Development and Psychopathology (2023), **35**, 2168–2185
doi:10.1017/S0954579423001128

CAMBRIDGE UNIVERSITY PRESS

Special Issue Article

2022 Minnesota Symposium on Child Psychology

Leveraging the developmental neuroscience of caregiving to promote resilience among youth exposed to adversity

Dylan G. Gee and Emily M. Cohodes
Department of Psychology, Yale University, New Haven, CT, USA

Abstract

Early adversity is a major risk factor for the emergence of psychopathology across development. Identifying mechanisms that support resilience, or favorable mental health outcomes despite exposure to adversity, is critical for informing clinical intervention and guiding policy to promote youth mental health. Here we propose that caregivers play a central role in fostering resilience among children exposed to adversity via caregiving influences on children's corticolimbic circuitry and emotional functioning. We first delineate the numerous ways that caregivers support youth emotional learning and regulation and describe how early attachment lays the foundation for optimal caregiver support of youth emotional functioning in a developmental stage-specific manner. Second, we outline neural mechanisms by which caregivers foster resilience—namely, by modulating offspring corticolimbic circuitry to support emotion regulation and buffer stress reactivity. Next, we highlight the importance of developmental timing and sensitive periods in understanding caregiving-related mechanisms of resilience. Finally, we discuss clinical implications of this line of research and how findings can be translated to guide policy that promotes the well-being of youth and families.

Keywords: Caregiver buffering; emotion socialization; corticolimbic circuitry; emotion regulation; early adversity

(Received 19 April 2023; revised 10 August 2023; accepted 11 August 2023; first published online 6 November 2023)

Introduction

Across development, caregivers play an outsize role in the emotional lives of children (Ainsworth, 1969; Bowlby, 1969; Lieberman, 2017), particularly in children's development of the capacity to regulate emotions (Calkins & Hill, 2007; Cassidy, 1994). Beginning at birth, stable caregiving is fundamental to children's emotional development (Hofer, 1978, 1994; Tottenham, 2012), and caregivers provide extrinsic scaffolding of children's increasingly emergent capacity to regulate their own emotions (Dozier et al., 2018; Gianino & Tronick, 1988; Hofer, 1994; Katz & Hunter, 2007; Pratt et al., 2015). Over time, and as caregivers adapt their behaviors to the child's changing needs, children undergo a shift from full reliance on caregivers to provide external regulation of their emotions in infancy to greater reliance on their own intrinsic capacity of self-regulation later in development (Grolnick et al., 2006; Thompson & Goodman, 2009). It is theorized that it is via this protracted socialization, which unfolds across development and occurs in tandem with fluctuations in other sources of social buffering, that caregivers influence their children's mental health and emotional well-being. The daily involvement of caregivers in their children's emotional lives directly influences children's development of psychobiological underpinnings of emotion regulation (Callaghan & Tottenham, 2016; Gee, 2016; Tan et al., 2020; Tottenham, 2015).

Though the role of parents in the emotional lives of children has universally important implications for child development across contexts (Morris et al., 2007), caregiving influences on the development of emotion regulation may have a particularly salient impact in the context of children's exposure to adversity due to the centrality of emotion regulation in processes of risk and resilience. Here we define resilience as positive mental health outcomes in the context of exposure to adversity; we consider resilience to be situated within a broader socioecological context and to be a dynamic and multifaceted process that is both influenced by and acts upon multiple systems (Masten et al., 2021). Emotion regulation, or an individual's ability to affect what emotions they experience, and when and how they experience and express these emotions (Gross, 1998), has been highlighted as a key transdiagnostic factor linking exposure to adversity and psychopathology (e.g., Ehring & Quack, 2010; Heleniak et al., 2016; Kim & Cicchetti, 2010; Villalta et al., 2018). Numerous studies have underscored that exposure to childhood adversity is linked with prototypically maladaptive coping strategies (Compas et al., 2001)—for example, exposure to community violence, peer victimization, and parental loss are associated with higher levels of rumination (Heleniak et al., 2016, 2018; McLaughlin et al., 2009; McLaughlin & Hatzenbuehler, 2009), and meta-analytic findings show an association between maltreatment and lower levels of emotion regulation across domains, as well as increased reliance on prototypically maladaptive strategies (Aldao & Christensen, 2015)

Corresponding author: D. G. Gee; Email: dylan.gee@yale.edu
Cite this article: Gee, D. G., & Cohodes, E. M. (2023). Leveraging the developmental neuroscience of caregiving to promote resilience among youth exposed to adversity. *Development and Psychopathology* **35**: 2168–2185, https://doi.org/10.1017/S0954579423001128

such as avoidance and suppression (Gruhn & Compas, 2020). Despite demonstrated links between adversity exposure and reliance on potentially maladaptive emotion regulation strategies at a group level, empirical evidence supports that, on an individual level, prototypically adaptive emotion regulatory processes following adversity may represent a mechanistic process of resilience. Across multiple cross-sectional and prospective samples representing youth exposure to a diverse range of adversities, reliance on maladaptive emotion regulation strategies and emotional reactivity have been found to mediate the association between youth exposure to trauma and the development of psychopathology (Heleniak et al., 2016; Kim & Cicchetti, 2010; Kim-Spoon et al., 2013; Weissman et al., 2019).

Here we propose that caregiving influences in the context of children's emotional lives—and on children's development of corticolimbic circuitry and emotion regulation—are a primary mechanism by which caregivers promote resilience following exposure to adversity. While the focus of the current review is on the role that caregivers play in children's emotional lives, we note that there are numerous, interdependent ways that caregiver involvement in the lives of children influences children's responses to adversity—and therefore shapes processes of risk and resilience (see Williamson et al., 2017 for a review). For example, in the wake of exposure to adversity, caregivers have central roles to play in providing physical safety, establishing and maintaining routines, obtaining psychological treatment and medical care, and detecting risk to minimize exposure to subsequent trauma. Rather than being completely distinct caregiving influences, we view these as complementary and dependent on one another. For example, it is challenging for a caregiver to optimally support their child's emotional development when facing housing or food insecurity, limited access to resources, and ongoing threats to physical and psychological safety.

In the sections that follow, within the context of a model by which children's brain and behavioral development mediates the association between adversity exposure and children's mental health, we examine the effects of caregiving on the link between adversity exposure and children's brain and behavioral development (i.e., a moderated mediation model; Fig. 1). Here we conceptualize adversity broadly—including but not limited to physical abuse, sexual abuse, neglect, serious accidental injury, community violence, natural disaster, and forced displacement. Specifically, we delineate how caregivers impact children's emotional functioning in the context of adversity from a multisystemic perspective—focused on behavioral, psychological, and neurobiological processes—and, further, synthesize evidence for associations between these processes and resilience following adversity. In addition, we review empirical work that has underscored important developmentally specific effects of caregiving involvement in the emotional lives of children following adversity. We conclude by highlighting the importance of considering caregiving influences on children's emotional lives in both intervention and policy settings.

Mechanisms by which caregivers influence children's trajectories of resilience following exposure to adversity

A substantial body of literature has focused on caregiving influences on children's responses to trauma, highlighting several key ways that caregivers promote resilience via involvement in the emotional lives of offspring (Appleyard & Osofsky, 2003; Gewirtz et al., 2008; Williamson et al., 2017; Wilson et al., 2010). Drawing upon this literature, a meta-analysis of 14 studies comprising 4,010

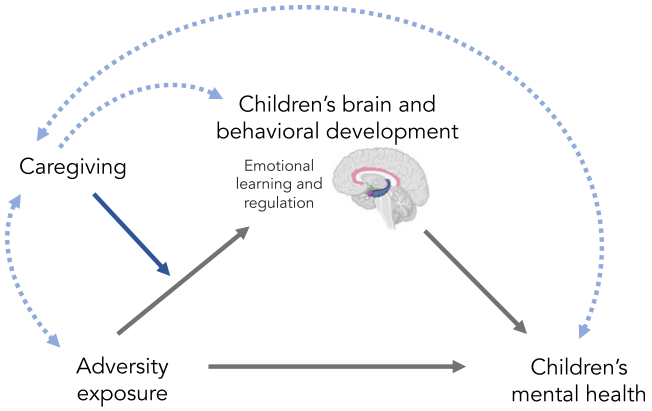

Figure 1. Conceptual model of how caregiving experiences can promote resilience in the context of adversity. Exposure to adversity during development can increase risk for mental health disorders, with evidence suggesting that alterations in brain and behavioral development mediate this link. In particular, alterations in corticolimbic circuitry and processes related to emotional learning and regulation are important for understanding the effects of adversity on mental health. Caregiving experiences are a key factor that moderates the effects of adversity via relations with several constructs in this model. For example, caregivers can contribute to adverse experiences (e.g., via perpetration of maltreatment), affect brain and behavioral development, and directly influence children's mental health. Here we focus on the role that caregivers play in moderating the association between adversity and offspring brain and behavioral development. Caregivers can promote children's resilience by modulating the effects of adversity through their involvement in processes such as establishing safety and predictability and fostering emotion regulation. Brain image created with BioRender.com.

participants that examined the impact of both positive and negative parenting practices on children's development of posttraumatic stress-related symptomatology following trauma exposure concluded that negative parenting behaviors (e.g., hostility, overprotection) accounted for 5.3% of the variance in children's symptom development whereas positive parenting behaviors (e.g., warmth) accounted for 2% of the variance in children's symptom development (Williamson et al., 2017). These findings suggest that parents appear to exert a relatively small effect on children's mental health-related outcomes following adversity exposure, though the magnitude of these estimates is constrained by the focus of this meta-analysis on broad domains of parenting rather than more detailed mechanistic processes, as well as its focus on posttraumatic stress disorder (PTSD) as the sole clinical outcome of interest. Despite these constraints, these findings invite more detailed understanding of the specific ways that parental involvement in the emotional lives of children in the wake of exposure to adversity has the potential to inform prevention and intervention efforts aimed at reducing the onset of trauma-related symptomatology. In the present review, we focus on several specific mechanisms by which caregiver involvement in the emotional lives of children following adversity may promote resilience. We highlight caregivers' attachment relationships with children as an ever-present basis of parental influences on child development in the context of adversity, and focus on caregiver promotion of generally benevolent environments and inputs in childhood, parental emotion socialization, including parental assistance with execution of specific emotion regulation strategies, and parental buffering of stress, as mechanisms by which caregiving is likely to influence children's developmental trajectories following exposure to adversity.

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

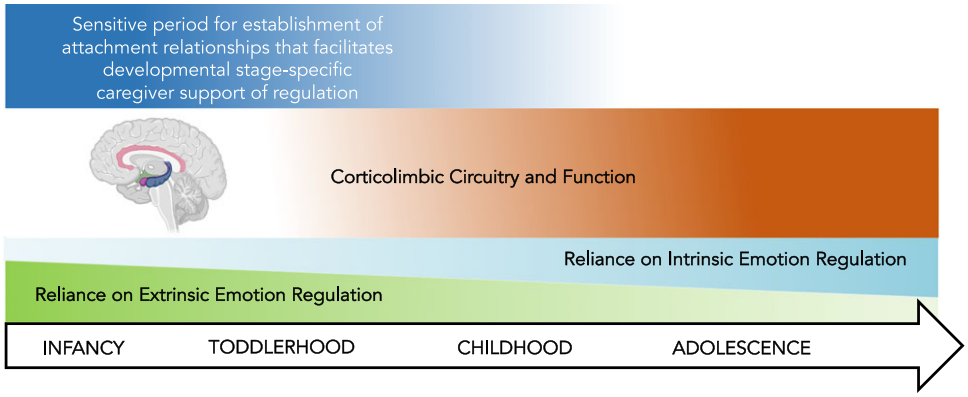

Figure 2. Caregiving influences and the development of corticolimbic circuitry that supports emotion regulation. Cross-species evidence has identified a potential sensitive period, spanning infancy and toddlerhood, when caregiver inputs to the developing brain may have a particularly strong impact on the development of corticolimbic circuitry that supports emotion regulation. Specifically, caregiver inputs that are predictable and that are associated with safety may promote healthy neurodevelopment such that caregivers are able to support youth emotion regulation via modulation of this circuitry in later developmental stages. During infancy and toddlerhood, caregivers play a central role in regulating human amygdala function. As corticolimbic circuitry (e.g., connections between the medial prefrontal cortex and amygdala) matures (represented here by increasing intensity of the orange horizontal band), children experience a shift from greater reliance on extrinsic sources of emotion regulation to greater reliance on intrinsic emotion regulation (represented here by the increasing intensity of the blue band as the intensity of the green band decreases). Importantly, the optimal role of caregivers, the emotion regulation skills that youth are acquiring (and, perhaps, that caregivers are most likely to play a role in socializing), and the effects of adversity on these processes will all vary by developmental stage. Figure adapted with permission from Gee & Cohodes, 2021, *Current Directions in Psychological Science*. Brain image created with BioRender.com.

Child–caregiver attachment relationships as the basis of caregiver influences

From birth, caregiver–child attachment relationships form the basis of a child's exploration of the world, and function as a critical lens through which children filter information about their environment and experiences (Bowlby, 1969). Secure attachment with caregivers facilitates caregivers' support of critical tasks of typical development (see Gee & Cohodes, 2021 for a review) (Fig. 2). During infancy, children learn that primary caregivers are responsive to their needs and that caregiving behaviors are both predictable and associated with safety, with caregivers transitioning from being a source of comfort and protection to taking on more complex roles in facilitating infants' increasing exploration of their environment (Lieberman et al., 2015). During the transition to toddlerhood, caregivers continue to solidify their association with predictability and safety as children navigate strong—and at times conflicting—desires for both exploration and independence, as well as safety and security in their close contact with parents (Lieberman et al., 2015). Later, throughout early and middle childhood, caregivers scaffold children's exploration of physical and social environmental inputs as children develop increasingly complex schemas about the social and physical world, all while serving as a primary source of external regulation of children's emotions (Kopp, 1989; Morris et al., 2007). During the transition to adolescence, although the potency of caregivers' role as a source of external regulation wanes in some contexts as offspring become increasingly independent and other attachment figures (e.g., peers, romantic partners) begin to play a greater role in social buffering processes (Gee, 2016; Hostinar et al., 2014), caregivers continue to play important roles in socializing coping behaviors and guiding adaptive behavior (Butterfield et al., 2019; Rogers et al., 2020).

In this developmentally salient and evolving manner, caregiver–child attachment relationships form the backdrop of children's increasing exploration, independence, and accomplishment of tasks of development. These processes are ubiquitous in both typical development and in the context of adversity, and evidence suggests that caregivers leverage attachment relationships to promote resilience following exposure to adversity, with the quality of a child's attachment largely governing caregivers' capacity to support children following adversity exposure (Lieberman, 2004; Lieberman et al., 2005; Lieberman et al., 2011; Lieberman & Pawl, 1988). Further, recent theoretical work highlights that specific patterns in caregiving behavior—namely the co-occurrence of predictability and safety—may be particularly salient inputs during infancy and toddlerhood, and may prime a caregiver's ability to serve as a source of external regulation later in development by directly impacting neural circuitry supporting emotion regulation (Gee & Cohodes, 2021). We argue that these critical elements of caregiving in the earliest periods of development not only facilitate optimal caregiver inputs in infancy and toddlerhood but also enable ideal input from caregivers across development. In the context of exposure to adversity, caregivers are likely to be able to take advantage of prior establishment of themselves as predictable—and as harbingers of safety—to facilitate greater parental attenuation of the impact of adversity via the numerous pathways described below.

One outstanding question pertains to the degree to which aversive caregiving has the potential to undermine parental influences on children's recovery following adversity. As exposure to any form of trauma can influence nearly all aspects of children's functioning and development, and result in a broad set of beliefs and altered cognitions regarding a generalized lack of safety in the world, children's exposure to both trauma that involves a caregiver in a perpetrating role (e.g., perpetration of maltreatment, neglect) and trauma that does not directly involve a caregiver (e.g., medical trauma, natural disaster) has the potential to "shatter the protective shield" of parental attachment (Lieberman & Amaya-Jackson, 2005). For example, even when caregivers do not perpetrate trauma, children may come to view their caregivers as inconsistent or unpredictable sources of protection and safety in the context of a risky environment. Therefore, caregiver-child attachment relationships—the very mechanism by which parents support children in the aftermath of adversity—may be compromised by adversity (Bernstein & Freyd, 2014).

However, the degree to which adversity in the context of the caregiver–child relationship disrupts a child's orientation to a caregiver as a source of stability and safety may vary by

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

developmental stage. Specifically, there is increasing evidence that, in the earliest stages of development, offspring prefer cues related to their caregivers, even when these cues have an inherently aversive quality. This absence of avoidance learning is believed to facilitate formation of attachment relationships even in the context of adversity (Gee, 2020; R. Perry & Sullivan, 2014). Specifically, young children were more likely to approach conditioned stimuli acquired in the presence of their caregiver, and, conversely, to avoid stimuli acquired in the absence of their caregiver (Tottenham et al., 2019). These findings directly parallel evidence from the rodent literature that offspring approach aversive stimuli when paired with a maternal cue during a period of development when maternal presence dampens affective reactivity in rodent offspring (Moriceau & Sullivan, 2006). This pronounced attraction to caregiver-related cues—even in the context of adversity—in the earliest stages of development may facilitate attachment and promote close physical proximity between caregivers and offspring despite adversity. The degree to which this pattern has broad ecological validity to a range of trauma exposures and across development remains unclear, and failure to establish safety and predictability in the context of caregiving relationships in infancy and toddlerhood may alter the degree to which caregivers can enact optimal influences on children's emotional lives later in development, particularly in the context of adversity (Gee & Cohodes, 2021; R. Perry & Sullivan, 2014).

Caregiver promotion and maintenance of broadly benevolent childhood environments and predictable routines in the context of family life

One primary way in which caregivers may promote resilience is via the establishment and maintenance of a home environment that yields beneficial inputs for children following adversity. In addition to extensive empirical work highlighting associations between childhood adversity and the development of psychopathology, substantial work has highlighted broad and general promotive childhood experiences that may mitigate the impact of adversity (Crandall et al., 2019, 2020; Narayan et al., 2018; Wright et al., 2013). In a major study assessing the impact of benevolent childhood experiences (BCEs) on later development of trauma-related psychopathology, endorsement of a higher number of BCEs (e.g., having good neighbors, having an opportunity to have fun) was found to be associated with lower levels of psychopathology and, critically, to offset the impact of adverse childhood events on the development of psychopathology later in life (Narayan et al., 2018). These findings, based on the establishment of the BCEs questionnaire (Narayan et al., 2018), are in line with previous evidence that parental maintenance of a positive home environment—and broad and general promotive and protective factors—are a primary mechanism by which caregivers support children's resilient functioning in the context of exposure (e.g., Collishaw et al., 2007; Doom et al., 2021; K. Howell et al., 2010; Morris et al., 2021), possibly via the impact of positive parenting practices and beneficial environments on children's symptomatology via promotion of children's emotion regulation (K. Howell et al., 2010).

One particular element of family environments that has received considerable attention is caregiver maintenance of consistent home routines and practices, yielding a sense of predictability for youth (Greeff & Wentworth, 2009; Williamson, Hiller et al., 2018). Caregiver maintenance of family routines following children's exposure to adversity has been linked to reduced child symptomatology (Boyce, 1981; Foy, 1992). Extending this work to the COVID-19 pandemic, a predictable home environment buffered the impact of exposure to COVID-19-related stress on children's mental health during the pandemic (Glynn et al., 2021), with parental maintenance of family routines also emerging as a specific moderator of the association between exposure to COVID-related stress and youth symptomatology (Cohodes et al., 2021) and family-level resilience (Bates et al., 2021). Though additional empirical work is required to elucidate specific mechanisms by which predictable home routines confer resilience during or following exposure to adversity, it is possible that predictable home routines signal predictable caregiver involvement in the emotional lives of children—as sources of external emotion regulation and active participants in the daily socialization of emotion—and therefore exert influences on child symptomatology via promotion of child regulation.

Caregiver socialization of children's emotions

Gottman's parental meta-emotion philosophy (Gottman et al., 1996) proposes that caregivers' beliefs about their children's emotions—including the degree to which they are aware of, accepting of, and directly involved in coaching their children's emotions—manifests in behavioral responses to children's displays of negative emotions. Parental meta-emotion philosophy predicts numerous outcomes in offspring, including the development of psychopathology (see Gottman et al., 1997 for a review). In the context of adversity exposure, parental emotion coaching, in particular—or the degree to which parents engage in assisting their children in identifying the emotions they are experiencing, show respect for their children's emotions, and actively engage in helping children cope with emotion-eliciting situations (Gottman et al., 1996, 1997)—has been highlighted as a buffer of children's development of symptomatology following exposure to a range of stressors (Cohodes et al., 2017; Cohodes et al., 2021; Fogarty et al., 2019; Greene et al., 2020; V. Johnson & Lieberman, 2007; L. Katz et al., 2015; L. F. Katz & Windecker-Nelson, 2006), including stress exposure in the context of a global pandemic (Cohodes et al., 2021; Lobo et al., 2021). Of note, additional empirical work suggests that parental emotion awareness, acceptance, and coaching affect children's outcomes following exposure via encouragement of children's own intrinsic emotion regulation capacities in the context of negative emotion (B. H. Ellis et al., 2014; Wu et al., 2020). These findings—suggesting a primary mechanism by which caregiver involvement in the emotional content of a stressor may impact children's behavior, and, resultingly, children's development of trauma-related symptomatology—are consistent with prominent etiological models of childhood PTSD highlighting caregivers' capacity to affect children's tendency to engage in negative reappraisals of the event and use of maladaptive coping and regulation strategies (Cobham et al., 2016; Ehlers et al., 2003; Ehlers & Clark, 2000; Meiser-Stedman, 2002; Stallard & Smith, 2007; Williamson et al., 2016). For example, a longitudinal empirical investigation of children's mental health following natural disasters demonstrated that parent–child interactions characterized by negative parental appraisals of a traumatic event, as well as promotion of avoidant coping behaviors, were associated with increased child symptomatology, and further, suggest that this association is likely driven by the effect of parental appraisals and

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

coping responses on children's development of their own maladaptive coping strategies (Hiller et al., 2018).

Highly related to parental emotion coaching, parental availability for discussion of stressful events may attenuate the impact of adversity exposure on children's development of symptomatology (Carpenter et al., 2017; Cohodes et al., 2021; Stallard et al., 2001). Parents who report providing children with frequent opportunities to discuss their feelings about recent stress exposure in an age-appropriate manner may buffer children's development of stress-related psychopathology via direct impacts on the valence of a child's appraisal of an event (Williamson et al., 2018; Williamson et al., 2018). In addition, parents may affect the content of children's narratives about their adversity exposure (Fivush et al., 2003), in the service of buffering harmful impacts of adversity on children's development of symptomatology (Kilmer & Gil-Rivas, 2010).

Recent advances in measurement of caregiver emotion socialization (Cohodes et al., 2021) have facilitated assessment of the degree to which caregivers support children's emotion regulation at the strategy-specific level. In the context of exposure to stress, a recent study examined parental assistance with prototypically adaptive and maladaptive emotion regulation studies as a potential moderator of the impact of family-level COVID-related stress exposure on children's development of internalizing and externalizing symptomatology. Results suggest that caregiver assistance with prototypically adaptive emotion regulation strategies (i.e., acceptance) buffered the impact of exposure to COVID-related stress, while assistance with prototypically maladaptive strategies (e.g., rumination) exacerbated its impact (Cohodes et al., 2022). Though this line of work is emerging, the impact of caregiver emotion socialization on children's mental health in the context of adversity exposure likely varies by the specific emotion regulatory processes that caregivers support.

Neurobiological mechanisms associated with caregiving influences on children's emotional functioning

A growing literature in developmental neuroscience has identified neurobiological processes by which caregiving influences children's emotional functioning (Callaghan & Tottenham, 2016; Farber et al., 2022; Gee, 2020; Tan et al., 2020; Tottenham, 2020), providing mechanistic insight into the ways that caregivers promote resilience following adversity. Affective learning and regulation are broadly supported by corticolimbic circuitry, which involves connections between the prefrontal cortex and subcortical structures involved in emotion processing (Kovner et al., 2019). Among key regions in this circuitry, the amygdala plays a central role in detecting emotionally salient stimuli in the environment and in guiding behavior in response to affect. The hippocampus is involved in emotional learning and memory. The medial prefrontal cortex (mPFC) is critical for regulating the amygdala and emotional reactivity. Paralleling dynamic changes in emotion processing across childhood and adolescence, this circuitry undergoes protracted development (Bloom et al., 2022; Casey et al., 2019; Gee et al., 2018; Hare et al., 2008).

Cross-species evidence shows that caregivers influence the development of corticolimbic circuitry, with an especially prolonged period of influence in humans (Callaghan et al., 2014; Tottenham, 2015). While studies of youth exposed to caregiving-related adversity have contributed some of the strongest evidence of caregiving influences on neurodevelopment (Nelson & Gabard-Durnam, 2020; Sheridan et al., 2012; Tottenham, 2012), a growing literature has pointed to associations between typical variation in caregiving behaviors and offspring brain development (Farber et al., 2022; Tan et al., 2020). Many of these studies have focused on aspects of caregiving related to warmth (versus harshness or hostility) and sensitivity (i.e., the extent to which a caregiver is attuned and responsive to their child). During childhood, caregiver sensitivity is associated with amygdala volume and microstructure of the amygdala and hippocampus (A. Lee et al., 2019), and negative caregiving behavior is associated with amygdala activation and functional connectivity to affective stimuli (Pozzi et al., 2019). In addition, maternal hostility and regulation at age 3 were associated with children's corticolimbic function at ages 7–8 (Kopala-Sibley et al., 2020), suggesting that caregiving in the earliest years of development may prime the development of corticolimbic circuitry. During adolescence, findings suggest sustained impact of caregiving behaviors. For example, parental warmth and support were associated with lower amygdala reactivity to fearful faces among adolescents (Romund et al., 2016), and harsher parenting was associated with reduced ventrolateral prefrontal engagement during peer rejection among adolescents at risk for anxiety disorders (Guyer et al., 2015). Evidence suggests these associations between caregiving and brain function have important implications for mental health. Among adolescents, higher parental warmth was associated with lower symptoms of anxiety and depression 2 years later via effects on subgenual anterior cingulate activation (Butterfield et al., 2020). Together, these findings suggest that harsher parenting is associated with weaker prefrontal control in certain contexts requiring regulation (e.g., Guyer et al., 2015), whereas caregiver warmth and sensitivity are generally associated with lower reactivity in regions such as the amygdala in negatively valenced contexts (e.g., Kopala-Sibley et al., 2020; Pozzi et al., 2019; Romund et al., 2016), as well as lower internalizing symptoms (e.g., Butterfield et al., 2020).

Regulatory influences: Caregiver buffering of neural function and behavior

Consistent with the idea that caregivers can promote resilience by influencing the neurobiological processes supporting regulation, evidence suggests that supportive caregiving can buffer the effects of numerous types of adversity on hypothalamic-pituitary-adrenal (HPA) axis function, corticolimbic circuitry, and epigenetic aging (Brody et al., 2016, 2019; Brown et al., 2020; Gunnar & Donzella, 2002; Kahhalé et al., 2023; Stevens et al., 2021; Whittle et al., 2017). Paralleling evidence that caregivers play a central role in guiding children's emotional learning (Tottenham et al., 2019; van Rooij et al., 2017) and helping to regulate children's emotions and stress (Cohodes et al., 2017; Cohodes et al., 2021; Compas et al., 2001; Eisenberg et al., 1998), cross-species research has demonstrated that caregivers serve an external regulatory function as corticolimbic circuitry is developing (Callaghan & Tottenham, 2016; Gee et al., 2014; Gee, 2016; Gunnar & Donzella, 2002; Hofer, 1994; C. L. McCoy & Masters, 1985). Consistent with findings in rodents and macaques (Moriceau & Sullivan, 2006; Sanchez, 2006), research in humans has shown that caregiver presence can buffer children's responses to stress by dampening cortisol reactivity (Hostinar et al., 2015) and amygdala reactivity (Gee et al., 2014). In a study of caregiver buffering at the neural and behavioral levels, children and

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

adolescents performed an emotional go/no-go task of inhibitory control in an affective context twice in the laboratory, once in the presence of their mother and once in the presence of a stranger. During an fMRI scan, participants viewed faces of their mother and of a stranger. Consistent with parental regulation of behavior, children showed better inhibitory control (i.e., fewer false alarms) when seated next to their mother than a stranger in the laboratory. Children showed lower amygdala reactivity when viewing their mother's face than when viewing a stranger's face. Moreover, exposure to the mother's face, relative to the stranger's face, phasically induced a pattern of stronger inverse mPFC-amygdala functional connectivity that is typically observed at older ages and that has been associated with greater regulation in prior work (e.g., Banks et al., 2007). In this study, caregiver buffering at the neural level was associated with individual differences in behavior, such that children whose parents buffered more strongly at the neural level exhibited better inhibitory control in their parent's presence (Gee et al., 2014). Of note, the effects of caregiver buffering observed in this study were specific to childhood and were not evident for adolescents in this study, which may be indicative of a relatively reduced dependence on external regulation in some affective contexts during adolescence. Together, these findings suggest that modulation of the HPA axis and frontoamygdala circuitry is one primary way that caregivers confer external regulation while regulatory systems are still developing during childhood.

Despite increasing independence from their caregivers as youth mature, caregivers continue to play an important role in scaffolding regulation during adolescence. However, at both behavioral and neural levels, the nature of this role appears to change in a manner consistent with the developing skills and unique needs of adolescents (Telzer et al., 2018). Demonstrating the prevailing role of parents in guiding offspring behavior via external regulation in adolescence—and the potentially increased importance of parents in appetitive social contexts that may induce a propensity for risk taking, a series of studies has shown that the presence of a parent can redirect adolescents toward safer behavior and stronger regulation in rewarding social contexts (Guassi Moreira & Telzer, 2018; Qu et al., 2015; Rogers et al., 2020; Telzer et al., 2015). As one example, compared with younger youth, older youth showed more disinhibition toward appetitive than aversive stimuli in social contexts. However, parental presence buffered this effect, such that there was no age-related difference when the parent was present (Rogers et al., 2020). With increasing age, adolescents exhibited greater mPFC activation and frontoamygdala connectivity in socially appetitive contexts when in their parent's presence, suggesting a prefrontal mechanism supporting the regulatory effects of caregivers during adolescence. In addition to the buffering effects of caregiver presence, caregivers appear to support adolescents' emotional well-being by socializing coping behaviors (e.g., A. S. Anderson et al., 2021; Liga et al., 2020). Building upon these behavioral findings, a recent study found that parental socialization of coping behaviors modulates adolescent mental health via modulation of neural circuitry implicated in affective regulation. Specifically, parents' use of reframing and problem-solving statements during a parent–adolescent interaction was associated with adolescents' insula and perigenual cingulate activation in response to affective stimuli. Among adolescents with anxiety disorders, parents' socialization of prototypically adaptive coping strategies was associated with lower use of disengaged coping in adolescents' daily life via these patterns of neural activation (Butterfield et al., 2019). Together, these findings suggest that adolescence may be an especially important time for caregivers' scaffolding of adaptive coping and safe behavior in the context of social challenges, which commonly arise in more appetitive contexts, during adolescence.

Ontogeny of caregiver buffering and individual differences

Understanding how caregiving cues facilitate regulation—and how these experiences become biologically embedded to influence the development of children's intrinsic regulatory capacity—can provide insight into the ways that caregivers foster resilience following adversity. We have previously proposed that effective caregiver buffering requires the pairing of predictability and safety in children's experience of caregiver cues (Gee & Cohodes, 2021). Specifically, children's interactions with caregivers provide opportunities to experience caregiver buffering and to learn about the degree to which their caregiver's presence is associated with the attenuation of fear (Gee et al., 2014; Moriceau & Sullivan, 2006). Through these repeated interactions, consistent—and predictable—experiences of caregiver regulation (e.g., via physical presence and related attenuation of physiological reactivity) (Callaghan & Tottenham, 2016) reinforce the association between caregiver presence and safety. A growing body of cross-species evidence indicates that the predictability of caregiving signals acts on corticolimbic circuitry (Glynn & Baram, 2019), with demonstrated effects on mPFC-amygdala connectivity (Granger et al., 2021; Guadagno et al., 2018) and amygdala reactivity (Malter Cohen et al., 2013). Across time, repeated co-activation of the amygdala and mPFC via parental presence may contribute to the development of this circuit and internalization of regulatory capacities (Callaghan & Tottenham, 2016; Gee, 2016). Evidence in humans shows that frontoamygdala connectivity to affective stimuli predicts frontoamygdala connectivity at rest 2 years later, suggesting that repeated co-activations during development may shape the more stable architecture of this circuit later in life (Gabard-Durnam et al., 2016). Indeed, environmental experiences that co-activate regions within a circuit can shape long-term changes in connectivity during adulthood (Gabard-Durnam et al., 2016; Kelly & Castellanos, 2014), which may be especially likely for early caregiver influences given heightened neuroplasticity and neural sensitivity to caregiving experiences early in development. Over time, such neurobiological scaffolding may be a mechanism by which the external regulation provided by caregivers becomes internalized as youth mature and become more independent.

Although group-level effects of caregiver modulation of offspring neural function and regulatory behavior have been identified during childhood and adolescence, there is important variability in these effects across individuals. Consistent with the idea that early caregiver–child attachment lays the foundation for subsequent caregiving influences on children's emotional functioning (Sroufe, 2005), individual differences in caregiver buffering have emerged as a function of attachment security in several studies. Specifically, children who reported greater security in their relationship with their caregiver showed greater caregiver-related attenuation of amygdala reactivity (B. Callaghan et al., 2019; Gee et al., 2014). In addition, in a study of adolescents, attachment history (i.e., attachment classification assessed during early childhood) moderated the effects of caregiver presence on regulatory behavior and neural functioning in response to affective cues, such that the buffering effect of caregiver presence was

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

stronger among adolescents with a history of insecure attachment (relative to those with a history of secure attachment) (Rogers et al., 2021). While future work is needed to better understand the relation between attachment and caregiver buffering across a range of contexts and developmental stages, broadly, these findings reinforce that individual youth are differentially sensitive to caregiving experiences (e.g., Schriber & Guyer, 2016) and highlight the importance of considering individual differences in the nature of caregiver–child relationships. Namely, children's individual profiles of caregiving adversity (e.g., frequency and chronicity of disrupted attachment relationships, history of caregiver betrayal) are likely to directly inform individuals' capacity to optimally benefit from caregivers' external regulation, which may have important implications for the development of psychopathology following adversity.

Caregiver buffering following adversity

Consistent with the idea that early experiences with caregivers may shape subsequent experiences of social buffering (Gee & Cohodes, 2021; Hostinar et al., 2014), across species, early caregiving adversity is associated with weaker effects of caregiver buffering later in development across species. Even though the evolutionary drive to establish attachment relationships persists even in the context of threatening cues (R. Perry & Sullivan, 2014), animal studies demonstrate that caregiving adversity interferes with caregiver buffering. Specifically, pups exposed to maternal maltreatment (e.g., rough handling of pups, stepping on pups) do not show the expected pattern of suppression of fear-related behavior in the presence of their mother during infancy, and, further, did not appear to benefit from maternal buffering to the same degree as their non-maltreatment exposed counterparts during the adolescent period with regard to their fear-related behavior (Opendak et al., 2019; Robinson-Drummer et al., 2019). Similarly, among non-human primates, infant maltreatment is associated with less effective maternal buffering of cortisol reactivity (Sanchez et al., 2015). In the context of human development, a recent study examined caregiver buffering of amygdala reactivity among youth who were previously exposed to caregiver deprivation via institutionalized care and later adopted into stable families. Findings suggest that, on average, children exposed to caregiver deprivation early in life do not benefit from caregiver buffering of amygdala reactivity (Callaghan et al., 2019). However, there is substantial variability in this effect and 40% of youth who previously experienced caregiving-related adversity *did* show reduced amygdala reactivity to caregiver cues. Paralleling findings related to individual differences in responses to caregiver buffering in typical development (i.e., among youth who did not experience caregiving adversity), greater caregiver–child attachment security was associated with stronger caregiver buffering of amygdala reactivity (Callaghan et al., 2019). Importantly, youth who appeared to respond to caregiver buffering despite a history of caregiving adversity also had lower levels of anxiety-related symptomatology up to 3 years later, suggesting that caregiver buffering of amygdala reactivity may be a mechanism by which caregivers promote resilience among youth at elevated risk of psychopathology due to their exposure to adversity.

Moreover, these findings highlight malleability in buffering effects following early caregiving disruptions. Despite the absence of consistent safety-related caregiving cues in the first few years of life, children exposed to early caregiver adversity who showed caregiver-related attenuation of amygdala reactivity benefited from having learned to associate their adoptive caregivers with safety during a later developmental stage (B. Callaghan et al., 2019). Consistent with this idea, evidence from rodent studies shows that exposure to subsequent augmented caregiving following caregiving-related adversity is associated with neurodevelopmental changes that support adaptive responses to stress (e.g., Singh-Taylor et al., 2018). Thus, although optimal patterns of early caregiver inputs may prime corticolimbic circuitry to be more receptive to caregiver modulation later in life, high-quality care following adversity may foster plasticity in youths' capacity to benefit from subsequent caregiver buffering. Consistent with these ideas, in our conceptual model, caregiving influences can indeed stem from caregivers who have been associated with adversity. In the context of caregiving-related adversity, there is more likely to be disruption in the extent to which a child associates a caregiver with safety and predictability (Gee & Cohodes, 2021). Thus, benevolent influences of a caregiver who previously perpetrated adversity or was associated with adversity are more complicated than caregiver influences that have consistently been associated with safety and predictability. However, often with significant support and intervention (Lieberman & Van Horn, 2008), the potential for buffering and benevolent caregiving experiences still exists.

The role of developmental timing of adversity exposure and sensitive periods in caregiving influences

Dynamic changes in plasticity and neurodevelopment across childhood and adolescence have broad implications for how caregiving experiences shape children's emotional functioning and foster resilience following adversity. During sensitive periods of heightened plasticity, the brain is more amenable to environmental influences (Knudsen, 2004; Werker & Hensch, 2015) and experiences can lead to a series of developmental cascades that can have downstream effects—both positive and negative—on mental health (Davidson & McEwen, 2012; Masten & Cicchetti, 2010). Such periods can render children particularly vulnerable to caregiving disruptions, but can also confer unique opportunities for intervention and buffering effects of augmented caregiving (Gee & Casey, 2015).

Cross-species evidence suggests that the period spanning infancy and toddlerhood may represent a sensitive period during which caregiver inputs that are predictable and associated with safety may be particularly important for establishing a foundation for later caregiver modulation of corticolimbic circuitry and emotional functioning (Fig. 2). The absence of stable, nurturing caregiving early in life disrupts corticolimbic development across species. For example, early caregiver deprivation is associated with altered connectivity between the amygdala and mPFC in mice (F. K. Johnson et al., 2018), rats (Yan et al., 2017), non-human primates (B. R. Howell et al., 2019), and humans (Gee et al., 2013; Herzberg et al., 2021). Disruptions to stable, supportive caregiving have particularly strong influences when they occur early in life, relative to later stages of development (Nelson & Gabard-Durnam, 2020; Tottenham, 2012), suggesting that this developmental period may reflect a sensitive period driven by experience-expectant mechanisms. Some of the strongest evidence for an early sensitive period related to species-expected caregiving comes from the Bucharest Early Intervention Project (BEIP), a randomized controlled trial that randomly assigned children in institutionalized care to either be placed in foster care or to remain in institutionalized care (Nelson et al., 2007). Findings suggest that

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

youth exposed to caregiver deprivation in the context of institutionalized care show more secure attachment, more normative stress responses, and more normative neurodevelopmental trajectories following placement into a foster care intervention prior to 24 months of age, relative to peers who were placed after 24 months of age (McLaughlin et al., 2011, 2015; Vanderwert et al., 2016). While studies of caregiving disruptions in humans involve complex adversities (e.g., parental deprivation, maltreatment) characterized by both the absence of species-expected inputs and the presence of extreme stress (which may, themselves, alter the timing of sensitive periods [see Gabard-Durnam & McLaughlin, 2020 for a review]), this evidence suggests that the first 2 years of life may be a potential sensitive period during which the absence of key aspects of species-expected caregiving inputs—such as the repeated co-occurrence of predictability and safety—may exert a particularly strong effect on neurodevelopment and longer-term emotional functioning.

Emerging evidence suggests that adolescence may represent another developmental window with increased potential for positive influences of supportive caregiving. Adolescence is a unique period for neurodevelopment and socioemotional functioning, with a broad array of challenges and opportunities (Andersen, 2003; Fuhrmann et al., 2015; F. S. Lee et al., 2014; Sisk & Gee, 2022). Despite exposure to increased stressful life events and the onset of many stress-related psychiatric disorders during adolescence (Kessler et al., 2005; McLaughlin et al., 2012), adolescents may be especially poised to benefit from positive caregiver influences following early-life adversity. As one example, a recent study using longitudinal data from the BEIP identified adolescence as a period of heightened sensitivity to the caregiving environment (Colich et al., 2021). Higher caregiving quality in adolescence was associated with greater reward responsivity and executive functioning, as well as lower internalizing and externalizing problems; further, these associations were strongest at age 16, relative to ages 8 and 12. These findings suggest that positive caregiving experiences during adolescence may be especially helpful to promote resilience among children exposed to earlier adversity and complement recent evidence that stress response systems may undergo a period of increased plasticity during adolescence. Specifically, adolescents who experienced caregiver deprivation early in life but were later adopted into stable families showed evidence of recalibration of the HPA axis with pubertal development (DePasquale et al., 2019, 2021; Gunnar et al., 2019). As such, increased plasticity of the HPA axis during adolescence may promote recalibration to current environmental inputs, such that supportive caregiving environments may have an outsize impact on psychobiological development during this period. Of note, the role of pubertal recalibration on the longer-term development of socioemotional processes is not yet fully understood and recent longitudinal analyses suggest that recalibration may actually be associated with poorer long-term adjustment (N. B. Perry et al., 2020, 2022). Future research will be important to further examine the optimal nature of an adolescent environment that facilitates recalibration, as well as its potential neural and behavioral consequences.

In addition to the role of developmental timing itself in the effects of adversity and caregiving experiences (Gee & Casey, 2015; Lupien et al., 2009; McCrory et al., 2013; Sabatini et al., 2007; Teicher et al., 2016; Tottenham & Sheridan, 2009), developmental timing intersects with key features of experience to shape neurodevelopment and emotional functioning. The extent to which a caregiver is involved in children's experiences of adversity—whether through connection to the adversity itself or through supporting children's coping in its aftermath—is likely to be especially impactful during developmental periods of heightened sensitivity (Cohodes et al., 2021; Gee & Casey, 2015). Caregivers may be involved in adversity exposures in a variety of ways, including via direct involvement (e.g., caregiver perpetration of abuse or neglect) or parent–child dyadic exposure to adversity (e.g., shared exposure to domestic violence). Exposure to adversity that involves deviations from species-expected caregiving (e.g., caregiver perpetration of maltreatment) has the potential to disrupt the caregiver–child attachment relationship and to hinder the efficacy of caregiver buffering following adversity (Lieberman, 2004). Consistent with this idea, several studies have found that, relative to children exposed to non-caregiver-related adversity, children who experienced caregiver-related adversity showed greater symptomatology, as well as difficulties with affect regulation and interpersonal relationships (Cook et al., 2005; D'Andrea et al., 2012). In addition, in this vein, children exposed to adversity characterized by maladaptive family functioning were more likely to develop mental health problems than children exposed to adversities not characterized by maladaptive family functioning (McLaughlin et al., 2010). These findings have important implications for the ways that caregivers might support children's emotional functioning following exposure to adversity and highlight the importance of interventions that support families with ongoing threats to caregiving relationships or in which a caregiver's own traumatic exposure affects their capacity to be involved in children's emotional functioning in an adaptive way. Given the essential role of attachment in development and emotional functioning (Bowlby, 1969; Cassidy & Shaver, 2002), such caregiver-involved adversity may have an especially pronounced impact on mental health in childhood, and delineating interactions between the timing of adversity and features such as caregiver involvement may directly inform interventions (Cohodes et al., 2021).

Implications for treatment

Here we propose that caregivers' engagement with children's emotional development is a primary mechanism by which caregivers promote children's resilience in the context of adversity. Further, attachment relationships form the basis of the numerous specific ways that caregivers exert this influence across development (Sroufe, 2005). Given the potential for adversity exposure to negatively impact attachment relationships, exposure to adversity may undermine the very caregiving influences that have the potential to buffer children from the deleterious sequelae of these exposures (Lieberman & Amaya-Jackson, 2005). Therefore, bolstering caregiver–child attachment relationships—and, in turn, a caregiver's ability to support children's emotion regulation—is a key treatment target for youth exposed to adversity (Dozier et al., 2018; Lieberman et al., 2005). Relational interventions such as Child–Parent Psychotherapy (Lieberman et al., 2005), Trauma-Focused Cognitive Behavioral Therapy (Cohen et al., 2000; Cohen et al., 2011), the Child and Family Traumatic Stress Intervention (Berkowitz et al., 2010), Parent–Child Interaction Therapy (Thomas & Zimmer-Gembeck, 2012), and Attachment-Based Family Therapy (Diamond et al., 2012) that center dyadic processes between caregivers and children and focus on restoring optimal caregiving inputs for children following adversity

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

(e.g., establishment or reestablishment of safety in the context of family life) are likely to promote children's ability to benefit from caregiving in the context of trauma (e.g., Lieberman et al., 2005; Lieberman & Van Horn, 2011). Importantly, the appropriate relational intervention program will ultimately depend on a particular child's history of adversity exposure—and the past and current family context—and will be influenced by factors such as whether caregivers have engaged in maltreatment or neglect.

Consistent with the increasing emphasis on precision medicine-based intervention for youth and families exposed to adversity (Aschbacher et al., 2022), delineating how children's specific profiles of adversity exposure and developmental stage relate to emotional learning and regulation is likely to inform optimized approaches to intervention (Gee et al., 2022) (Fig. 3). For example, interventions can be tailored based on an individual's profile of exposure to adversity across multiple dimensions (Cohodes et al., 2021; Cohodes et al., 2023; Nikolaidis et al., 2022), based on specific patterns of caregiver–child interactions (Kitt et al., 2022), or based on specific caregiver-level factors such as parental symptomatology following dyadic exposure to adversity (Hagan et al., 2017). We specifically highlight the importance of considering family-level processes in treatment selection and optimization given the multifaceted influence of caregivers on resilience-related processes reviewed here (Garner et al., 2021). While variability in numerous factors could characterize an individual's exposure to adversity and their caregiving experiences, the following dimensions may be especially important for understanding the optimal role of caregivers in promoting youth's resilience and optimizing interventions to support caregiving influences: (a) adversity: extent to which a caregiver was involved in adversity; extent to which adversity was characterized by threat, deprivation, or unpredictability; developmental timing of the adversity; (b) caregiving: extent to which caregiver is associated with safety or predictability, caregiver warmth, caregiver sensitivity. Notably, the literatures on caregiving-related adversity and associations between caregiving and brain development have focused on a wide array of caregiving-related behaviors (e.g., emotion socialization, assistance with emotion regulation, predictability of caregiving or home routines, caregiver warmth, etc.). The influence of specific caregiving-related behaviors is likely to be child- and context-specific; thus it will be important for clinical assessment to involve delineation of the ways that particular caregiving behaviors are associated with children's resilience in order to optimize intervention.

Building upon current efforts to chart sensitive periods of affective development and to identify patterns of experience-driven plasticity (L. Gabard-Durnam & McLaughlin, 2020; McLaughlin & Gabard-Durnam, 2022) is likely to enhance intervention approaches (Gee & Casey, 2015) and the potential to optimally support and repair stress-related alterations to neurobiological systems underlying emotion regulation (Sisk & Gee, 2022). Specifically, caregivers' role in buffering offspring neural and behavioral regulation changes from childhood to adolescence (Gee et al., 2014; Rogers et al., 2020); therefore, there are likely developmental stage-specific changes in the optimal role of caregivers in promoting resilience following adversity, with important implications for developing targeted interventions. For example, consistent with the tasks of development specific to infancy and toddlerhood, evidence suggests that children who experienced adversity in the first 5 years of life benefit from dyadic parent–child interventions focused on scaffolding opportunities to reaffirm caregivers' associations with safety and predictability, and to support children's emerging understanding of caregivers' capacity for repair (Gee & Cohodes, 2021; Lieberman et al., 2015). As another relevant example, accumulating evidence suggests opportunities during adolescence for reshaping of biological systems underlying the stress response for youth exposed to early adversity in the context of a transition to enhanced caregiving quality (Colich et al., 2021; DePasquale et al., 2019, 2021; Gunnar et al., 2019). Despite the promise of these findings to inform the selection and timing of specific interventions, the role of pubertal recalibration in longer-term socioemotional functioning is not yet fully understood and recent longitudinal analyses suggest that recalibration may be associated with poorer adjustment in the longer term (N. B. Perry et al., 2020, 2022). The consideration of these developmental processes—alongside heterogeneity in individual- and family-level factors related to adversity—may inform when and for whom specific interventions have the potential to be maximally effective for shaping or reshaping caregiving influences on youth resilience (Cohodes et al., 2021; Gee et al., 2022; Ghosh Ippen et al., 2011; Sisk & Gee, 2022).

Finally, evidence suggests that supportive caregiving is a viable treatment target (Chu et al., 2021), and, further, that the neural mechanisms underlying caregiving influences on emotional development in the context of adversity can indeed be modified through psychotherapeutic intervention. As one example, a randomized controlled trial of a supportive parenting intervention for families living in poverty found that family participation in the Strong African American Families (SAAF) Program moderated the association between length of exposure to conditions of poverty and amygdala and hippocampal volumes among young adults. Specifically, whereas longer exposure to poverty during adolescence was associated with amygdala and hippocampal volume reduction among young adults whose families participated in the control condition (i.e., provision of informational brochures), this association was not detected among young adults whose families participated in SAAF (Brody et al., 2017). These findings suggest that supportive caregiving may buffer the risk of developing psychopathology in the context of adversity exposure (in this case, exposure to poverty), specifically via modulation of corticolimbic circuitry. Similarly, a recent study examined neurobiological changes associated with an early attachment intervention (Attachment and Biobehavioral Catch-Up (ABC) Dozier & Bernard, 2019) for children exposed to caregiving-related adversity early in life. Children whose families engaged in ABC (relative to the control condition) showed greater activation of neural regions implicated in social cognition (e.g., hippocampus) to parental cues; further, the degree of parental cue-related activation was associated with more adaptive psychosocial functioning (Valadez et al., 2020). Taken together, these studies suggest that corticolimbic circuitry can be effectively modified in the context of psychosocial intervention focused on caregiving, and that targeted intervention has the potential to promote resilience following adversity by bolstering optimal caregiver influences on the developing brain and behavior. Building upon this promising line of work, delineating how psychosocial interventions may impact the neural bases of caregiver modulation of affective functioning across development will continue to shed light on ideal interventions for youth exposed to adversity. For example, identifying evidence-based interventions that facilitate the recovery of caregivers' capacity to provide optimal external regulation for youth following

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

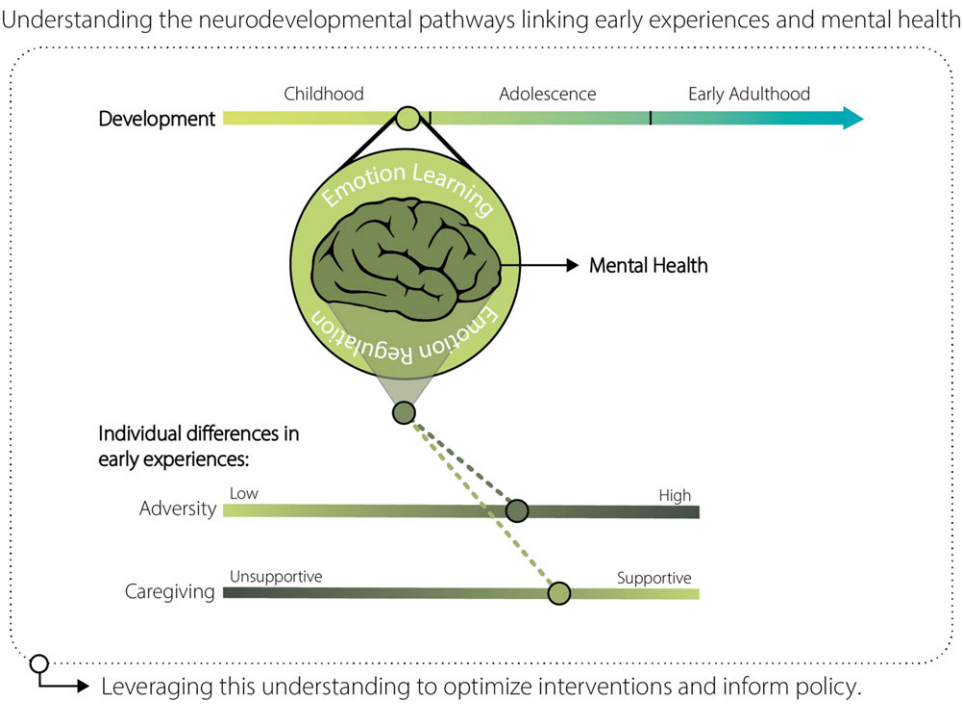

Figure 3. Applying knowledge of developmental stage and individual differences in early experiences to inform interventions and policy. Experiences that occur early in life (e.g., adversity, caregiving) can substantially affect development and mental health. Corticolimbic circuitry and related processes of emotion learning and regulation play a central role in linking early experiences with mental health. There is significant heterogeneity in the nature and timing of early experiences and in brain and behavioral development. Developmental stage and individual differences in adversity exposure and caregiving experiences relate to variability in neurodevelopment and mental health (here we represent variability in a given factor that differs across individuals via a spectrum of shading). Translating findings from this research can guide efforts to optimize interventions for youth with adversity-related psychopathology and to inform policy that supports the well-being of youth and families. Figure reproduced with permission from Gee (2022), American Psychologist. Illustration by Nessa Bryce with Beyond Bounds Creative.

missed opportunities for provision of predictable, safe caregiver cues during early sensitive periods, or how dyadic or family-based interventions may exert distinct neurodevelopmental effects relative to individual treatments, will further inform efforts to optimize treatments for youth with adversity-related psychopathology (Gee & Cohodes, 2021).

Implications for policy

Developmental science has a notable history of influencing policy and fostering structural changes to better support youth and families. Findings from the BEIP (Nelson et al., 2007) that demonstrated the consequences of parental deprivation and the importance of early intervention influenced societal shifts away from institutionalized care. Scientific knowledge of brain development and adolescent behavior has influenced numerous cases in the juvenile justice system (Casey et al., 2020; A. O. Cohen & Casey, 2014; Steinberg, 2017). Research on child development has been central to policymaking related to poverty reduction (Noble et al., 2021) and paid family leave (Brito et al., 2022).

Building directly on the research discussed here, theoretical and empirical advances in understanding the mechanisms by which caregivers promote resilience among youth exposed to adversity can inform public policy and public health-related efforts that prioritize the well-being of youth and families. Research reviewed thus far highlights the major impact of caregiving-related disruptions on child mental health due to the fact that, intrinsic to this experience, children can be deprived of a primary mechanism of buffering and support. Relatedly, this empirical literature highlights the immense burden of repair when caregiving relationships are severed in contexts such as forced family separation, parental incarceration, or humanitarian crises like war or political violence. Here we outline specific recommendations for policymakers based on current understanding of the ways in which caregivers promote resilience following youth exposure to adversity.

First, the establishment and preservation of attachment relationships is essential to children's well-being and should be prioritized. Given the profound and lasting impact that caregiving-related adversity can have on the developing brain and behavior—and the central role of caregivers in buffering children from the deleterious mental health impacts of exposure to adversity—policy should focus on supporting caregivers and preventing ruptures to children's attachment relationships. Second, while children can show remarkable capacity for resilience following adversity, policy must ensure that the burden of coping with adversity does not fall on individual youth and their families, particularly given disproportionate effects of adversity exposure and barriers to mental healthcare for families of lower-income and minoritized racial and ethnic backgrounds (R. E. Anderson et al., 2021; Condon et al., 2020; Shonkoff et al., 2021). Rather, changes should be enacted at the level of society and systems to maximally support children and their families. Indeed, consistent with the idea that resilience depends on multilevel interactions between multiple systems in society (Masten et al., 2021), evidence demonstrates that intervening at the family, community, or broader societal level is often most effective for promoting favorable outcomes following adversity (Feder et al., 2019; Gee, 2021b; Sapienza & Masten, 2011). Third, systems-level change should be enacted to eliminate systemic infliction of trauma on youth and families (Gee, 2022; Kribakaran et al., 2023). While interventions can mitigate harm, addressing the broader societal forces that give rise to trauma is essential to prevention.

As an example of the policy-related implications of empirical research documenting the impacts of caregiving-related adversity, evidence of the consequences of caregiver–child separation and the essential role of caregivers in buffering children from the negative effects of adversity (Cohodes et al., 2021; Sidamon-Eristoff et al., 2022) directly informed immigration policy related to the detention and forced separation of migrant families at the United States-Mexico border resulting from the United States government's "Zero Tolerance Policy" (Gee & Cohodes, 2019; Gee,

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

2021b), as well as the ruling that the U.S. government must provide access to mental health care for all separated families (Jordan, 2019). Despite reports of harm (Brabeck et al., 2014; Hampton et al., 2021; MacLean et al., 2019; Sidamon-Eristoff et al., 2022) and calls for structural changes to prevent the infliction of trauma against migrant children in the United States (Cohodes et al., 2020; Kribakaran & Gee, 2020; Kribakaran et al., 2023; Pompa, 2019), migrant children and families continue to face separation, detention, exploitation, and deportation at alarming rates in the United States (Montoya-Galvez, 2022).

Developmental scientists have a unique and important role to play in informing broader discussions in society about adversity and youth well-being (Gee, 2022). Researchers can contribute to these ongoing discussions and policymaking by conducting rigorous science on childhood adversity, including on the central role of caregivers and families in promoting resilience, by sharing their findings in meaningful ways with broad audiences that go beyond the academic realm. In this work it is essential that our field works to center the voices of youth and families affected by adversity and embraces community-engaged research approaches that directly involve affected youth and their caregivers throughout the research process (Collins et al., 2018; DePrince et al., 2022; Payán et al., 2022). Moreover, scholars in many other fields are conducting critical and complementary work; informing policy that prioritizes youth mental health will require interdisciplinary collaborations and partnerships.

Advances in this science, with the eventual goal of translating findings into clinical practice and informing policy, will require continuous refinement of conceptual models of early adversity to reflect the broader socioecological contexts in which children develop (Cicchetti & Lynch, 1993; Hyde et al., 2020; D. C. McCoy, 2013). Moreover, understanding resilience and trajectories of mental health in the context of early adversity necessitates consideration of distinct ways of experiencing and understanding these adversities (Biel & Coates, 2021; Danese & Widom, 2020; Pollak & Smith, 2021), as well as an emphasis on eradicating harmful societal forces such as structural racism that perpetually contribute to inequities in adversity exposure and mental health (Anglin et al., 2021; Bailey et al., 2017; G. C. Gee & Ford, 2011; Wildeman & Wang, 2017). Lastly, while adversity-related changes in neurobiology or behavior have often been framed as detrimental, such changes may be adaptive in the context of harsh or unpredictable environments (B. J. Ellis et al., 2017; Frankenhuis et al., 2020). Efforts to critically evaluate how we conceptualize adversity and effects on brain and behavioral development could both stimulate important scientific discoveries as well as shift the often dominant deficit-based narrative that can contribute to stigma of youth exposed to adversity (Gee, 2021a; Hanson & Nacewicz, 2021; Simmons et al., 2021). In conclusion, as developmental scientists, we have a collective responsibility to harness our knowledge of brain and behavioral development to improve the lives of youth—to affect systems-level change, to center the voices of youth, and, ultimately, to promote resilience among children and families.

Acknowledgments. The authors acknowledge and thank Nessa Bryce with Beyond Bounds Creative for the illustration in Figure 3 that depicts key concepts in this article.

Author contribution. Dylan Gee and Emily Cohodes contributed equally to this work.

Funding statement. This work was supported by the National Science Foundation (NSF) CAREER Award (BCS-2145372), National Institutes of Health (NIH) Director's Early Independence Award (DP5OD021370), Brain and Behavior Research Foundation (National Alliance for Research on Schizophrenia and Depression; NARSAD) Young Investigator Award, Jacobs Foundation Early Career Research Fellowship, and the Society for Clinical Child and Adolescent Psychology (SCCAP; Division 53 of the American Psychological Association [APA]) Richard "Dick" Abidin Early Career Award and Grant to DGG; and an NSF Graduate Research Fellowship Program award (NSF DGE-1752134), the SCCAP (Division 53 of the APA) Donald Routh Dissertation Grant, the American Psychological Foundation Elizabeth Munsterberg Koppitz Child Psychology Graduate Fellowship, a Dissertation Funding Award from the Society for Research in Child Development, a Dissertation Research Award from the APA, an American Dissertation Fellowship from the American Association of University Women (AAUW), and a Scholar Award granted by the International Chapter of the Philanthropic Educational Organization (P.E.O. Foundation) to EMC. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH, NSF, or any other funding source.

Competing interests. None.

References

Ainsworth, M. D. S. (1969). Object relations, dependency, and attachment: A theoretical review of the infant-mother relationship. *Child Development*, *40*, 969–1025.

Aldao, A., & Christensen, K. (2015). Linking the expanded process model of emotion regulation to psychopathology by focusing on behavioral outcomes of regulation. *Psychological Inquiry*, *26*(1), 27–36.

Andersen, S. L. (2003). Trajectories of brain development: Point of vulnerability or window of opportunity? *Neuroscience and Biobehavioral Reviews*, *27*(1-2), 3–18. https://doi.org/10.1016/s0149-7634(03)00005-8

Anderson, A. S., Watson, K. H., Reising, M. M., Dunbar, J. P., Bettis, A. H., Gruhn, M. A., & Compas, B. E. (2021). Relations between maternal coping socialization, adolescents' coping, and symptoms of anxiety and depression. *Journal of Child and Family Studies*, *30*(3), 663–675. https://doi.org/10.1007/s10826-020-01879-y

Anderson, R. E., Jones, S. C. T., Saleem, F. T., Metzger, I., Anyiwo, N., Nisbeth, K. S., Bess, K. D., Resnicow, K., & Stevenson, H. C. (2021). Interrupting the pathway from discrimination to black adolescents' psychosocial outcomes: The contribution of parental racial worries and racial socialization competency. *Child Development*, *92*(6), 2375–2394. https://doi.org/10.1111/cdev.13607

Anglin, D. M., Ereshefsky, S., Klaunig, M. J., Bridgwater, M. A., Niendam, T. A., Ellman, L. M., DeVylder, J., Thayer, G., Bolden, K., Musket, C. W., Grattan, R. E., Lincoln, S. H., Schiffman, J., Lipner, E., Bachman, P., Corcoran, C. M., Mota, N. B., van der Ven, E. (2021). From womb to neighborhood: A racial analysis of social determinants of psychosis in the united states. *The American Journal of Psychiatry*, *178*(7), 599–610. https://doi.org/10.1176/appi.ajp.2020.20071091

Appleyard, K., & Osofsky, J. D. (2003). Parenting after trauma: Supporting parents and caregivers in the treatment of children impacted by violence. *Infant Mental Health Journal*, *24*(2), 111–125. https://doi.org/10.1002/imhj.10050

Aschbacher, K., Cole, S., Hagan, M., Rivera, L., Baccarella, A., Wolkowitz, O. M., Lieberman, A. F., & Bush, N. R. (2022). An immunogenomic phenotype predicting behavioral treatment response: Toward precision psychiatry for mothers and children with trauma exposure. *Brain, Behavior, and Immunity*, *99*, 350–362. https://doi.org/10.1016/j.bbi.2021.07.012

Bailey, Z. D., Krieger, N., Agénor, M., Graves, J., Linos, N., & Bassett, M. T. (2017). Structural racism and health inequities in the USA: Evidence and interventions. *The Lancet*, *389*(10077), 1453–1463. https://doi.org/10.1016/S0140-6736(17)30569-X

Banks, S. J., Eddy, K. T., Angstadt, M., Nathan, P. J., & Phan, K. L. (2007). Amygdala-frontal connectivity during emotion regulation. *Social Cognitive and Affective Neuroscience*, *2*(4), 303–312. https://doi.org/10.1093/scan/nsm029

Bates, C. R., Nicholson, L. M., Rea, E. M., Hagy, H. A., & Bohnert, A. M. (2021). Life interrupted: Family routines buffer stress during the COVID-19

pandemic. *Journal of Child and Family Studies*, *30*(11), 2641–2651. https://doi.org/10.1007/s10826-021-02063-6

Berkowitz, S., Stover, C. S., & Marans, S. R. (2010). The child and family traumatic stress intervention: Secondary prevention for youth at risk of developing PTSD. *The Journal of Child Psychology and Psychiatry*, *52*(6), 676–685.

Bernstein, R., & Freyd, J. (2014). Trauma at home: How betrayal trauma and attachment theories understand the human response to abuse by an attachment figure. *Attachment*, *8*(1), 18–41.

Biel, M. G., & Coates, E. E. (2021). Editorial: Sharpening our focus on early adversity, development, and resilience through cross-national research. *Journal of the American Academy of Child and Adolescent Psychiatry*, *60*(2), 219–221. https://doi.org/10.1016/j.jaac.2020.08.013

Bloom, P. A., VanTieghem, M., Gabard-Durnam, L., Gee, D. G., Flannery, J., Caldera, C., Goff, B., Telzer, E. H., Humphreys, K. L., Fareri, D. S., Shapiro, M., Algharazi, S., Bolger, N., Aly, M., Tottenham, N. (2022). Age-related change in task-evoked amygdala-prefrontal circuitry: A multiverse approach with an accelerated longitudinal cohort aged 4-22 years. *Human Brain Mapping*, *43*(10), 3221–3244. https://doi.org/10.1002/hbm.25847

Bowlby, J. (1969). Attachment. In *Attachment and loss Volume 1*. Basic Books.

Boyce, W. T., & B., W. T. (1981). Interaction between social variables in stress research. *Journal of Health and Social Behavior*, *22*, 194–195.

Brabeck, K. M., Lykes, M. B., & Hunter, C. (2014). The psychosocial impact of detention and deportation on U.S. Migrant children and families. *American Journal of Orthopsychiatry*, *84*(5), 496–505. https://doi.org/10.1037/ort0000011

Brito, N. H., Werchan, D., Brandes-Aitken, A., Yoshikawa, H., Greaves, A., & Zhang, M. (2022). Paid maternal leave is associated with infant brain function at 3 months of age. *Child Development*, *93*(4), 1030–1043. https://doi.org/10.1111/cdev.13765

Brody, G. H., Gray, J. C., Yu, T., Barton, A. W., Beach, S. R., Galván, A., MacKillop, J., Windle, M., Chen, E., Miller, G. E. (2017). Protective prevention effects on the association of poverty with brain development. *JAMA Pediatrics*, *171*(1), 46–52.

Brody, G. H., Yu, T., Chen, E., Beach, S. R. H., & Miller, G. E. (2016). Family-centered prevention ameliorates the longitudinal association between risky family processes and epigenetic aging. *Journal of Child Psychology and Psychiatry*, *57*(5), 566–574. https://doi.org/10.1111/jcpp.12495

Brody, G. H., Yu, T., Nusslock, R., Barton, A. W., Miller, G. E., Chen, E., Holmes, C., McCormick, M., & Sweet, L. H. (2019). The protective effects of supportive parenting on the relationship between adolescent poverty and resting-state functional brain connectivity during adulthood. *Psychological Science*, *30*(7), 1040–1049. https://doi.org/10.1177/0956797619847989

Brown, S. M., Schlueter, L. J., Hurwich-Reiss, E., Dmitrieva, J., Miles, E., & Watamura, S. E. (2020). Parental buffering in the context of poverty: Positive parenting behaviors differentiate young children's stress reactivity profiles. *Development and Psychopathology*, *32*(5), 1778–1787. https://doi.org/10.1017/S0954579420001224

Butterfield, R. D., Siegle, G. J., Lee, K. H., Ladouceur, C. D., Forbes, E. E., Dahl, R. E., Ryan, N. D., Sheeber, L., & Silk, J. S. (2019). Parental coping socialization is associated with healthy and anxious early-adolescents' neural and real-world response to threat. *Developmental Science*, *22*(6), e12812. https://doi.org/10.1111/desc.12812

Butterfield, R. D., Silk, J. S., Lee, K. H., Siegle, G. S., Dahl, R. E., Forbes, E. E., Ryan, N. D., Hooley, J. M., & Ladouceur, C. D. (2020). Parents still matter! parental warmth predicts adolescent brain function and anxiety and depressive symptoms 2 years later. *Development and Psychopathology*, *33*(1), 1–14. https://doi.org/10.1017/S0954579419001718

Calkins, S. D., & Hill, A. (2007). *Caregiver influences on emerging emotion regulation* (pp. 229–248). Handbook of Emotion Regulation.

Callaghan, B., Gee, D. G., Gabard-Durnam, L., Telzer, E. H., Humphreys, K. L., Goff, B., Shapiro, M., Flannery, J., Lumian, D. S., Fareri, D. S., Caldera, C., Tottenham, N. (2019). Decreased amygdala reactivity to parent cues protects against anxiety following early adversity: An examination across 3-years. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, *4*(7), 664–671. https://doi.org/10.1016/j.bpsc.2019.02.001

Callaghan, B. L., Sullivan, R. M., Howell, B., & Tottenham, N. (2014). The international society for developmental psychobiology sackler symposium: Early adversity and the maturation of emotion circuits - a cross-species analysis. *Developmental Psychobiology*, *56*(8), 1635–1650. https://doi.org/10.1002/dev.21260

Callaghan, B. L., & Tottenham, N. (2016). The neuro-environmental loop of plasticity: A cross-species analysis of parental effects on emotion circuitry development following typical and adverse caregiving. *Neuropsychopharmacology*, *41*(1), 163–176.

Carpenter, A. L., Elkins, R. M., Kerns, C., Chou, T., Greif Green, J., & Comer, J. S. (2017). Event-related household discussions following the boston marathon bombing and associated posttraumatic stress among area youth. *Journal of Clinical Child and Adolescent Psychology*, *46*(3), 331–342. https://doi.org/10.1080/15374416.2015.1063432

Casey, B. J., Heller, A. S., Gee, D. G., & Cohen, A. O. (2019). Development of the emotional brain. *Neuroscience Letters*, *693*, 29–34. https://doi.org/10.1016/j.neulet.2017.11.055

Casey, B. J., Taylor-Thompson, K., Rubien-Thomas, E., Robbins, M., & Baskin-Sommers, A. (2020). Healthy development as a human right: Insights from developmental neuroscience for youth justice. *Annual Review of Law and Social Science*, *16*(1), 203–222.

Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. *Monographs of the Society for Research in Child Development*, *59*(2-3), 228–249.

Cassidy, J., & Shaver, P. R. (2002). *Handbook of attachment: Theory, research, and clinical applications*. The Guilford Press.

Chu, A. T., Ippen, C. G., & Lieberman, A. F. (2021). It's all about the relationship: The role of attachment in child-parent psychotherapy. *Research on Child and Adolescent Psychopathology*, *49*(5), 591–593. https://doi.org/10.1007/s10802-020-00741-5

Cicchetti, D., & Lynch, M. (1993). Toward an ecological/Transactional model of community violence and child maltreatment: Consequences for children's development. *Psychiatry-Interpersonal and Biological Processes*, *56*(1), 96–118. https://doi.org/10.1080/00332747.1993.11024624

Cobham, V. E., McDermott, B., Haslam, D., & Sanders, M. R. (2016). The role of parents, parenting and the family environment in children's post-disaster mental health. *Current Psychiatry Reports*, *18*(6), 53. https://doi.org/10.1007/s11920-016-0691-4

Cohen, A. O., & Casey, B. J. (2014). Rewiring juvenile justice: The intersection of developmental neuroscience and legal policy. *Trends in Cognitive Sciences*, *18*(2), 63–65. https://doi.org/10.1016/j.tics.2013.11.002

Cohen, J. A., Mannarino, A. P., Berliner, L., & Deblinger, E. (2000). Trauma-focused cognitive behavioral therapy for children and adolescents: An empirical update. *Journal of Interpersonal Violence*, *15*(11), 1202–1223. https://doi.org/10.1177/088626000015011007

Cohen, J. A., Mannarino, A. P., & Iyengar, S. (2011). Community treatment of posttraumatic stress disorder for children exposed to intimate partner violence: A randomized controlled trial. *Archives of Pediatrics & Adolescent Medicine*, *165*(1), 16–21. https://doi.org/10.1001/archpediatrics.2010.247

Cohodes, E., Chen, S., & Lieberman, A. (2017). Maternal meta-emotion philosophy moderates effect of maternal symptomatology on preschoolers exposed to domestic violence. *Journal of Child and Family Studies*, *26*(7), 1831–1843. https://doi.org/10.1007/s10826-017-0699-3

Cohodes, E. M., Kitt, E. R., Baskin-Sommers, A., & Gee, D. G. (2021). Influences of early-life stress on frontolimbic circuitry: Harnessing a dimensional approach to elucidate the effects of heterogeneity in stress exposure. *Developmental Psychobiology*, *63*(2), 153–172.

Cohodes, E. M., Kribakaran, S., & Gee, D. G. (2020). *Op-Ed: The crime against migrant children that Biden needs to repair*. Los Angeles Times.

Cohodes, E. M., Kribakaran, S., Odriozola, P., Bakirci, S., McCauley, S., Hodges, H. R., Sisk, L. M., Zacharek, S. J., & Gee, D. G. (2021). Migration-related trauma and mental health among migrant children emigrating from Mexico and central America to the united states: Effects on developmental neurobiology and implications for policy. *Developmental Psychobiology*, *63*(6), e22158. https://doi.org/10.1002/dev.22158

Cohodes, E. M., McCauley, S., & Gee, D. G. (2021). Parental buffering of stress in the time of COVID-19: Family-level factors may moderate the association between pandemic-related stress and youth symptomatology. *Research on Child and Adolescent Psychopathology*, *49*(7), 935–948. https://doi.org/10.1007/s10802-020-00732-6

Cohodes, E. M., McCauley, S., Pierre, J. C., Hodges, H. R., Haberman, J. T., Santiuste, I., Rogers, M. K., Wang, J., Mandell, J. D., Gee, D. G. (2023). Development and validation of the dimensional inventory of stress and trauma across the lifespan (DISTAL): A novel assessment tool to facilitate the dimensional study of psychobiological sequelae of exposure to adversity. *Developmental Psychobiology*, *65*(4), e22372. https://doi.org/10.1002/dev.22372

Cohodes, E. M., McCauley, S., Preece, D. A., Gross, J. J., & Gee, D. G. (2022). Parental assistance with emotion regulation moderates link between COVID-19 stress and child mental health. *Journal of Clinical Child & Adolescent Psychology*, *0*(0), 1–18. https://doi.org/10.1080/15374416.2022.2140431

Cohodes, E. M., Preece, D. A., McCauley, S., Rogers, M. K., Gross, J. J., & Gee, D. G. (2021). Development and validation of the parental assistance with child emotion regulation (PACER) questionnaire. *Research on Child and Adolescent Psychopathology*, *50*(2), 133–148. https://doi.org/10.1007/s10802-020-00759-9

Colich, N. L., Sheridan, M. A., Humphreys, K. L., Wade, M., Tibu, F., Nelson, C. A., Zeanah, C. H., Fox, N. A., & McLaughlin, K. A. (2021). Heightened sensitivity to the caregiving environment during adolescence: Implications for recovery following early-life adversity. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, *62*(8), 10. https://doi.org/10.1111/jcpp.13347

Collins, S. E., Clifasefi, S. L., Stanton, J., K. J. E., Straits, Gil-Kashiwabara, E., Rodriguez Espinosa, P., Nicasio, A. V., Andrasik, M. P., Wallerstein, N., Hawes, S. M., Miller, K. A., Nelson, L. A., Orfaly, V. E., Duran, B. M., & **The Leap Advisory Board** (2018). Community-based participatory research (CBPR): Towards equitable involvement of community in psychology research. *The American Psychologist*, *73*(7), 884–898. https://doi.org/10.1037/amp0000167

Collishaw, S., Pickles, A., Messer, J., Rutter, M., Shearer, C., & Maughan, B. (2007). Resilience to adult psychopathology following childhood maltreatment: Evidence from a community sample. *Child Abuse & Neglect*, *31*(3), 211–229. https://doi.org/10.1016/j.chiabu.2007.02.004

Compas, B. E., Connor-Smith, J. K., Saltzman, H., Thomsen, A. H., & Wadsworth, M. E. (2001). Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychological Bulletin*, *127*(1), 87–127. https://doi.org/10.1037/0033-2909.127.1.87

Condon, E. M., Dettmer, A. M., Gee, D. G., Hagan, C., Lee, K. S., Mayes, L. C., Stover, C. S., & Tseng, W.-L. (2020). Commentary: COVID-19 and mental health equity in the united states. *Frontiers in Sociology*, *5*, 584390. https://doi.org/10.3389/fsoc.2020.584390

Cook, A., Spinazzola, J., Ford, J., Lanktree, C., Blaustein, M., Cloitre, M., DeRosa, R., Hubbard, R., Kagan, R., Liautaud, J., Mallah, K., Olafson, E., van der Kolk, B. (2005). Complextrauma in children and adolescents. *Psychiatric Annals*, *35*(5), 390–398.

Crandall, A., Broadbent, E., Stanfill, M., Magnusson, B. M., Novilla, M. L. B., Hanson, C. L., & Barnes, M. D. (2020). The influence of adverse and advantageous childhood experiences during adolescence on young adult health. *Child Abuse & Neglect*, *108*, 104644. https://doi.org/10.1016/j.chiabu.2020.104644

Crandall, A., Miller, J. R., Cheung, A., Novilla, L. K., Glade, R., Novilla, M. L. B., Magnusson, B. M., Leavitt, B. L., Barnes, M. D., Hanson, C. L. (2019). ACEs and counter-ACEs: How positive and negative childhood experiences influence adult health. *Child Abuse & Neglect*, *96*, 104089. https://doi.org/10.1016/j.chiabu.2019.104089

D'Andrea, W., Ford, J., Stolbach, B., Spinazzola, J., & Kolk, B. A.van der (2012). Understanding interpersonal trauma in children: Why we need a developmentally appropriate trauma diagnosis. *American Journal of Orthopsychiatry*, *82*(2), 187–200. https://doi.org/10.1111/j.1939-0025.2012.01154.x

Danese, A., & Widom, C. S. (2020). Objective and subjective experiences of child maltreatment and their relationships with psychopathology. *Nature Human Behaviour*, *4*(8), 1–8. https://doi.org/10.1038/s41562-020-0880-3

Davidson, R. J., & McEwen, B. S. (2012). Social influences on neuroplasticity: Stress and interventions to promote well-being. *Nature Neuroscience*, *15*(5), 689–695. https://doi.org/10.1038/nn.3093

DePasquale, C. E., Donzella, B., & Gunnar, M. R. (2019). Pubertal recalibration of cortisol reactivity following early life stress: A cross-sectional analysis. *Journal of Child Psychology and Psychiatry*, *60*(5), 566–575. https://doi.org/10.1111/jcpp.12992

DePasquale, C. E., Herzberg, M. P., & Gunnar, M. R. (2021). The pubertal stress recalibration hypothesis: Potential neural and behavioral consequences. *Child Development Perspectives*, *15*(4), 249–256. https://doi.org/10.1111/cdep.12429

DePrince, A. P., Alexander, A., Cook, J. M., & Gudiño, O. G. (2022). A roadmap for preventing and responding to trauma: Practical guidance for advancing community-engaged research. *Psychological Trauma: Theory, Research, Practice, and Policy*, *14*(6), 948–955. https://doi.org/10.1037/tra0001159

Diamond, G., Creed, T., Gillham, J., Gallop, R., & Hamilton, J. L. (2012). Sexual trauma history does not moderate treatment outcome in attachment-based family therapy (ABFT) for adolescents with suicide ideation. *Journal of Family Psychology*, *26*(4), 595–605. https://doi.org/10.1037/a0028414

Doom, J. R., Seok, D., Narayan, A. J., & Fox, K. R. (2021). Adverse and benevolent childhood experiences predict mental health during the COVID-19 pandemic. *Adversity and Resilience Science*, *2*(3), 193–204. https://doi.org/10.1007/s42844-021-00038-6

Dozier, M., & Bernard, K. (2019). *Coaching parents of vulnerable infants: The attachment and biobehavioral catch-up approach*. The Guilford Press.

Dozier, M., Roben, C. K. P., Caron, E., Hoye, J., & Bernard, K. (2018). Attachment and biobehavioral catch-up: An evidence-based intervention for vulnerable infants and their families. *Psychotherapy Research*, *28*(1), 18–29. https://doi.org/10.1080/10503307.2016.1229873

Ehlers, A., & Clark, D. M. (2000). A cognitive model of posttraumatic stress disorder. *Behaviour Research and Therapy*, *38*(4), 319–345.

Ehlers, A., Mayou, R. A., & Bryant, B. (2003). Cognitive predictors of posttraumatic stress disorder in children: Results of a prospective longitudinal study. *Behaviour Research and Therapy*, *41*(1), 1–10.

Ehring, T., & Quack, D. (2010). Emotion regulation difficulties in trauma survivors: The role of trauma type and PTSD symptom severity. *Behavior Therapy*, *41*(4), 587–598.

Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry*, *9*(4), 241–273.

Ellis, B. H., Alisic, E., Reiss, A., Dishion, T., & Fisher, P. A. (2014). Emotion regulation among preschoolers on a continuum of risk: The role of maternal emotion coaching. *Journal of Child and Family Studies*, *23*(6), 965–974.

Ellis, B. J., Bianchi, J., Griskevicius, V., & Frankenhuis, W. E. (2017). Beyond risk and protective factors: An adaptation-based approach to resilience. *Perspectives on Psychological Science: A Journal of the Association for Psychological Science*, *12*(4), 561–587. https://doi.org/10.1177/1745691617693054

Farber, M. J., Gee, D. G., & Hariri, A. R. (2022). Normative range parenting and the developing brain: A scoping review and recommendations for future research. *The European Journal of Neuroscience*, *55*(9-10), 2341–2358. https://doi.org/10.1111/ejn.15003

Feder, A., Torres, S. F., Southwick, S. M., & Charney, D. S. (2019). The biology of human resilience: Opportunities for enhancing resilience across the lifespan. *Biological Psychiatry*, *0*(0), 443–453. https://doi.org/10.1016/j.biopsych.2019.07.012

Fivush, R., Hazzard, A., McDermott Sales, J., Sarfati, D., & Brown, T. (2003). Creating coherence out of chaos? Children's narratives of emotionally positive and negative events. *Applied Cognitive Psychology*, *17*(1), 1–19.

Fogarty, A., Wood, C. E., Giallo, R., Kaufman, J., & Hansen, M. (2019). Factors promoting emotional-behavioural resilience and adjustment in children exposed to intimate partner violence: A systematic review. *Australian Journal of Psychology*, *71*(4), 375–389. https://doi.org/10.1111/ajpy.12242

Foy, D. W. (1992). *Treating PTSD: Cognitive-behavioral Strategies*. Guilford Press.

Frankenhuis, W. E., Young, E. S., & Ellis, B. J. (2020). The hidden talents approach: Theoretical and methodological challenges. *Trends in Cognitive Sciences*, *24*(7), 569–581. https://doi.org/10.1016/j.tics.2020.03.007

Fuhrmann, D., Knoll, L. J., & Blakemore, S.-J. (2015). Adolescence as a sensitive period of brain development. *Trends in Cognitive Sciences*, *19*(10), 558–566. https://doi.org/10.1016/j.tics.2015.07.008

Gabard-Durnam, L., & McLaughlin, K. A. (2020). Sensitive periods in human development: Charting a course for the future. *Current Opinion in Behavioral Sciences*, *36*, 120–128. https://doi.org/10.1016/j.cobeha.2020.09.003

Gabard-Durnam, L. J., Gee, D. G., Goff, B., Flannery, J., Telzer, E., Humphreys, K. L., Lumian, D. S., Fareri, D. S., Caldera, C., Tottenham, N. (2016). Stimulus-elicited connectivity influences resting-state connectivity years later in human development: A prospective study. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, *36*(17), 4771–4784. https://doi.org/10.1523/JNEUROSCI.0598-16.2016

Garner, A., Yogman, M., Child, C., & on P. A. of & Health F (2021). Preventing childhood toxic stress: Partnering with families and communities to promote relational health. *Pediatrics*, *148*(2), e2021052582.

Gee, D. G. (2016). Sensitive periods of emotion regulation: Influences of parental care on frontoamygdala circuitry and plasticity: Sensitive periods of emotion regulation. *New Directions for Child and Adolescent Development*, *2016*(153), 87–110. https://doi.org/10.1002/cad.20166

Gee, D. G. (2020). Caregiving influences on emotional learning and regulation: Applying a sensitive period model. *Current Opinion in Behavioral Sciences*, *36*, 177–184. https://doi.org/10.1016/j.cobeha.2020.11.003

Gee, D. G. (2021a). Early adversity and development: Parsing heterogeneity and identifying pathways of risk and resilience. *The American Journal of Psychiatry*, *178*(11), 998–1013. https://doi.org/10.1176/appi.ajp.2021.21090944

Gee, D. G. (2021b). Early-life trauma and resilience: Insights from developmental neuroscience for policy. *Biological Psychiatry: Cognitive Neuroscience and Neuroimaging*, *6*(2), 141–143. https://doi.org/10.1016/j.bpsc.2020.07.005

Gee, D. G. (2022). Neurodevelopmental mechanisms linking early experiences and mental health: Translating science to promote well-being among youth. *The American Psychologist*, *77*(9), 1033–1045. https://doi.org/10.1037/amp0001107

Gee, D. G., Bath, K. G., Johnson, C. M., Meyer, H. C., Murty, V. P., van den Bos, W., & Hartley, C. A. (2018). Neurocognitive development of motivated behavior: Dynamic changes across childhood and adolescence. *The Journal of Neuroscience: The Official Journal of the Society for Neuroscience*, *38*(44), 9433–9445. https://doi.org/10.1523/JNEUROSCI.1674-18.2018

Gee, D. G., & Casey, B. J. (2015). The impact of developmental timing for stress and recovery. *Neurobiology of Stress*, *1*, 184–194. https://doi.org/10.1016/j.ynstr.2015.02.001

Gee, D. G., & Cohodes, E. M. (2019). A call for action on migrant children's mental health. *The Lancet Psychiatry*, *6*(4), 286. https://doi.org/10.1016/S2215-0366(19)30094-X

Gee, D. G., & Cohodes, E. M. (2021). Caregiving influences on development: A sensitive period for biological embedding of predictability and safety cues. *Current Directions in Psychological Science*, *30*(5), 376–383. https://doi.org/10.1177/09637214211015673

Gee, D. G., Gabard-Durnam, L., Telzer, E. H., Humphreys, K. L., Goff, B., Shapiro, M., Flannery, J., Lumian, D. S., Fareri, D. S., Caldera, C., Tottenham, N. (2014). Maternal buffering of human amygdala-prefrontal circuitry during childhood but not during adolescence. *Psychological Science*, *25*(11), 2067–2078. https://doi.org/10.1177/0956797614550878

Gee, D. G., Gabard-Durnam, L. J., Flannery, J., Goff, B., Humphreys, K. L., Telzer, E. H., Hare, T. A., Bookheimer, S. Y., & Tottenham, N. (2013). Early developmental emergence of human amygdala-prefrontal connectivity after maternal deprivation. *Proceedings of the National Academy of Sciences of the United States of America*, *110*(39), 15638–15643. https://doi.org/10.1073/pnas.1307893110

Gee, D. G., Sisk, L. M., Cohodes, E. M., & Bryce, N. V. (2022). Leveraging the science of stress to promote resilience and optimize mental health interventions during adolescence. *Nature Communications*, *13*(1), Article–1. https://doi.org/10.1038/s41467-022-33416-4

Gee, G. C., & Ford, C. L. (2011). STRUCTURAL RACISM AND HEALTH INEQUITIES: Old issues, new directions. *Du Bois Review: Social Science Research on Race*, *8*(1), 115–132. https://doi.org/10.1017/S1742058X11000130

Gewirtz, A., Forgatch, M., & Wieling, E. (2008). Parenting practices as potential mechanisms for child adjustment following mass trauma. *Journal of Marital and Family Therapy*, *34*(2), 177–192. https://doi.org/10.1111/j.1752-0606.2008.00063.x

Ghosh Ippen, C., Harris, W. W., Van Horn, P., & Lieberman, A. F. (2011). Traumatic and stressful events in early childhood: Can treatment help those at highest risk? *Child Abuse & Neglect*, *35*(7), 504–513. https://doi.org/10.1016/j.chiabu.2011.03.009

Gianino, A., & Tronick, E. Z. (1988). The mutual regulation model: The infant's self and interactive regulation and coping and defensive capacities. In *Stress and coping across development* (pp. 47–68). Lawrence Erlbaum Associates, Inc.

Glynn, L. M., & Baram, T. Z. (2019). The influence of unpredictable, fragmented parental signals on the developing brain. *Frontiers in Neuroendocrinology*, *53*, 100736. https://doi.org/10.1016/j.yfrne.2019.01.002

Glynn, L. M., Davis, E. P., Luby, J. L., Baram, T. Z., & Sandman, C. A. (2021). A predictable home environment may protect child mental health during the COVID-19 pandemic. *Neurobiology of Stress*, *14*, 100291. https://doi.org/10.1016/j.ynstr.2020.100291

Gottman, J. M., Katz, L. F., & Hooven, C. (1996). Parental meta-emotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology*, *10*(3), 243–268.

Gottman, J. M., Katz, L. F., & Hooven, C. (1997). *Meta-emotion: How families communicate*. Lawrence Erlbaum Associates, Inc.

Granger, S. J., Glynn, L. M., Sandman, C. A., Small, S. L., Obenaus, A., Keator, D. B., Baram, T. Z., Stern, H., Yassa, M. A., Davis, E. P. (2021). Aberrant maturation of the uncinate fasciculus follows exposure to unpredictable patterns of maternal signals. *Journal of Neuroscience*, *41*(6), 1242–1250. https://doi.org/10.1523/JNEUROSCI.0374-20.2020

Greeff, A. P., & Wentworth, A. (2009). Resilience in families that have experienced heart-related trauma. *Current Psychology*, *28*(4), 302–314.

Greene, C. A., McCarthy, K. J., Estabrook, R., Wakschlag, L. S., & Briggs-Gowan, M. J. (2020). Responsive parenting buffers the impact of maternal PTSD on young children. *Parenting*, *20*(2), 141–165. https://doi.org/10.1080/15295192.2019.1707623

Grolnick, W. S., McMenamy, J. M., & Kurowski, C. O. (2006). Emotional self-regulation in infancy and toddlerhood. In *Child psychology: A handbook of contemporary issues* (2nd ed. pp. 3–25). Psychology Press.

Gross, J. J. (1998). Antecedent-and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology*, *74*(1), 224–237.

Gruhn, M. A., & Compas, B. E. (2020). Effects of maltreatment on coping and emotion regulation in childhood and adolescence: A meta-analytic review. *Child Abuse & Neglect*, *103*, 104446. https://doi.org/10.1016/j.chiabu.2020.104446

Guadagno, A., Kang, M. S., Devenyi, G. A., Mathieu, A. P., Rosa-Neto, P., Chakravarty, M., & Walker, C.-D. (2018). Reduced resting-state functional connectivity of the basolateral amygdala to the medial prefrontal cortex in preweaning rats exposed to chronic early-life stress. *Brain Structure and Function*, *223*(8), 3711–3729.

Guassi Moreira, J. F., & Telzer, E. H. (2018). Mother still knows best: Maternal influence uniquely modulates adolescent reward sensitivity during risk taking. *Developmental Science*, *21*(1), e12484. https://doi.org/10.1111/desc.12484

Gunnar, M. R., DePasquale, C. E., Reid, B. M., Donzella, B., & Miller, B. S. (2019). Pubertal stress recalibration reverses the effects of early life stress in postinstitutionalized children. *Proceedings of The National Academy of Sciences of The United States of America*, *116*(48), 23984–23988. https://doi.org/10.1073/pnas.1909699116

Gunnar, M. R., & Donzella, B. (2002). Social regulation of the cortisol levels in early human development. *Psychoneuroendocrinology*, *27*(1-2), 199–220. https://doi.org/10.1016/S0306-4530(01)00045-2

Guyer, A. E., Jarcho, J. M., Pérez-Edgar, K., Degnan, K. A., Pine, D. S., Fox, N. A., & Nelson, E. E. (2015). Temperament and parenting styles in early childhood differentially influence neural response to peer evaluation in

adolescence. *Journal of Abnormal Child Psychology*, *43*(5), 863–874. https://doi.org/10.1007/s10802-015-9973-2

Hagan, M. J., Browne, D. T., Sulik, M., Ippen, C. G., Bush, N., & Lieberman, A. F. (2017). Parent and child trauma symptoms during child-parent psychotherapy: A prospective cohort study of dyadic change. *Journal of Traumatic Stress*, *30*(6), 690–697.

Hampton, K., Raker, E., Habbach, H., Deda, L. C., Heisler, M., & Mishori, R. (2021). The psychological effects of forced family separation on asylum-seeking children and parents at the US-mexico border: A qualitative analysis of medico-legal documents. *PLOS ONE*, *16*(11), e0259576. https://doi.org/10.1371/journal.pone.0259576

Hanson, J. L., & Nacewicz, B. M. (2021). Amygdala allostasis and early life adversity: Considering excitotoxicity and inescapability in the sequelae of stress. *Frontiers in Human Neuroscience*, *15*, 624705. https://doi.org/10.3389/fnhum.2021.624705

Hare, T. A., Tottenham, N., Galvan, A., Voss, H. U., Glover, G. H., & Casey, B. J. (2008). Biological substrates of emotional reactivity and regulation in adolescence during an emotional go-nogo task. *Biological Psychiatry*, *63*(10), 927–934. https://doi.org/10.1016/j.biopsych.2008.03.015

Heleniak, C., Jenness, J. L., Vander Stoep, A., McCauley, E., & McLaughlin, K. A. (2016). Childhood maltreatment exposure and disruptions in emotion regulation: A transdiagnostic pathway to adolescent internalizing and externalizing psychopathology. *Cognitive Therapy and Research*, *40*(3), 394–415.

Heleniak, C., King, K. M., Monahan, K. C., & McLaughlin, K. A. (2018). Disruptions in emotion regulation as a mechanism linking community violence exposure to adolescent internalizing problems. *Journal of Research on Adolescence*, *28*(1), 229–244. https://doi.org/10.1111/jora.12328

Herzberg, M.P., McKenzie, K.J., Hodel, A.S., Hunt, R.H., Mueller, B.A., Gunnar, M.R., Thomas, K.M. (2021). Accelerated maturation in functional connectivity following early life stress: Circuit specific or broadly distributed? *Developmental Cognitive Neuroscience*, *48*, 100922.

Hiller, R. M., Meiser-Stedman, R., Lobo, S., Creswell, C., Fearon, P., Ehlers, A., Murray, L., & Halligan, S. L. (2018). A longitudinal investigation of the role of parental responses in predicting children's post-traumatic distress. *Journal of Child Psychology and Psychiatry*, *59*(7), 781–789. https://doi.org/10.1111/jcpp.12846

Hofer, M. A. (1978). Hidden regulatory processes in early social relationships. In *Social behavior* (pp. 135–166). Springer.

Hofer, M. A. (1994). Early relationships as regulators of infant physiology and behavior. *Acta Paediatrica*, *83*(s397), 9–18.

Hostinar, C. E., Johnson, A. E., & Gunnar, M. R. (2015). Parent support is less effective in buffering cortisol stress reactivity for adolescents compared to children. *Developmental Science*, *18*(2), 281–297. https://doi.org/10.1111/desc.12195

Hostinar, C. E., Sullivan, R. M., & Gunnar, M. R. (2014). Psychobiological mechanisms underlying the social buffering of the hypothalamic-pituitary-adrenocortical axis: A review of animal models and human studies across development. *Psychological Bulletin*, *140*(1), 256–282. https://doi.org/10.1037/a0032671

Howell, B. R., Ahn, M., Shi, Y., Godfrey, J. R., Hu, X., Zhu, H., Styner, M., & Sanchez, M. M. (2019). Disentangling the effects of early caregiving experience and heritable factors on brain white matter development in rhesus monkeys. *NeuroImage*, *197*, 625–642. https://doi.org/10.1016/j.neuroimage.2019.04.013

Howell, K., Graham-Bermann, S., Czyz, E., & Lilly, M. (2010). Assessing resilience in preschool children exposed to intimate partner violence. *Violence and Victims*, *25*(2), 150–164. https://doi.org/10.1891/0886-6708.25.2.150

Hyde, L. W., Gard, A. M., Tomlinson, R. C., Burt, S. A., Mitchell, C., & Monk, C. S. (2020). An ecological approach to understanding the developing brain: Examples linking poverty, parenting, neighborhoods, and the brain. *The American Psychologist*, *75*(9), 1245–1259. https://doi.org/10.1037/amp0000741

Johnson, F. K., Delpech, J.-C., Thompson, G. J., Wei, L., Hao, J., Herman, P., Hyder, F., & Kaffman, A. (2018). Amygdala hyper-connectivity in a mouse model of unpredictable early life stress. *Translational Psychiatry*, *8*(1), 49. https://doi.org/10.1038/s41398-018-0092-z

Johnson, V., & Lieberman, A. (2007). Variation in behavior problems of preschoolers exposed to domestic violence: The role of mother's attunement to children's emotional experiences. *Journal of Family Violence*, *22*(5), 297–308.

Jordan, M. (2019). *U.S. must provide mental health services to families separated at border*. The New York Times.

Kahhalé, I., Barry, K. R., & Hanson, J. L. (2023). Positive parenting moderates associations between childhood stress and corticolimbic structure. *PNAS Nexus*, *2*(6), pgad145. https://doi.org/10.1093/pnasnexus/pgad145

Katz, L., Stettler, N., & Gurtovenko, K. (2015). Traumatic stress symptoms in children exposed to intimate partner violence: The role of parent emotion socialization and children's emotion regulation abilities. *Social Development*, *25*(1), n/a–n/a. https://doi.org/10.1111/sode.12151

Katz, L. F., & Hunter, E. C. (2007). Maternal meta-emotion philosophy and adolescent depressive symptomatology. *Social Development*, *16*(2), 343–360.

Katz, L. F., & Windecker-Nelson, B. (2006). Domestic violence, emotion coaching, and child adjustment. *Journal of Family Psychology*, *20*(1), 56–67.

Kelly, C., & Castellanos, F. X. (2014). Strengthening connections: Functional connectivity and brain plasticity. *Neuropsychology Review*, *24*(1), 63–76. https://doi.org/10.1007/s11065-014-9252-y

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry*, *62*(6), 593–602. https://doi.org/10.1001/archpsyc.62.6.593

Kilmer, R. P., & Gil-Rivas, V. (2010). Exploring posttraumatic growth in children impacted by hurricane katrina: Correlates of the phenomenon and developmental considerations. *Child Development*, *81*(4), 1211–1227. https://doi.org/10.1111/j.1467-8624.2010.01463.x

Kim, J., & Cicchetti, D. (2010). Longitudinal pathways linking child maltreatment, emotion regulation, peer relations, and psychopathology. *Journal of Child Psychology and Psychiatry*, *51*(6), 706–716. https://doi.org/10.1111/j.1469-7610.2009.02202.x

Kim-Spoon, J., Cicchetti, D., & Rogosch, F. A. (2013). A longitudinal study of emotion regulation, emotion lability-negativity, and internalizing symptomatology in maltreated and Nonmaltreated children. *Child Development*, *84*(2), 512–527. https://doi.org/10.1111/j.1467-8624.2012.01857.x

Kitt, E. R., Lewis, K. M., Galbraith, J., Abend, R., Smith, A. R., Lebowitz, E. R., Pine, D. S., & Gee, D. G. (2022). Family accommodation in pediatric anxiety: Relations with avoidance and self-efficacy. *Behaviour Research and Therapy*, *154*, 104107.

Knudsen, E. I. (2004). Sensitive periods in the development of the brain and behavior. *Journal of Cognitive Neuroscience*, *16*(8), 1412–1425. https://doi.org/10.1162/0898929042304796

Kopala-Sibley, D. C., Cyr, M., Finsaas, M. C., Orawe, J., Huang, A., Tottenham, N., & Klein, D. N. (2020). Early childhood parenting predicts late childhood brain functional connectivity during emotion perception and reward processing. *Child Development*, *91*(1), 110–128. https://doi.org/10.1111/cdev.13126

Kopp, C. B. (1989). Regulation of distress and negative emotions: A developmental view. *Regulation of Distress and Negative Emotions: A Developmental View*, *25*(3), 343–354.

Kovner, R., Oler, J. A., & Kalin, N. H. (2019). Cortico-limbic interactions mediate adaptive and maladaptive responses relevant to psychopathology. *American Journal of Psychiatry*, *176*(12), 987–999. https://doi.org/10.1176/appi.ajp.2019.19101064

Kribakaran, S., Cohodes, E.M., Gee, D.G. (2023). Developmental neuroscience informs policy related to migrant and refugee children's mental health. *Policy Insights from the Behavioral and Brain Sciences*.

Kribakaran, S., & Gee, D. G. (2020). *COVID-19 is threatening detained migrant children in the US*. World Economic Forum.

Lee, A., Poh, J. S., Wen, D. J., Tan, H. M., Chong, Y.-S., Tan, K. H., Gluckman, P. D., Fortier, M. V., Rifkin-Graboi, A., Qiu, A. (2019). Maternal care in infancy and the course of limbic development. *Developmental Cognitive Neuroscience*, *40*, 100714. https://doi.org/10.1016/j.dcn.2019.100714

Lee, F. S., Heimer, H., Giedd, J. N., Lein, E. S., Šestan, N., Weinberger, D. R., & Casey, B. J. (2014). Mental health. Adolescent mental health—Opportunity

https://doi.org/10.1017/S0954579423001128 Published online by Cambridge University Press

and obligation. *Science (New York, N.Y.)*, *346*(6209), 547–549. https://doi.org/10.1126/science.1260497

Lieberman, A. F. (2004). Traumatic stress and quality of attachment: Reality and internalization in disorders of infant mental health. *Infant Mental Health Journal*, *25*(4), 336–351. https://doi.org/10.1002/imhj.20009

Lieberman, A. F. (2017). *The emotional life of the toddler*. Simon and Schuster.

Lieberman, A. F., & Amaya-Jackson, L. (2005). *Reciprocal Influences of Attachment and Trauma: Using a Dual Lens in the Assessment and Treatment of Infants, Toddlers, and Preschoolers*. Guilford Press.

Lieberman, A. F., Chu, A., Horn, P. V., & Harris, W. W. (2011). Trauma in early childhood: Empirical evidence and clinical implications. *Development and Psychopathology*, *23*(2), 397–410. https://doi.org/10.1017/S0954579411000137

Lieberman, A. F., & Horn, P. V. (2011). *Psychotherapy with infants and young children: Repairing the effects of stress and trauma on early attachment*. Guilford Press.

Lieberman, A. F., Ippen, C. G., & Van Horn, P. (2015). *" Don't hit my mommy!": A manual for child-parent psychotherapy with young children exposed to violence and other trauma*. Zero to Three.

Lieberman, A. F., & Pawl, J. H. (1988). Clinical applications of attachment theory. In *Clinical implications of attachment* (pp. 327–351.

Lieberman, A. F., Van horn, P., & Ippen, C. G. (2005). Toward evidence-based treatment: Child-parent psychotherapy with preschoolers exposed to marital violence. *Journal of the American Academy of Child & Adolescent Psychiatry*, *44*(12), 1241–1248. https://doi.org/10.1097/01.chi.0000181047.59702.58

Lieberman, A. F., & Van Horn, P. (2008). *Psychotherapy with infants and young children: Repairing the effects of stress and trauma on early attachment (pp. xvi, 366)*. The Guilford Press.

Lieberman, A. F., Van Horn, P., & Ozer, E. J. (2005). Preschooler witnesses of marital violence: Predictors and mediators of child behavior problems. *Development and Psychopathology*, *17*(2), 385–396.

Liga, F., Inguglia, C., Gugliandolo, M. C., Ingoglia, S., & Costa, S. (2020). The socialization of coping strategies in adolescence: The modeling role of parents. *Anxiety, Stress, & Coping*, *33*(1), 47–58. https://doi.org/10.1080/10615806.2019.1666248

Lobo, F. M., Lunkenheimer, E., Lucas-Thompson, R. G., & Seiter, N. S. (2021). Parental emotion coaching moderates the effects of family stress on internalizing symptoms in middle childhood and adolescence. *Social Development*, *30*(4), 1023–1039.

Lupien, S. J., McEwen, B. S., Gunnar, M. R., & Heim, C. (2009). Effects of stress throughout the lifespan on the brain, behaviour and cognition. *Nature Reviews Neuroscience*, *10*(6), Article–6. https://doi.org/10.1038/nrn2639

MacLean, S. A., Agyeman, P. O., Walther, J., Singer, E. K., Baranowski, K. A., & Katz, C. L. (2019). Mental health of children held at a united states immigration detention center. *Social Science & Medicine*, *230*, 303–308. https://doi.org/10.1016/j.socscimed.2019.04.013

Malter Cohen, M., Jing, D., Yang, R. R., Tottenham, N., Lee, F. S., & Casey, B. J. (2013). Early-life stress has persistent effects on amygdala function and development in mice and humans. *Proceedings of The National Academy of Sciences*, *110*(45), 18274–18278. https://doi.org/10.1073/pnas.1310163110

Masten, A. S., & Cicchetti, D. (2010). Developmental cascades. *Development and Psychopathology*, *22*(3), 491–495. https://doi.org/10.1017/S0954579410000222

Masten, A. S., Lucke, C. M., Nelson, K. M., & Stallworthy, I. C. (2021). Resilience in development and psychopathology: Multisystem perspectives. *Annual Review of Clinical Psychology*, *17*(1), 521–549.

McCoy, C. L., & Masters, J. C. (1985). The development of children's strategies for the social control of emotion. *Child Development*, *56*(5), 1214–1222. https://doi.org/10.2307/1130236

McCoy, D. C. (2013). Early violence exposure and self-regulatory development: A bioecological systems perspective. *Human Development*, *56*(4), 254–273.

McCrory, E. J., De Brito, S. A., Kelly, P. A., Bird, G., Sebastian, C. L., Mechelli, A., Samuel, S., & Viding, E. (2013). Amygdala activation in maltreated children during pre-attentive emotional processing. *British Journal of Psychiatry*, *202*(04), 269–276. https://doi.org/10.1192/bjp.bp.112.116624

McLaughlin, K. A., Fox, N. A., Zeanah, C. H., & Nelson, C. A. (2011). Adverse rearing environments and neural development in children: The development of frontal electroencephalogram asymmetry. *Biological Psychiatry*, *70*(11), 1008–1015. https://doi.org/10.1016/j.biopsych.2011.08.006

McLaughlin, K. A., & Gabard-Durnam, L. (2022). Experience-driven plasticity and the emergence of psychopathology: A mechanistic framework integrating development and the environment into the research domain criteria (RDoC) model. *Journal of Psychopathology and Clinical Science*, *131*(6), 575–587. https://doi.org/10.1037/abn0000598

McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2010). Childhood adversities and adult psychopathology in the national comorbidity survey replication (NCS-R) III: Associations with functional impairment related to DSM-IV disorders. *Psychological Medicine*, *40*(5), 847–859. https://doi.org/10.1017/S0033291709991115

McLaughlin, K. A., Greif Green, J., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., & Kessler, R. C. (2012). Childhood adversities and first onset of psychiatric disorders in a national sample of US adolescents. *Archives of General Psychiatry*, *69*(11), 1151–1160. https://doi.org/10.1001/archgenpsychiatry.2011.2277

McLaughlin, K. A., & Hatzenbuehler, M. L. (2009). Mechanisms linking stressful life events and mental health problems in a prospective, community-based sample of adolescents. *Journal of Adolescent Health*, *44*(2), 153–160. https://doi.org/10.1016/j.jadohealth.2008.06.019

McLaughlin, K. A., Hatzenbuehler, M. L., & Hilt, L. M. (2009). Emotion dysregulation as a mechanism linking peer victimization to internalizing symptoms in adolescents. *Journal of Consulting and Clinical Psychology*, *77*(5), 894–904.

McLaughlin, K. A., Sheridan, M. A., Tibu, F., Fox, N. A., Zeanah, C. H., & Nelson, C. A. (2015). Causal effects of the early caregiving environment on development of stress response systems in children. *Proceedings of The National Academy of Sciences*, *112*(18), 5637–5642. https://doi.org/10.1073/pnas.1423363112

Meiser-Stedman, R. (2002). Towards a cognitive-behavioral model of PTSD in children and adolescents. *Clinical Child and Family Psychology Review*, *5*(4), 217–232.

Montoya-Galvez, C. (2022). *12,212 migrant children reentered U.S. border custody alone in 2021 after being expelled*. CBS News.

Moriceau, S., & Sullivan, R. M. (2006). Maternal presence serves as a switch between learning fear and attraction in infancy. *Nature Neuroscience*, *9*(8), 1004–1006.

Morris, A. S., Hays-Grudo, J., Zapata, M. I., Treat, A., & Kerr, K. L. (2021). Adverse and protective childhood experiences and parenting attitudes: The role of cumulative protection in understanding resilience. *Adversity and Resilience Science*, *2*(3), 181–192. https://doi.org/10.1007/s42844-021-00036-8

Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development (Oxford, England)*, *16*(2), 361–388. https://doi.org/10.1111/j.1467-9507.2007.00389.x

Narayan, A. J., Rivera, L. M., Bernstein, R. E., Harris, W. W., & Lieberman, A. F. (2018). Positive childhood experiences predict less psychopathology and stress in pregnant women with childhood adversity: A pilot study of the benevolent childhood experiences (BCEs) scale. *Child Abuse & Neglect*, *78*, 19–30. https://doi.org/10.1016/j.chiabu.2017.09.022

Nelson, C. A., & Gabard-Durnam, L. J. (2020). Early adversity and critical periods: Neurodevelopmental consequences of violating the expectable environment. *Trends in Neurosciences*, *43*(3), 133–143. https://doi.org/10.1016/j.tins.2020.01.002

Nelson, C. A., Zeanah, C. H., Fox, N. A., Marshall, P. J., Smyke, A. T., & Guthrie, D. (2007). Cognitive recovery in socially deprived young children: The Bucharest early intervention project. *Science*, *318*(5858), 1937–1940. https://doi.org/10.1126/science.1143921

Nikolaidis, A., Heleniak, C., Fields, A., Bloom, P. A., VanTieghem, M., Vannucci, A., Camacho, N. L., Choy, T., Gibson, L., Harmon, C., Hadis, S. S., Douglas, I. J., Milham, M. P., Tottenham, N. (2022). Heterogeneity in caregiving-related early adversity: Creating stable dimensions and subtypes. *Development and Psychopathology*, *34*(2), 621–634. https://doi.org/10.1017/S0954579421001668

Noble, K. G., Magnuson, K., Gennetian, L. A., Duncan, G. J., Yoshikawa, H., Fox, N. A., & Halpern-Meekin, S. (2021). Baby's first years: Design of a randomized controlled trial of poverty reduction in the united states. *Pediatrics*, *148*(4), e2020049702. https://doi.org/10.1542/peds.2020-049702

Opendak, M., Robinson-Drummer, P., Blomkvist, A., Zanca, R. M., Wood, K., Jacobs, L., Chan, S., Tan, S., Woo, J., Venkataraman, G., Kirschner, E., Lundström, J. N., Wilson, D. A., Serrano, P. A., Sullivan, R. M. (2019). Neurobiology of maternal regulation of infant fear: The role of mesolimbic dopamine and its disruption by maltreatment. *Neuropsychopharmacology*, *1*(7), 1247–1257. https://doi.org/10.1038/s41386-019-0340-9

Payán, D. D., Zawadzki, M. J., & Song, A. V. (2022). Advancing community-engaged research to promote health equity: Considerations to improve the field. *Perspectives in Public Health*, *142*(3), 139–141. https://doi.org/10.1177/17579139211054118

Perry, N. B., DePasquale, C. E., Donzella, B., & Gunnar, M. R. (2020). Associations between stress reactivity and behavior problems for previously institutionalized youth across puberty. *Development and Psychopathology*, *32*(5), 1854–1863. https://doi.org/10.1017/S0954579420001297

Perry, N. B., Donzella, B., & Gunnar, M. R. (2022). Pubertal stress recalibration and later social and emotional adjustment among adolescents: The role of early life stress. *Psychoneuroendocrinology*, *135*, 105578. https://doi.org/10.1016/j.psyneuen.2021.105578

Perry, R., & Sullivan, R. M. (2014). Neurobiology of attachment to an abusive caregiver: Short-term benefits and long-term costs: Benefits and costs of abusive caregiver attachment. *Developmental Psychobiology*, *56*(8), 1626–1634. https://doi.org/10.1002/dev.21219

Pollak, S. D., & Smith, K. E. (2021). Thinking clearly about biology and childhood adversity: Next steps for continued progress. *Perspectives on Psychological Science*, *17456916211031540*(6), 1473–1477. https://doi.org/10.1177/17456916211031539

Pompa, C. (2019). *Immigrant kids keep dying in CBP detention centers, and DHS won't take accountability*. American Civil Liberties Union.

Pozzi, E., Simmons, J. G., Bousman, C. A., Vijayakumar, N., Bray, K. O., Dandash, O., Richmond, S., Schwartz, O., Seal, M., Sheeber, L., Yap, M. B. H., Allen, N. B., Whittle, S. L. (2019). The influence of maternal parenting style on the neural correlates of emotion processing in children. *Journal of the American Academy of Child & Adolescent Psychiatry*, *59*(2), 274–282. https://doi.org/10.1016/j.jaac.2019.01.018

Pratt, M., Singer, M., Kanat-Maymon, Y., & Feldman, R. (2015). Infant negative reactivity defines the effects of parent-child synchrony on physiological and behavioral regulation of social stress. *Development and Psychopathology*, *27*(4pt1), 1191–1204.

Qu, Y., Fuligni, A. J., Galvan, A., & Telzer, E. H. (2015). Buffering effect of positive parent-child relationships on adolescent risk taking: A longitudinal neuroimaging investigation. *Developmental Cognitive Neuroscience*, *15*, 26–34. https://doi.org/10.1016/j.dcn.2015.08.005

Robinson-Drummer, P. A., Opendak, M., Blomkvist, A., Chan, S., Tan, S., Delmer, C., Wood, K., Sloan, A., Jacobs, L., Fine, E., Chopra, D., Sandler, C., Kamenetzky, G., Sullivan, R. M. (2019). Infant trauma alters social buffering of threat learning: Emerging role of prefrontal cortex in preadolescence. *Frontiers in Behavioral Neuroscience*, *13*, 132. https://doi.org/10.3389/fnbeh.2019.00132

Rogers, C. R., Chen, X., Kwon, S.-J., McElwain, N. L., & Telzer, E. H. (2021). The role of early attachment and parental presence in adolescent behavioral and neurobiological regulation. *Developmental Cognitive Neuroscience*, *101046*, 101046. https://doi.org/10.1016/j.dcn.2021.101046

Rogers, C. R., Perino, M. T., & Telzer, E. H. (2020). Maternal buffering of adolescent dysregulation in socially appetitive contexts: From behavior to the brain. *Journal of Research on Adolescence: The Official Journal of the Society for Research on Adolescence*, *30*(1), 41–52. https://doi.org/10.1111/jora.12500

Romund, L., Raufelder, D., Flemming, E., Lorenz, R. C., Pelz, P., Gleich, T., Heinz, A., & Beck, A. (2016). Maternal parenting behavior and emotion processing in adolescents-an fMRI study. *Biological Psychology*, *120*, 120–125. https://doi.org/10.1016/j.biopsycho.2016.09.003

Sabatini, M. J., Ebert, P., Lewis, D. A., Levitt, P., Cameron, J. L., & Mirnics, K. (2007). Amygdala gene expression correlates of social behavior in monkeys experiencing maternal separation. *Journal of Neuroscience*, *27*(12), 3295–3304.

Sanchez, M. M. (2006). The impact of early adverse care on HPA axis development: Nonhuman primate models. *Hormones and Behavior*, *50*(4), 623–631. https://doi.org/10.1016/j.yhbeh.2006.06.012

Sanchez, M. M., McCormack, K. M., & Howell, B. R. (2015). Social buffering of stress responses in nonhuman primates: Maternal regulation of the development of emotional regulatory brain circuits. *Social Neuroscience*, *10*(5), 512–526. https://doi.org/10.1080/17470919.2015.1087426

Sapienza, J. K., & Masten, A. S. (2011). Understanding and promoting resilience in children and youth. *Current Opinion in Psychiatry*, *24*(4), 267–273. https://doi.org/10.1097/YCO.0b013e32834776a8

Schriber, R. A., & Guyer, A. E. (2016). Adolescent neurobiological susceptibility to social context. *Developmental Cognitive Neuroscience*, *19*, 1–18. https://doi.org/10.1016/j.dcn.2015.12.009

Sheridan, M. A., Fox, N. A., Zeanah, C. H., McLaughlin, K. A., & Nelson, C. A. (2012). Variation in neural development as a result of exposure to institutionalization early in childhood. *Proceedings of the National Academy of Sciences of the United States of America*, *109*(32), 12927–12932. https://doi.org/10.1073/pnas.1200041109

Shonkoff, J. P., Slopen, N., & Williams, D. R. (2021). Early childhood adversity, toxic stress, and the impacts of racism on the foundations of health. *Annual Review of Public Health*, *42*(1), 115–134. https://doi.org/10.1146/annurev-publhealth-090419-101940

Sidamon-Eristoff, A. E., Cohodes, E. M., Gee, D. G., & Peña, C. J. (2022). Trauma exposure and mental health outcomes among central American and mexican children held in immigration detention at the united states-mexico border. *Developmental Psychobiology*, *64*(1), e22227. https://doi.org/10.1002/dev.22227

Simmons, C., Conley, M. I., Gee, D. G., Baskin-Sommers, A., Barch, D. M., Hoffman, E. A., Huber, R. S., Iacono, W. G., Nagel, B. J., Palmer, C. E., Sheth, C. S., Sowell, E. R., Thompson, W. K., Casey, B. J. (2021). Responsible use of open-access developmental data: The adolescent brain cognitive development (ABCD) study. *Psychological Science*, *32*(6), 866–870. https://doi.org/10.1177/09567976211003564

Singh-Taylor, A., Molet, J., Jiang, S., Korosi, A., Bolton, J. L., Noam, Y., Simeone, K., Cope, J., Chen, Y., Mortazavi, A., Baram, T. Z. (2018). NRSF-dependent epigenetic mechanisms contribute to programming of stress-sensitive neurons by neonatal experience, promoting resilience. *Molecular Psychiatry*, *23*(3), 648–657. https://doi.org/10.1038/mp.2016.240

Sisk, L. M., & Gee, D. G. (2022). Stress and adolescence: Vulnerability and opportunity during a sensitive window of development. *Current Opinion in Psychology*, *44*, 286–292.

Sroufe, L. A. (2005). Attachment and development: A prospective, longitudinal study from birth to adulthood. *Attachment & Human Development*, *7*(4), 349–367. https://doi.org/10.1080/14616730500365928

Stallard, P., & Smith, E. (2007). Appraisals and cognitive coping styles associated with chronic post-traumatic symptoms in child road traffic accident survivors. *Journal of Child Psychology and Psychiatry*, *48*(2), 194–201.

Stallard, P., Velleman, R., & Baldwin, S. (2001). Recovery from post-traumatic stress disorder in children following road traffic accidents: The role of talking and feeling understood. *Journal of Community & Applied Social Psychology*, *11*(1), 37–41. https://doi.org/10.1002/casp.610

Steinberg, L. (2017). Adolescent brain science and juvenile justice policy-making. *Psychology, Public Policy, and Law*, *23*(4), 410–420. https://doi.org/10.1037/law0000128

Stevens, J. S., van Rooij, S. J. H., Stenson, A. F., Ely, T. D., Powers, A., Clifford, A., Kim, Y. J., Hinrichs, R., Tottenham, N., Jovanovic, T. (2021). Amygdala responses to threat in violence-exposed children depend on trauma context and maternal caregiving. *Development and Psychopathology*, *1-12*(3), 1159–1170. https://doi.org/10.1017/S0954579421001085

Tan, P. Z., Oppenheimer, C. W., Ladouceur, C. D., Butterfield, R. D., & Silk, J. S. (2020). A review of associations between parental emotion socialization behaviors and the neural substrates of emotional reactivity and regulation in youth. *Developmental Psychology*, *56*(3), 516–527.

Teicher, M. H., Samson, J. A., Anderson, C. M., & Ohashi, K. (2016). The effects of childhood maltreatment on brain structure, function and connectivity. *Nature Reviews Neuroscience*, *17*(10), 652–666. https://doi.org/10.1038/nrn.2016.111

Telzer, E. H., Ichien, N. T., & Qu, Y. (2015). Mothers know best: Redirecting adolescent reward sensitivity toward safe behavior during risk taking. *Social Cognitive and Affective Neuroscience*, *10*(10), 1383–1391. https://doi.org/10.1093/scan/nsv026

Telzer, E. H., van Hoorn, J., Rogers, C. R., & Do, K. T. (2018). Social influence on positive youth development: A developmental neuroscience perspective. *Advances in Child Development and Behavior*, *54*, 215–258. https://doi.org/10.1016/bs.acdb.2017.10.003

Thomas, R., & Zimmer-Gembeck, M. J. (2012). Parent-child interaction therapy: An evidence-based treatment for child maltreatment. *Child Maltreatment*, *17*(3), 253–266. https://doi.org/10.1177/1077559512459555

Thompson, R. A., & Goodman, M. (2009). Development of emotion regulation: More than meets the eye. In A. M. Kring, & D. M. Sloan (Eds.), *Emotion regulation and psychopathology: A transdiagnostic approach to etiology and treatment*. Guilford Press.

Tottenham, N. (2012). Human amygdala development in the absence of species-expected caregiving. *Developmental Psychobiology*, *54*(6), 598–611. https://doi.org/10.1002/dev.20531

Tottenham, N. (2015). Social scaffolding of human amygdala-mPFC circuit development. *Social Neuroscience*, *10*(5), 489–499. https://doi.org/10.1080/17470919.2015.1087424

Tottenham, N. (2020). Neural meaning making, prediction, and prefrontal-subcortical development following early adverse caregiving. *Development and Psychopathology*, *32*(5), 1563–1578. https://doi.org/10.1017/S0954579420001169

Tottenham, N., Shapiro, M., Flannery, J., Caldera, C., & Sullivan, R. M. (2019). Parental presence switches avoidance to attraction learning in children. *Nature Human Behaviour*, *3*(10), Article–10. https://doi.org/10.1038/s41562-019-0656-9

Tottenham, N., & Sheridan, M. (2009). A review of adversity, the amygdala and the hippocampus: A consideration of developmental timing. *Frontiers in Human Neuroscience*, *3*, 68. https://doi.org/10.3389/neuro.09.068.2009

Valadez, E. A., Tottenham, N., Tabachnick, A. R., & Dozier, M. (2020). Early parenting intervention effects on brain responses to maternal cues among high-risk children. *American Journal of Psychiatry*, *177*(9), 818–826. https://doi.org/10.1176/appi.ajp.2020.20010011

van Rooij, S. J. H., Cross, D., Stevens, J. S., Vance, L. A., Kim, Y. J., Bradley, B., Tottenham, N., & Jovanovic, T. (2017). Maternal buffering of fear-potentiated startle in children and adolescents with trauma exposure. *Social Neuroscience*, *12*(1), 22–31. https://doi.org/10.1080/17470919.2016.1164244

Vanderwert, R. E., Zeanah, C. H., Fox, N. A., & Nelson, C. A. (2016). Normalization of EEG activity among previously institutionalized children placed into foster care: A 12-year follow-up of the Bucharest early intervention project. *Developmental Cognitive Neuroscience*, *17*, 68–75. https://doi.org/10.1016/j.dcn.2015.12.004

Villalta, L., Smith, P., Hickin, N., & Stringaris, A. (2018). Emotion regulation difficulties in traumatized youth: A meta-analysis and conceptual review. *European Child & Adolescent Psychiatry*, *27*(4), 527–544. https://doi.org/10.1007/s00787-018-1105-4

Weissman, D. G., Bitran, D., Miller, A. B., Schaefer, J. D., Sheridan, M. A., & McLaughlin, K. A. (2019). Difficulties with emotion regulation as a transdiagnostic mechanism linking child maltreatment with the emergence of psychopathology. *Development and Psychopathology*, *31*(3), 899–915.

Werker, J. F., & Hensch, T. K. (2015). Critical periods in speech perception: New directions. *Annual Review of Psychology*, *66*(1), 173–196.

Whittle, S., Vijayakumar, N., Simmons, J. G., Dennison, M., Schwartz, O., Pantelis, C., Sheeber, L., Byrne, M. L., & Allen, N. B. (2017). Role of positive parenting in the association between neighborhood social disadvantage and brain development across adolescence. *JAMA Psychiatry*, *74*(8), 824–832. https://doi.org/10.1001/jamapsychiatry.2017.1558

Wildeman, C., & Wang, E. A. (2017). Mass incarceration, public health, and widening inequality in the USA. *The Lancet*, *389*(10077), 1464–1474. https://doi.org/10.1016/S0140-6736(17)30259-3

Williamson, V., Creswell, C., Butler, I., Christie, H., & Halligan, S. L. (2016). Parental responses to child experiences of trauma following presentation at emergency departments: A qualitative study. *BMJ Open*, *6*(11), e012944.

Williamson, V., Creswell, C., Fearon, P., Hiller, R. M., Walker, J., & Halligan, S. L. (2017). The role of parenting behaviors in childhood post-traumatic stress disorder: A meta-analytic review. *Clinical Psychology Review*, *53*, 1–13. https://doi.org/10.1016/j.cpr.2017.01.005

Williamson, V., Halligan, S. L., Coetzee, B., Butler, I., Tomlinson, M., Skeen, S., & Stewart, J. (2018). Caregiver experiences of public services following child trauma exposure: A qualitative study. *International Journal of Mental Health Systems*, *12*(1), 15. https://doi.org/10.1186/s13033-018-0190-6

Williamson, V., Hiller, R. M., Meiser-Stedman, R., Creswell, C., Dalgleish, T., Fearon, P., Goodall, B., McKinnon, A., Smith, P., Wright, I. (2018). The parent trauma response questionnaire (PTRQ): Development and preliminary validation. *European Journal of Psychotraumatology*, *9*(1), 1478583.

Wilson, A. C., Lengua, L. J., Meltzoff, A. N., & Smith, K. A. (2010). Parenting and temperament prior to september 11, 2001, and parenting specific to 9/11 as predictors of children's posttraumatic stress symptoms following 9/11. *Journal of Clinical Child & Adolescent Psychology*, *39*(4), 445–459. https://doi.org/10.1080/15374416.2010.486317

Wright, M. O., Masten, A. S., & Narayan, A. J. (2013). Resilience processes in development: Four waves of research on positive adaptation in the context of adversity. In S. Goldstein, & R. B. Brooks (Eds.), *Handbook of resilience in children* (pp. 15–37). Springer US.

Wu, Q., Feng, X., Yan, J., Hooper, E. G., Gerhardt, M., & Ku, S. (2020). Maternal emotion coaching styles in the context of maternal depressive symptoms: Associations with preschoolers' emotion regulation. *Emotion*, *22*(6), 1171–1184. https://doi.org/10.1037/emo0000916

Yan, C.-G., Rincón-Cortés, M., Raineki, C., Sarro, E., Colcombe, S., Guilfoyle, D. N., Yang, Z., Gerum, S., Biswal, B. B., Milham, M. P., Sullivan, R. M., Castellanos, F. X. (2017). Aberrant development of intrinsic brain activity in a rat model of caregiver maltreatment of offspring. *Translational Psychiatry*, *7*(1), e1005–e1005. https://doi.org/10.1038/tp.2016.276