Furthermore, until only the past few decades, parents have had the right to physically and emotionally harm children—largely because of the views that family matters, such as discipline, are inherently private (see Helfer & Kempe, 1968). The brutalization of children has been such a part of many cultures that intergenerational patterns of maltreatment of children have been nearly endemic (Rhodes, 1999). Indeed, social institutions to treat emotional and behavioral problems are quite recent, dating only to the nineteenth century (Levine & Levine, 1992).

Whereas mental disorder has received banishment and harsh treatment throughout history, the plight of children and adolescents has been even worse, given the low status and utter lack of power afforded to youth. Parental blame for mental illness has been a mainstay of societal and even professional attitudes (see Lefley, 1992).

EMPIRICAL AND CULTURAL EVIDENCE FOR STIGMA

What do empirical research investigations reveal regarding the actual presence of stigma during our contemporary era? Moreover, what can we learn from a broader examination of cultural, linguistic, and institutional practices? We begin with attitudes of the general public, then highlight families and mental health professionals, and conclude with examination of less empirically rigorous, but nevertheless important, evidence stemming from everyday cultural practices.

Empirical Research

Researchers have gathered a wealth of empirical evidence in their efforts to understand the nature, mechanisms, and scope of mental health stigma. Below, we overview the contributions of this work.

General Public

Systematic research on mental illness stigma emerged in the 1940s and 1950s. Early investigators often utilized the methodology of presenting written case-history vignettes to probe respondents' abilities to identify whether mental illness was present and to appraise their attitudes toward mental disorder. Outcome measures typically included: (a) social distance scales (still common in contemporary research), whereby respondents appraised the degree of desired contact or distance from an individual so depicted; (b) informational and attitudinal measures; and (c) semantic differentials, for which respondents would choose between opposite pairs of adjectives, such as dirty versus clean, to describe the vignette (see, e.g., Nunnally, 1961). The overarching conclusion was the devastating nature of the stigmatization experienced by individuals with mental illness.

Indeed, once members of the public could identify a certain pattern of behavior as representing mental disorder, negative and rejecting responses were modal. The clearest explanations for such stigmatizing attitudes were the unpredictability and threat value of the behavior patterns in question (Rabkin, 1972). Stigmatizing attitudes characterized not only the general public but also family members and patients themselves. Furthermore, investigations revealed the presence of stigmatization even among mental health professionals and staff members, who had apparently internalized the general cultural messages of fear, distancing, and prejudice.

By the 1970s, however, some investigators noted that public attitudes, as revealed by questionnaire responses, had begun to shift toward a more empathic and altruistic stance toward people with mental illness (Crocetti, Spiro, & Siassi, 1971; Gove, 1982). Close examination reveals that such conclusions were premature. First, research in which direct comparisons were made between persons with mental illness and other stigmatized groups (e.g., physical

diseases, ex-convicts) consistently showed that mental disorder continued to be ranked last or nearly last in terms of social acceptance (e.g., Albrecht, Walker, & Levy, 1982; Tringo, 1970). Second, questionnaire responses may be influenced by social desirability (Link & Cullen, 1983), meaning that attitude scales may conceal or minimize the actual extent of stigmatization. Third, and crucially, research on the behavioral (as opposed to attitudinal) responses of the public to mental illness was strongly consistent in revealing tendencies toward shunning, devaluation, and discrimination. For example, the early work of Farina and colleagues (e.g., Farina, Allen, & Saul, 1968; Farina & Ring, 1965; Farina, Gliha, Boudreau, Allen, & Sherman, 1971) revealed that even a participant's *belief* that interaction partners knew of his or her mental illness negatively influenced a subsequent encounter, exemplifying a self-fulfilling prophecy effect. A classic and noteworthy example of behavioral—as opposed to attitudinal—research is the experimental work of Page (1995). Across three decades, data revealed that landlords were far more likely to deny housing opportunities to potential renters who disclosed a history of mental hospitalization, compared to those who did not present such a history.

More recent research, both attitudinal and behavioral, has confirmed that although the general public appears to have gained basic knowledge about mental illness over the past decades, attitudes and behavioral responses remain highly prejudicial and stigmatizing (e.g., Crisp, Gelder, Rix, Meltzer, & Rowlands, 2000; Hinshaw, 2007; Hinshaw & Stier, 2008; Link, Phelan, Bresnahan, Strueve, & Pescosolido, 1999; Pescosolido et al., 2010; Thompson et al., 2002; Wahl, 1999, 2012). Despite vigorous public awareness campaigns, levels of social rejection and stereotypes (e.g., perceived dangerousness) are pronounced across the diagnostic spectrum related to mental illness (Pescosolido et al., 2010; see also Pescosolido, 2011).

Which receives greater stigmatization: the behavioral displays characteristic of mental illness or the mental illness label itself? The answer is complex. When behaviors and the label are pitted against each other, the behavioral features of mental disorder receive more castigation and social distance. Yet when the label occurs alone, or in the presence of minimal behavioral disruption, stigmatization can be strong. The effects of the label are magnified greatly when respondents have pre-existing associations of mental disorder with dangerousness and violence risk (Link, Cullen, Frank, & Wozniak, 1987; see review in Hinshaw, 2007).

With respect to children, the bulk of research on stigma has focused on the effects of diagnostic labels with respect to the attitudes of social perceivers. A number of investigations reveal negative effects of labeling on stigma-related processes. For example, Farrington (1977) showed that the labeling, as delinquent, of youth displaying antisocial behavior had negative effects on eventual outcome (see Adams, Robertson, Gray-Ray, & Ray, 2003). Holguin and Hanson (2003) also demonstrated the negative consequences of the label of sexual abuse for individuals so termed. Furthermore, not only are children with behavioral and emotional disorders highly likely to receive peer rejection in response to the symptoms of their conditions (e.g., Erhardt & Hinshaw, 1994), but age-mates' perceptions of labels related to mental illness fuel denigration (M. J. Harris, Milich, Corbitt, Hoover, & Brady, 1992; Milich, McAninch, & Harris, 1992).

Labeling effects have considerable reach across the life span. Negative effects extend to infancy: Labeling videotapes of infants as cocaine exposed yielded more negative ratings of the behaviors displayed than did a no-label condition (Woods, Eyler, Conlon, Behnke, & Webie, 1998). Similarly, branding infants as depressed increases negative ratings, particularly if parents (fathers, in this case) show symptoms of depression themselves (Hart, Field, Stern, & Jones, 1997).

Other investigations, however, suggest that labeling of child behavior problems is not always pejorative and may well have positive effects. MacDonald and MacIntyre (1999) found that altering labels of intellectual disability and attention-disordered behavior did not influence participants' evaluations of the behavior patterns depicted. In addition, Klasen (2000) found that for parents of children with ADHD, the diagnosis of the child was actually salutary, as it reduced parental blame and increased the likelihood of obtaining treatment. Indeed, appropriate diagnosis and responsive treatment can be liberating, particularly if they facilitate the opening of opportunities for future independence and life satisfaction (Hinshaw, 2007).

Unfortunately, a substantial proportion of adults has stigmatizing attitudes toward treatment for children. This fact is critical, as the actions of adults may determine whether their children receive treatment that could alter their developmental trajectories. Distressingly, results from a nationally representative sample found that most respondents agree that physicians overmedicate children, that medicine has long-term negative developmental consequences, and that medicine turns children into zombies (Pescosolido, Perry, Martin, McLeod, & Jensen, 2007). Such findings do not bode well for increased treatment utilization.

Finally, research employing implicit measurement tools (using reaction time and bypassing self-report) has shed

important light on unconscious expressions of public stigma. Research applying these methods to mental illness stigma shows how attitudes in this domain may be automatic, unconscious, and reflexive. As noted, Teachman and her research team (2006) found evidence for implicit associations of mental illness labels with negativity and helplessness. Attitudes and beliefs that people with mental illness are vile and inept may thus reside below the threshold of conscious awareness and control. How such attitudes shape behavior and social interaction—along with potential moderators of this association—requires additional inquiry. In addition, explaining implicit internalized stigma, which may manifest as low self-esteem and/or increased shame (e.g., Rüsch et al., 2010), is an important area of future investigation.

People with Mental illness

Distressingly, persons with mental illness are highly likely to have internalized many of the negative stereotypes and prejudicial attitudes related to mental disorder that are part of the general culture. They frequently report being the victims of overt or covert discrimination as well as general prejudicial cultural practices (Brohan et al., 2010; Read & Baker, 1996; Wahl, 1999). The reported ubiquity of public stigma for those contending with mental illness is especially troubling. A survey of 1229 mental health services users in recovery from psychotic disorders from 14 European countries revealed that 69.4% experienced moderate or high levels of perceived discrimination (Brohan et al., 2010).

Furthermore, stigma and social rejection predict subsequent life adjustment problems for individuals with mental illness, over and above initial symptom levels (e.g., Hatzenbuehler et al., 2013; Wright, Gronfein, & Owens, 2000). Importantly, stigmatization predicts premature termination from therapy (Sirey et al., 2001). Among people with mental illness, two predominant mechanisms for coping with stigma are secrecy and withdrawal—behaviors that are likely to sustain, rather than diminish, stigmatization (Corrigan & Wassel, 2008; Wahl, 1999). We contend that timing is all-important with respect to disclosure of a history of mental illness, yet an automatic reversion to silence often perpetuates the core problem.

Largely unexplored (and unexplained) are the variety of coping styles and strategies deployed by persons with mental illness in response to the stigmatization they receive (Corrigan & Watson, 2002). Indeed, almost entirely unknown are the processes by which some persons internalize prejudice and stigma, others apparently ignore such castigation, and still others view it as a call to social action. Developmental factors are bound to be essential to such coping strategies, constituting a major area for future research. Why, for example, do some join consumer-oriented support groups or engage in advocacy (see Corrigan & Wassel, 2008), whereas others elect not to participate in such activism? Can changing social mores, and an enhanced sense of political mobilization, propel larger numbers of individuals to come out, demand justice, and work toward systemic change?

Families and Relatives

Two decades ago, research on family experiences of mental illness surged (e.g., Lefley, 1989, 1992; Tessler & Gamache, 2000; Wahl & Harman, 1989), although systematic research on this topic had begun during the 1950s (see Clausen & Yarrow, 1955). Early investigations documented stages of recognition of symptoms—analogous to those in reaction to the development of physical illnesses—with initial anxiety and denial giving way to adoption of a sick role and eventual rehabilitation.

As reviewed by Kreisman and Joy (1974), the early years of work in the field focused on (a) a variety of negative responses to relatives with mental disturbance, including fear and dislike; and (b) a host of reactions in such relatives themselves, such as sensitivity to criticism by others, a perception of marginality (with few resources available to help their plight), and self-disregard. Concealment was noted to be a predominant coping response. The enduring ramifications of having a relative with mental illness are considerable, encompassing Goffman's (1963) notion of courtesy stigma, in which social devaluation spreads to persons associated with a stigmatized group (see Struening et al., 2001). To take one example, family members of individuals with diagnoses of bipolar disorder continue to receive considerable stigmatization (Perlick et al., 2007). Qualitative research shows that family members too often experience rejection, avoidance, and blame (Karnieli-Miller et al., 2013). Moreover, a vignette experiment suggests that the siblings of people with mental illness are susceptible to social rejection because of genetic attributions (Phelan, 2005).

Mental Health Professionals

One might assume that those who work directly with persons with mental disorders would be immune to stigmatizing attitudes and practices. However, data reveal that the picture is actually quite complex (Schulze, 2007; Wahl & Aroesty-Cohen, 2010). Evidence began to be accumulated by pioneers in stigma research half a century ago (Nunnally, 1961). In investigations utilizing attitude

scales completed by staff of psychiatric facilities during the 1950s and 1960s, mental health personnel were found to be somewhat more accepting of mental disorder than members of the general community. However, additional attitudes, such as authoritarianism or benevolence—the latter signifying a belief in the childlike qualities of mental patients—were also prevalent and, when present, frequently associated with worse patient outcomes (Cohen & Streuning, 1962; see also review in Rabkin, 1972). Even as funding and models of care shifted to community-based rather than institutional settings, a continuing pattern of stereotypic beliefs and stigmatizing attitudes was found (see Keane, 1990, 1991; Scott & Philip, 1985). Fryer and Cohen (1988) found that staff of a Veterans Administration facility ascribed a host of negative traits—including apathy, hostility, immaturity, selfishness, and aloofness—to persons branded as psychiatric patients (as opposed to general medical patients). Mukherjee and colleagues (2002) provided evidence that, in London, half of surveyed medical students and physicians had beliefs in the dangerousness and unpredictability of individuals with schizophrenia and drug/alcohol problems. The general pattern appears to be one of continuing stigmatization from professionals and trainees.

Whereas a great number of those in the mental health field are genuinely committed to improving their clients' clinical status and fostering autonomy, training models (in psychology, psychiatry, and allied helping disciplines) often convey an attitude of superiority that promotes an us versus them mindset (Hinshaw & Cicchetti, 2000). In addition, the mental health professions have low status (in comparison with other medical subdisciplines), once again providing evidence for courtesy stigmatization. Medical professionals have often voiced disparaging attitudes toward clientele with mental illness (for historical information, see Nunnally, 1961; see also Wahl, 1999, with particular concern on the part of clientele that professionals have low expectations for improvement and change). Admittedly, working with patients who have serious mental illness can be stressful, especially when professionals receive relatively low pay and low status. Yet denigrating attitudes on the part of professionals will certainly undermine therapeutic outcomes. Indeed, there is an abundance of staff burnout, use of inappropriate humor, and scapegoating of particularly difficult clients and diagnostic categories (Wahl, 1999). Research into the current millennium continues to emphasize mental health professionals' propensity for stigmatization (Sadow & Ryder, 2008; Servais & Saunders, 2007). Indeed, Servais and Saunders (2007) found that a large percentage of clinical psychologists felt disidentified with their more severely disturbed clientele.

Overall, mental health professionals may inadvertently foster stigmatization through attitudes of superiority, paternalism, and separation from persons with mental illness. Stigmatization may also result from theoretical modes that fundamentally blame parents and family members for mental disorders of children and adolescents. Positive attitudes on the part of many clinicians certainly exist (Wahl & Aroesty-Cohen, 2010), but this is not uniformly the case.

In Hinshaw (2008), a number of mental health professionals, ranging from scientists and clinicians to trainees, disclosed their own personal and family histories of mental illness. These disclosures were an explicit attempt to break down barriers of silence and shame. Such efforts—along with different models of training that emphasize disclosure and honesty—may help to alter professional attitudes to the benefit of clients. It is difficult to discern who gains from postures of pseudo-strength, overconfidence in one's expertise, and denying the personal (and familial) roots of many professionals' interest in the very field in which they work. We advocate for closer self-examination of professionals' own attitudes, beliefs, and practices.

Summary

This section overviews research on stigmatization related to mental disorder. Although the general public is more knowledgeable about mental illness than a half-century ago, fundamentally negative attitudes abound. Moreover, research indicates that persons with mental illness are likely to be recipients of discrimination. Family shame and stigma regarding mental disorder are key issues. Especially pernicious is the notion that mental disorders result primarily or exclusively from poor parenting, a residue emanating from historical professional practices and scientific beliefs. In addition, when parents have mental disorders, the risk of transmission to their children is compounded by the presence of stigmatization and silence. Finally, many mental health professionals themselves are prone to display stigmatizing, patronizing, and sometimes hopeless attitudes toward the very persons they are entrusted to serve.

As a whole, has stigmatization toward persons with mental disorders increased or decreased in recent years? Although improvements in knowledge are apparent and although some reductions with respect to overtly expressed attitudes may be occurring (particularly in younger people), fundamental social attitudes have not sufficiently

improved in recent years (Pescosolido et al., 2010). One implication is that endorsement of a biologically-based, brain disease model to brand mental illness is not a panacea for stigma. In addition, insufficient research has examined the practical, behavioral consequences of perceivers' implicit, unconscious biases, a high priority for future research.

Beyond empirical evidence, less formal indicators of stigmatization are striking. We therefore include broader types of evidence for stigma, including indicators in the general culture and language of everyday life, depictions in the public media, and discrimination with respect to such areas as housing, employment, and fundamental social rights.

Broader Cultural Evidence for Stigma

The task of searching for general indicators of stigma in relation to mental illness is more difficult than one might expect. A key reason is that widely held attitudes and stances in a given culture are often so pervasive and grounded in everyday life that they are hard to detect (Goldhagen, 1996). In other words, the stigmatization of mental illness may be so deeply embedded in our culture's words, images, and practices as to escape easy capture. A fine-grained, more ethnographic approach may be required. Such an analysis may reveal that many cultural epithets, practices, and institutional structures are, in fact, stigmatizing toward—and discriminatory against—those coping with mental illness as well as members of their social networks.

Everyday Language

Many words in common use convey stereotyping and stigmatization about mental illness. During the course of an argument, if one makes a statement that disrupts the logic of the discussion, a common response from interaction partners may be "Are you insane?" Unpopular ideas are commonly dismissed as crazy or nuts; outlandish plans are described as madness. If someone does something deemed stupid, he or she is commonly called an idiot, imbecile, or moron—the formal terms used a century ago to designate gradations of intellectual disability. A panoply of disparaging terms emanate from depictions of mental disorder: Ideas are deranged, persons who behave outside the norms are lunatics, and strange or violent behavior is branded as psycho. A gift shop next to a contemporary art gallery in Los Angeles is even called WACKO, a naming choice that would be unthinkable for a racial/ethnic epithet. The frequency of use of terms like these betrays a preoccupation with the rationality and conformity of social partners.

Other linguistic practices are even more graphic. The institutions that are entrusted with the treatment and rehabilitation of people with mental disorders are termed loony bins or nut houses. This kind of language reveals fear as well as fascination—fear that the affliction could befall the perceiver and fascination with the illicit (and perhaps dangerous or bizarre) behavior patterns underlying the terms and labels. Children come to use such terms at early ages, signaling the pervasiveness of the cultural disparagement of persons with mental disorders. Indeed, the pejorative labels linked to mental disorders or developmental delays (cuckoo, crazy, retard) are among the initial terms used on the playground to denigrate socially rejected peers.

Media Depictions

Perhaps the most telling evidence in modern culture related to the stereotyping and stigmatization of mental disturbance is found through examination of media portrayals of those with mental illness (see Wahl, 1995, 2012). Although there are some signs that portrayals in public media are beginning to be less disparaging than has been the case for many decades, the pervasiveness of distorted media images is a major issue for anyone concerned with stigma. Negative depictions are frequent—of clients/patients as homicidal maniacs and narcissistic parasites, as well as mental health professionals as inept (see discussion in Schulze, 2007). Nunnally (1961) presented disheartening accounts of media practices from the 1950s, concluding that images from visual media were grossly negative, unflattering, stereotyped, and sensationalistic. Commercials, soap operas, prime-time dramas, advertisements, and newspaper/magazine accounts continue to portray persons coping with mental disorders as deranged, violent, and unpredictable (Coverdale, Nairn, & Claasen, 2002; Diefenbach, 1997; Wahl, 2012). Tellingly, children's cartoons are highly likely to depict mental illness in characters, and such portrayals are typically stereotyped and pejorative (Wilson, Nairn, Coverdale, & Panapa, 2000).

Even when portrayals do not include stereotyped depictions of violence and utter irrationality, they still often depict incompetence, unemployment, and grossly disturbed affect (Hinshaw, 2007). Despite an upturn in human interest coverage in recent years, still relatively absent are the perspectives and life stories of people with mental illness and their family members. What empirical evidence exists for change in media portrayals in recent

years? Surprisingly, and depressingly, the answer is not much. O'Hara, Ahmad, and Hinshaw (2015) examined U.S. and British newspaper headlines and stories related to mental health across a 25-year period from the 1980s through the past decade. The overall finding—from reliable, blinded coding of these accounts—was that little, if any, substantive change in tone and content had occurred. Although one can point to clear examples of greater humanization in coverage in some key instances—and a greater media-related awareness of mental disorder overall—the overall picture is not one of sustained progress. Indeed, whereas instances of sensational violence saturate the media landscape (see the introduction to this chapter), few stories of recovery and resilience are highlighted (Jamison, 2006).

Discriminatory Policies

A host of discriminatory policies linked to mental disorder are still in place. Several levels of discrimination can be differentiated: (a) *direct discrimination*, where, for example, housing or employment is denied based on knowledge of an applicant's mental disorder; (b) *structural discrimination*, entailing the curtailing of rights of those with mental illnesses because of long-standing policies and the formation of related societal barriers; and (c) *discrimination via self-stigmatization*, a subtle but pernicious form of limitation through which an individual's internalized stigma prevents his or her pursuit of important life opportunities (Angermeyer & Schulze, 2001).

Employment discrimination against those with mental disorder is a major concern. This is an important issue because gainful work can foster economic independence as well as benefit economies. Although the Americans with Disabilities Act (ADA) officially eliminated discrimination in public and work settings with its passage 25 years ago, persons with histories of mental illness still face substantial obstacles. Those contending with mental health issues know that disclosure of their pasts can be extremely problematic. Such disclosure may preclude their being considered for various jobs (or promotions within existing jobs) and can lead to diminution of status—or even precipitate job loss (Wahl, 1999, 2012). Distressingly, even though work-related accommodations linked to mental illness are often far less costly than those related to physical disability (e.g., a flexible work schedule versus the major rebuilding of an accessible workplace), only a tiny fraction of ADA-linked requests are for the purposes of accommodating mental illness. The reason is the underlying shame and discrimination involved (see review in Hinshaw, 2007).

Too few individuals make use of the legally mandated remedies that might mitigate problems. Moreover, persons with histories of mental illness face legal barriers with respect to obtaining or renewing a driver's license, maintaining child custody, or serving on a jury or running for office in a number of states (Corrigan, Markowitz, & Watson, 2004; see also Wahl, 1999, 2012). All such indicators of discrimination constitute prima facie evidence of persisting stigmatization.

Summary

A host of evidence from the general culture reveals pervasive and pernicious effects of stigmatization on the lives of persons with mental disorders and their family members. Coupled with the empirical research cited earlier, this evidence argues that stigma related to mental illness remains a central issue for the research and clinical fields as well as for the broader society. We admit to feeling puzzled by the current ambiguity in this field. On one hand, there appears to be considerably more openness and tolerance than in previous eras, given the greater number of memoirs and films depicting mental disorder in realistic fashion (e.g., *A Beautiful Mind* from 2001 and *Silver Linings Playbook* from 2012). Similarly hopeful is the reemergence of a national dialogue on mental health—spurred largely by recognition of huge mental health problems among war veterans (see Hoge et al., 2004) and horrific, widely reported acts of violence. On the other hand, however, fundamental change is proving elusive, given the flat nature of public attitude change (e.g., Pescosolido et al., 2010), the stereotype that mental illness is one and the same as acts of random violence, and the still-prevalent discrimination that exists across multiple layers of society.

We next consider the specific ways in which prejudice, discrimination, and stigmatization may manifest from childhood through adolescence and beyond. We underscore how considering core developmental principles and processes can benefit subsequent investigations of stigma.

DEVELOPMENTAL THEMES

Much current social psychological and evolutionary research on stigma is adevelopmental. Most investigations focus largely on adult manifestations of stigma processes without sufficient attention to (a) mechanisms related to stigmatization across the life span or (b) core principles from developmental psychopathology that could

enhance understanding of the causes and consequences of stigma. In this section, we discuss these essential points (for elaboration, see Hinshaw, 2006, 2007; and Hinshaw & Cicchetti, 2000).

Stigma Across the Life Span

Mental health stigma affects people across the life span. Below, we trace the trajectory of mental health stigma from infancy to old age.

Infancy and Toddlerhood

Although stigma pertaining to disorders of infancy and toddlerhood might not appear to be a major concern, given the young age of the children in question, stigma processes can have harmful implications when there is the possibility of mental illness in a very young child. Indeed, if the topic is expanded to include the entire family, the potential for diagnosis of mental dysfunction in a child of this age almost always incorporates implicit (if not explicit) blaming of parents. Such ascription—which has historically included the assumption of poor bonding/attachment as a function of parental unresponsiveness—can understandably spur parental reluctance to seek appropriate evaluation or treatment for the child. Of course, in some cases insecure or disorganized attachments may well be part of the diagnostic picture, and maltreatment of infants and young children remains a major clinical and public health issue (Kim-Cohen et al., 2006; Widom, Czaja, Bentley, & Johnson, 2012). Yet the automatic assumption that a young child's behavioral, emotional, and/or learning problems invariably emanate from insensitive parenting is a stigmatizing historical relic with major potential consequences for child and family mental health.

In the case of autism spectrum disorders, the causal attribution is increasingly made to genetic vulnerability given substantial evidence for the heritability of this class of conditions. This ascription may convey substantial stigma as well, as our previous discussion has illustrated. The absence of direct blaming of parents for having caused their child's serious emotional and behavioral disturbance (linked to such dated concepts as emotional refrigeration) may well propel appropriate referral and early intervention. Yet the potential for a family taint related to genetic transmission is a concern. This point is worth emphasis because of the need for accurate screening, diagnosis, and treatment of the earliest manifestations of childhood mental illness—such as autism spectrum disorders, early-onset depression, and ADHD. Ultimately, the stigma attached to having a young child with mental illness, regardless of the causal origin, often undermines early assessment and detection.

Preschool and School-Age Children

During the preschool and school-age years, parallel issues are salient, including ignorance of the possibility of mental illness, shame at admitting its presence, a lack of treatment options, as well as a historical lack of reimbursement in terms of insurance coverage. The confluence of these forces impedes needed intervention (for a conceptual framework related to child mental disorders, see Mukolo, Heflinger, & Wallston, 2010). Indeed, as noted previously, rates of treatment seeking for children with mental illness are abysmally low in the United States and are undoubtedly even lower elsewhere. The critical importance of academic achievement during childhood exacerbates this problem. In fact, the presence of a mental illness may disrupt the child's ability to focus on school curricula to attain mastery of educational material (see Hinshaw, 1992, for information on the complex associations among ADHD, aggressive behavior, and underachievement). If initial learning does not occur, this may set in motion a recursive cycle of school failure (see Cohen, Garcia, Apfel, & Master, 2006, on the importance of such feedback processes).

Under the Individuals with Disabilities Educational Act (IDEA), federal law guarantees the right to a school-based assessment and (if special needs are documented) appropriate accommodations under the concept of the least restrictive alternative (i.e., that the child is placed in settings that are as close as possible to mainstreamed classrooms). However, neither assessments nor accommodations can be implemented if stigmatization makes families reluctant to even acknowledge a child's emotional and behavioral difficulties. Also, at a structural level, IDEA's provisions involve only partial federal funding. In other words, it is an underfunded mandate, meaning that considerable debate and wrangling may well occur over a given family's contention that special educational services be implemented. Stigma may therefore derail development by limiting important life opportunities during years that are crucial for gaining academic, social, and emotional skills.

Therapeutic efforts with children nearly always require collateral work with parents, even if systemic intervention with the family is not primary intervention. Such work requires careful attention to stigma processes. Most saliently, related to our earlier discussion, clinicians must become familiar with current scientific literature that has largely debunked prior conceptions of psychogenic—and, in particular, child discipline–related—causation of most

childhood mental illness (e.g., Beauchaine & Hinshaw, 2013). At the same time, it is important that clinicians steer away from the other extreme of reductionistic, biogenetic causal factors as the sole determinants of child mental health issues. Psychoeducation about the complex array of biological predispositions *and* life stresses that converge to produce psychopathology might minimize blame, recrimination, and self-doubt among parents and family members, while at the same time motivating the seeking of needed intervention. Research underscores the reciprocal and transactional nature of child and family influence in child behavior disorders (Johnston, Mash, Miller, & Ninowski, 2012). Even for conditions with substantial heritability, psychosocial influences matter greatly in terms of outcome (see Nigg, 2013; Tully, Arseneault, Caspi, Moffitt, & Morgan, 2004).

For instance, related to ADHD, a condition with strong psychobiological underpinnings (Hinshaw & Scheffler, 2014; Nigg, 2013), socialization processes are predictive of impairments and comorbidities, and—if optimized—the potential for improvements over time (Hinshaw et al., 2000; see also Cicchetti & Hinshaw, 2002, for detailed accounts of how clinical and prevention trials can yield conceptually rich information on processes and mechanisms of psychopathology). The message for stigma reduction is clear: Whereas parents do not *cause* ADHD (or most other mental illnesses) in terms of direct effects of parenting styles per se, their socialization practices and ability to secure treatments are essential for affecting *outcome and course*. In the clinical enterprise, it is essential to remove blame, but not responsibility.

Adolescence

Adolescence is a time period during which identity is expected to consolidate and in which autonomy is gradually gained (see Dahl, 2004). Mental illnesses with onset (or continued presence) during adolescence may be particularly harmful for psychological and behavioral functioning. Mental disorders may impair identity consolidation, independent functioning, and a sense of fitting in or belonging with peers (Hinshaw, 2007). Indeed, adolescence is a time during which many symptoms are likely to emerge and during which female manifestations of psychopathology are particularly salient (Hinshaw, 2009). Experiences of acute symptoms during this developmental period may shape self-perceptions and the potential for independent functioning for years to come. With the addition of stigmatization—that is, when the adolescent and his/her family are ashamed to admit the presence of a mental illness or are banished to exclusionary treatment options—the opportunity for maintenance of intact self-esteem and a sense of personal agency is further diminished.

Furthermore, if the illness is severe and hospitalization is required, the dehumanizing settings, punitive procedures, and major restrictions on autonomy that ensue may exert profoundly deleterious effects on an individual's self-image (Hinshaw, 2002). Indeed, essential for destigmatization is that mental health staff and therapists show respect for the integrity and agency of their clientele and that treatment venues not confer derogation. Improvements in personnel selection, staff training, and pay scales may all be related to this essential effort, over and above enhanced attitudes toward mental disorder across society.

Adulthood

During adulthood, many persons with mental illness conceal information about their illness as a means of coping (see Link, 1987). Motivations for this strategy include shame as well as fear of losing employment or housing. However, such concealing may exacerbate the loneliness, isolation, and lack of social support that are frequent accompaniments of many forms of mental illness. To be clear, we are not advocating that individuals with a history of mental illness indiscriminately disclose their personal narratives. Indeed, given the pervasiveness of stigma, such a strategy could well result in backlash. We also recognize that there are individual differences in the degree to which people feel comfortable disclosing personal information. However, because of the potentially devastating consequences of a life filled with self-silencing and shame, opportunities for disclosure and support should be given greater consideration and pursued judiciously. Timing, along with adequate social supports, is crucial.

When adults with mental illness are also parents, the impact of stigma can be particularly harmful for the family. Specifically, when parents are not willing or able to disclose to their offspring that many of the erratic behaviors in the home are the products of mental illness, the children are highly likely to internalize blame. This often occurs because children do not understand the absences, unpredictable behavior, and deprivations they may well have experienced. To the extent that youngsters begin to comprehend that such experiences transcend their own personal control, they can be released from potentially disabling self-blame, guilt, and shame. Parental mental illness is clearly a risk factor for disordered functioning in children. A much-needed step is finding ways of encouraging productive discussion among family members. Such family

intervention requires honesty, frank disclosure, and a willingness to receive input from multiple sources of support (Beardslee, 2002).

Another core issue is the pervasive social attitude that mental illness permeates or encompasses all aspects of a person's being. Under the penumbra of such a view, the individual's identity may well become equated with the disorder. In other words, because having a mental illness is associated with the person's entire self-concept, the individual may begin to view himself or herself as a schizophrenic, a manic depressive, or an obsessive-compulsive (see Haque & Waytz, 2012). This practice may be perpetuated by professionals, who may come to perceive the individual as inextricably linked to—and defined by—his or her disorder. The underlying humanity of the person in question can be distorted by the diagnostic label, which connotes weakness, deviance, permanence, and a sense of fundamental flaw (see Martinez et al., 2011). Individuals with mental illnesses may well lose their basic sense of personhood when the diagnostic label is applied to who they are, rather than linked to a condition with which they must contend and manage (APA, 2013; Hinshaw & Cicchetti, 2000).

Finally, we note in passing that elderly persons with mental illness must struggle with the dual stigma of being old (and often disenfranchised financially as well as isolated from their families) and having a mental illness (see Hinshaw, 2007, for elaboration). Differential diagnostic issues related to cognitive decline versus mental illness (or their overlap) are paramount for many older adults with depressive features as well as memory loss. Yet efforts surrounding diagnostic clarity are often curtailed by the stigma that pertains to decrements in psychological functioning for elderly persons as well as by the potential for negative attitudes of staff and professionals.

Summary

Across the life span, stigma has important implications for a variety of life domains. These include the attainment of competencies; the development of a sense of self; the ability to gain independence and a sense of personal agency; the potential to receive social support and acceptance; and the struggle for families to acquire, and maintain, services for their children with mental illness. The pain and impairments that emanate from mental illness are often quite severe; when stigma and discrimination are superimposed on such symptoms, chances for life success become substantially diminished (Hinshaw, 2007). Only a life span perspective will yield a rich understanding of the pervasive consequences of stigma across multiple aspects of individual and family functioning. We call for developmentally oriented investigators to take up this topic more readily than has been the case heretofore.

Developmental Psychopathology Issues Related to Stigma

The enterprise of developmental psychopathology—the field that explicitly links normal and atypical development and that comprises the overarching topic of this entire series (see also Beauchaine & Hinshaw, 2013; Cicchetti & Cohen, 2006; Rutter & Sroufe, 2000)—embraces several core principles. We note some of the most salient and relevant themes and attempt to integrate them with the many considerations already raised regarding mental health stigma (for elaboration, see Hinshaw, 2013).

Continuities between the Typical and Atypical within Developmental Psychopathology

A core tenet of developmental psychopathology is that atypical, pathological behavior patterns represent aberrations in pathways that otherwise lead to normative development. Mental illness is not a fixed and static entity but rather the outcome of developmental processes, which are themselves characterized by flux (Cicchetti, 1993; Hinshaw & Cicchetti, 2000). Indeed, they represent fluid states that typically alternate with periods of more normative functioning and are best understood as disruptions in developmental processes that typically yield adaptation. Thus, persons with mental illness are not fundamentally different in type from other humans: They lie on the same continuum, even though they may have genetic propensities for emotional and behavioral disturbances that render them more susceptible to the influence of stressful or traumatic environments (spanning prenatal, familial, and sociocultural contexts).

Although it is possible that certain mental illnesses are best understood as taxa—that is, as discrete categorical entities different from the norm—evidence for this contention is quite slim (Beauchaine & Hinshaw, 2013). Indeed, most mental illnesses appear to be far more continuous in nature, representing extremes of distributions of underlying behavioral, cognitive, and emotional processes. (In actuality, categories of mental disturbance can be simultaneously continuous and categorical, depending on which criteria are used to examine their features, paralleling the way that light can be represented as both waves and photons; see Pickles & Angold, 2003, for lucid discussion). The upshot is that it is mistaken to view people with mental illness as qualitatively distinct, essentialistically demarcated, flawed, and inferior (see

Haslam & Ernst, 2002)—views that are bound to perpetuate beliefs in fundamental difference and thereby enhance stigma.

Ecological Models

Developmental psychopathology emphasizes the linkages between individuals and their environments and construes pathology and coping as residing at the interface of persons and settings (Bronfenbrenner, 1977). Thus, psychopathology does not lie exclusively within the individual or within the environment but rather within the fit (or misfit) between them. Stated somewhat differently, psychopathology constitutes an imbalance or disequilibrium between personal resources and environmental supports.

Intriguingly, stigma is a relational process too, as it comprises a mark of degradation conferred by society, related to membership in a group believed to be evil, flawed, or contagious. For children and adolescents, stigma processes occur in families, schools, and communities, with the concept of fit particularly relevant for conditions like ADHD, in which adaptation to classroom settings and pressure to perform academically is paramount (Hinshaw & Scheffler, 2014). Adults, as well, are judged by societal standards of appropriate deportment (e.g., in the work setting) in relation to decisions regarding mental illness. Although the impairments related to serious mental illness are undoubted, it is also important to understand that changing environmental standards may render certain behavioral tendencies more (or less) adaptive. Deviancies and flaws in one cultural context may well be adaptive in others. Fostering tolerance and acceptance of difference in behavior patterns (so long as they are not threatening to others) will require adapting contexts and environments—school, home, and workplace—to individuals to maximize the potential for productive behavior. At the same time, it is crucial to influence the biological substrates, underlying cognitive patterns, emotion-regulatory strategies, and other important features of the individual himself or herself. This is especially the case when intense personal pain and suffering are present, the ability to master key life transitions becomes disrupted, and fundamentally altering all life contexts is impractical or impossible.

Reciprocal Determinism, Transaction, and Multilevel Analysis

In developmental psychopathology models, mental illness results from interactive linkages between multiple levels of analysis. These include individual-level constructs (such as genotypes or temperament), relational variables (including attachment and parenting styles), and wider systemic influences (school or neighborhood settings and the general culture). We emphasize that these processes shape both typical and atypical development. Such multilevel, reciprocal influences unfold over time, reflecting the construct of *transaction* (Sameroff & McKenzie, 2003). The upshot of such transactional perspectives for stigma is that preconditions for psychopathology are at least potentially modifiable by environmental circumstances.

Along these lines, there is continuing interest in gene–environment interplay, including the process known as gene-by-environment interaction, in which both genotypes and crucial environmental circumstances synergize to yield risk for psychopathology. Although spurring considerable research across the past decade (see Dodge & Rutter, 2011), meta-analyses have challenged the robustness of this phenomenon (see Risch et al., 2009; but see also Karg, Burmeister, Shedden, & Sen, 2011). When operative, such gene-by-environment interactions reveal that psychopathology is not the fixed product of either biology or the environment alone but, rather, the interaction between the two. There are important implications for stigma, given that stigmatization is likely to intensify when people seek monocausal explanations. Stigmatization of families often occurs when parenting is viewed as *the* primary cause of mental illness; similarly, derogation and punishment of the individual are strong possibilities when deviant genetic makeup (or weak personal will) is believed to be *the* sole determinant of mental illness (e.g., Mehta & Farina, 1997). Understanding the inherently transactional nature of mental illness may help reduce blame for either parenting styles or flawed individual constitutions as the exclusive locus of mental disturbance.

Transactional models are not intuitively obvious, and communicating them may be difficult in a culture of quick Facebook posts and Twitter feeds. Yet promoting the notions of vulnerability, life stress, interaction, and transaction may help to reduce the stigmatization that is associated with extremes of exclusively environmental or exclusively biological perspectives. Such promotion may help to shape lay views of psychopathology as reflecting combinations of internal preconditions and external stressors that work in concert across time (Hinshaw, 2007).

Along the same line, media outlets might be able to help promote dual attributions (Hinshaw & Stier, 2008) for the treatment of mental illness. Rather than the perspective that causation and intervention involve either biological (e.g., genes/medicine) or psychosocial (e.g., life circumstances/psychotherapy), mental illness should be seen (as is quite often the case) as responsive to both. Such a dual

attributional perspective would imply that—beyond solely altering brain chemistry—efforts to seek treatment, family supports, and personal agency are also crucial ingredients to recovery. By invoking the psychosocial along with the biological, dual attributions may begin to alleviate the disempowerment and hopelessness that a diagnosis of mental illness may unwittingly trigger (Martinez & Mendoza-Denton, 2011).

Equifinality and Multifinality

Developmental psychopathology recognizes that there may be multiple causal pathways that lead to the same mental health–related outcome, signaling *equifinality*. For example, major depression may emanate from heritable risk, repeated experiences of stress, maltreatment, and/or overwhelming loss events (or, of course, combinations of some or all of the above). Alternatively, ADHD-related symptomatology, which is extremely heritable, may also result from low birthweight, exposure to prenatal alcohol, environmental lead (or even pesticides), or the experience of severe early deprivation, such as experienced in horrific Eastern European orphanages (for reviews, see Nigg, 2006, 2013). The presence of equifinality should caution us from reifying the nature of categorical diagnoses as representing single, essentialist, immutable psychiatric end states (Cicchetti & Rogosch, 1996).

Moreover, the same risk factor or vulnerability, relatively early in development, may well lead to a wide range of eventual outcomes, a process known as *multifinality*. Thus, an inhibited temperament in infancy and toddlerhood, although probabilistically linked to social isolation later in life, does not automatically do so, given the process of child-parent fit as well as key socialization experiences. Maltreatment is clearly a risk factor for a range of negative outcomes, but these are not inevitable, as they depend on the child's experience of protective factors (see Hinshaw, 2013, for elaboration). Multifinality reveals the complexity of causal pathways to mental health–related outcomes, revealing the importance of ongoing context. Moreover, multifinality also cautions against viewing risk-pathology linkages as invariant and inevitable. Recognition of both equifinality and multifinality should play a greater role in stigma-reduction research and intervention efforts, given that they signal the multitude of malleable influences that impinge on the individual regarding mental disorder and the potential for recovery.

Resilience

The pain and impairment related to mental disorder are beyond dispute, but it is also true that many people's mental illness symptoms wax and wane over time. Most people with mental illness experience periods in which relatively normal functioning is prevalent, and many such individuals can make unexpectedly good life adjustments. As noted, protective factors may intercede and eventually outweigh risk factors in producing healthy outcomes. In other words, *resilience* is a real possibility. Defined as the attainment of positive outcomes in the presence of risk for maladjustment (Luthar, Cicchetti, & Becker, 2000; Masten, 2001; Rutten et al., 2013), resilience provides a needed antidote to views of mental illness based solely on pathology and pessimism.

Resilience involves both individual characteristics (humor, intelligence, persistence, certain temperamental traits) and familial and community supports (presence of mentors or extrafamilial supports in childhood, healthy partners in adulthood). Stigmatizing attitudes may change when the general public comes to understand that mental illness does not inevitably or invariably result in despair and degradation. Indeed, views of mental illness that underscore its malleability—rather than immutability—should facilitate stigma reduction (see Jones et al., 1984; Martinez & Mendoza-Denton, 2011).

It would be a mistake, however, to apply overly optimistic approaches to depictions of mental illness. Indeed, many reform efforts have been derailed due to unrealistic, excessively positive views of the amenability of serious mental illness to community treatments or the latest round of reforms (see Grob, 1994). The promotion of realistic—rather than simplistic or sensationalistic—portrayals of mental illness is urgently needed at the level of public (and now social) media. Stigma reduction will have begun in earnest when we acknowledge that individuals with serious forms of mental illness can attend school and learn as children, can be sensitive and loving parents as adults, and can maintain their integrity despite, in many cases, tremendous challenges. The more human, realistic, and appropriately hopeful portrayals become, the greater the likelihood of stigma reduction.

Summary

The principles of developmental psychopathology—such as reciprocal determinism, transaction, equifinality, multifinality, and resilience—are important to consider when understanding the stigma of mental illness. Historically, however, mental health stigma researchers have tended to work in isolation from these principles. Future research and future stigma reduction intervention efforts may be strengthened by leveraging core developmental psychopathology concepts.

TOWARD AN INTEGRATIVE MODEL OF THE SOCIAL STIGMA OF MENTAL ILLNESS

We now attempt to synthesize the various concepts we have reviewed about the stigma surrounding mental illness. This model integrates principles from social-personality, evolutionary, and developmental psychology as well as sociology and developmental psychopathology, with particular emphasis on what is sometimes termed threat theory (Stangor & Crandall, 2000; see also Blascovich, Mendes, Hunter, & Lickel, 2000). Note that any accurate portrayal of stigma must acknowledge and address its overdetermined nature: Stigma processes operate at the levels of individuals, families, communities, and broader social and political contexts. Attempting to find which level of analysis is primary is futile because all such levels interact and transact. In spite of these myriad factors, we aim for clarity, economy, and coherence in our model. We highlight again that all too little is known about stigma's emergence across development, constituting a key research question for the future.

First, florid symptoms of the most severe forms of mental illness are threatening to social perceivers. Some of this threat may not require much in the way of cognitive mediation on the part of perceivers—for instance, psychotic behavior, with its irrational and unpredictable nature, may evoke felt threat to physical integrity that is automatically triggered. It may also signal to the perceiver a sense of the fragility of control over his or her own mental life, yielding an intense personal threat. Some of the symptoms may also, at a basic level, convey a sense of potential disease contagion or parasitic infestation (see Kurzban & Leary, 2001). Severely psychotic symptoms may also disrupt the perceiver's foundational belief in a stable, predictable world and engender fears of mortality.

Despite real variations across history and across cultures regarding response to such symptoms, these patterns of behavior tend to evoke powerful, negatively valenced emotion in social perceivers. Specifically, such displays predict anger (over the violations of social contracts and reciprocation) and revulsion/disgust (over the fear of contamination related to grossly disordered behavior and disheveled appearance). L. T. Harris and Fiske (2006) placed attributes of out-group members within a two-by-two array of warmth and competence (see also Rosenberg, Nelson, & Vivekananthan, 1968, and Fiske, 2013). Intriguingly (and depressingly), those individuals low on both dimensions (i.e., those believed to possess little warmth and poor competencies, such as homeless individuals, those with addictions, and presumably many with severe mental illness) activate perceivers' brain regions linked to disgust. Moreover, neural *de*activation of the medial prefrontal cortex (the brain region involved in social cognition) is implicated in perceptions of dehumanization—a process all too often inherent in the societal responses to the subject matter under consideration (i.e., serious mental illness).

Such responses are expectable from an evolutionary perspective when considering the development of automatic exclusion modules linked to fear of contagion, fear of being exploited, and tribal revulsion (Fishbein, 2002; Kurzban & Leary, 2001). In addition, the very label of mental illness has taken on a variety of meanings (as have many other poorly understood diseases throughout history; see Sontag, 1978), including depravity, weakness, filth, and loss of control (see Luhrmann, 2008). Again, these associations may well operate at implicit levels, below the threshold of conscious awareness (Greenwald et al., 2009; L. T. Harris & Fiske, 2006). In short, mental illness categories—even those that are not as intrinsically threatening as psychotic-level variants—carry semantically associated and sometimes automatically triggered baggage. Finally, when persons with mental illness are specifically seen as threats to the survival of a group's or nation's viability and/or as subhuman, extremely harsh responses (e.g., sterilization and even genocide) may follow. Recall the eugenics movements in the United Kingdom and United States early in the last century, as well as Hitler's direct linkage of persons with mental illness and developmental disorders as threats to the Aryan race.

Stangor and Crandall (2000) posited three stages to perceivers' reactions to threat: (a) an initial phase of real or symbolic threat; (b) the subsequent deployment of cognitive distortions (and stereotypes) to exaggerate differences from the out-group, serving as a fertile breeding ground for prejudice; and (c) the amplification of such distorted perceptions through societal communication (e.g., mass media). This latter process invokes system justification (specifically, blaming the victim) to promote the belief that the cause is not social inequity but rather weakness or deviance on the part of the stigmatized individual. In the second and third stages, we highlight once again that the target individual in question, in terms of ascribed humanity, is construed as "less than human" (Haslam, 2006; Haslam & Loughnan, 2014). This pernicious ascription may arise, as we noted earlier, because of perceivers' great fear of losing their own rationality, reason, and sense of control. In such cases, the harshest, most extreme, and even lethal responses may come to feel justified.

As noted, one of the hopes of recent decades has been that stigmatization will markedly decrease when mental

illness is finally seen from a naturalistic, medical-model perspective rather than as a volitional, morally censured, and depraved set of behaviors. Yet we have repeatedly highlighted that exclusive focus on (or overaccentuation of) biogenetic explanations of mental illness may actually increase punitive social responses (Dietrich et al., 2004; Martinez & Mendoza-Denton, 2011; Mehta & Farina, 1997; Read & Harré, 2001; for the definitive meta-analysis to date, see Kvaale et al., 2013). Factors other than attributions are clearly at play in this regard. Indeed, the threat value of disturbed behavior is twofold. First, the routinely media-promoted association of mental illness with violence means that the public seldom becomes exposed to the great numbers of people with mental health conditions who sustain strong recoveries (e.g., see Jamison, 1995). Thus, by default, people may construe mental illness as immutable, if not untreatable (Martinez & Mendoza-Denton, 2011). Second, general cultural norms assume personal responsibility for behavior and emotion, predisposing perceivers to shun and stigmatize those with mental illness, regardless of attributions to biological loci (Haslam, 2000, 2003).

What of the effects of stigmatization on its targets—that is, those who experience mental illness? In other words, how can we account for self-stigma or internalized stigma (see Corrigan & Watson, 2002)? Crucially, unlike ethnic characteristics or physical disabilities, a history of experiencing mental illness usually exemplifies a concealable mark (unless the individual is floridly symptomatic in the present moment). As discussed, such concealability leads to the perpetual dilemma of whether to reveal or mask such a history to social partners. Considerable anxiety, related to the potential for rejection and devaluation, is likely to accompany concealable attributes (see Quinn & Chaudoir, 2009). Furthermore, attempts to suppress symptoms (and relevant history, which may come to constitute a core aspect of personal identity) require great mental exertion. These attempts are likely to be peppered with intrusive thoughts about the concealed attribute in question and consequently deplete the individual's attentional/cognitive resources and mental bandwidth, further undermining social interactions and the fulfillment of life goals (see Mani, Mullainathan, Shafir, & Zhao, 2013; Mullainathan & Shafir, 2013; Smart & Wegner, 2000).

Thus, stigmatization of mental illness yields intense consequences for those who must cope with its effects on a day-to-day basis. Incessant, problematic coping attempts may engender a sense of low self-worth, hopelessness, and even despair in the target of stigma. Far greater understanding is needed of effective (and sustainable) coping strategies utilized by persons with mental illness in contending with prejudice and stigma, particularly in children and adolescents whose mental illness may be in its beginning stages. The responses of family members are crucial in the latter instance.

In closing, we note two key points. First, stigma exists only when social, institutional, and political power enforces the views of the dominant over those of the stigmatized group (Link & Phelan, 2001; Hatzenbuehler et al., 2013). In other words, individual differences alone, or social cognitions alone, do not fully explain stigma; only when the attributes in question are officially devalued are prejudice and stigmatization likely to occur. Thus, full consideration of stigma must integrate psychology with the investigation of structural aspects of social and institutional power, as well as the predominant culture's views of what are acceptable behavioral displays (see also Corrigan, 2004).

Our second point is that despite the fact that the lion's share of research in mental illness stigma relies on survey methods, important aspects of stigma are reflexive and automatic in nature. Theory and research must incorporate these implicit processes, in addition to deliberative, explicit processes (Systems 1 and 2, respectively, in Kahneman's framework, 2003). However, as we have indicated throughout this chapter, the automaticity of many forms of stereotyping and stigmatization does not mean that stigma is immutable or irreversible. Indeed, automatic schemas themselves may be highly malleable (see Foroni & Mayr, 2005, for a compelling empirical demonstration). Despite the pervasiveness and perniciousness of the stigmatization of mental illness, as well as its automatic activation in some instances, the situation can improve at both individual and structural levels. It will undoubtedly take sustained, well-organized, and multilevel intervention efforts to effect much-needed change (see Hinshaw, 2007).

KEY RESEARCH DIRECTIONS

Despite the great volume of research on stigma and stigma processes in recent decades, the vast majority of such work has focused on racial/ethnic or gender prejudice (Quinn & Chaudoir, 2009). A host of key questions remain to be addressed regarding the applicability of such models to the stigmatization of mental illness. We highlight several of the most salient of these in the current section.

Measurement and Appraisal of Stigma

The measurement and appraisal of stigma is a huge research area, dealing with such issues as basic definitions

of stigma (and the related constructs of stereotyping, prejudice, and discrimination) in relation to mental illness, attitude-behavior distinctions, and the explicit versus implicit nature of stigmatizing attitudes (for a review, see Link, Yang, Phelan, & Collins, 2004). Below, we discuss significant issues in this domain.

Defining Stereotyping, Prejudice, Discrimination, and Stigmatization in Relation to Mental Illness

Too often, investigators do not make clear distinctions among these core terms and processes. For example, much of the research reportedly dealing with the stigmatization of mental illness utilizes surveys of cognitions or attitudes as the chief (or only) measurement tool. Other investigators infer the presence of stigma from a single behavioral indicator. Although no one investigation can incorporate all potential measures of stigmatization, inclusion of a just few items signifying negative attitudes on a questionnaire is insufficient. State-of-the-art research on public stigma should include, when possible, at least some of the classic, theoretically informed (yet too often ignored) dimensions elucidated by Jones and colleagues from 1984 (concealability, course/chronicity, disruptiveness, aesthetics, peril/danger, and origin) in terms of defining stigmatized attributes. Future research should also consider examination of the impact of devaluation on the target of stigma himself or herself—self-stigma—over and above the documentation of negative attitudes and behaviors on the part of perceivers. Examining *reciprocal* processes of influence, both attitudinal and behavioral, is a priority. Investigators also need to elucidate the temporal unfolding of the cyclic (and bidirectional) nature of stigmatization. Unconscious or implicit measures are a welcome complement to the usual explicit attitude measures. Finally, structural processes and variables are a necessary adjunct to individual/psychological measures, and appraisal of courtesy (or associated) stigma is particularly relevant for family-level investigations. In brief, when stigma is characterized solely in terms of isolated negative attitudes (or a single behavioral indicator), important components of this crucial construct are bound to be overlooked. The task for the next generation of investigators should be to ensure that the elucidation of stigmatization is as multifaceted and comprehensive as the phenomenon itself.

Linking Attitudes and Behaviors in Relation to Stigmatization

Attitudes and beliefs on the part of perceivers do not translate automatically or directly into behavioral responses (see, e.g., the classic work of Azjen & Fishbein, 1980). In other words, negative attitudes may not always yield behavioral rejection and supposedly positive attitudes may sometimes be followed by harsh behavioral responses. Several points are salient with respect to this key issue.

First, attitude measures may be subject to social desirability as a key determinant of responses. That is, research participants may express kind or benevolent attitudes toward those with mental illness in terms of questionnaire responses, but those same attitudes may not be shown in terms of their behavioral responses. Investigators would do well to consider strongly the types of response biases, particularly social desirability, that may contaminate overt attitude surveys. However, this tide may be turning with the use of online samples in which participants may be more willing to reveal their authentic attitudes, perhaps because of anonymity (see Lowery, Unzueta, Knowles, & Goff, 2006).

Second, measures of attitudes of the general public need to utilize the types of large and representative samples evident in many early studies (see review of Rabkin, 1972). Convenience samples of undergraduates are far less than ideal in terms of representing the age, educational, and social class levels of the population. The external validity, or generalizability, of both attitude and behavioral research is dependent on the collection of data from diverse, representative samples.

Third, a major problem in reviewing research on public conceptions of mental illness is that attitude measures across different investigations and across time are quite difficult to compare. Indeed, on what basis can one assert with confidence that public attitudes have either improved or worsened across a given time period? Investigations in which respondents compare individuals with mental illness to other forms of disability or out-group status can be far more informative. In fact, studies forcing such explicit contrasts have shown that mental illness is typically the least (or nearly the least) preferred and most rejected among all social categories under consideration (e.g., Albrecht et al., 1982; Tringo, 1970). Thus, forced comparisons may be a valuable complementary research strategy, as they afford appraisal of the castigation of mental illness vis-à-vis other groups at a given assessment point. This strategy could serve as an ongoing metric for assessing mental illness stigma changes over time.

Fourth, we highlighted earlier that behavioral research reveals high levels of rejection and discrimination against persons with mental illness (e.g., Page, 1995). A basic disconnect, however, still exists between investigations of social cognitions (and attitudes) and those focused on appraising behavioral indicators. For example, it is difficult

to come up with many examples of studies in which respondents in behavioral, interactional research—that is, those in which participants interact directly with a person labeled as mentally disordered—have also been asked to provide responses on general belief and attitudinal measures toward mental illness. Admittedly, one risks undermining the experimental manipulation if attitude or social distance measures related to mental illness are administered to respondents immediately before they interact with persons suspected of having mental illness. Future research might employ two time-lagged occasions for measurement: one for attitude assessment (embedded with filler items) and another for recording a behavioral interaction. Although more time- and resource-intensive than a cross-sectional survey, such designs are eminently feasible and could yield considerable insight.

Implicit versus Explicit Expression of Prejudice and Stigma

Many investigators who study racial/ethnic prejudice have concluded that overt, explicit measures of attitudes and acceptance fail to tap underlying, implicit attitudes and biases—those that are the most likely to be exhibited in current times, when it is socially unacceptable to openly voice prejudicial sentiments (Pearson et al., 2009). A major tool for assessing unconscious biases is the Implicit Association Test (see Greenwald, McGhee, & Schwartz, 1998). Here, the outcome measure is response latency (or reaction time) as participants associate pairs of concepts with the attribute of interest. Interestingly, many individuals who claim to be without bias on explicit response measures show marked implicit biases on these types of measures. The assessment of implicit attitudes provides a unique window on the types of responses biases that exist below individuals' usual levels of awareness.

What if mental illness, by default, is the object of implicit bias? Research by Teachman and colleagues (2006) suggests that implicit bias against mental illness may be common, but studies with representative samples are sorely needed. Cheon and Chiao (2012) showed cross-cultural variation in implicit attitudes toward mental illness, an important finding given the barriers in performing such research via explicit attitude surveys (see also Wang, Huang, Jackson, & Chen, 2012). Also, at least some people with mental illness themselves may show similar biases against mental illness (Rüsch et al., 2010; Teachman et al., 2006, Study 2), perhaps due to implicit self-stigmatization. Furthermore, automatic shame associations to mental illness—among people with mental illness—may foster the acceptance of maltreatment by society and hence further perpetuate stigma (Rüsch et al., 2010). The prevalence of these effects, however, is unknown, as only small samples have been investigated thus far. Finally, O'Driscoll, Heary, Hennessy, and McKeague (2012) showed that normally developing youth showed different patterns of implicit versus explicit stigma toward peers with ADHD versus depression. Implicit stigma measures may therefore provide an aid to developmental research on the acquisition, and stabilization, of stigmatizing attitudes.

Even though much stigma may well operate at implicit levels, minimizing prejudice requires intentional, planned, effortful means or repeated exposure to counterstereotypic images (e.g., Dasgupta & Greenwald, 2001; Devine, 1989). Moreover, it may be the case that some measures of implicit bias gauge the level of exposure to—rather than the endorsement of—overlearned stimuli in positive or negative contexts. As such, these implicit associations would not inevitably portend discriminatory action. Overall, a key research priority is to formulate, and empirically test, models that make sense of the complex web of explicit attitudes, implicit attitudes, and actual behavioral responses toward people with mental illness.

Issues Regarding the Independent Variable of Mental Illness

What is actually stigmatized in the realm of mental illness: the symptoms themselves, particular diagnostic entities, the general labels of mental illness or ex-mental patient, or the associations commonly made to such terms? Whereas evidence exists that all of these may be the focus of stereotypes, prejudice, discrimination, and stigmatization, the lesson for investigators is that the independent variable—that is, the construct that is the potential subject of such denigration—must be specified clearly and precisely.

A key finding, highlighted earlier, is that when both behavioral depictions of symptoms and the label of mental illness (or ex-mental patient) are presented to research participants, symptom depictions are the more salient triggers of negative attitudes and stigmatization (see reviews in Hinshaw, 2007; Hinshaw & Stier, 2008). Yet when *normative* levels of behavior are branded or framed as related to mental illness, prejudice and stigmatization may well ensue. This is the case when labels are presented without accompanying behavioral symptoms. Importantly, when a given respondent carries in mind a strong preexisting association between mental illness and risk for dangerousness or violence, the label becomes a potent trigger for stigmatizing attitudes (Link et al., 1987). The flip side of this finding is that if individuals do not hold in mind an association between the label of mental illness and violence,

presentation of the label might lead to benign attitudes. Hence, the expectation that mental illness equates with violence is an important aspect of prejudice and stigma. In the end, labels *do* matter, and investigations of the effects of diagnoses or labels are still extremely viable as independent variables for future research efforts.

However, the world contains a great diversity of mental aberrations (see APA, 2013), belying the notion of a uniform or homogenous construct or label of mental illness. Indeed, considering mental illness to be undifferentiated may be not only ill-informed but also potentially stereotypic and stigmatizing, as doing so implicitly assumes that people with mental illnesses are all the same. Recognizing the great range of symptom levels and impairment has led investigators of recent large-scale public attitude surveys (in both the United States and abroad) to make distinctions among various forms of mental illness. Findings reveal that the different categories of mental illness are associated with unique profiles of misinformation and stigmatization, even though all forms receive some degree of stigma (e.g., Crisp et al., 2000; Pescosolido et al., 2010; Thompson et al., 2002).

At the same time, however, the global label of mental illness or mental illness should receive parallel attention, as media often use broad, global labels. For example, in a 2012 reelection debate the current U.S. president used the label mentally ill twice (Kliff, 2012). We thus recommend a two-pronged approach that investigates both the specific and the global labels of mental illness.

Three related issues are salient. First, as noted, belief in the immutability or chronicity of a stigmatizing condition is likely to be related to negative perceptions of that condition (Jones et al., 1984; Martinez & Mendoza-Denton, 2011). Thus, to the extent that mental illness is believed to be a chronic and permanent pattern of behavioral dysregulation—with little or no chance of successful rehabilitation—harshly stigmatizing responses are expectable. Even scientists and clinicians hold such stereotypes (Corrigan & Wassel, 2008; Schulze, 2007). However, evidence suggests that even schizophrenia is not chronically deteriorating in all cases or even in a majority of individuals (Harding, Brooks, Ashikaga, Strauss, & Breier, 1987). It is paramount that such information be explicitly imparted to the general public. Indeed, the term *schizophrenia* continues to retain a metaphoric linkage with despair, hopelessness, and devaluation (Finzen & Hoffman-Richter, 1999). In addition, the serious impairments of schizophrenia are often associated in the public mind as representing all forms of mental disturbance (or, far too often, misattributed to severe splits in behavior, which should more accurately be linked to dissociative disorders). In short, to erode common stereotypes, the malleability and treatability of many mental illnesses should be accurately underscored.

Second, viewing mental illness in its variegated manifestations, rather than as a homogenous and amorphous entity, prompts consideration of a crucial point: Not all forms of mental disturbance are utterly severe, and evidence-based treatments may yield real gains even with serious forms of mental disorder. Yet far too little is known about the responses of the general public, family members, mental health professionals, and patients themselves with respect to more prevalent but less severe forms of mental disturbance (Hinshaw, 2007). Although the severity and chronicity of mental disorders should predict the highest levels of stigmatization, less severe forms of mental disturbance may receive strong stigmatization precisely because of the expectation that the individual in question should have been able to control the periodic, aberrant behavior in question. It may well be, for example, that milder forms of autism spectrum disorders are particularly stigmatized (see, e.g., Norvitilis, Scime, & Lee, 2002; see also discussion in Hinshaw & Scheffler, 2014, regarding ADHD). A research priority is to extend work on prejudice, discrimination, and stigmatization to the full diagnostic and behavioral spectrum of mental health conditions.

Third, when considering the depictions of mental illness in typical research investigations, the portrayal is typically in the form of written vignettes that describe various symptom patterns. Alternatively, the manipulation may relate to the presence or absence of the label of mental illness or ex-mental patient. Although informative, such research should be complemented by other investigations that feature the direct exposure to behavioral and emotional patterns of mental illness. It would be extremely worthwhile to pursue research paradigms in which symptoms of mental illness are presented in videotaped, face-to-face, or virtual reality formats. Such encounters might yield the side benefit of enhancing empathy for the difficult experiences associated with mental illness if appropriate framing and contextualization are provided.

Overall, investigators need to exert care and thoughtfulness when depicting the independent variable of mental illness. Specific conditions, as well as the general label, require further investigation. Furthermore, the types of paper-and-pencil methods (or their present-day digital analogs) employed in many forms of attitude research should be supplemented with social interaction paradigms that feature actual, ongoing behavior.

Otherwise, investigators risk obtaining an incomplete, and potentially misleading, account of mental health stigma.

Extending the Attributional Analysis of Mental illness Stigmatization

We have made repeated reference to (a) the finding from attribution theory that ascribing deviant, threatening behavior to noncontrollable causes should lead to stigma reduction (Weiner, 1985, 2006) and (b) the counterpoint that there is a paradoxical risk of enhancing stigma by focusing on exclusive, reductionistic biogenetic attributions. Indeed, attributing mental illness to noncontrollable biomedical or genetic causal factors may not reduce punitive responses on the part of respondents and may, in fact, increase some key aspects of stigmatization, such as pessimism, social distance, and perceived dangerousness (Kvaale et al., 2013).

Accounting for this counterintuitive state of affairs should be a major research effort. First, many of the symptoms of mental disturbance are sufficiently threatening to observers that they may override or deactivate attributional processing (Haslam, 2003). The unpredictability of such symptoms—along with the symbolic threat they bring to the perceiver's beliefs in a rational world and his or her own sense of personal behavioral and emotional control—may evoke fear, castigation, and distancing. Such responses may be so rapid and automatic that they transpire prior to any mitigating effect of a causal explanation.

Second, when respondents are told that mentally disturbed behavior should be attributed to noncontrollable factors, such as aberrant genes or biochemistry, there may be initial resistance, related to the ubiquitous cultural belief that construes behavior as volitional. Maneuvers to foster a medical model of mental illness may thus be perceived as excuse-making or coddling, thereby engendering reactance. Many people may well believe that medical-model ascriptions are part of an overly disease-oriented culture that tries to absolve persons from personal responsibility.

Third, however, what if such biomedical, genetic ascriptions are ultimately accepted—particularly in relation to deeply disturbing behavior patterns that pose realistic or symbolic threat to perceivers? Again, intriguing behavioral evidence suggests that harshly punitive reactions may ensue (Mehta & Farina, 1997). This tendency may relate to the linkage of biomedical/genetic ascriptions to a deep sense of immutability and hopelessness regarding the sufferer's mental illness. In addition, if mental illness is believed to stem from a biogenetic defect, this belief may bolster essentialist views of its underlying nature as a separately caused, categorically distinct entity, which could invoke the forms of tribal stigma usually reserved for racial/ethnic or national minorities (Kurzban & Leary, 2001). Paradoxically, then, the medical model attribution might actually be an additional source of mental illness stigmatization, provoking exploitation and punishment rather than acceptance and inclusion.

Considering underlying mechanisms is provocative. We still do not fully know *how* persons in current society view mental illness and its biomedical attributions. It may be that there is a fundamental discounting of attempts to reattribute mental disturbance to biological and genetic causes: Many may continue to believe that the individual in question could *still* have controlled his or her behavior. Alternatively, some respondents may undergo a radical attributional shift, coming to the belief that the behaviors in question stem from a deep-seated, inborn flaw. Still other respondents may take a perspective parallel to demonological accounts of mental illness in former eras. Here, a supposedly uncontrollable causal factor—namely, possession by evil spirits or the devil—can be linked to the belief that the afflicted person is responsible for his or her *vulnerability* to the possession, perhaps through a moral weakness or lack of faith (Hinshaw, 2007; Zilboorg, 1941). Reductionistic medical-model/genetic perspectives may similarly convey the notion that the person displaying aberrant behavior still bears ultimate responsibility for being susceptible to the biological difference or vulnerability.

In terms of empirical investigations, open-ended/narrative responses need to complement the traditional rating-scale studies of attribution (see Weiner, 2006) to understand how members of society comprehend various explanations of mental illness. Uncovering the contents of such personal representations of, and attributions for, mental illness may require the intensive study of more diverse stimulus material: personal accounts, analyses of advertisements and media portrayals, and examination of cultural practices and language structures (e.g., jokes or common stories told in various cultures). Mixed-method research strategies may be crucial in this regard. The Web—with its social networks, crowd-sourcing, and weblogs (see Ito, 2004)—represents a novel data trove that may be mined for insights into these questions.

It will be particularly important to understand the cultural and linguistic representations of genetic ascriptions for mental disturbance. Indeed, in the coming years, genetic selection may become far more intentionally directed than has ever been the case in human history. Having deviant

genes may be viewed as an entirely controllable facet of one's makeup that is under the volitional control of parents. It will be important to understand societal messages regarding people who show the behavioral signs of a presumed genetic inferiority—and one that could have potentially been controlled or prevented through prenatal selection/termination or genetic manipulation. Overall, investigators must decode and explicate the content of current societal messages regarding ascriptions for mental illness—particularly in relation to genetic loci and their attributional consequences—to understand implications for stigma.

Responses of Persons with Mental illness to Social Stigma

Although research on the responses of the general public to mental illness has been plentiful for almost 60 years, far less is known about the targets or victims of stigma and about resultant self-stigma. That is, not enough is known about how people with mental illness comprehend, internalize, and/or cope with the devaluation and stigmatization they experience. As noted earlier, it was originally posited that stigmatized individuals would internalize the castigation foisted on them (see Allport, 1954). Later psychological perspectives, however, emphasized that lowered self-esteem and shame are far from universal consequences of being stigmatized (Crocker et al., 1998).

Still, however, individuals with mental illness may be particularly likely to experience shame and reduced self-esteem (Rüsch et al., 2014). This tendency may be related to the very symptoms of many forms of mental illness, which include demoralization and self-denigration, and to the lack of social cohesion compared to other stigmatized groups (such as racial/ethnic minorities). Along this line, self-advocacy and political solidarity have been a relatively recent occurrence with respect to mental illness. Throughout history, few have desired to disclose having to contend with or receive treatment for—let alone organize political movements around—this facet of identity. For such reasons, internalization of blame may be expected.

We note the taxonomy of personal coping responses described by Corrigan and Watson (2002). For one subgroup of persons with mental illness, shame and loss of self-esteem appear to be quite salient, over and above the symptoms of mental illness. Such individuals therefore display internalized or self-stigma. A second group shows active coping responses, including activism; this strategy appears to dissipate shame and self-blame. A third subgroup appears to ignore many stigmatizing messages, going on with their daily lives and personal goals. Unknown, however, are the proportions of such coping types among individuals with mental illness and whether these three tendencies are exhaustive of all potential coping responses. Also unknown are the social cognitive and emotional processes that enable people to sustain these strategies in the long-term. It may well be that developmental processes are sufficiently strong that individuals may shift across such types throughout the life course.

In addition, *stereotype threat* is a replicable phenomenon regarding members of stigmatized racial/ethnic and gender groups. In brief, when a particular societal stereotype is made salient (e.g., "African American individuals are inferior in terms of academic achievement" or "women are poor at math"), performance on relevant tests suffers accordingly for members of the group in question (once baseline differences in performance are controlled; McKown & Weinstein, 2003; Steele, 1997, 2010; see Inzlicht & Kang, 2010, for other consequences). Yet when tests are framed in ways that do not evoke stereotype threat—for example, the test items are described as problem-solving exercises rather than gauges of (presumably innate) ability—the performance of the stigmatized group does not suffer. Although challenges to the power of stereotype threat have been posed, it is a phenomenon of potential relevance here.

Specifically, an important question is how stereotype threats might influence at least some individuals with mental illness. Investigators will have to contend with the crucial issue of just what the relevant stereotypes are—and in what performance domains they might matter. Although there have been some initial forays into this area (see Quinn, Kahng, & Crocker, 2004), far too little is known. For example, does priming the common stereotype that persons with mental illness are unpredictable and incompetent impair performance during job interviews or in employment contexts? More ominously, does the stereotype that mental illness is inevitably and invariably associated with violence trigger self-fulfilling prophecies?

In all, the ways in which persons with mental illness respond to stigma and discrimination (successfully and unsuccessfully) constitute a crucial topic for future research. We have argued that self-stigmatization is likely to be particularly potent for individuals with mental illness, but there are too few data points on representative samples to state this assertion with confidence. Developing a comprehensive taxonomy of coping strategies would be an important initial step. Whether stereotypes related to mental illness (e.g., violence, incompetence, unpredictability, untreatability, and immutability) evoke threat and

performance decrements in crucial life tasks is a topic in need of programmatic investigation.

Families and Mental Health Professionals

Even more than objective types of burden—such as financial costs, finding housing, providing care, and taking time off from work—family members of persons with serious mental illness incur a strong sense of *subjective burden*. This process involves embarrassment, shame, and a host of related negative emotions related to the difficulties associated with caring for their afflicted relatives (Lefley, 1989, 1992). Beyond descriptive information about such burden, there is an important need to understand the following: Which types of families stay silent about a relative's mental illness, and which types exhibit openness? Do certain forms of mental illness predict one or the other stance with any specificity? What are the kinds of extra-familial supports that successful families utilize? At which points in the life cycle of the relative's mental illness do families show the greatest chance of engaging in open dialogue with one another and with relevant professionals? For important background, see Larson and Corrigan (2008).

The subjective experiences of family members are inextricably linked with professional and scientific views on mental illness. As discussed earlier, some professionals in the field convey stereotypic views of and stigmatizing attitudes toward people with mental illness. Yet most information about attitudes comes from explicit attitude measures or from selected personal accounts (Wahl, 1999). Obtaining information on the actual behavioral responses of professionals to persons with mental illness is an important objective. Equally crucial is obtaining a rich database on how the *implicit* associations of mental health workers and professionals affect persons with mental illness and how these biases may shape treatment adherence and clinical interactions and outcomes. Finally, it may well be that the majority of current and recently trained mental health professionals hold positive or nonstigmatizing attitudes toward persons with mental illness. However, relevant research that could shed light on this topic has simply been lacking.

Developmental Issues Regarding Stigma

Research on racial/ethnic bias has taken on a decidedly developmental perspective, with efforts made to ascertain the ages at which children become aware of prejudice and bias toward people of color (e.g., McKown & Weinstein, 2003). More should be known about the parallel topic of bias and stigma regarding mental illness. In fact, however, developmental considerations have been sorely missing from most research on this topic.

Space limitations preclude a full exploration of this issue, but we propose several key questions that require greater elucidation. First, how do stigmatizing attitudes in society (and from mental health professionals) explain parental rejection versus acceptance of a diagnosis of mental illness in their child? Also, how does the age of the child relate to such family response? In other words, what are the distinct (and common) issues for families of infants/toddlers, preschoolers, grade-schoolers, and adolescents in contending with a child's mental illness? Second, what are children's own reactions at different ages to receiving a mental illness diagnosis? Can such a label be a source of strength in that one can begin to attribute negative experiences to an outside entity (an illness) rather than to one's flawed sense of self? Or does the stigma attached to mental illness make the receipt of a diagnosis a trigger for lowered self-esteem? Even more fundamentally, how do children of various ages understand what mental illness signifies, both in general and for themselves in particular?

At a broader level, how do cultural messages about mental illness—from the media, from school-based lessons, from peer networks, from social media—influence the thoughts and attitudes of typically developing children and adolescents toward peers with mental disorders? As noted earlier, even children's cartoons have contained frequent, and disparaging, images of mental illness (Wilson et al., 2000), and some of the first words young children use to denigrate disliked peers are slang words for mental illness. A host of research questions emerge from consideration of the ways in which visual images and verbal messages regarding mental illness are communicated to, and processed by, children. We noted earlier the important investigation of O'Driscoll et al. (2012) regarding implicit versus explicit attitudes displayed by children versus adolescents with respect to two different mental disorders (ADHD and depression). Such research, particularly if carried out longitudinally, would represent a major advance.

At present, the field is ripe for developmentally oriented investigators to probe both basic and applied questions about the origins, and manifestations, of stigma in children and adolescents. A systems approach is critical, given the need for providers of children's services to be aware of potentially stigmatizing messages and practices (see Heflinger & Hinshaw, 2010). All such work would simultaneously enhance knowledge of social cognitive processes across development and facilitate interventions

aimed at reducing mental health stigma in its earliest manifestations.

Current Social Issues in Relation to Stigma and Mental illness

A number of political and social events and issues appear to have important implications for the stigmatization of mental illness. We list these briefly in the hope of stimulating relevant empirical inquiries. First, nearly all state budgets across the United States have become awash in red ink during the early years of the twenty-first century. Education, welfare, and mental health are often the first targets of defunding and disinvestment. Will stigmatization of persons with mental illness, including children and adolescents, show increases in economic downturns and anemic economic recoveries? Will the willingness to engage in treatment be affected? Admittedly, linking public attitudes temporally with economic trends and current events is difficult. Yet investigations of this topic area could shed light on important macro-level variables in relation to stigmatization.

An immediate concern is the implementation of the Affordable Care Act, the landmark legislation that brings the United States closer to universal health coverage. Political and ideological rancor might still be successful in derailing this public policy. Alternatively, if implemented with fidelity to its goals—which is now more likely given the Supreme Court decision of June 2015—the Affordable Care Act could result in greater access to mental health care and thereby destigmatize participation in mental health care services.

Further, immigration is a major issue confronting Congress and could render the United States more ethnically and culturally heterogeneous, potentially stoking the flames of hatred and xenophobia. It is unknown whether intolerance will spread to persons with mental illness. Yet two reasons make such an occurrence probable. For one, the persistent media-driven stereotype that mental illness equals violence would clearly tend to intensify rejection and marginalization of people with mental illness. For another, recall the fascinating linkage, as previously noted, between (a) fears of mortality and (b) intolerance of those who are different (e.g., Solomon et al., 1991). Some theorists posit that anxiety over death or annihilation may lead the perceiver to become acutely aware of the fleeting nature of life, thereby spurring stereotyping and castigation of individuals who seem to imperil community norms and safety. Given threatening, high-profile acts of violence that saturate the media, discrimination against those with mental illness may intensify.

Summary

A host of research questions emerge from analysis of the literature on stigmatization. Indeed, the bulk of empirical work on stigma pertains to the important topics of racial/ethnic and gender-based prejudice, but the applicability of such research to mental illness remains uncertain. Important issues pertain to the specification of the dependent variable of stigma (including more focus on measurement of observable behaviors, rather than attitudes and beliefs per se) and parallel specification of the independent variable of mental illness (in terms of its inherent variability and specificity). Also important are high-granularity attributional analyses related to personal control versus biogenetic ascriptions and their impact on stigma. Finally, more research needs to address questions about family issues, developmental factors, and the impact of macro-level sociopolitical and economic events on stigma in this domain.

STRATEGIES FOR OVERCOMING STIGMA

Finding effective strategies to overcome stigma is a difficult yet achievable task. Although knowledge must replace ignorance as a starting point, increased literacy regarding mental illness does not always translate into improved attitudes. Knowledge may be particularly helpful for youth, but *contact*, which can lead to empathy and modeling of equitable interactions, is especially important across the life span (for data and relevant discussion, see Corrigan & Kosyluk, 2013). Intervention must be multilevel and operate on psychological, structural, and cultural processes, as single-focus anti-stigma efforts are bound to fail to address the array of factors necessary for lasting change (Hinshaw, 2007). Efforts to reduce self-stigmatization are gaining in ascendancy (e.g., Corrigan, Kosyluk, & Rüsch, 2013; Corrigan, Sokol, & Rüsch, 2013). A major, multifaceted anti-stigma program in the United Kingdom, called Time to Change, was recently evaluated (see Henderson & Thornicroft, 2013), with some evidence of national-level success but limited evidence for maintenance of gains. System-wide change with respect to stigma reduction is bound to be a challenging objective. In the limited space available, we describe several promising strategies.

Social Policy and Culture-wide Levels

Beginning with broad levels of intervention in the realm of policy, general health care reform is a priority in light

of the large numbers of uninsured in the United States. As just noted, the funding and sustained implementation of the Affordable Care Act is a key long-term priority. Even if it survives full-frontal political attacks and becomes established in the long-term, it still could eventually be defunded in practice, as were community mental health centers after deinstitutionalization occurred. Moreover, enforcing existing legislation mandating nondiscrimination in employment and housing is also crucial. Yet beyond such enforcement, new initiatives will be required to help promote education and occupational skills (and, hence, income levels) of persons with mental illness.

Regarding children and adolescents, strengthening the provisions of the IDEA will help to ensure adequate academic attainment for youth with mental illness. An additional suggestion with potentially far-reaching implications is to include behavioral and emotional functioning as part of the medical checkups that children receive each year from health care providers. Such a preventive approach could bring discussion of children's social and behavioral functioning into the everyday language of doctors and families. Importantly, this dialogue could help address the precursors of mental illness before symptoms escalate (Hinshaw, 2007; Institute of Medicine, 2009) and potentially curtail future suffering as well as violence-laden tragedies. Such efforts are controversial, however, particularly given fears that early detection would lead, in too many cases, to overmedication as opposed to preventive intervention.

In terms of public media, a far different kind of message about mental illness needs to be transmitted. Information about mental illness in the print, visual, and electronic media continues to pertain largely to danger, violence, and utter irrationality. Protest by consumer groups may lead to consciousness raising among writers and producers, even though protest movements have the potential (in some instances) to lead to a counterproductive rebound of the very messages that are targeted (Corrigan & Penn, 1999; Wahl, 1995). Furthermore, promotion of poignant disclosures by individuals and families who deal with mental illness provides a different set of images and a different cultural dialogue than the typical depiction of persons with mental illness as either heroes or incompetents. For developing youth, portrayals of the realities of such conditions as child autism and ADHD—as well as adolescent mood disorders and eating disorders—can set the stage for openness and discussion instead of silence and shame. It is important to avoid demonization *and* glorification from such accounts; everyday struggles and triumphs are likely to promote identification and empathy.

Communities

At a community level, the predominant empirically based strategy for overcoming discrimination and stigma has stemmed from the contact hypothesis (Allport, 1954). From this perspective, changes in attitudes and behaviors are most likely to occur through direct behavioral contact with members of out-groups. A major meta-analysis by Pettigrew and Tropp (2006) confirmed that sheer contact is an important, and even necessary, condition for alleviating prejudice and stigma across multiple out-groups (as for the effectiveness of contact with people dealing with mental illness, see Corrigan & Kosyluk, 2013). The *conditions* of contact are crucial for success: Specifically, contact is most likely to lead to improved attitudes when in-group and out-group members have regular, informal contact on an egalitarian basis. Thus, visiting patients in a mental hospital is not nearly as likely to facilitate enhanced attitudes as is regular interchange in the mainstreams of the community and the workplace (but see Pettigrew & Tropp, 2006, who contended that contact per se transcends such conditions with regard to reducing prejudice). Clearly, improvements in mental health care, enhanced employment opportunities, and housing availability are needed for contact to be more egalitarian than it often is today (see review in Hinshaw, 2007).

Other aspects are important for successful contact. Adequate treatment and social supports are essential aspects of such community intervention. Also, stigma is particularly likely to diminish when in-group and out-group members work toward common, superordinate goals that foster expanded in-group identity (Gaertner & Dovidio, 2000; Sherif & Sherif, 1953). Advocacy and support groups in which persons with mental illness, their family members, and the general public interact provide a clear example of such collaboration.

Importantly, provocative new social psychological research has shown that contact effects are not restricted to this kind of direct contact. Specifically, *indirect contact* has been shown to be effective in some intergroup contexts as well (Hewstone & Swart, 2011). Indirect contact comes in at least two flavors, including *extended contact* and *imagined contact*. In the former, one might have a friend who has a friend with mental illness. This type of contact can shift attitudes in the initial, more distantly related person. Thus, extended social networks might help decrease mental illness stigma. In addition, *imagined contact* research has shown that the sheer act of imagining contact with out-groups can positively change attitudes about them. Although it is presently unknown whether this kind of intervention would ameliorate stigma

in the domain of mental illness, future research should systematically explore this possibility, especially given that imaginative engagement causally affects empathy (Kidd & Castano, 2013).

Moreover, because contact effects with a specific out-group can shift attitudes toward out-groups more generally (in what are termed secondary transfer effects—see Pettigrew, 2009), reducing mental illness stigma via contact may reduce patterns of prejudice at a broad level. As Allport (1954) maintained over 60 years ago, if the in-group's boundaries can be stretched to include wider numbers of individuals, we all stand to benefit. Still, as noted in Henderson and Thornicroft (2013, introducing a supplement to the *British Journal of Psychiatry*), even carefully thought-out, well-funded multipronged strategies at a national level do not always yield large effects. Considerable work remains to be done.

Families

For families, a number of procedures and interventions may serve to decrease subjective burden and bolster coping resources. These include education about the causes and realities of mental illness, social support from other families grappling with similar issues, and engagement in (plus reimbursement for) family-based therapies that provide strategies for dealing with the difficult life issues presented by serious mental illness. Furthermore, when a parent has a mental illness, families need to engage children in treatment in ways to help them understand that they themselves are not to blame—and that their parent is getting help (Beardslee, 2002). Openness and communication are crucial in this regard. Self-help and advocacy groups can reduce isolation, provide needed information, and aid in family coping. In addition, theoretical models in the field must emphasize reduction of parental blame for the mental illnesses of their children yet simultaneously promote family responsibility for ameliorating the course of the disorder. At the same time, the reality is that some families promote maladjustment via physical or sexual abuse or child neglect. Preventive strategies along these lines are also essential for optimal mental health care and, ultimately, stigma reduction.

Youth in the Community

From all appearances, young people in the general population appear eager to discuss behavioral differences, are far more likely to accept a variety of expressions of sexuality than older individuals, and may be more accepting of mental illness. These cultural trends provide grounds for optimism about a future that features far less mental health stigma than the past. Yet is there any evidence that active promotion of youth-based discussion actually helps? In an intriguing model, Let's Erase the Stigma (LETS) features a simple premise: High school (or even middle school) students can form a school club rather than a support group with mental health professionals during which active discussion of differences, acceptance, and ideas for reducing stigmatization is the priority. In an initial, quasi-experimental evaluation of the LETS model, benefits of participation were noted with respect to improved attitudes and knowledge (about mental illness stigma), enhanced behavioral intentions to combat stigma, and reduced social distance toward individuals with mental disorders (Murman et al., 2014). Such contact- and peer-based programs are likely to be preferable to top-down knowledge enhancement alone as a strategy for community-wide stigma reduction among youth. LETS has recently merged with the antistigma organization known as Bring Change 2 Mind, and further evaluations are ongoing.

Persons with Mental Illness

Finally, for individuals with mental illness (including children and adolescents), engagement in evidence-based treatment is absolutely crucial. Participation in such intervention can reduce symptoms and facilitate competent academic, social, and vocational performance as well as enhance social welfare (see Marcotte & Markowitz, 2011, for policy implications)—all of which can serve to reduce stigma. To the extent that interventions diminish threatening and maladaptive symptoms, perceivers in society will have less *apparent* justification to stigmatize those with mental illness (Hinshaw, 2007). More simply stated, there may be few more effective means of combating stigma than ensuring access to well-funded, responsive treatments.

Yet there is potential peril in this line of reasoning. It is dangerous to advocate for the position that all responsibility for stigma reduction falls on the shoulders of persons with mental illness, who must eliminate any sign of disturbance. This kind of blaming-the-victim mentality could be perceived as tantamount to arguing that the solution for ending racial/ethnic prejudice is to have all members of minority groups blanch their skin. Obviously, such a solution is irrational and immoral. Thus, there is need for systemic change, not just adjustment on the part of persons with mental illness to conform to social norms.

However, mental illness is unlike ethnicity and race in an important and undeniable respect: It is indeed a form of illness—albeit a complex form, comprising all of the developmental psychopathology principles and processes discussed throughout this chapter. Relatedly, the symptoms of mental illness are undeniably maladaptive and cause suffering. The evidence-based treatment of such symptoms, and related impairments, can enhance autonomy and flourishing in the individual in question. Thus, successful treatment is clearly a crucial aspect of stigma reduction. But just as clearly, it cannot be the sole component.

Beyond participation and engagement in evidence-based intervention, finding means to bolster coping resources of persons with mental illness is needed. For example, if individuals encounter prejudice, it will be important that they attribute such stigma appropriately to the biases of society instead of to inherent defects within themselves. At the same time, individuals should retain motivation to remain in their particular forms of treatment. Because, however, many forms of mental illness serve to erode self-confidence, as well as personal value and agency, teaching such coping strategies is a formidable objective. Finally, even successful interventions will not be likely to reduce all signs of behavioral difference, nor should this be their goal. Thus, greater societal tolerance for and appreciation of the diversity of behavioral and emotional expressions is a simultaneous cultural objective for stigma reduction.

Summary

The ultimate goal of mental illness stigma research is to find means of promoting change strategies that span levels of the person, family, community, media, and social policy. Again, there is a danger that ameliorating stigma processes at any one level will leave untouched the pernicious problems at other levels, leading to fragmented and unsustainable change (Hinshaw & Stier, 2008; Link & Phelan, 2001). Moreover, stigma is a process with social, cultural, and even moral dimensions (Kleinman & Hall-Clifford, 2009; Yang et al., 2007), meaning that change is likely to be slow. Yet concentrated efforts must begin in earnest. A major intellectual, clinical, and policy-related challenge is to apply the basic principles of stigmatization—across the multiple levels of influence that are operative—to design, implement, evaluate, and refine stigma reduction practices for children, adolescents, adults, and their families and communities. Importantly, elucidating mental illness stigma in particular will also add to a more comprehensive general theory of stigmatization, potentially benefiting other socially marginalized groups.

Citizens and interventionists face particularly complex challenges. These include the pervasive shame and silence surrounding mental illness, the cyclic nature of reform and retrenchment throughout history, and the automatic (and perhaps naturally selected) stigmatizing tendencies toward behavioral deviance, all of which we have discussed in this chapter (Hinshaw, 2007; Kurzban & Leary, 2001). All human societies, however, require variability and diversity, so long as the behavioral manifestations are not threatening to fellow humans. Thus, at the largest level, successful stigma reduction will require promoting greater tolerance for a wider range of behavioral and emotional styles, thereby allowing *all* individuals to actualize their potential. Although severe forms of mental illness—which can include highly irrational and erratic forms of behavior—may always receive some degree of castigation, this does not mean that reducing stigma is impossible. All members of society will gain when compassion and understanding supplant shunning and shame and when access to evidence-based treatments becomes a reality. Understanding relevant developmental processes that contribute to stigma formation—and that may therefore illuminate pathways to its undoing—is an urgent priority for basic science, informed public policy, and forging the kind of humane society to which we all should aspire.

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