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Adverse childhood experiences and emotionally responsive parenting in childhood have been found to shape later parenting behaviors. However, it is critical for researchers to continue to focus on examining the mechanisms that explain how early childhood experiences shape later parenting to better understand areas for potential intervention. The goals of the current study were to (a) simultaneously examine the direct effects of mothers' adverse childhood experiences and remembered emotionally responsive parenting in childhood on maternal sensitivity to infant distress at 2 months and (b) to understand the processes by which these effects occur by examining indirect effects via parenting-related cognition, parenting-related emotion, and emotion-related physiology, and moderating effects of remembered emotionally responsive parenting in childhood on the association between adverse childhood experiences and maternal sensitivity to distress.

Participants included 299 mothers and their 2-month-old infants. During the third trimester, mothers retrospectively reported on their adverse childhood experiences and emotionally responsive parenting in childhood. Mothers' cognitive, emotional, and physiological responses to videoclips of crying infants were also measured during the prenatal visit. When infants were approximately 2 months old, infant affect and maternal sensitivity was observationally coded during the re-engagement episode of the Face-to-Face Still-Face paradigm. Results from the structural equation model indicated that mothers' remembered emotionally responsive parenting in childhood was associated with lower prenatal negative cognition about infant crying and negative emotion in response to infant crying. Consistent with

the hypothesis, lower prenatal negative cognition about infant crying was associated with higher maternal sensitivity to infant distress at 2 months, and there was an indirect effect of mothers' remembered emotionally responsive parenting on maternal sensitivity to infant distress via lower negative cognition about infant crying. There was not an indirect effect from emotionally responsive parenting to maternal sensitivity to infant distress via negative emotion in response to infant crying. However, post hoc analyses demonstrated that mothers who recalled more emotionally responsive parenting in childhood experienced lower negative emotion in response to infant crying, which in turn predicted lower negative cognition about infant crying which ultimately predicted higher maternal sensitivity to infant distress at 2 months. Furthermore, there were no significant direct or indirect effects of mothers' adverse childhood experiences on maternal sensitivity to infant distress at 2 months. Moreover, mothers' remembered emotionally responsive parenting in childhood did not buffer the effects of adverse childhood experiences on prenatal cognitive, emotional, or physiological reactions to infant crying, or maternal sensitivity to infant distress at 2 months. These findings suggest that the legacy of emotionally responsive parenting is maintained through lower negative cognition about infant crying. Implications for parenting interventions, programs, and future research are discussed.

PATHWAYS BY WHICH MOTHERS' ADVERSE CHILDHOOD EXPERIENCES
AND EMOTIONALLY RESPONSIVE PARENTING IN CHILDHOOD
PREDICT MATERNAL SENSITIVITY TO DISTRESS: THE
ROLES OF COGNITIVE, EMOTIONAL, AND
PHYSIOLOGICAL REACTIONS TO
INFANT CRYING

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CHAPTER I: INTRODUCTION

Experiencing early sensitive caregiving is critical for several developmental outcomes throughout the life course (Bowlby, 1982). Maternal sensitivity is the ability of a mother to respond quickly, appropriately, and effectively to child cues in a manner that is well matched to and prioritizes child needs rather than the mothers' needs (Ainsworth et al., 1974). Moreover, maternal sensitivity can be further differentiated by considering responses to the distinct nature of different types of *infant cues* or the demands of specific parenting *contexts* (Leerkes et al., 2012). Maternal sensitivity to non-distress is characterized by mothers' prompt and appropriate responses to infant neutral or positive cues, or mothers' responses to infant cues in non-distressing contexts (e.g., free play tasks; Leerkes et al., 2012). Maternal sensitivity to distress, however, is the extent to which mothers contingently and appropriately respond to infant distress cues or respond in contexts that are emotionally arousing and likely to elicit distress (e.g., fear or frustration tasks; Leerkes et al., 2012). In addition to maternal sensitivity to non-distress and distress being distinct dimensions that have more unshared than shared variance, there is evidence that they differentially predict child outcomes. Of most relevance to the current study, there is robust evidence that maternal sensitivity to infant distress is a unique predictor of children's socioemotional well-being, including the formation of secure attachment, adaptive emotion regulation skills, social competency, and low levels of behavior problems (Crockenberg & Leerkes, 2011; Leerkes et al., 2009; McElwain & Booth-LaForce, 2006). Considering the critical role that maternal sensitivity to distress has for subsequent child development, it is important for researchers to focus on identifying factors that predict maternal sensitivity to infant distress. Notably, early childhood experiences and parent characteristics have been recognized as important predictors of maternal sensitivity (Belsky & Jaffee, 2006). In the current study, I focus

on the indirect effects of mothers' early childhood experiences on maternal sensitivity to infant distress via parenting-related cognition, parenting-related emotion, and emotion-related physiology.

Theoretical and conceptual research has demonstrated that early childhood experiences, both positive and negative, shape one's later parenting behaviors. Adverse childhood experiences refer to a range of circumstances that threaten a child's physical or psychological well-being. This includes being a victim of abuse or neglect, household substance use or abuse, caregiver mental illness, interpersonal violence, and incarceration of a household member. Researchers who have examined the long-lasting effects of adverse childhood experiences on parenting have primarily focused on childhood maltreatment (e.g., abuse and neglect). However, there is clear theoretical support for multiple types of childhood adversity having an impact on subsequent parenting in adulthood (Crick & Dodge, 1994). Moreover, it is important to take a cumulative approach to studying the effects of adverse childhood experiences as research has demonstrated that there are high levels of co-occurrence among different childhood adversities (Lacey & Minnis, 2020) and experiencing more adverse childhood experiences is consistently related to poorer outcomes across developmental domains (Felitti et al., 1998).

In addition, emotionally responsive parenting in childhood is considered one type of positive childhood experience. Emotionally responsive parenting includes warm, supportive, and responsive parenting behaviors, particularly in response to displays of emotion. Furthermore, there is a large line of literature that has demonstrated the intergenerational transmission of emotionally supportive parenting (Kerr & Capaldi, 2019). In the current study, I aim to examine whether recollections of adverse childhood experiences and emotionally responsive parenting in

childhood each predict maternal sensitivity to infant distress and the pathways by which this occurs.

Drawing upon social information processing perspectives (Crick & Dodge, 1994; Lemerise & Arsenio, 2000), when mothers are faced with infant distress, they must first encode the cue and then simultaneously determine the causal attribution of infant distress. Causal attributions are interpretations of why a social partner behaved a certain way (Crick & Dodge, 1994), and parents' attributions about child behavior have been assessed in response to child misbehavior and infant distress. Parents' negative attributions about child behavior, that is viewing the behavior as willful or deliberate and reflective of stable, negative child traits rather than the result of situational or recent circumstances, have most consistently been studied as they are a central component of social information processing perspectives. However, there has been increased attention to understanding parents' causal attributions about infant crying, an alternative aversive behavior, and how this predicts parenting. The primary focus on negative attributions was likely driven by the parenting outcomes of interest: harsh or abusive discipline. In the context of emotion-related parenting, a parent's capacity to attribute behavior to a child's emotional state, or the emotionally evocative nature of a situation, is likely critical to prompt sensitive responding. Whereas attributions that minimize emotion, that is de-emphasizing emotional reasons for crying in favor of physical reasons, may prompt non-responsiveness or insensitive responses to child emotion.

Relatedly, parents' beliefs about infant crying are important predictors of parenting behaviors. Parenting beliefs can be conceptualized as child-oriented or parent-oriented. Child-oriented beliefs about infant crying include a focus on the child's needs (e.g., I want my child to feel safe when upset), whereas parent-oriented beliefs reflect a focus on the parents' needs (e.g.,

I want my child to stop crying because it bothers me). Of particular importance to the current study, negative and minimizing attributions about infant crying and parent-oriented beliefs about infant crying have been found to predict less optimal parenting behaviors. In the current study, I utilize social information processing theories that emphasize associations between early childhood experiences and cognition about others' behavior (Crick & Dodge, 1994; Lemerise & Arsenio, 2000), and an integrated perspective of the roles of cognition and emotion on parenting that underscores the influential role of parenting-related cognition on parenting behaviors (Leerkes & Augustine, 2019). In addition to parenting-related cognition, parenting-related emotion also serve as an important intermediary mechanism explaining how early childhood experiences shape one's later parenting behaviors.

Parent-child interactions naturally evoke strong emotions that influence parenting behaviors. Emotions that are prompted during parent-child interactions or in response to parenting-related stimuli (e.g., vignettes or videos about child cues) are defined as parenting-related emotion. Parenting-related emotion, like cognition, can be characterized as falling under two categories: child-oriented and parent-oriented. Child-oriented emotion reflects parents' concerns about children and their own emotional states. These are often displayed as feelings of happiness toward the child or feelings of empathy and sympathy in response to child distress. On the other hand, parent-oriented emotion is characterized by a focus on one's own concerns, wants, and needs. These may be expressed as feelings of anger, frustration, or amusement in reaction to child distress. In the current study, I draw on theoretical frameworks that emphasize links among parents' early childhood experiences, parent-oriented emotion and cognition, and parenting behaviors (Dix, 1991; Leerkes & Augustine, 2019).

In addition to felt emotion, which reflects how an individual makes meaning of their emotions (e.g., naming them, identifying the source) and necessarily has a cognitive component, physiological arousal, which largely reflects unconscious immediate reactions to stimuli, is also important in relation to parenting. Likewise, the ability to regulate emotions effectively is a critical skill for responding sensitively to infant distress (Leerkes & Augustine, 2019). Emotion regulation is defined as “behaviors, skills, and strategies, whether conscious or unconscious, automatic or effortful, that serve to modulate, inhibit, or enhance emotional experiences and expressions” (Calkins & Hill, 2007, p. 229). Importantly, there is a large body of research that has highlighted the importance of examining parents’ physiological arousal and regulation in response to child distress or during parent-child interactions. In the current study, I focus on two emotion-related physiological indicators: skin conductance level (indexes arousal) and respiratory sinus arrhythmia (indexes regulation). The autonomic nervous system (ANS) is a fast-acting physiological stress response system and is composed of coordination between the sympathetic nervous system and parasympathetic nervous system (Koss & Gunnar, 2018). The sympathetic nervous system (SNS) initiates physiological arousal to prepare the body for external challenges, whereas the parasympathetic nervous system (PNS) initiates physiological regulation to initiate growth and restorative processes to return the body to a calm state. Although the SNS and PNS are distinct systems, there is a complex dynamic relation between the two processes (Porges et al., 1994). As such, it is important for researchers to simultaneously examine the effects of both branches of the ANS.

Skin conductance level (SCL) is a noninvasive measure of SNS functioning that reflects the amount of sweat that arises from sweat ducts to the surface of the skin. Importantly, SCL reflects a pure measure of SNS functioning (Young-Southward et al., 2020). Furthermore, an

increase in SCL, also known as SCL augmentation, is believed to reflect an increase in arousal. Moreover, polyvagal theory asserts that an important component of the PNS is the vagus nerve (Porges, 2007). The vagus nerve originates in the brain and extends to several organs in the body, one being the heart. Vagal input to the heart via the sino-atrial node (i.e., cardiac vagal tone) initiates the regulation of heart rate and mobilizes the body in response to motion, emotion, and communication (Porges et al., 1994). Respiratory sinus arrhythmia (RSA) is a noninvasive measure of pure PNS functioning and is characterized by a rhythmic increase and decrease in heart rate within respiration cycles (Porges et al., 1994). The vagal nerve is believed to function as a brake to facilitate changes in RSA in response to external challenges to support motion, emotion, and communication by regulating metabolic output (Porges et al., 1994). A decrease in RSA (i.e., vagal withdrawal) stimulates faster heart rate and increases of SNS input to the heart. In emotionally arousing contexts, like parenting, RSA withdrawal is an adaptive response that provides the body with information on how to respond to positive and negative contextual demands (Porges et al., 1994). In the current study, I draw on social information processing theories that emphasize how prior developmental experiences influence emotion-related physiological processes (Lemerise & Arsenio, 2000; Leerkes & Augustine, 2019), and from parenting-specific social information processing perspectives (Leerkes & Augustine, 2019) that underscore the important roles of physiological regulation and arousal in predicting parenting behaviors.

In the current study, I integrate several theoretical frameworks to examine the pathways that explain how mothers' remembered early childhood experiences predict maternal sensitivity to infant distress at 2 months. The current study has two overarching goals embedded in 2 research questions (See Figure 1 for conceptual model). First, numerous studies have

demonstrated that adverse childhood experiences and emotionally responsive parenting in childhood predict later parenting behaviors. However, most of this research focuses on the effects of negative or positive childhood experiences separately, and there is a need for empirical research to simultaneously consider the effects of both on parenting behaviors to determine if they are independent of one another and/or work in conjunction with one another (i.e., moderating effects). Thus, the first overarching goal of the current study is to simultaneously examine the effects of both mothers' adverse childhood experiences and remembered emotionally responsive parenting in childhood on maternal sensitivity to infant distress at 2 months. A second overarching goal is to understand the processes by which such effects occur with a high degree of specificity; this involves considering indirect effects via parenting-related cognition, parenting-related emotion, and emotion-related physiology, and moderating effects of remembered emotionally responsive parenting in childhood on the association between adverse childhood experiences and maternal sensitivity to distress. These overarching goals were pursued by focusing on two research questions that were tested in the same model.

First, in the current study I examined how mothers' remembered early childhood experiences directly and indirectly effect maternal sensitivity to infant distress. Although four specific intermediary mechanisms were tested, other unmeasured processes may also link early childhood experiences and maternal sensitivity to infant distress. For instance, shared genetic traits, epigenetic modification, and psychopathology are other processes that may explain how early childhood experiences predict later parenting behaviors (Alink et al., 2019; Champagne et al., 2006; Jaffee & Price, 2007). As such, it is possible that direct effects of mothers' remembered early childhood experiences may exist above and beyond the proposed indirect effects. In addition to examining direct effects of mothers' remembered early childhood

experiences, I focused on four social information processes that have been found to be outcomes related to adverse childhood experiences and emotionally responsive parenting in childhood, and predictors of maternal sensitivity to infant distress. Theoretical research has posited that early developmental experiences shape individuals' cognition, emotion, and physiological functioning (Crick & Dodge, 1993; Lemerise & Arsenio, 2000). Importantly, the current study includes a focus on how early childhood experiences are specifically related to parenting-related cognition, parenting-related emotion, and emotion-related physiology. Including a focus on processes specifically during emotionally arousing situations, like infant distress, is particularly important for later parenting behaviors. Moreover, the inclusion of several parenting-related processes across multiple developmental levels of analysis (i.e., cognition, emotion, and physiology) is a strength because it is possible that negative and positive early childhood experiences predict cognition, emotion, and physiology differently. Further, the inclusion of several indirect paths is an important contribution as it allows for the ability to identify multiple potential mechanisms that explain how early childhood experiences predict maternal sensitivity to infant distress. In addition to filling an important gap in basic science, this work has the potential to inform the development of interventions. That is, one cannot change their childhood experiences, and interventions to help parents cope with or recover from those experiences take a long time and have only modest effects (e.g., Circle of Security; Powell et al., 2013). In contrast, the current intermediary variables of parenting-related cognition and emotion and emotion-related physiology are malleable, but evidence about which of these matter the most is lacking and is needed to optimize current interventions. Thus, the first research question was, do mothers' recollections of early childhood experiences predict maternal sensitivity to infant distress at 2

months both directly and indirectly via their cognitive, emotional, and physiological responses to infant crying?

Finally, risk and resilience perspectives have posited that some individuals show positive adaptation despite experiencing significant risk (Masten, 2001). In the current study, I am interested in examining how mothers' remembered emotionally responsive parenting in childhood serves as both a promotive and protective factor. It is possible for individuals to experience both adverse childhood experiences and emotionally responsive parenting in childhood. As such, it is important to examine whether emotionally responsive parenting in childhood buffers the negative effects of adverse childhood experiences on parenting and social information processing factors. Therefore, in the current study, the second research question was, are there conditional direct and indirect effects of mothers' adverse childhood experiences on maternal sensitivity to infant distress at 2 months via mothers' cognitive, emotional, and physiological responses to infant crying that are dependent upon mothers' remembered emotionally responsive parenting in childhood?

CHAPTER II: THEORETICAL FRAMEWORK

In the current study, I integrate theoretical perspectives focused on human development, social relationships, parenting, and resilience. Specifically, the current study draws on social information processing perspectives (Crick & Dodge, 1994; Dix, 1991; Leerkes & Augustine, 2019; Lemerise & Arsenio, 2000) and risk and resilience perspectives (Luthar et al., 2000; Masten et al., 2021; Zimmerman, 2013). This integrative theoretical foundation allows for a better understanding of the pathways that explain how mothers' positive and negative childhood experiences shape subsequent parenting behavior.

Social Information Processing Perspectives

Social information processing (SIP) theory posits that previous experiences shape the development of cognitive schema and future responses and interpretations of events (Milner, 2000). A central component of SIP is that individuals enter social situations with a database of previous experiences that shape how they encode, interpret, and respond to social cues (Crick & Dodge, 1994). The database can include early childhood experiences, memories, acquired rules, and social schema that predict social processing. There are six steps in Crick and Dodge's (1994) social-information processing model that are posited to predict how an individual responds to the cues of a social partner: 1) encoding of external and internal cues, 2) interpretation and mental representation of cues, 3) clarification or selection of goals, 4) response access or construction, 5) response decision, and 6) behavioral enactment. The process of encoding and interpreting social cues involves selectively attending to cues and making mental representations of cues that are subsequently stored into memory. Salient to these interpretational processes is the role of attributions. Attributions are defined as interpretations about why something happened that are highly influenced by previous experiences (i.e., the database). Moreover, attributions

reciprocally shape how cues are encoded (step 1) and the selection or clarification of goals related to social situations (step 3). Following the interpretation of cues, individuals form goals that function as a guide toward producing a desired outcome (Crick & Dodge, 1994). Importantly, individuals bring goal-oriented tendencies to a social situation based on the database but can revise and create new goals in response to new experiences. Goals are a pivotal construct of social information processing theory as they affect what possible responses or behavior to select from and enact. Then in steps 4 and 5, individuals draw upon and evaluate possible responses to social cues that are stored in memory and select the response perceived to lead to the most favorable outcome. Finally, the end point in Crick and Dodge's (1994) SIP model is behavioral implementation of a response, which involves the ability to implement, monitor, and modify the behavior as needed.

Importantly, the SIP model by Crick and Dodge (1994) is cyclical, highlighting the dynamic nature of individuals engaging in multiple social-information processes at the same time. Although each SIP step is discussed as involving an active processing of sequences before enacting a behavioral response, it is important to note that most SIP processes occur automatically and simultaneously (Crick & Dodge, 1994). As such, there are reciprocal relationships between steps in the SIP model that allow for mental representations or behavioral responses to be shaped by *and* subsequently shape how social cues are encoded and interpreted. Notably, the previously mentioned construct of the database has reciprocal relationships with each of the processes in the SIP model. Suggesting that the prior experiences that characterize the database shape SIP factors, but the database is also updated based on new social experiences that stem, in part, from SIP. This highlights a key assumption of the SIP model: that previous

experiences, knowledge, and capabilities shape behavior in social situations through cognitive processes (Crick & Dodge, 1994).

There are also several analytic models that can be used to assess how social information is processed. In the current study, I employ Model B (Crick & Dodge, 1994, p. 95) as a guide. An assumption of this model is that multiple processing variables are not independent of each other, rather they are all assessed and related to social behavior. This is particularly important as this approach simultaneously tests multiple processing variables in the same model, rather than in separate models. As such, this model provides a better understanding of what cognitive processes are important in understanding a particular social behavior (Crick & Dodge, 1994).

The SIP model by Crick and Dodge (1994) focused on the role of cognitive processes in predicting social behavior. Criticisms of this model have primarily focused on the lack of attention to the role of emotion in predicting behavior. An adaptation of the SIP model proposed by Lemerise and Arsenio (2000) emphasized the interrelatedness of emotional and cognitive processes and highlighted the role emotion plays in how information is processed and behaviors enacted (Lemerise & Arsenio, 2000). This is consistent with functionalist perspectives of emotion as motivation for cognitive processes and behavior (Izard, 1994; Lazarus, 1991). Lemerise and Arsenio's adaptation of the SIP model included integration of emotion processes at each step of the model to create a more accurate reflection of how emotion and cognition jointly shape behavior.

In addition to memories, acquired rules, and social schema being a part of the database, Lemerise and Arsenio (2000) posit that individuals also have affective representations of previous experiences. Furthermore, behavioral and physiological emotion processes like emotionality, arousal and/or mood, and emotion regulation are important individual

characteristics that can be considered components of the database. Similar to Crick and Dodge's (1994) SIP model, Lemerise and Arsenio's (2000) adaptation emphasizes that the affective and cognitive characteristics of the database have reciprocal relationships with each step of the SIP model. As such, levels of arousal, regulatory abilities, and emotions can influence what social cues are noticed, how they are interpreted and evaluated, and what behavioral response is enacted. In addition to one's own emotion cues, others' affective cues also provide information about social situations that impact several steps in the SIP model. Specifically, others' affective cues and the affective relationship between individuals shape how social cues are encoded and interpreted, the types of goals selected, and evaluation and enactment of behaviors (Lemerise & Arsenio, 2000).

Overall, SIP perspectives highlight how previous developmental experiences shape social interactions with others. Moreover, emotional, physiological, and cognitive processes simultaneously occur to shape behavior in a cyclical process (Lemerise & Arsenio, 2000). SIP perspectives serve as an important theoretical framework for the current study as they highlight how prior experiences influence individuals' emotional and cognitive responses to cues which in turn predict behavior. The SIP perspective has primarily, although not exclusively, been applied to the study of peer and partner relationships. A complementary perspective focused exclusively on parenting is Dix's affective organization of parenting model (1991).

Affective Organization of Parenting

Parent-child relations are unique in that there is a power hierarchy and parents are responsible for the survival of their offspring during infancy and are believed to be important sources of children's long-term well-being. As such, parenting is a highly emotional experience and emotions play a role in shaping the quality of parenting behaviors. Dix's affective

organization of parenting model (1991) highlights that internal and external factors activate parents' emotions, which in turn influence parenting. According to Dix (1991), there are three main processes that constitute how the affective system influences parenting: activation, engagement, and regulation.

Activation processes occur in response to a child or non-child focused event and determine when emotion will occur and how strongly it will be activated (Dix, 1991). Similar to Lerner and Arsenio's (2000) SIP model, the activation process is largely automatic; however, cognition is an important determinant of emotion because how individuals appraise events shapes their emotions. If an event is thought to interfere with goals or behavior, then a negative emotion will be elicited, whereas if an event is perceived as promoting goals, then a positive emotion will be produced. Once emotions are activated, engagement processes facilitate emotion-specific orientations toward events (Dix, 1991). That is, emotions have orienting, organizing, and motivating effects on how events are perceived and what behavioral response follows. This can include changes in cognition, physiology, emotional states, and behavior (Dix, 1991). Next, regulation processes assist in controlling emotions and how they are expressed. Individuals have an active role in regulation processes as regulation involves understanding one's emotions and evaluating how others will respond. Moreover, regulation processes help individuals promote desirable emotions and cope with undesirable emotions (Dix, 1991). The dynamic relationship between cognition and emotion to produce behavior is relatively similar across social information processing perspectives (Lerner & Arsenio, 2000) and Dix's (1991) affective organization of parenting. The most notable difference between the two is that SIP models are more broadly focused on individuals' interactions with peers and others, whereas the affective organization of parenting is specifically focused on parent-child interactions.

In parenting contexts, affective processes are activated because outcomes of parent-child interactions matter to parents. During interactions with children, parents continually appraise events and adjust behavior to promote parenting goals effectively (Dix, 1991). The activation of positive or negative emotion depends on parents' appraisals of why behaviors are occurring and how much control parents have of the situation (Dix, 1991). Parents' attribution dispositions are, in part, formed by information on normative child development (Dix, 1993). However, characteristics of parents, like their prior developmental experiences and social biases, are stronger predictors of parents' appraisals and emotion in comparison to what children are actually like (Dix, 1993). For example, infant crying is inherently arousing and aversive, but also signals a need for a response from a parent. Parents who believe that infants should be able to signal what they need without crying are likely to become upset or angry at infant distress. Moreover, negative emotions are likely to be elicited if parents believe that their parenting goals are being blocked by child behaviors. In other words, child behavior and parents' appraisals of behavior are interdependent; it is when these are incompatible that negative emotions are likely to occur. The occurrence of chronic and intense negative emotion can also undermine parenting and lead to maladaptive parenting behaviors because it promotes negative attributions, inattention, and a focus on self rather than child concerns (Dix, 1991). Dix's affective organization of parenting is an important theoretical guide of the current study as it highlights the emotional and cognitive processes that shape parenting behaviors specifically.

Integrated SIP Perspective on Parenting

More recently, Leerkes and Augustine (2019) developed an integrated model focused on the role of parenting-related emotion and cognition on parenting behavior. Informed by SIP perspectives (Crick & Dodge, 1994, Lemerise & Arsenio, 2000) and the affective organization of

parenting (Dix, 1991), this integrated model highlighted how conscious and unconscious cognitive, emotional, and physiological processes independently and jointly shape parenting behavior. Similar to theoretical models by Crick and Dodge (1994) and Lemerise and Arsenio (2000), the integrated model of parenting includes six dynamic steps that simultaneously occur to shape parenting behavior in a cyclical process. Importantly, a contribution of this model is that trait emotional characteristics (e.g., global emotion regulation, mood, and emotional well-being) are separated from parenting-related emotion (e.g., emotional reactions to child behavior or stimuli), highlighting that both may influence parenting but the processes by which these occur may be different (Leerkes & Augustine, 2019). The association between trait emotion characteristics and parenting may reflect more general behavioral responses, whereas there may be a more nuanced association between parenting-related emotion and specific parenting behaviors. Parenting-related emotion can further be differentiated into child-oriented emotion and mother-oriented emotion. Moreover, positive parenting-related emotion has consistently been related to higher maternal sensitivity, whereas negative parenting-related emotion is associated with a range of maladaptive parenting behaviors (Leerkes & Augustine, 2019).

In addition, the model by Leerkes and Augustine (2019) is informed by attachment theory and includes more of a focus on parents' developmental history as part of the database compared to earlier perspectives. In particular, the type of parenting experienced in childhood and the meaning attributed to these parenting experiences are posited to act as part of the database (Leerkes & Augustine, 2019). Subsequently, these early attachment-related experiences are believed to shape parenting-related cognition and emotion. Early life experiences have lasting developmental consequences for individuals' expectations about themselves and others (Bowlby, 1982; Cassidy et al., 2013). Specifically, attachment-related experiences with individuals have

been found to shape internal working models, or mental representations of close relationships (Bowlby, 1982). As such, individuals learn to approach situations with biases, preconceptions, and interpretive tendencies that influence feelings, thoughts, and behaviors with others at conscious and unconscious levels (Bowlby, 1982; Cummings & Cummings, 2002). Both positive (e.g., emotionally responsive parenting) and negative (e.g., adverse childhood experiences) experiences can be included in the database as part of developmental history and attachment-related experiences. Experiencing emotionally responsive parenting in childhood can lead to the development of secure attachment representations and more adaptive parenting-related emotion, cognition, physiology, and behavior. Whereas experiencing adversity in childhood can lead to the development of insecure internal working models from a mistrust and wariness of others. In the parenting context, having insecure internal working models can lead to processing information about children in a defensive and negatively biased manner and engaging in maladaptive parenting behaviors. Overall, greater focus on the type of parenting received in childhood and adult attachment as components of the database is a key strength of the integrated model of parenting. However, it is also important for researchers to consider that other types of childhood experiences, including adverse childhood experiences, may also function as an important part of the database. Next, risk and resilience perspectives are discussed as some parents may demonstrate adaptive social information processing despite experiencing risk earlier in development.

Risk and Resilience Perspectives

In addition to SIP perspectives, risk and resilience perspectives provide a valuable foundation for understanding how positive and negative childhood experiences shape development. Generally, risk is defined as exposure to significant threat or severe adversity

(Luthar et al., 2000). Researchers have examined risk in several ways, ranging from poverty, maltreatment, discrimination, and parental mental illness (Masten et al., 2021). Regardless of how researchers measure risk, there is a consensus that risk involves an elevated probability of an undesirable outcome. Consistent with this perspective, I predict that adverse childhood experiences will predict maladaptive cognitive, emotional, and physiological reactions to infant crying and less sensitive responses to infant distress.

The emergence of research on resilience was a transition in the field to move from deficit-oriented models towards understanding how some children demonstrate positive outcomes despite experiencing significant risk (Masten, 2001). Moreover, resilience is defined as “the capacity of a dynamic system to adapt successfully through multisystem processes to challenges that threaten the function, survival, or development of the system” (Masten et al., 2021, p. 524). This can include dynamic systems within the individual (e.g., the autonomic nervous system), as well as external systems (e.g., individuals and families). There are two necessary components for displaying resilience: 1) some type of risk must be experienced and 2) there needs to be evidence of positive adaptation despite the experience of significant risk (Luthar et al., 2000; Masten et al., 2021). Moreover, what is considered positive adaptation varies by criteria selected by the researcher (Masten et al., 2021). In the current study, adverse childhood experiences are viewed as the risk and positive adaptation is considered average or lower (a) negative cognition about infant crying, (b) negative emotion in response to infant crying, and average or higher (c) physiological arousal in response to infant crying and (d) physiological regulation in response to infant crying.

The significance of protective and promotive processes emerged as researchers sought to identify predictors of resilience (Masten et al., 2021). Protective processes are predictors that

modify or reduce the effects of risk in a positive direction (Luthar et al., 2006). Whereas promotive processes are predictors of better adjustment regardless of risk level (Masten et al., 2021). Although both processes are predictors of resilience, they are distinct in how they predict outcomes. Furthermore, it is possible for a construct to have both protective and promotive effects on developmental outcomes and researchers have used various models to assess this. In the current study, I propose that emotionally responsive parenting in childhood operates as both a promotive factor (i.e., proposed main effect) and a protective factor (i.e., proposed moderator of the effect of adverse childhood experiences on mediators and outcome) in relation to mothers' cognitive, emotional, and physiological reactions to infant crying and maternal sensitivity to infant distress.

Zimmerman (2013) outlined several models that researchers use when studying resilience. Two of these models that were used as a framework for the current study are a) compensatory model and b) protective factor model. Compensatory models of resilience include a focus on promotive factors having an opposite and independent effect on developmental outcomes than risks (Zimmerman, 2013). For example, independent of the negative effects of adverse childhood experiences on regulatory abilities, emotionally responsive parenting during childhood may predict better regulatory abilities. Protective factor models of resilience suggest that there are factors that modify the relationship between a risk factor and a developmental outcome (Zimmerman, 2013). This is often tested as an interaction effect between a risk and protective factor. The example that was used to explain compensatory models of resilience can also be applied to protective factor models. In addition to having a direct effect on an outcome, emotionally responsive parenting during childhood can protect individuals from the deleterious effects of adverse childhood experiences on regulatory abilities. The use of risk and resilience

perspectives as a theoretical framework is critical as it provides a more complete understanding of how multiple early childhood experiences shape later parent-child relationships independently and in concert with one another.

Integrative Perspectives and the Current Study

An integrative theoretical foundation is utilized to allow for a better understanding of the pathways that explain how mothers' positive and negative childhood experiences shape subsequent parenting behavior. The more general SIP perspectives (Crick & Dodge, 1994, Lemerise & Arsenio, 2000) highlight that individuals' prior experiences shape their emotional, physiological, and cognitive responses to social cues in a cyclical fashion. The affective organization of parenting (Dix, 1991) and the integrated model of parenting (Leerkes & Augustine, 2019) expand upon these assumptions and specifically focus on how parenting-related emotion and cognitive processes predict parenting behaviors. The latter focuses strongly on childhood experiences as key factors that influence subsequent parenting by virtue of their impact on emotional and cognitive responses to child behavior. Taken together, these theories demonstrate that there are multiple conscious and unconscious pathways that explain how previous developmental experiences shape parenting behavior. In addition, risk and resilience perspectives (Luthar et al., 2006; Masten et al., 2021) emphasize that when faced with adversity, individuals have the capacity to adapt and demonstrate positive outcomes across developmental domains. The current study incorporates risk and resilience perspectives with SIP perspectives by suggesting that positive childhood experiences have direct effects on parenting-related emotional, physiological, cognitive, and behavioral processes but can also buffer the deleterious effects of childhood adversity on parenting-related emotion, physiology, cognition, and behavior.

CHAPTER III: LITERATURE REVIEW

In the current section, I review empirical research that highlights: (a) direct effects of childhood experiences on later parenting, (b) consequences of adverse childhood experiences on cognitive, emotional, and physiological functioning, (c) effects of remembered emotionally responsive parenting on cognitive, emotional, and physiological functioning, (d) associations between parents' cognition, emotion, and physiology and parenting behavior, and (e) buffering effects of remembered emotionally responsive parenting on the association between adverse childhood experiences and cognitive, emotional, and physiological functioning.

Direct Effects of Childhood Experiences on Parenting Behaviors

The long-term effects of childhood experiences on subsequent parenting have been well-documented (Burrous et al., 2009; Kerr & Capaldi, 2019; Leerkes et al., 2020; Lomanowska et al., 2017; Madigan et al., 2019; Savage et al., 2019). A history of adverse childhood experiences has been found to predict later maltreatment of children (Capaldi et al., 2019; Greene et al., 2020; Narayan et al., 2017; Pears & Capaldi, 2001; Thornberry & Henry, 2013; Yang et al., 2018). Most of these effects have been found in higher risk samples (Narayan et al., 2017; Pears & Capaldi, 2001; Thornberry et al., 2018; Yang et al., 2018) where maltreatment might be more likely to occur, however there is some evidence that similar effects also exist in community samples (Capaldi et al., 2019). Of most relevance to the current study, Capaldi et al. (2019) examined both mothers and fathers' self-reports of their own maltreatment history and their own engagement in maltreating their own child. Notably, mothers who were severely maltreated in childhood engaged in more maltreating behaviors with their school-aged child than mothers who were not maltreated. Indeed, results from a recent meta-analysis of 58 studies demonstrated that parents' childhood history of maltreatment was a significant risk factor of child physical abuse, r

= .23, $p < .01$ (Milner et al., 2022). However, a limitation of this study is that parents' maltreatment history and later parenting behaviors were both assessed via self-reports, and may be subjected to social desirability bias (Shadish et al., 2002).

Additionally, research has demonstrated that mothers who experienced childhood adversity are at greater risk of engaging in compromised parenting like permissive, intrusive, or controlling behaviors (Driscoll & Easterbrooks, 2007; Greene et al., 2020; Khan & Renk, 2019; Lyons-Ruth & Block, 1996; Yoon et al., 2019; Zvara et al., 2015, 2017) and exhibit lower levels of positive parenting such as emotional availability, sensitivity, or warmth (Fuchs et al., 2015; Lyons-Ruth & Block, 1996; Pereira et al., 2012). Researchers who have focused on relations between childhood adversity and compromised or lower levels of positive parenting have primarily relied on data from community samples (Driscoll & Easterbrooks, 2007; Fuchs et al., 2015; Khan & Renk, 2019; Pereira et al., 2012), but some researchers have specifically oversampled for women experiencing poverty (Lyons-Ruth & Block, 1996; Zvara et al., 2015, 2017) or teen motherhood (Yoon et al., 2019). Consistent with studies that examined the effects of adverse childhood experiences on later maltreatment, all previously mentioned studies predicting compromised parenting or lower levels of positive parenting utilized parents' retrospective reports of childhood adversity. However, observational measures of parenting behaviors were used frequently to assess parents' own behaviors towards their children during infancy (Fuchs et al., 2015; Pereira et al., 2012; Zvara et al., 2015, 2017) and childhood (Driscoll & Easterbrooks, 2007). The reliance on parents' self-reports of childhood adversity is reflective of the inherent difficulties in following families over extended periods of time, let alone over generations. However, studies that have included observational measures of parenting behavior reduce shared method variance and mono-informant bias (Shadish et al., 2002), thus

strengthening the validity in the association between adverse childhood experiences and later parenting behaviors.

There is also evidence that positive parenting experienced in childhood is predictive of later adaptive parenting behaviors (Chen & Kaplan, 2001; Kerr et al., 2009; Shaffer et al., 2009). Specifically, parents who experienced warm and responsive parenting during childhood have been found to have high levels of involvement and sensitivity with their own children (Belsky et al., 2005; Kerr et al., 2009; Kovan et al., 2009; Shaffer et al., 2009). Notably, three studies drawing on data from different prospective, longitudinal datasets have demonstrated intergenerational continuity in supportive parenting (Belsky et al., 2005; Kovan et al., 2009; Shaffer et al., 2009). Moreover, two included observational data on the type of parenting received in both generation one and generation two (Belsky et al., 2005; Kovan et al., 2009) across a variety of non-distressing and challenging tasks (Belsky et al., 2005). Results demonstrated that positive parenting experiences (e.g., supportiveness, praise, warmth) during early childhood, middle childhood, and adolescence were each predictive of mothers' sensitive and stimulating engagement with their child during infancy (Belsky et al., 2005; Kovan et al., 2009). Taken together, results from observational and self-report studies have demonstrated that both positive and negative childhood experiences have direct effects on later parenting behaviors. In the current study, I propose four social information processing factors that may serve as mechanisms by which adverse childhood experiences and remembered emotionally responsive parenting in childhood predict maternal sensitivity to distress. These are elaborated below.

In addition to social information processing factors, there are several additional potential mechanisms that can explain how early childhood experiences shape later parenting. Some of

which include shared genetic traits (e.g., positivity; Jaffee & Price, 2007; Lomanowska et al., 2017), neurophysiological processes (e.g., hypercortisolism; Bernard et al., 2015; Reijman et al., 2016), epigenetic modification (e.g., DNA methylation; Champagne et al., 2006), psychopathology (e.g., depression and anxiety; Alink et al., 2019), and executive functioning (e.g., working memory; Bos et al., 2009; Fishbein et al., 2009). Thus, in addition to indirect pathways via social information processing mechanisms, it is highly likely that direct effects will remain as a function of other un-tested intermediary pathways.

Adverse Childhood Experiences and Social Information Processing Factors

Social information processing scholars have directed attention to understanding the lasting effects of early developmental experiences on cognition, emotion, and physiological functioning (Crick & Dodge, 1993; Lemerise & Arsenio, 2000). In the following sections, I summarize literature that has focused on associations between adverse childhood experiences and causal attributions and parenting beliefs, emotion, and emotion-related physiology.

Adverse Childhood Experiences, Causal Attributions, and Parenting Beliefs

Social information processing perspectives emphasize the importance of cognitive processes for understanding how prior developmental experiences shape behavior. Several researchers have applied social information processing perspectives to examine how adverse childhood experiences shape attribution biases. Importantly, attribution biases have been found to be stable over time (Compas et al., 1988; Hamad & Ad-daghistani, 2022; Leerkes et al., 2022). In a sample of children at risk for socioemotional delays, higher levels of exposure to adverse childhood experiences were positively associated with children's hostile attribution biases (Ziv et al., 2018a). There has also been research aimed at understanding the effects of specific types of childhood adversity, like family violence, harsh parenting, and child maltreatment, on cognitive

processes. Exposure to violence within the family/home context and harsh parenting have been found to be associated with more hostile and negative attribution biases (Daggett et al., 2000; Weiss et al., 1992; Ziv, 2012). Importantly, research has demonstrated that these associations exist during childhood (Weiss et al., 1992; Ziv, 2012) and later in adulthood (Daggett et al., 2000). Of most relevance to the current study, mothers who reported experiencing harsh discipline in childhood had more negative attributions about their child's misbehavior during early childhood (Daggett et al., 2000). It is possible that experiences of harsh discipline and witnessing violence provide models of aggression that are drawn upon when engaging in social interactions throughout the life course. Taken as a whole, adverse childhood experiences have lasting consequences on children's mental representations about others that lead to more hostile or negative attributions about others (Tottenham, 2020).

A large line of research has specifically focused on the effects of child maltreatment, and researchers have found that children who were maltreated demonstrated more hostile attribution biases compared to children who were not maltreated (Dodge et al., 1990; Keil & Price, 2009; Lento & Price, 2003; Price & Glad, 2003; Price & Van Slyke, 1991). Moreover, children who were physically abused or physically abused and neglected had the highest hostile attribution biases compared to children who experienced other types of maltreatment and non-maltreated children (Keil & Price, 2009; Price & Glad, 2003). Furthermore, physical abuse has been related to the development of more hostile attribution biases about several relationship figures, including peers, mothers, fathers, and teachers (Price & Glad, 2003). Taken together, this suggests that child maltreatment is a risk factor for the development of maladaptive attribution biases; however, children who have experienced physical abuse may be the most at risk for developing hostile attribution biases. Compared to other types of maltreatment, physical abuse often includes

contexts that are more hostile, aggressive, and overtly negative (Reid et al., 2002), and it may be that through learned behavior, this dynamic has particularly lasting consequences for individuals' hostile mental representation of others.

Similarly, there is evidence that negative experiences within the family-of-origin (e.g., child maltreatment, authoritarian parenting, corporal punishment) shape the development of parenting beliefs and values related to discipline (Milner, 1993). Specifically, experiences of child abuse are posited to lead to the development of abuse-related parenting beliefs (Milner, 2000). This is believed to occur through the formation of cognitive schema that reflect a tendency to endorse physically aggressive beliefs consistent with prior experiences within the family of origin. Moreover, research has shown that adults who recalled more experiences of harsh authoritarian parenting during childhood had positive beliefs about parent-child aggression (Boppana & Rodriguez, 2017) and more favorable beliefs towards the use of harsh discipline (Bower-Russa, 2005). Similarly, children of parents who approved of and used corporal punishment were more likely to endorse the use of hitting in response to interpersonal conflict (Simons et al., 2010). These effects have also been found in adult samples, with mothers who were exposed to physical abuse in childhood reporting more positive beliefs about corporal punishment, and in turn engaging in infant spanking (Chung et al., 2009; Clement & Chamberland, 2009). Children often learn to emulate the parenting they received and it is possible that like the development of hostile attributions, children are taught that self-oriented and negative beliefs about emotion are acceptable and normative.

Adverse Childhood Experiences and Subsequent Emotion

In addition to the importance of cognitive processes, emotion plays a critical role in explaining how prior developmental experiences shape later behavior (Dix, 1991; Lemerise &

Arsenio, 2000; Leerkes & Augustine, 2019). There is evidence that adverse childhood experiences are related to more difficulties in understanding emotions during childhood (Ardizzi et al., 2016; Berzenski & Yates, 2022; Luke & Banerjee, 2013; Main & George, 1985), adolescence (Yu et al., 2020), and adulthood (Flasbeck et al., 2018; Locher et al., 2014). A limited understanding of emotions can undermine adaptive emotion expression and regulatory processes, leading to more negative emotion expressions. Specifically, there are negative associations between emotional neglect (Flasbeck et al., 2018), physical abuse (Berzenski & Yates, 2022), emotional abuse (Berzenski & Yates, 2022), and cumulative childhood maltreatment (Yu et al., 2020) with empathic concern for others' distress. Empathy is considered a motivator for helping others in distress (McDonald & Messinger, 2011) and empathic responses, both self-reported and observed, have been found to increase across childhood but to remain stable across several years during school-age (Eisenberg et al., 1991), adolescence (Davis & Franzoi, 1991; Eisenberg et al., 1995), and adulthood (Eisenberg et al., 1999). In addition to victims of childhood maltreatment showing less empathy, they have also been found to demonstrate emotional blunting, characterized by a lack of concern, fear, and anger in response to others' distress (Klimes-Dougan & Kistner, 1990; Locher et al., 2014), which may reflect a greater focus on self than others. Furthermore, results from a qualitative study demonstrated that foster caregivers perceived foster children to show a lack of empathy towards other people's emotional situations and to have difficulties with understanding and responding to emotions (Luke & Banerjee, 2013). It is possible that adverse childhood experiences coincide with home environments that are characterized by (a) lack of empathy, (b) under stimulation in regard to emotion socialization, or (c) high hostility, all of which are aspects of emotion socialization that are associated with expression of emotions and regulatory processes in childhood. Subsequently,

the emotional characteristics of the home environment may be interpreted as socially acceptable and carried forward in time, resulting in deficits in emotional awareness prompting less empathy and more negative emotion in response to others' distress.

However, there is also evidence that childhood adversity is related to increased empathy (Berzenski & Yates, 2022; Flasbeck et al., 2018; Greenberg et al., 2018; Locher et al., 2014). Specifically, higher chronicity and severity of witnessing domestic violence, experiencing a death, or childhood maltreatment have been associated with increased empathy (Berzenski & Yates, 2022; Greenberg et al., 2018; Locher et al., 2014). The variation in how childhood adversity affects displays of emotion may indicate that how individuals perceive childhood experiences has a lasting effect on their emotional responses to others' distress. Additionally, studies that have demonstrated positive associations between childhood adversity and empathy have used more global trait measures of empathy rather than in the moment emotional reactions to stimuli (Berzenski & Yates, 2022; Greenberg et al., 2018). The global measures of empathy involved participants self-reporting on their empathic feelings (e.g., I really enjoy caring for other people; Greenberg et al., 2018) rather than having to respond to another's distress in the moment. It is possible that self-reports on global trait measures of empathy may be subjected to social desirability bias, resulting in higher empathy scores. Likewise, it is possible that there may be different associations with global measures of emotion rather than situation specific emotion. For example, individuals who have experienced adverse childhood experiences may view themselves as being empathetic or caring for others' feelings in general; however, these emotional reactions may change in response to emotionally arousing or distressing stimuli in that individuals show negative emotion to events that require immediate responses. As such, more

research is needed to better understand how adverse childhood experiences are related to emotional responses to others' distress.

Research with samples of adults have shown that unresolved trauma and adult attachment unresolved classifications, which stem largely from high adversity in childhood and/or maltreatment, are related to negative emotional responses to child cues (DeOliveira et al., 2005; Haft & Slade, 1989; Lyons-Ruth et al., 1999). During structured play interactions, mothers who had insecure attachment representations and are classified as unresolved on the AAI have been found to show more frightened reactions in response to infant cues, and to distort and inappropriately respond to infant negative affect as shown by rejecting babies' cues for comfort (Jacobvitz et al., 2006; Haft & Slade, 1989). Additionally, mothers with unresolved attachment have reported feelings of helplessness in response to their child's anger (DeOliveira et al., 2005). It is believed that infant distress may serve as a triggering emotional experience to mothers with unresolved attachment, causing them to become overwhelmed with their own traumatic experiences and subsequently respond in fearful ways to infant negative affect (Lyons-Ruth et al., 1999). This is consistent with prior research that has demonstrated associations between adverse early caregiving experiences and hyperactive fearful responses to stimuli in animal and human studies (Gee et al., 2013; Tottenham, 2012).

Adverse Childhood Experiences and Emotion-Related Physiology

Children's experiences within the family largely shape how they experience and regulate emotion at the physiological level. Specifically, adverse childhood experiences place children at risk for emotion regulation difficulties throughout the life course (Dvir et al., 2014). Notably, a large line of research has demonstrated links between adverse childhood experiences and dysregulation of stress response systems (Alink et al., 2012; Berens et al., 2017; Otte et al.,

2016). Several studies have demonstrated associations between childhood adversity and the ANS, with associations varying depending on specific types of childhood adversity and subgroups of individuals (Wesarg et al., 2022). Specifically, childhood maltreatment has been associated with lower levels of physiological regulation, whereas other types of childhood adversities (e.g., death of a family member, poverty) have shown non-significant associations (Wesarg et al., 2022). Moreover, these effects are stronger among individuals with a psychiatric diagnosis and who are older in age (Wesarg et al., 2022). In addition to associations varying by type of adversity experienced, presence of psychopathology, and age, researchers who have focused on the role of the ANS have used various measures depending on if the parasympathetic or sympathetic nervous system is a primary focus.

Extant research has yielded mixed findings on the effects of childhood adversity on sympathetic nervous system functioning. Some studies have found associations between childhood adversity and blunted sympathetic nervous system functioning (Busso et al., 2017; Koss & Gunnar, 2018; McLaughlin et al., 2016; Oosterman et al., 2019; Pollak et al., 2005), whereas others have found associations with overactive sympathetic nervous system functioning (Bernstein et al., 2013; El Sheikh, 2005; Esposito et al., 2015; Oosterman et al., 2010). Physical abuse and exposure to interpersonal violence have been associated with blunted sympathetic nervous system functioning (e.g., hypoarousal; Busso et al., 2017; Pollak et al., 2005). Notably, both types of adversities are characteristic of environments that are hostile and threatening and it is possible that individuals engage in increased down-regulation of stress response systems to cope with violence. In contrast, emotional abuse, neglect, poverty, and institutional care are predictors of persistently high arousal (e.g., hyperarousal) in childhood (Esposito et al., 2015; Evans & Kim, 2013; Johnson et al., 2017; Oosterman et al., 2010), adolescence (McLaughlin et

al., 2015), and adulthood (Bernstein et al., 2013; Buisman et al., 2018). Emotional abuse, neglect, poverty, and institutional care are considered contexts that reflect deprivation, unpredictability, and a lack of supportive social interactions (Esposito et al., 2015). As such, minimal emotion socialization may occur in these contexts, resulting in a lack of knowledge of regulatory skills or inability to regulate arousal. It is possible that as a result, the “fight or flight” response is continually activated resulting in persistently high arousal levels.

Moreover, in samples of adults, there has been some evidence that recollection of trauma is associated with autonomic nervous system functioning (Bakkum et al., 2022; Griffin et al., 1997; Sledjeski & Delahanty, 2012). Researchers have used the Adult Attachment Interview (AAI; George et al., 1996) to assess adult’s attachment classifications through recollections of childhood attachment experiences. Pregnant women who were classified as having unresolved/disorganized attachment, reflecting experiences of unresolved trauma in childhood, showed blunted physiological arousal throughout the AAI (Bakkum et al., 2022). These findings are consistent with prior research that has shown adult victims of trauma with high dissociation to show blunted physiological arousal while discussing their trauma (Griffin et al., 1997; Sledjeski & Delahanty, 2012). Research examining the effects of adverse childhood experiences on sympathetic nervous system functioning is a relatively newer line of research compared to other physiological systems, and more research is warranted to better understand if these effects also vary by cumulative exposure to childhood adversity.

Relatedly, most researchers have applied a domain-specific approach to examine how types of childhood adversity, rather than cumulative childhood adversity, shape physiological regulation. There have been consistent links between adverse childhood experiences and resting physiological regulation, as in utero exposure to maternal prenatal substance use (Chazotte et al.,

1991; Fifer et al., 2009; Jansson et al., 2010; Schuetze & Eiden, 2006; Schuetze et al., 2009; Zeskind & Gingras, 2006), and postnatal exposure to maternal depression (Field et al., 1988; Field, 1995), and domestic violence (Rigterink et al., 2010) are related to lower resting RSA levels. Resting RSA is believed to reflect characteristic regulatory levels and is an indicator of well-being (Blandon et al., 2010). Typically, when resting RSA is low, the capacity for withdrawal when presented with a stressor is compromised. That multiple types of adverse childhood experiences are associated with lower wellbeing and capacity for regulation suggests that childhood adversity “gets under the skin” and disrupts regulatory functioning that can lead to less biological flexibility to contextual cues.

The effects of childhood adversity on changes in physiological regulation is a bit more complex. Exposure to domestic violence (Busso et al., 2017), prenatal maternal depression (Rash et al., 2016, 2015; Sharp et al., 2012), low income (Alkon et al., 2014; Busso et al., 2017; Johnson et al., 2017), and composites of abuse and neglect (Buisman et al., 2018) have been found to be unrelated to RSA withdrawal during infancy (Alkon et al., 2014; Rash et al., 2016, 2015; Sharp et al., 2012), childhood (Johnson et al., 2017), adolescence (Busso et al., 2017), and adulthood (Buisman et al., 2018). Conversely, greater exposure to cumulative early adversity is related to lower RSA withdrawal in response to stressors during infancy (Conradt et al., 2014) and in response to a cry-response task in adulthood (Oosterman et al., 2019). Regarding domain specificity, cumulative childhood maltreatment, physical abuse, and sexual abuse are associated with lower RSA withdrawal, reflecting poorer regulation (Dale et al., 2009; De Schipper et al., 2010; Miskovic et al., 2009; Oosterman et al., 2010; Portnoy et al., 2018). Additionally, maternal prenatal substance use has been found to be related to lower RSA withdrawal in newborns (Fifer et al., 2009; Oberlander et al., 2010). However, the effects of prenatal substance use on RSA

withdrawal may change over time, as children who were exposed to substance use during pregnancy have been found to show less linear growth in RSA withdrawal across childhood (Conradt et al., 2014) and by 13 months no RSA withdrawal in response to challenges (Schuetze et al., 2007; Schuetze et al., 2009). Initially, the effects of maternal prenatal substance use may result in deficits in regulatory abilities of newborn infants. Then, over time, there may be overall reduced functioning of the parasympathetic nervous system that manifests as an absence of regulation and perhaps even overactivation of arousal. Taken together, the current literature suggests that some types of adverse childhood experiences (e.g., physical abuse, sexual abuse, prenatal substance use) and cumulative adverse childhood experiences may be particularly important for individuals' ability to regulate when faced with stressors. Nonetheless, more research is needed to better understand the nuanced association between adverse childhood experiences and physiological regulation.

Emotionally Responsive Parenting in Childhood and Social Information Processing Factors

The research reviewed thus far has focused on the negative consequences of childhood adversity on development. However, positive childhood experiences, like emotionally responsive parenting, are also predictive of cognitive, emotional, and physiological functioning (Lemerise & Arsenio, 2000). In the following sections, I summarize literature that has focused on associations between emotionally responsive parenting in childhood and attributions, emotion, and physiological responses to stressors.

Emotionally Responsive Parenting in Childhood and Causal Attributions

Social information processing perspectives can also be applied to examine how positive developmental experiences, like emotionally responsive parenting in childhood, shape cognition. Children of caregivers who are more emotionally available, as indicated by warmth, support, and

low levels of hostility and intrusiveness, have been found to have more competent social information processing skills (Domitrovich et al., 2001; Ziv et al., 2018b). Specifically, these children demonstrated lower hostile attribution biases (Ziv et al., 2018b) and more positive perceptions of peer behavior and prosocial responses (Domitrovich et al., 2001). Additionally, there have been significant correlations between maternal sensitivity and paternal warmth with children's lower negative attribution biases (Nelson & Coyne, 2008; Raikes & Thompson, 2008).

Central to attachment theory is the assumption that early experiences with caregivers shape mental representations of close relationships that influence feelings, thoughts, and behaviors with others (Bowlby, 1982). As such, warm and responsive interactions with caregivers are believed to lead to the development of secure attachment and adaptive social interactions with others across the lifespan (Ainsworth et al., 1974; Dykas & Cassidy, 2011). Several studies have demonstrated support for this assumption as securely attached children have been found to accurately process social cues by attributing nonaggressive peer responses to positive motives and aggressive responses to negative motives (Cassidy et al., 1996; Main & Cassidy, 1988; Ziv et al., 2004). Similar results have been found in adult samples, with pregnant women's coherence of mind, which reflects the ability to describe early attachment experiences and their influence on current functioning in an organized manner, being related to higher situational attributions about infant distress (Leerkes et al., 2015) and lower negative attributions about infant distress (Leerkes et al., 2016).

There have also been associations between self-reports on the type of parenting received in childhood and parenting beliefs and attributions (Kerr & Capaldi, 2019). For example, lower levels of emotionally responsive parenting in childhood, as indicated by emotional rejection or emotion minimization, are predictive of more parent-oriented and less infant-oriented cry beliefs

(Leerkes & Crockenberg, 2002; Leerkes & Siepak, 2006; Leerkes et al., 2010). Specifically for mothers, emotion minimization in childhood was correlated with less infant-oriented beliefs about crying (Leerkes et al., 2010). Taken together, there is evidence that parents' recollections of the parenting they received during childhood shape their own parenting beliefs.

In addition, mothers' nonsupportive emotion socialization during childhood is positively associated with mother-oriented cry processing, a latent factor reflecting emotional and cognitive responses to infant crying (Leerkes et al., 2020). Thus, non-supportive emotion socialization during childhood is linked with a tendency toward making more minimizing (e.g., the baby is hungry) and negative attributions (e.g., the baby is spoiled) about infant fear, and mistaking infant distress for positive emotions (e.g., amusement). On the other hand, less infant-oriented cry processing reflects women making less situational attributions (e.g., the baby is signaling they need help) about infant anger (Leerkes & Crockenberg, 2002; Leerkes & Siepak, 2006). It is possible that mothers may internalize their own childhood experiences of emotional rejection as cognitive schema. In turn, when faced with infant distress, an aversive stimulus, mothers may rely on this distorted schema as a guide for how to interpret and respond to infant cues. Across a variety of studies there is evidence that emotionally responsive parenting in childhood is an important predictor of parenting beliefs and causal attributions about behavior and infant distress.

Emotionally Responsive Parenting in Childhood and Subsequent Emotion

Emotionally responsive parenting in childhood has lasting effects on how children understand and display emotion (Eisenberg, 2020; Eisenberg et al., 1998). Specifically, positive interactions with parents are predictive of higher empathy in response to others' distress (Eisenberg et al., 1991; Eisenberg & McNally, 1993). This is believed to occur through parents'

emotion-related socialization behaviors that include (a) supportive reactions to children's emotions, (b) discussion of emotions, and (c) expression of emotion (Eisenberg et al., 1998). Parents' self-reported supportive behaviors in response to child distress have been linked to children's increased understanding of and empathy towards others' distress (Davidov & Grusec, 2006; Perlman et al., 2008). Relatedly, observed positive interactions between parents and children, like maternal sensitivity and mother-infant synchrony, have been found to predict children's concern for distress, lower displays of anger, and higher displays of empathy across childhood and adolescence (Brophy-Herb et al., 2011; Denham, 1993; Feldman, 2007; Spinrad & Stifter, 2006; Taylor et al., 2013). By responding in emotionally responsive ways, parents may validate children's experiences and help teach children that expressing negative emotions is appropriate. As such, children may learn to (a) express emotions in socially acceptable ways, (b) come to believe that it is adaptive and non-threatening for social partners to display negative emotions, and (c) demonstrate social competence and prosocial behavior (Davidov & Grusec, 2006).

On the other hand, experiencing low levels of emotionally responsive parenting has been found to predict negative displays of emotion. Specifically, children who experienced punitive and minimizing parenting responses have shown more negative emotions during peer interactions (Eisenberg et al., 1996; Fabes et al., 2001). Parental suppression of children's emotions is believed to lead children to store negative beliefs about emotions in memory and teach children that negative emotions are bad and should be avoided (Eisenberg et al., 1998). Subsequently, these maladaptive responses to displays of emotion are believed to be carried forward in time and result in negative responses to others' emotions (Roberts & Strayer, 1987). Indeed, research has demonstrated that women's recollection of emotional rejection during

childhood is associated with less empathy and more negative emotional reactions to infant distress (e.g., amusement; Leerkes & Crockenberg, 2006; Leerkes & Siepak, 2006). These findings are particularly important as much of the prior research has focused on how emotion minimization in childhood is related to negative peer interactions. Moreover, there has been recent evidence that adults with higher levels of attachment security reported less anxiety and hostility after listening to infant crying (Rousseau et al., 2020). Findings from studies with adult samples (Leerkes & Crockenberg, 2006; Leerkes & Siepak, 2006; Rousseau et al., 2020) demonstrate that the type of parenting received in childhood is carried forward into adulthood and shapes emotional responses to infant crying. This is particularly important as this is one mechanism that can explain how emotion socialization may be transmitted across generations (Leerkes et al., 2020).

Emotionally Responsive Parenting in Childhood and Physiological Responses to Stressors

In addition, emotionally responsive parenting is foundational in the organization of physiological systems involving arousal and regulation (Eisenberg et al., 1998). Consistent with this view, there is evidence that emotionally supportive parenting reduces negative arousal (Garner et al., 2008). Specifically, infants of sensitive mothers have shown minimal increases in physiological arousal in response to an adaptation of the Still-Face procedure (Enlow et al., 2014). Maternal sensitivity involves responding to infant cues accurately and appropriately (Ainsworth et al., 1974), and these contingent responses likely provide a sense of security and comfort for the infant that is effective in maintaining adaptive arousal levels. Moreover, in adult samples, there is evidence that dismissing and preoccupied states of mind on the AAI, which reflect (in part) experiencing less consistent sensitive care in childhood, are related to increased physiological arousal while answering questions during the AAI (Dozier & Kobak, 1992;

Roisman et al., 2004). Notably, attachment security was not related to increases in arousal during the AAI. These findings are particularly noteworthy as the lack of association between attachment security on the AAI (Dozier & Kobak, 1992; Roisman et al., 2004) contrasts with research that has shown concurrent effects of maternal sensitivity on minimal increases in infants' physiological arousal (Enlow et al., 2014). It is possible that maternal behaviors that provide a sense of security have immediate effects on maintaining adaptive arousal levels, but it is insecure attachment rooted in a history of less responsive parenting that has lasting effects on physiological arousal during adulthood. Nonetheless, more research is needed to better understand if these findings replicate in other samples.

Relatedly, research has demonstrated that emotionally responsive parenting is associated with RSA withdrawal concurrently and longitudinally across childhood (Calkins et al., 2008; Moore & Calkins, 2004; Perry et al., 2013; 2016; 2020; Zhang et al., 2020). During infancy, maternal emotional warmth and supportiveness is predictive of better physiological regulation and recovery in response to a stressor (Moore & Calkins, 2004; Perry et al., 2016). Similarly, children of mothers who were high in emotional support during toddlerhood, compared to children of mothers who were low in emotional support, had greater RSA withdrawal in response to stressors (e.g., distressing and challenging tasks) during toddlerhood and preschool years (Calkins et al., 2008; Perry et al., 2013). That these effects are observed throughout childhood highlights the salient role of emotionally supportive parenting in helping children generate effective coping behaviors that down-regulate arousal.

In addition, there is evidence that emotionally responsive parenting influences changes in children's physiological regulation over time. Zhang et al. (2020) found that parents' supportive reactions to children's emotions were related to children's RSA augmentation (e.g., increases in

RSA) while viewing an anger scene. However, emotionally supportive parenting also predicted children's trajectories of physiological regulation, such that there was a transition from RSA augmentation to RSA withdrawal over two years. Although the finding that emotionally supportive parenting was initially related to RSA augmentation contrasts with prior research, this may be explained by methodological differences. For example, Zhang and colleagues had children watch emotionally arousing videos, whereas prior research has primarily focused on children's active involvement in challenging or distressing tasks (Calkins et al., 2008; Moore & Calkins, 2004; Perry et al., 2013, 2016, 2020). In addition, that emotionally supportive parenting predicted increased physiological regulation over time is consistent with prior research that has shown longitudinal effects of responsive parenting during infancy and toddlerhood. Findings from Zhang and colleagues expand previous research by demonstrating that responsive parenting has lasting effects on school-aged children's regulatory skills.

On the other hand, parents' non-supportive emotional responses are believed to add to the arousal that children are already experiencing and increase the likelihood of dysregulated behavior (Eisenberg et al., 1996). There is some evidence that maternal non-supportive reactions to children's negative emotions during preschool years is predictive of lower physiological regulation at age 10 (Perry et al., 2020). Non-supportive reactions include dismissing, minimizing, or punishing emotional expressions (Eisenberg et al., 1998) that likely lead to reduced opportunities for children to engage in regulatory processes (Perry et al., 2020). As a result, children may not acquire adaptive regulatory skills and subsequently experience lower physiological regulation and prolonged physiological arousal (Dykas & Cassidy, 2011). In sum, prior research has demonstrated that emotionally responsive parenting in childhood has lasting

implications for the organization of physiological systems involving arousal and regulation throughout the life course.

Social Information Processing Factors and Parenting

Theoretical perspectives posit that cognitive, emotional, and physiological responses to children's social signals predict parenting behavior (Dix, 1991; Leerkes & Augustine, 2019). In the following sections, I summarize literature that has focused on parenting-related cognition (e.g., causal attributions and parenting beliefs), parenting-related emotion (e.g., negative emotion in response to child cues), and parents' physiological arousal and regulation in response to stressors.

Effects of Parenting-Related Cognition on Parenting Behaviors

Causal attributions and beliefs about child cues are salient parenting-related cognition that are predictive of positive and negative parenting behaviors. When assessing causal attributions, researchers tend to focus on hostile or negative attributions about child cues (e.g., babies ignore mothers to be annoying). Beliefs about child cues can be categorized based on whether the needs of the child or the parent are being prioritized (Dix, 1991). These can include beliefs about appropriate child behavior, knowledge of child development, and parenting beliefs (Leerkes et al., 2010).

Mothers' hostile and negative causal attributions about child behavior have been associated with engaging in physical abuse (Beckerman et al., 2017; Berlin et al., 2011, 2013; Bugental et al., 2002), neglect (Hildyard & Wolfe, 2007), harsh parenting (Beckerman et al., 2017; Berlin et al., 2013; Hastings & Grusec, 1998; Lorber & O'Leary, 2005), and less supportive parenting (Beckerman et al., 2017). These findings are consistent with prior research that has found deficits in processing social and emotional information among maltreating parents

(Milner, 1993). It is possible that mothers who engage in maladaptive parenting behaviors tend to blame children for various reasons, regardless of if their behaviors are developmentally appropriate or not. Relatedly, researchers have examined how causal attributions about infant crying, an alternative aversive child behavior, are related to parenting. Prior research has identified three distinct types of causal attributions about infant crying (Leerkes & Siepak 2006): negative, minimizing, and situational-emotional. Negative attributions about crying are characterized by the belief that infants cry because of negative, internal infant traits and have been found to correlate with harsh parenting behaviors (Berlin et al., 2013). Minimizing attributions are characterized by a de-emphasis on emotional reasons for crying in favor of physical reasons that undermine a motivation to comfort infants when distressed and are believed to be related to lower maternal sensitivity distress. Conversely, situational/emotional attributions are characterized by the recognition that situations external to the infant can cause and maintain distress and have been found to predict more sensitive maternal behavior (Bailes & Leerkes, 2021; Leerkes et al., 2015). Further, minimizing and negative attributions have been found to be related to lower maternal sensitivity to distress 6 months postpartum and up to 2 years postpartum (Leerkes et al., 2015; Leerkes et al., 2022). Taken together, prior research has demonstrated that negative causal attributions about child cues are related to maladaptive parenting behaviors, whereas situational/emotional causal attributions are related to adaptive parenting behaviors.

In addition to causal attributions, beliefs about parenting and child development are established predictors of parenting behavior (Dix, 1991, 1992). Infant-oriented beliefs about infant crying (e.g., my baby is trying to communicate with me) have been found to predict higher maternal sensitivity to distress (Leerkes, 2010; Leerkes et al., 2004). Whereas parent-oriented

beliefs (e.g., I want my child to stop crying because it bothers me) are associated with controlling parenting behaviors and lower sensitivity (Hastings & Grusec, 1998; Zeifman, 2003). This includes research demonstrating that minimizing and spoiling cry beliefs are related to lower sensitivity to distress during infancy (Leerkes et al., 2015, 2016). Parent-oriented beliefs about crying are centered around one's own concerns rather than prioritizing what the infant is trying to communicate. In turn, these maladaptive cognition may lead to lower responsiveness to infant cues and parenting behaviors that may help the parent (e.g., intrusiveness or detachment).

Effects of Parenting-Related Emotion on Parenting Behaviors

Similar to parent-related cognition, parenting-related emotion can be differentiated by the nature of concerns and are typically categorized as child-oriented or parent-oriented (Dix, 1991). There is evidence that parent-oriented or negative emotion in response to child cues are predictive of maladaptive parenting behaviors. Specifically, maternal negative emotions are related to punitive and controlling parenting (Bryan & Dix, 2009; Del Vecchio et al., 2017; Dix et al., 2004; Leerkes et al., 2012; Lorber & O'Leary, 2005; Lorber et al., 2016), harsh and abusive parenting (Lorber & Slep, 2005; Lorber et al., 2011), permissive parenting (Lorber & Slep, 2005; Lorber et al., 2016), and lower maternal sensitivity to distress (Leerkes, 2010). Several studies have utilized video-recall procedures to assess mothers' emotions in response to cry or misbehavior paradigms (Bryan & Dix, 2009; Leerkes et al., 2022; Lorber & O'Leary, 2005; Lorber & Slep, 2005). These are particularly important as they provide insight on how parenting-specific emotion, rather than trait-like emotion characteristics, relate to parenting behavior. Furthermore, results from this specificity approach have highlighted that mothers' experiences of anger and sadness while interacting with their child were related to more mother-child asynchronous behaviors and maternal anger was also related to more restrictive parenting

behaviors (Bryan & Dix, 2009; Dix et al., 2004). Moreover, researchers have particularly focused on the negative effects of anger on parenting, with studies demonstrating that maternal anger is related to more punitive responses to infant distress (Del Vecchio et al., 2017; Leerkes et al., 2012; Lorber, 2012), more permissive responses to child behavior (Lorber et al., 2016), and less positive parenting (Del Vecchio et al., 2017). It is possible that mothers' who experience negative emotion in response to child cues are preoccupied with their own emotions and less focused on responding sensitively, thus resulting in more punitive and permissive parenting.

Effects of Emotion-Related Physiological Processes on Parenting Behaviors

Parenting is an emotional task that requires balancing one's own demands and navigating the demands of caring for a child (Ryan & Padilla, 2019). As such, strong emotions occur routinely in parent-child interactions (Leerkes & Augustine, 2019). The effects of physiological arousal on parenting are complicated. Research has demonstrated that higher physiological arousal in response to stressful tasks is associated with maladaptive parenting behaviors (Reijman et al., 2016). Specifically, increases in SCL in response to infant crying are predictive of child maltreatment (Friedrich et al., 1985; Frodi & Lamb, 1980; Wolfe et al., 1983). In addition, mothers who consistently had large increases in arousal across the Strange Situation procedure, a standardized task that intentionally increases child distress, showed high harsh parenting behaviors and moderate levels of insensitivity (Sturge-Apple et al., 2011). This is consistent with recent research that has found parents' increases in SCL during a challenging task to be related to lower emotional availability (Zhang et al., 2021). However, there has also been evidence that non-maltreating mothers demonstrate greater increases in SCL in response to infant crying (Reijman et al., 2014) and that increases in SCL are associated with higher maternal sensitivity (Leerkes et al., 2016, 2022; Leerkes et al., 2023). Furthermore, there is also

evidence of null associations between physiological arousal and parenting (Ablow et al., 2013; Emery et al., 2014). The current state of the literature reflects that the association between physiological arousal and parenting is complex. This, in part, may be explained by the use of different stimuli to assess physiological arousal. Researchers have used audio of infant crying (Emery et al., 2014; Friedrich et al., 1985; Reijman et al., 2014), video clips with images and sounds of crying infants evolving in real time (Ablow et al., 2013; Frodi & Lamb, 1980; Leerkes et al., 2022; Leerkes et al., 2023; Wolfe et al., 1983), and mother-child interactions during challenging or distressing tasks (Sturge-Apple et al., 2011; Zhang et al., 2021). Furthermore, there is also variation within types of stimuli used to assess physiological arousal. For example, video clips with images and sounds of crying infants range from videos of a child being separated from a parent (Ablow et al., 2013) to obvious causes of infant distress (Leerkes et al., 2022; Leerkes et al., 2023) to ambiguous sources of infant crying (Frodi & Lamb, 1980). Interestingly, researchers who have measured physiological arousal during mother-child interactions have found increases in arousal to be related to less adaptive parenting behaviors. Whereas, arousal in response to video clips of crying infants and audio of infant crying have been related to adaptive parenting behaviors in some studies (Leerkes et al., 2015, 2022; Leerkes et al., 2023; Reijman et al., 2014), child maltreatment in others (Friedrich et al., 1985; Frodi & Lamb, 1980; Wolfe et al., 1983), and unrelated to parenting behavior in others (Ablow et al., 2013; Emery et al., 2014). It is likely that at times arousal is related to increased awareness of infant distress and subsequently a desire to help or meet child needs (e.g., in response to obvious causes of infant distress). Alternatively, increases in arousal can also result in emotional flooding in which mothers are overwhelmed with emotion and their ability to engage in adaptive parenting behaviors is undermined (Leerkes & Augustine, 2019; Lorber et al., 2016). This may

be the case with studies that have demonstrated associations between increased arousal during parenting tasks and higher harsh parenting and lower emotional availability (Sturge-Apple et al., 2011; Zhang et al., 2021). As such, it is possible that physiological arousal may function differently depending on maternal characteristics (e.g., personality or psychopathology) or the context in which it is being assessed. Nonetheless, there is a need for more research to better understand when physiological arousal is related to adaptive parenting. Given prior research employing the cry videos I intend to use has demonstrated increased arousal to be related to higher maternal sensitivity, I hypothesize that increased physiological arousal in response to infant crying will be associated with higher maternal sensitivity to distress at 2 months.

Relatedly, the ability to regulate one's emotion is critical for mothers' well-being and adaptive parenting (Rutherford et al., 2015). The ability to regulate one's emotions is a key skill in allowing flexibility in social settings and adaptive functioning. Moreover, infant crying is a salient cue that signals the need for safety and comfort, but it is aversive to many adults perhaps because of the acoustics which often elicit irritation and/or that it motivates a feeling that one must successfully intervene, which may produce feelings of anxiety (Leerkes et al., 2012). Mothers' regulatory abilities are particularly challenged during times of infant distress as there is a need to recognize and respond to infant cues and maintain a regulated emotional state. RSA withdrawal in response to infant crying and distressing parent-child interactions has been found to be related to more sensitive parenting when faced with infant cry or stressful parenting interactions (Ablow et al., 2013; Joosen et al., 2013; Mills-Koonce et al., 2009; Moore et al., 2009). Several researchers have utilized cry paradigms to assess expectant mothers' physiological regulation and have found that mothers who demonstrated greater RSA withdrawal while watching videos of crying infants were subsequently rated more sensitive when interacting

with their own infants up to 9 months postpartum (Ablow et al., 2013; Joosen et al., 2013). Similarly, mothers' greater RSA withdrawal during challenging mother-child interactions is predictive of higher maternal sensitivity (Leerkes et al., 2022; Mills-Koonce et al., 2009; Moore et al., 2009). That physiological regulation has immediate and long-term effects on parenting behaviors highlights the importance of being able to regulate one's own emotions to respond appropriately to infant cues.

Buffering Effect of Emotionally Responsive Parenting

The theoretical and empirical research that I have reviewed thus far highlights that emotionally responsive parenting in childhood can have promotive effects on several developmental outcomes. Moreover, emotionally responsive parenting has been found to be an important protective factor that can reduce the effects of early adversity and increase sensitive and empathic parenting (Bartlett & Easterbrooks, 2015; Egeland et al., 1988; Thornberry et al., 2013; Werner, 2000).

Although adverse childhood experiences have lasting negative consequences on cognitive, emotional, and physiological functioning, individuals may still be able to reflect on positive experiences with their caregivers during childhood. Indeed, researchers have posited that parents who experienced childhood adversity and had positive childhood experiences, including supportive relationships with caregivers, were socially competent and engaged in adaptive parenting with their own children (Luthar & Eisenberg, 2017; Panter-Brick & Leckman, 2013). For example, in a sample of pregnant women with elevated levels of childhood adversity, having experienced positive childhood relationships with parents was associated with lower levels of depression (Chung et al., 2008). Similarly, adults with high levels of adverse childhood experiences who also grew up with a caregiver who made them feel safe and secure were less

likely to report frequent mental distress (Crouch et al., 2019; Narayan et al., 2019). Early experiences of emotional support have also been found to be related to neurobiological flexibility, cognitive resilience and a composite of social and cognitive resilience in childhood despite experiences of maltreatment (Fishbane, 2012; Sattler & Font, 2018). Taken together, these studies show that the ability of caregivers to provide emotional support during childhood is impactful on promoting emotion, social, and cognitive skills for children who experienced childhood adversity. Notably, each of these assets are well-documented predictors of effective parenting (Leerkes et al., 2015, 2022; Mills-Koonce et al., 2009; Moore et al., 2009). Of most relevance to the current study, mothers who experienced trauma but were able to draw upon remembered childhood experiences of love and support still showed positive parenting behaviors with their children (Lieberman et al., 2005; Lieberman & Van Horn, 2008). As such, the long-term effects of positive childhood memories may allow mothers to develop more adaptive cognitive, emotional, and physiological responses to infant crying and more sensitive behavior toward their own child in distress-eliciting situations.

The Current Study

Both adverse childhood experiences and emotionally responsive parenting in childhood have been found to shape later parenting behaviors. However, it is critical for researchers to continue to focus on examining the mechanisms that explain how early childhood experiences shape later parenting to better understand areas for potential intervention. In the current study, I examine the extent to which negative (e.g., adverse childhood experiences) and positive (e.g., emotionally responsive parenting) childhood experiences are each uniquely associated with parenting-specific cognition, emotion, and physiology (e.g., negative cognition about infant crying, negative emotion in response to infant crying, and physiological regulation and arousal in

response to infant crying). In addition, it is important for researchers to examine protective factors that highlight how some women can overcome prior experiences of adversity and demonstrate positive adaptation. In the current study, I examine whether emotionally responsive parenting in childhood buffers the negative effects of adverse childhood experiences on parenting-specific cognition, emotion, and physiology. Furthermore, I examine if parenting-related cognition, emotion, and physiology predict maternal sensitivity to infant distress. Leerkes (2010; Leerkes et al., 2012, 2015, 2016, 2020) has conducted systematic research demonstrating that each of these factors, particularly mother-oriented cry processing (a latent factor reflecting negative emotional and cognitive responses to infant crying), are related to maternal sensitivity and has attempted to identify antecedents. Some of this work has focused on the links between parenting experienced in childhood and social information processing factors (Leerkes & Crockenberg, 2002; Leerkes & Siepak, 2006; Leerkes et al., 2010, 2020). However, none of this prior work has focused on direct or indirect effects of adverse childhood experiences on maternal sensitivity to distress, nor how emotionally responsive parenting can serve as a moderator of the effects of adverse childhood experiences. Considering that early childhood experiences shape multiple domains of developmental outcomes, it is important to consider how both early positive and negative experiences independently and jointly predict later social information processing factors. Furthermore, Leerkes has typically examined maternal cognition and emotion as part of broader latent constructs (Leerkes et al., 2015, 2016), whereas the current study examines each of these as well as physiology as separate, but related, constructs. A strength of this approach is the ability to assess if adverse childhood experiences and remembered emotionally responsive parenting in childhood effect each social information processing factor similarly or differently.

In the current study, I include data from a community sample of 299 mothers who vary with respect to race/ethnicity and socioeconomic status and their infants from a prospective longitudinal study aimed to identify pre- and postnatal biopsychosocial predictors of early infant weight gain. Expectant mothers completed questionnaires and visited campus for additional data collection in their third trimester and again when their infants were 2 months old. Mothers' recollection of adverse childhood experiences, emotionally responsive parenting in childhood, and parenting-specific cognition, emotion, and physiology were assessed during the third trimester of pregnancy. Maternal sensitivity to infant distress was assessed when infants were 2 months old via observational coding. I aim to address the following research questions and hypotheses (See Figure 1 for conceptual model):

Research Question 1

Do mothers' recollections of early childhood experiences predict maternal sensitivity to infant distress at 2 months both directly and indirectly via their cognitive, emotional, and physiological responses to infant crying?

Hypothesis 1a

Mothers' adverse childhood experiences will be uniquely associated with lower maternal sensitivity to infant distress at 2 months.

Hypothesis 1b

Mothers' remembered emotionally responsive parenting in childhood will be uniquely associated with higher maternal sensitivity to infant distress at 2 months.

Hypothesis 1c

Mothers' adverse childhood experiences will be associated with: (i) higher negative cognition, (ii) higher negative emotional reactions, (iii) lower physiological arousal, and (iv)

lower physiological regulation in response to infant crying, each of which will in turn predict lower maternal sensitivity to infant distress.

Hypothesis 1d

Mothers' remembered emotionally responsive parenting in childhood will be associated with: (i) lower negative cognition, (ii) lower negative emotional reactions, (iii) higher physiological arousal and (iv) higher physiological regulation in response to infant crying, each of which will in turn predict higher maternal sensitivity to infant distress.

Research Question 2

Are there conditional direct and indirect effects of mothers' adverse childhood experiences on maternal sensitivity to infant distress at 2 months via mothers' cognitive, emotional, and physiological responses to infant crying that are dependent upon mothers' remembered emotionally responsive parenting in childhood?

Hypothesis 2a

Remembered emotionally responsive parenting in childhood will attenuate the unique, main association between higher adverse childhood experiences and mothers' lower sensitivity to infant distress at 2 months. Specifically, the negative association will be lower among mothers who are higher in emotionally responsive parenting in childhood compared to mothers who are lower in emotionally responsive parenting in childhood.

Hypothesis 2b

The indirect effect of mothers' adverse childhood experiences on maternal sensitivity to infant distress at 2 months via mothers' (a) negative cognition, (b) negative emotional reactions, (c) physiological arousal, and (d) physiological regulation in response to infant crying will be moderated by mothers' remembered emotionally responsive parenting in childhood. Specifically,

the indirect effects will be lower among mothers who recall higher emotionally responsive parenting in childhood compared to mothers who recall lower emotionally responsive parenting in childhood, based on the moderating effect on the a` paths (i.e., adverse childhood experiences to each mediator, moderated by remembered emotionally responsive parenting). That is, remembered emotionally responsive parenting in childhood will attenuate the association between higher adverse childhood experiences and mothers' (a) higher negative cognition (b) higher negative emotional reactions, (c) lower physiological arousal, and (d) lower physiological regulation in response to infant crying. Specifically, the positive associations will be lower among mothers who recall higher emotionally responsive parenting in childhood compared to mothers who recall lower emotionally responsive parenting in childhood.

Selection of Covariates

These hypotheses were tested over and above the inclusion of multiple covariates that were identified based on prior empirical work demonstrating their association with key variables. Specifically, indicators of socioeconomic status, including maternal age, education, and income-to-needs, have frequently been found to correlate with parenting behaviors and responses to emotions. Specifically, mothers who are younger and have lower education levels and income-to-needs ratios, have been found to exhibit lower (a) maternal sensitivity, (b) positive parenting emotion, and (c) resting physiological regulation (Deater-Deckard et al., 2012; Dotterer et al., 2012; Lanza et al., 2011; Norcross et al., 2020). Thus, in the current study, the effects of maternal age, education, and income-to-needs on parenting-related cognition and emotion, emotion-related physiology, and maternal sensitivity to infant distress were controlled to determine if these effects are significant over and above these established predictors.

Maternal race is an important factor that has also been related to emotion and parenting behavior. Specifically, studies have found that Black and White mothers vary in their responses to child emotions. Importantly, researchers have shown that although Black parents report engaging in more emotion minimizing behaviors with their children; this operates in an adaptive way to protect children from the effects of systemic racism (Dunbar et al., 2017). Indeed, Black parents frequently engage in racial socialization that prepares children for bias, teaches children strategies for coping with racism and social interactions, and enables children to maintain a sense of self (Coard & Sellers, 2005; Coard et al., 2007; Umaña-Taylor & Hill, 2020). Moreover, in the context of preparation for bias, parental suppression of children's negative emotion has been found to be adaptive and predict lower externalizing behaviors in Black children (Dunbar et al., 2021). In the current study, it is possible that race may be related to parenting-related emotion and maternal sensitivity to distress, therefore, it was controlled to rule out effects from possible third variables.

Additionally, infant characteristics, like infant distress, influence parenting behaviors (Leerkes & Augustine 2019). Several studies have demonstrated concurrent associations between child distress and lower maternal sensitivity to distress (Leerkes, 2010; Leerkes et al., 2016; Mills-Koonce et al., 2007). It is likely that it is more difficult to engage in sensitive behaviors when an infant is highly distressed. As such, concurrent infant distress at 2 months was included as a covariate on maternal sensitivity to infant distress in the current study to determine if these effects are significant above and beyond the effects of infant distress.

Similarly, recent life events are potentially stressful experiences that may impact responses to infant crying and parenting behaviors. There is evidence that recent life events are related to lower well-being in pregnant women (Chen et al., 2019), suggesting that exposure to

recent adverse life experiences may increase feelings of stress. Indeed, research has demonstrated that recent life events are associated with high parental distress and low positive parenting behaviors (e.g., acceptance toward child behaviors; Tein et al., 2000). In the current study, the effects of concurrent recent stressful life events (assessed prenatally) on parenting-related cognition and emotion, and emotion-related physiology were controlled to rule out effects from possible third variables. Moreover, the concurrent effects of recent stressful life events assessed at 2 months (reflecting stressful life events experienced between the birth of the focal child and the 2-month visit) on maternal sensitivity to infant distress at 2 months were controlled.

Lastly, maternal psychopathology and personality are established predictors of compromised parenting-related social cognition and behavior. Several studies have demonstrated that depression and depressive symptoms are associated with less sensitive parenting (Leerkes, 2010; Lovejoy et al., 2000; Norcross et al., 2020). Moreover, there is evidence that maternal depressive symptoms are associated with less adaptive parenting-related emotion and cognition. Specifically, maternal depressive symptoms are related to lower child-oriented emotion and cognition (Dix et al., 2004; Leerkes et al., 2016) and more parent-oriented cognition (Leerkes et al., 2016). Similarly, characteristics of mothers' personality have been found to be associated with parenting-related emotion and cognition and parenting behaviors (Bailes & Leerkes, 2021; Belsky & Jaffee, 2006). Specifically, trait agreeableness is related to lower parent-oriented emotion and cognition and higher maternal sensitivity to distress across infancy, whereas trait neuroticism is related to higher parent-oriented cognition and lower maternal sensitivity to distress during infancy (Leerkes et al., 2015; 2016). Trait emotion characteristics may reflect more general behavioral responses to infant cues rather than parenting-specific responses (Leerkes & Augustine, 2019). Thus, in the current study, the effects of maternal

psychopathology and personality on parenting-related cognition and emotion assessed prenatally, and maternal sensitivity to infant distress at 2 months were controlled to determine if these effects are significant over other established predictors. Moreover, controlling for emotional risk on the intermediary variables also reduces concerns that a negative response bias is solely responsible for associations between mothers' remembered childhood experiences and parenting-related cognition, emotion, and physiology.

CHAPTER IV: METHOD

Participants in the current study were drawn from the Infant Growth and Development (iGrow) study, a prospective longitudinal study investigating predictors of early weight gain (Leerkes et al., 2020). Expectant mothers were recruited from childbirth education classes, breast-feeding classes, local obstetric practices, clinics, by referrals from other participants, and a QR code interest survey posted in the community (social media, local parenting blogs). Interested women provided consent to be contacted or called/emailed about the details of the study. Inclusion criteria included that women were 18 or older, fluent in English, only pregnant with a singleton, planning on staying in the area for the next 3 years, and had no physical or mental impairments that would prevent them from participating in any aspect of the study (e.g., deaf or hard of hearing). Recruitment occurred between January 2019 and March 2020 and then during October 2020 and April 2022. Recruitment was halted in the middle of the two timepoints due to concerns for the safety of pregnant women during the early phase of the coronavirus pandemic.

Participants

Participants included 299 mothers and their 2-month-old infants (48.8% female). At the prenatal visit, expectant mothers ranged in age from 18-47 years old ($M = 29.71$, $SD = 5.48$). Mothers self-identified as White (57.3%), Black or African American (30.6%), Biracial (5.2%), Asian (2.1%), Multiracial (1.7%), Native Hawaiian or Pacific Islander (0.7%), American Indian or Alaskan Native (0.3%), or as another racial group (2.1%); 7.8% of mothers reported being of Hispanic, Latino, or Spanish origin. There was variability in mothers' highest education level, as 15.9% had a high school degree or less, 37.4% had some college, and 56.6% had a 4-year college degree or beyond. Income-to-needs ratio was computed as household income divided by the

federal poverty level for a family of that size ($M = 3.49$, $SD = 2.96$, $range = 0-16.58$). Most participants were married and/or cohabiting with their partner (81.7%), 11.9% were not in a romantic relationship, 5.4% were not married or living together but in a serious romantic relationship, and 1% were divorced. Descriptive statistics are presented in Table 1 and intercorrelations among all primary variables and covariates are presented in Table 2.

Of the original 299 participants, 230 mother-infant dyads participated in the laboratory visit when infants were 2 months old (77%) and 226 mother-infant dyads have data from the Still-Face re-engagement episode. Reasons for missing data included: inability to re-contact the mother or schedule visit within the time frame (26), suspension of in-person data collection due to the coronavirus pandemic (23), participants opted for questionnaire only because busy or moved from the general area (9), withdrawing from the study (9), video problems or the infant fell asleep (4), ineligible due to infant mortality or health complication (2).

Procedures

During their third trimester, expectant mothers completed online questionnaires via Qualtrics Experience Manager and then visited the campus laboratory for an interview. During the campus laboratory visit, skin conductance level was measured via a fetrotde placed on two fingers on mothers' non dominant hand. In addition, maternal heart rate was measured by placing three disposable electrodes on mothers (one placed on each ribcage and one placed on their collarbone). Expectant mothers engaged in a 5-minute resting baseline procedure in which mothers were asked to be as calm and quiet as possible. Next, participants viewed on a computer four 1-minute video clips of crying infants used by Leerkes et al. (2015). The order of presentation was fixed. The first two clips were of infants exhibiting anger; the first infant was White and the second infant was Black. The next two clips were of infants exhibiting fear; the

first infant was White and the second infant was Black. With regards to the creation of these video clips, each was recorded during standard temperament assessments: an arm restraint procedure for the anger clips and a novel toy approach procedure for the fear clips (see Leerkes & Crockenberg, 2003 for details). The facial expressions of the infants in these clips are consistent with the fear and anger facial configurations identified by Izard (1983). Further, the infants were crying during the majority of each clip. After viewing each video clip, mothers completed questionnaires about their perceptions of the infant's behavior and their own emotion in response to the video clips. After watching all four video clips, mothers completed a questionnaire on their own beliefs about infant crying.

Next, when infants were approximately 2 months old, mothers completed online questionnaires via Qualtrics Experience Manager. Then, mothers and infants visited the campus laboratory for a videotaped observation. Mother-infant dyads participated in the 6-minute Face-to-Face Still-Face procedure (Tronick et al., 1978). During the Still-Face task, infants were placed in a car seat and mothers were seated in front of their infant so they were at eye level. During the engagement episode, for the first two minutes mothers played with their infant as they normally would using their own facial expressions and body movement, but no objects. Next, mothers were told to briefly look away from the infant, and then look back at their infant with a neutral face for 2 minutes (i.e., the still-face episode). Then during the re-engagement episode, mothers were instructed to play with their infant as they normally would for two minutes, once again without objects. Participants received \$50 and small gifts with the iGrow logo at the prenatal visit, and \$70 and small gifts with the iGrow logo at the 2-month visit for compensation. All procedures were approved by the University Of North Carolina Greensboro Internal Review Board (#18-0198).

Measures

Adverse Childhood Experiences (Prenatal Assessment)

During the third trimester, women retrospectively reported on adverse childhood experiences that occurred prior to age 18 using the 10-item ACE measure (CDC, 2016; Felitti et al., 1998). The ACE measure includes questions related to childhood abuse (e.g., Did a parent or other adult in the household often push, grab, slap, throw something at you, or hit you so hard that you had marks or were injured?), household challenges (e.g., Did you live with anyone who was a problem drinker, or alcoholic, or who used street drugs?), and neglect (e.g., You didn't have enough to eat, had to wear dirty clothes, and had no one to protect you; CDC, 2016). Participants indicated whether each event occurred by answering either 0 (*no*) or 1 (*yes*). A total sum score was calculated with higher scores indicating more adverse childhood experiences. The ACE measure has been found to have good test-retest reliability in adulthood (Dube et al., 2004) and to be a valid measure with low rates of false positives when compared with prospectively obtained court, clinic, or research records (Hardt & Rutter, 2004). In addition, retrospectively reported ACEs have been found to moderately correlate with prospectively reported ACEs (Reuben et al., 2016). In the current study, internal reliability was adequate for an index ($\alpha = .76$).

Emotionally Responsive Parenting in Childhood (Prenatal Assessment)

During the third trimester, participants completed a revised version of the Parental Bonding Instrument (PBI-R; Parker et al., 1979) that includes additional items added by Leerkes and Siepak (2006). First, participants responded to two items about who they considered to be their mother figure and their father figure. The majority of participants identified their biological mother (95.2%) and biological father (84.5%). Then, participants rated how likely it was that

each parent displayed certain behaviors with them during the first 16 years of life on a scale from 1 (*not at all likely*) to 4 (*very likely*). The current study includes 12 items from original PBI (Parker et al., 1979) *remembered care* subscale that reflects warmth and affection (e.g., made me feel I wasn't wanted (reverse coded), appeared to understand what I needed or wanted). An additional 17 items were added by Leerkes and Siepak (2006) to assess *remembered emotional responsiveness* that reflects empathy, comfort, and sensitivity to distress (9 items; e.g., helped me to calm down, felt badly when I cried) and *remembered emotion minimization* that reflects punishment, teasing, and rejection in response to distress (8 items; e.g., told me not to cry, picked on me when I was scared). The test-retest reliability of the original PBI has been demonstrated in clinical and non-clinical samples over both brief intervals (Parker, et al., 1979; Plantes et al., 1988), and prolonged periods of up to two decades (Lizardi & Klein, 2005; Wilhelm et al., 2005; Wilhelm & Parker, 1990). Recently, the PBI exhibited predictive validity in showing that pregnant women who reported non-optimal childhood caregiving experiences were more likely to have experienced at least 1 form of childhood maltreatment, as measured by the Childhood Trauma Questionnaire (McCormack et al., 2021).

For each subscale, items were averaged to yield 6 total scores reflecting remembered care from mother ($\alpha = .95$) and father ($\alpha = .93$), remembered emotional responsiveness from mother ($\alpha = .94$) and father ($\alpha = .92$), and remembered emotion minimization from mother ($\alpha = .89$) and father ($\alpha = .87$). Higher scores indicated higher levels of each respective behavior. Preliminary correlations suggested the care and emotionally responsive subscales were highly correlated ($r = .87, p < .001$ for mothers, $r = .84, p < .001$ for fathers). Thus, the care and emotionally responsive subscales were averaged together to reflect a *remembered care and emotionally responsive* subscale ($\alpha = .92$ for mothers, $\alpha = .91$ for fathers). Then, an exploratory factor

analysis was calculated to determine if a single factor reflecting the totality of participants' remembered parenting from both their mother and father figures would be supported. A single factor emerged with an eigenvalue of 2.47 that accounted for 61.95% variability. The factor loadings were .71 for remembered care and emotionally responsiveness from mother, .49 for remembered care and emotionally responsiveness from father, -.88 for remembered emotion minimization from mother, and -.69 for remembered emotion minimization from father. A single score reflecting total remembered emotionally responsive parenting in childhood was calculated by first reverse scoring remembered emotion minimization from mother and father, and then averaging remembered care and emotionally responsiveness from mother and father and remembered emotion minimization from mother and father ($M = 0.67$, $SD = 0.61$; $\alpha = .80$).

Negative Cognition About Infant Crying (Prenatal Assessment)

After viewing each infant cry video clip during the prenatal visit, participants rated the extent to which they agreed with 18 attribution statements about why the infant was crying on a 4-point scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) (Leerkes & Siepak, 2006). In the current study, I focused on two of three subscales: *minimizing attributions* which reflect endorsing temporary physical rather than emotional reasons for crying (5 items; e.g., the baby is hungry) and *negative attributions* which reflect endorsing stable, negative, and internal reasons for crying (7 items; e.g., the baby is trying to make mother's life difficult). Subscale scores were calculated for each clip by averaging appropriate items; these scores were then averaged across the clips resulting in single scores each for minimizing and negative attributions. Higher scores indicate higher minimizing and negative attributions about infant crying; internal reliability was good (α 's = .94 and .93, respectively).

Then, after viewing all video clips, participants reported their beliefs about infant crying on the Infant Crying Questionnaire (ICQ; Haltigan et al., 2012). The ICQ includes 43-items in which participants were asked to rate how often they believe certain things about infant crying and want to achieve specific outcomes when their infant cries. Participants responded on a 4-point scale ranging from 1 (*never*) to 5 (*always*). In the current study, I focused on two of five subscales: minimizing beliefs about infant crying, which reflect prioritizing parent needs and well-being in response to infant distress (9 items; I want baby to stop because I can't get anything else done) and spoiling beliefs about infant crying, which reflect endorsing beliefs that how parents respond can cause children to be dependent on the parent in a negative manner (3 items; e.g., I could spoil baby). Higher scores indicate higher minimizing and spoiling beliefs about infant crying; internal reliability was good (α 's = .77 and .76, respectively).

A latent variable of negative cognition about infant crying reflects minimizing and negative attributions and minimizing and spoiling beliefs about infant crying. Higher scores indicate more negative cognition about infant crying.

Negative Emotion in Response to Infant Crying (Prenatal Assessment)

After viewing each video clip during the prenatal laboratory visit, participants completed the 17-item My Emotions Questionnaire (MEQ; Leerkes & Qu, 2018) by rating how strongly they felt each emotion on a scale from 1 (*not at all*) to 4 (*very strongly*). In the current study, I focused on two of the five subscales: self-oriented nervousness/anxiety, which reflect feelings of worry that are focused on their own concerns about being evaluated as a parent (4 items, e.g., I felt nervous that I wouldn't know how to respond) and annoyance/frustration at the infant, which reflect callousness towards the infant for being upset (4 items, e.g., I felt annoyed that the baby was demanding my attention.). Subscale scores were calculated for each clip by averaging

appropriate items; these scores were then averaged across the clips resulting in single scores for self-oriented nervousness/anxiety and annoyance/frustration at the infant. Higher scores indicate higher self-oriented nervousness/anxiety and annoyance/frustration at the infant in response to infant crying; internal reliability was good (α 's = .87 and .86, respectively). A composite reflecting negative emotion in response to infant crying was created by standardizing and then averaging total self-oriented anxiety and frustration ($\alpha = .90$). Higher scores indicate more negative emotion in response to infant crying.

Physiological Measures (Prenatal Assessment)

Skin Conductance Level

Expectant mothers' skin conductance level was recorded in microsiemens using a Biolog (UFI, Moro Bay, CA) at a sampling rate of 100Hz. This Biolog data file was transferred to a computer, and average skin conductance during each task of interest was calculated. Difference scores were calculated by subtracting the average skin conductance level scores while mothers watched each of the four video clips from the average skin conductance level during baseline. Scores were then averaged across all video clip to create a total physiological arousal score. High scores reflect SCL augmentation and indicate an increase in arousal from baseline to video clips. Repeated measures analysis of variance (ANOVAs) with follow-up contrasts demonstrated that the video clips of crying infants effectively elicited higher SCL relative to baseline ($p < .01$) for the full sample.

Respiratory Sinus Arrhythmia

Maternal heart rate was recorded using a Biolog (UFI, Morro Bay, CA) and electrocardiograms were recorded at a sampling rate of 1kHz. The experimenter pressed an event mark button on the Biolog to denote the start and stop time of the baseline and each video clip. A

Biolog data file containing the interbeat intervals (IBI) for the entire period of collection, with separate tasks marked, was transferred to a computer for artifact editing (resulting from movement) and analysis. Artifact editing and RSA estimation were done via the CardioEdit software (Brain Body Center, University of Illinois at Chicago) using Porges' (1985) methods. RSA, in msec², was calculated in 15-second epochs for every task of interest (5-minute baseline period, and each of the four 1-minute video-clips). Epoch scores were then averaged within task. Brief epochs such as these are typical and have been validated for short duration tasks such as this one (Huffman et al. 1998, Moore et al., 2009). If more than 15% of RSA data within a task required editing, it was treated as missing. In iGrow, 225 participants had complete RSA data, 62 had some missing RSA data, and 11 had no usable RSA data due to poor signal quality/exceeding the editing threshold. RSA withdrawal scores were calculated by subtracting the average heart rate variability while watching each of the four video clips from the average heart rate variability during baseline. Scores were then averaged across all video clips to create a total RSA withdrawal score. High scores indicate greater RSA withdrawal from baseline to clip and reflect better physiological regulation in response to infant crying.

Repeated measures ANOVAs with follow-up contrasts demonstrated that the video clips of crying infants effectively elicited lower RSA relative to baseline, and that difference was statistically significant for three of the four video clips ($p < .01$).

Maternal Sensitivity to Distress (2-month Assessment)

When infants were approximately 2 months old, mothers and infants visited the laboratory and were videotaped engaging in the 6-minute Face-to-Face Still-Face procedure (Tronick et al., 1978). Trained coders rated four maternal behaviors (maternal sensitivity to distress, maternal sensitivity to non-distress, intrusiveness, and detachment) separately for the

engagement and re-engagement episodes of the Still-Face task using the NICHD Study of Early Child Care and Youth Development (ECCRN, 1999; Mills-Koonce et al., 2011) 7-point sensitivity scale from 1 (*very low*) to 7 (*very high*). Maternal sensitivity to infant distress cues reflects how a mother responds to the child's displays of negative affect. Sensitive responses to infant distress cues are prompt, appropriate, and involve mothers taking the time to soothe and calm the child. Similarly, maternal sensitivity to infant non-distress cues reflects how mothers observe and respond to child social gestures, expressions, and signals. Sensitive responses to non-distress cues are characterized by acknowledging the child's affect, contingent vocalizations, providing an appropriate level of stimulation, and picking up on the child's interests. In both maternal sensitivity to infant distress and non-distress cues, a key defining characteristic of a sensitive interaction is that it is child centered. As such, sensitive responses reflect mothers being in tune to the child and aware of the child's needs, interests, and capabilities.

Maternal intrusiveness is characterized by mothers imposing their agenda on the child, despite signals from the child that a different activity or pace is needed. Intrusive behaviors can include an overwhelming succession of toys or approaches, failing to modulate behavior that the child expresses negative affect to, taking away objects from the child, and not allowing the child to make choices.

Additionally, maternal detachment is characterized by maternal emotional uninvolved or disengagement. As such, maternal detachment includes an unawareness of the child's needs and a lack of contingent responses to child cues. Detached behaviors can include facing the child away from the parent without visually checking in with the child, rarely talking or interacting with the child, and failing to demonstrate awareness, concern, or empathy when the child is distressed.

To assess maternal sensitivity to distress, I intend to use observational coding of maternal behaviors during the re-engagement episode. A latent variable of maternal sensitivity to distress reflects sensitivity to distress cues, sensitivity to non-distress cues, intrusiveness (reverse scored), and detachment (reverse scored). A high maternal sensitivity to distress score indicates higher sensitivity to distress and non-distress cues and lower intrusiveness and detachment. Reliability was calculated on 33 double-rated cases and intraclass correlations (ICC's) ranged from .44 to .70 during the re-engagement episode of the Still-Face.

Covariates (Prenatal and 2-month Assessments)

Demographics

Prior to the prenatal laboratory visit, participants completed a brief demographic questionnaire that assessed maternal age, education, race, income, and household composition. Family income and household composition were used to calculate an income-to-needs ratio, which reflects the total family income divided by the official poverty threshold for a household of that size. Income-to-need ratios that are less than 1 reflect a family living below the poverty line for a family that size, income-to-need ratios that are greater than 1 reflect a family that is not living in poverty.

Emotional Risk

Prior to the prenatal laboratory visit, participants completed a questionnaire, reporting on their depressive symptoms, trait anxiety, trait agreeableness, and trait neuroticism. Maternal depressive symptoms were assessed using the 20-item Center of Epidemiologic Studies–Depression Scale (CES-D; Radloff, 1977), which consists of a checklist of moods, feelings, and cognition associated with depression (e.g., I felt depressed, I felt that people dislike me) designed for use with community samples. Participants indicate how often they felt a particular way

during the previous week on a 4-point scale ranging from 0 (*rarely*) to 3 (*most of the time*). Higher scores indicate higher depressive symptoms ($M = 12.00$, $SD = 8.87$). The CES-D demonstrates convergent validity with the Research Diagnostic Criteria, a standardized psychiatric interview, and with the Beck Depression Inventory (Spitzer, Endicott, & Robins, 1978). In this sample, the CES-D demonstrated good internal reliability ($\alpha = .90$).

Mothers' trait anxiety was assessed using the 20-item State-Trait Anxiety Inventory (STAI; Spielberger et al., 1970). The STAI is a checklist of descriptions associated with trait anxiety (e.g., I feel nervous and restless, I feel inadequate). Participants indicate how frequently they generally feel each item on a 4-point scale ranging from 1 (*almost never*) to 4 (*almost always*). Higher scores indicate higher trait anxiety ($M = 37.69$, $SD = 36.00$). Research has demonstrated that the STAI has adequate concurrent validity with the Hamilton Anxiety Rating Scale and adequate internal consistency (Kabacoff et al., 1997). In this sample, the STAI demonstrated good internal reliability ($\alpha = .92$).

Maternal trait agreeableness and neuroticism, two of the big-5 personality traits, were assessed using the 24-item NEO-Five Factor Inventory (NEO-FFI; McCrae & Costa, 2004). Agreeableness is composed of 12 items that measure the extent to which the mother is trusting, helpful, and forgiving (e.g., I would rather cooperate with others than compete with them). Neuroticism is also composed of 12 items that assess the extent to which the mother is anxious, hostile, and depressed (e.g., When I'm under a great deal of stress, sometimes I feel like I'm going to pieces). Participants were asked to indicate how much each statement in the scale describes them, with responses ranging from 1 (*strongly disagree*) and 5 (*strongly agree*). Higher scores indicate higher trait agreeableness ($M = 3.87$, $SD = 0.47$) and higher trait neuroticism ($M = 2.57$, $SD = 0.62$). The NEO-FFI is one of the most widely used measures of the Five Factor

Model (Zillig et al., 2002) and has shown reliability and validity across different contexts and cultures. The NEO-FFI has acceptable test-retest reliability ($r = .63$ to $.81$), good discriminant validity (Costa & McCrae, 1992), and adequate stability (Robins et al., 2001). In this sample, maternal trait agreeableness and neuroticism demonstrated good internal reliability ($\alpha = .77$ and $.85$, respectively).

A latent variable of emotional risk reflects maternal depressive symptoms, trait anxiety, neuroticism, and agreeableness (reverse scored). A high emotional risk score indicates lower trait agreeableness and higher depressive symptoms, trait anxiety, and trait neuroticism.

Recent Stressful Life Events

Prior to the prenatal laboratory visit, participants responded on recent life events using the 26-item Stressful Life Events Questionnaire (SLEQ; Bergman et al., 2007). This questionnaire has 26 items that are designed to assess stressful life events experienced by pregnant mothers. Statements are oriented toward the mother and the experiences of those around her. Sample items include: *You were in trouble with the law*, *You had a serious accident or illness*, *Your partner had an extramarital affair*, and *You were physically cruel to your partner*. In addition to the 26 items in the Bergman et al. (2007) questionnaire, there were 17 items added that address the central aims of the study. In the current study, the original 26-items were used. For each item, participants were asked if this event had occurred during their pregnancy, 0 (*no*) or 1 (*yes*). Higher scores indicate more life events experienced during pregnancy. The 26-item life events questionnaire has demonstrated good internal reliability in samples of pregnant women (Bergman et al., 2007; Norbeck & Anderson, 1989). In the current sample, reliability was adequate for an index ($\alpha = .67$)

Participants also responded to the same 26-item SLEQ prior to the 2-month laboratory visit. At the 2-month visit, mothers responded to stressful life events that were experienced between the birth of their child and the 2-month visit. At the 2-month visit, reliability was adequate (.66).

Observed Infant Distress

Infant distress during the Still-Face Re-engagement episode was rated using the NICHD Study of Early Child Care and Youth Development (ECCRN, 1999; Mills-Koonce et al., 2011) 7-point scale from 1 (*very low*) to 7 (*very high*). Inter-rater reliability was established based on 33 cases via intra-class correlation coefficients and was good for infant negative affect (.96). Approximately 74% of infants became distressed during the Still-Face Re-engagement episode.

Analytic Approach

Descriptive statistics were calculated in SPSS and distributions and missing data were evaluated. Bivariate correlations were examined in Mplus version 8.6 (Muthén & Muthén, 2017). Mplus utilizes full information maximum likelihood estimation to use all available data in estimating coefficients (Acock, 2005). Prior to testing interaction effects, participants recalled adverse childhood experiences and emotionally responsive parenting in childhood were grand-mean centered. Then, an interaction variable was created by multiplying the centered variables.

Primary analyses were conducted via structural equation modeling (SEM) using Mplus (Muthén & Muthén, 2017). The SEM model included manifest (i.e., remembered emotionally responsive parenting in childhood, adverse childhood experiences, the interaction variable between emotionally responsive parenting in childhood X adverse childhood experiences, negative emotion in response to infant crying, physiological arousal, physiological regulation, SES, emotional risk, maternal race, recent life events, and observed infant distress) and latent

(e.g., negative cognition about infant crying and maternal sensitivity to distress) variables.

Negative cognition about infant crying was a latent variable comprised of 4 manifest indicators: minimizing attributions, negative attributions, minimizing beliefs, and spoiling beliefs. Maternal sensitivity to distress at 2-months was a latent variable comprised of 4 manifest indicators: sensitivity to infant distress, sensitivity to non-distress, intrusiveness (reverse-scored), and detachment (reverse-scored).

In the first structural model designed to test research question 1 (see Figure 2), remembered emotionally responsive parenting in childhood and adverse childhood experiences were each specified as exogenous variables predicting negative cognition about infant crying, negative emotion in response to infant crying, physiological arousal, physiological regulation, and maternal sensitivity to distress at 2-months. To account for method effects (i.e., all being responses to the same 4 video clips), in the structural model residual error correlations were added between negative cognition about infant crying, negative emotion in response to infant crying, physiological arousal, and physiological regulation. Any correlations that were nonsignificant were removed from the model. Negative cognition about infant crying, negative emotion in response to infant crying, physiological arousal, and physiological regulation were specified as endogenous variables predicting maternal sensitivity to distress at 2 months. In the structural model, all covariates (e.g., SES, emotional risk, maternal race, recent life events, observed infant distress) were specified as exogenous variables predicting maternal sensitivity to distress. In addition, recent life events was specified to predict negative cognition about infant crying, negative emotion in response to infant crying, physiological arousal, and physiological regulation.

Then, to test research question 2, a second model was run in which an interaction term was created by multiplying the centered adverse childhood experiences and centered remembered emotionally responsive parenting in childhood variables together. The indirect effects of remembered emotionally responsive parenting in childhood, adverse childhood experiences, and the interaction term between emotionally responsive parenting in childhood and adverse childhood experiences were assessed using bias-corrected bootstrapped 95% confidence intervals with 1,000 draws (Preacher & Hayes, 2004). Confidence intervals that did not span 0 indicated significant effects. Multiple fit statistics were used to comprehensively evaluate the model, including the chi-square statistic, the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA), and the standardized root mean residual (SRMR). Good model fit is indicated by a non-significant chi-square test, $CFI \geq 0.90$, $RMSEA \leq 0.08$, and/or $SRMR \leq 0.08$ (Kline, 2010).

CHAPTER V: RESULTS

Preliminary Analyses

Descriptive statistics, including means, standard deviations, minimum, and maximum values are presented in Table 1. Preliminary correlations among latent and manifest variables included in the SEM models were calculated in Mplus and are presented in Table 2. In addition, bivariate correlations among all raw variables (i.e., manifest variables, indicators of latent variables) are presented in Table 3. Maternal age was correlated with lower negative cognition about infant crying ($r = -.28, p < .001$), lower negative emotion in response to infant crying ($r = -.20, p = .02$), and lower SCL augmentation in response to infant crying ($r = -.12, p = .03$). Maternal education was correlated with less adverse childhood experiences ($r = -.17, p < .001$), lower negative cognition about infant crying ($r = -.27, p < .001$), lower SCL augmentation in response to infant crying ($r = -.12, p = .046$), and higher maternal sensitivity to infant distress ($r = .18, p < .001$). Maternal race (coded as 0 = non-Hispanic white and 1 = all other races) was correlated with more adverse childhood experiences ($r = .14, p = .01$), higher negative cognition about infant crying ($r = .23, p < .001$), and lower RSA withdrawal in response to infant crying ($r = -.13, p = .02$). Income-to-needs ratio was correlated with less adverse childhood experiences ($r = -.20, p < .001$), recollection of higher emotionally responsive parenting in childhood ($r = .12, p = .04$), lower negative cognition about infant crying ($r = -.14, p = .03$), and lower negative emotion in response to infant crying ($r = -.12, p = .045$). Maternal emotional risk was correlated with more adverse childhood experiences ($r = .21, p < .001$), recollection of lower emotionally responsive parenting in childhood ($r = -.24, p < .001$), higher negative cognition about infant crying ($r = .24, p < .001$), higher negative emotion in response to infant crying ($r = .19, p < .001$). Recent stressful life events experienced during pregnancy was correlated with more

adverse childhood experiences ($r = .42, p < .001$), and recollection of lower emotionally responsive parenting in childhood ($r = -.32, p < .001$). Recent stressful life events experienced at 2 months was correlated with more adverse childhood experiences ($r = .21, p = .001$), and recollection of lower emotionally responsive parenting in childhood ($r = -.16, p = .01$). Observed infant distress during the Still-Face Re-Engagement phase was correlated with lower maternal sensitivity to distress ($r = -.16, p < .001$). Therefore, maternal age, education, race, income-to-needs ratio, emotional risk, prenatal recent life events, 2-month recent life events, and observed infant distress were retained as covariates.

Of central importance to the current study, adverse childhood experiences were correlated with recollection of lower emotionally responsive parenting in childhood ($r = -.60, p < .001$) and higher SCL augmentation in response to infant crying ($r = .12, p = .04$). Remembered emotionally responsive parenting in childhood was correlated with lower negative cognition about infant crying ($r = -.14, p = .03$) and lower negative emotion in response to infant crying ($r = -.14, p = .02$). Negative cognition about infant crying was associated with higher negative emotion in response to infant crying ($r = .55, p < .001$) and lower maternal sensitivity to infant distress at 2 months ($r = -.38, p < .001$). Negative emotion in response to infant crying was associated with lower maternal sensitivity to infant distress at 2 months ($r = -.23, p < .001$).

Primary Analyses

The SEM models were estimated using the default maximum likelihood (ML) estimator in Mplus. Factor loadings for the three latent variables and residual correlations are presented in Table 4. The latent variable of negative cognition about infant crying had significant factor loadings that ranged from .44 to .79. Additionally, the latent variable of maternal sensitivity to distress had significant factor loadings that ranged from .44 to .99. Similarly, the latent variable

of emotional risk had significant factor loadings that ranged from .42 to .95. Taken together, the significant factor loadings for all indicators of the latent constructs indicate the measurement model was acceptable. Model fit for the first SEM was mixed, $\chi^2(199) = 481.04, p = .000, CFI = .85, RMSEA = .07, SRMR = .08$. The significant chi-square test was expected as this test is biased with sample sizes larger than 200 participants (Kenny, 2014; Kline, 2020), therefore other indicators of model fit were examined. The RMSEA and SRMR values demonstrated acceptable model fit. However, the CFI value was slightly lower than the “acceptable” threshold of .90. Examination of correlations among the intermediary variables (e.g., negative cognition about infant crying, negative emotion in response to infant crying, physiological arousal to infant crying, physiological regulation to infant crying) that were added to account for method effects demonstrated non-significant associations between a) negative cognition about infant crying and physiological arousal in response to infant crying ($r = .06, p = .44$), b) negative cognition about infant crying and physiological regulation in response to infant crying ($r = -.11, p = .17$), c) negative emotion in response to infant crying and physiological arousal in response to infant crying ($r = -.00, p = .95$), d) negative emotion in response to infant crying and physiological regulation in response to infant crying ($r = -.10, p = .15$), and e) physiological arousal in response to infant crying and physiological regulation in response to infant crying ($r = .08, p = .18$). Therefore, these correlations were removed from the model.

After the non-significant correlations among the intermediary variables were removed, the first SEM demonstrated adequate fit to the data, $\chi^2(189) = 472.74, p = .000, CFI = .86, RMSEA = .07, SRMR = .08$. Again, the significant chi-square test was expected as the current study included a larger sample size (Kline, 2020). The CFI value slightly improved after removing the non-significant correlations among the intermediary variables, however it was still

slightly lower than typically accepted standards. CFI values tend to be lower in complex models that have low associations among variables (Moss, 2009). Indeed, there were several non-significant and small associations in the SEM, primarily between the intermediary variables and adverse childhood experiences. Moreover, CFI values tend to be lower among models with more parameters estimated (Kenny, 2014). In these cases, it is believed that the CFI should not solely be interpreted as an indicator of model fit when the RMSEA of the null model is less than 0.158 because it will result in a lower CFI value (Kenny, 2014); the RMSEA for the null model in the current study was .067. As such, the overall model fit indices suggest adequate model fit for the first SEM. Similarly, after adding the interaction term between mothers' adverse childhood experiences and remembered emotionally responsive parenting in childhood, the second SEM also demonstrated adequate fit to the data, $\chi^2(206) = 494.08, p = .000, CFI = .86, RMSEA = .07, SRMR = .079$.

All reported values are the standardized values (see Figures 3 and 4). Examination of the covariates demonstrated that infant negative mood during the re-engagement episode of the Still-Face was associated with lower maternal sensitivity to infant distress ($\beta = -.34, p = .000$). In the full model, maternal age was associated with lower negative cognition about infant crying ($\beta = -.26, p = .001$) and was not significantly associated with negative emotion in response to infant crying ($\beta = .02, p = .75$), physiological arousal in response to infant crying ($\beta = -.09, p = .07$), physiological regulation in response to infant crying ($\beta = .02, p = .72$), or maternal sensitivity to infant distress at 2 months ($\beta = .04, p = .57$). Additionally, maternal education was associated with lower negative cognition about infant crying ($\beta = -.24, p = .01$) and lower physiological arousal in response to infant crying ($\beta = -.12, p = .048$), but was not significantly associated with negative emotion in response to infant crying ($\beta = .08, p = .27$), physiological regulation in

response to infant crying ($\beta = .09, p = .17$), or maternal sensitivity to infant distress ($\beta = .14, p = .09$). Household income-to-needs ratio was not significantly associated with negative cognition about infant crying ($\beta = -.07, p = .42$), negative emotion in response to infant crying ($\beta = -.07, p = .25$), physiological arousal in response to infant crying ($\beta = -.05, p = .33$), physiological regulation in response to infant crying ($\beta = .02, p = .75$), or maternal sensitivity to infant distress at 2 months ($\beta = .06, p = .42$). Mothers' prenatal emotional risk was associated with higher negative emotion in response to infant crying ($\beta = .15, p = .03$) and was not significantly associated with negative cognition about infant crying ($\beta = .05, p = .59$), physiological arousal in response to infant crying ($\beta = -.03, p = .55$), physiological regulation in response to infant crying ($\beta = -.02, p = .32$), or maternal sensitivity to infant distress at 2 months ($\beta = -.06, p = .43$).

Maternal race (coded as 0 = Non-Hispanic White, 1 = All Others) was associated with higher negative cognition about infant crying ($\beta = .27, p = .003$) and was not significantly associated with negative emotion in response to infant crying ($\beta = -.09, p = .19$), physiological arousal in response to infant crying ($\beta = -.11, p = .07$), physiological regulation in response to infant crying ($\beta = -.12, p = .05$), or maternal sensitivity to infant distress at 2 months ($\beta = -.01, p = .88$).

Mothers' prenatal stressful life events was not significantly associated with negative cognition about infant crying ($\beta = .05, p = .54$), negative emotion in response to infant crying ($\beta = -.04, p = .62$), physiological arousal in response to infant crying ($\beta = -.03, p = .58$), or physiological regulation in response to infant crying ($\beta = -.08, p = .09$). Finally, mothers' concurrent stressful life events were not significantly associated with maternal sensitivity to infant distress at 2 months ($\beta = .03, p = .64$).

Direct Effects of Mothers' Adverse Childhood Experiences (H1a) and Mothers' Remembered Emotionally Responsive Parenting in Childhood (H1b) on Maternal Sensitivity to Infant Distress at 2 Months

To address these hypotheses, in SEM model 1 I examined the coefficients of the paths from prenatal retrospective reports of mothers' adverse childhood experiences and emotionally responsive parenting in childhood to maternal sensitivity to infant distress at 2 months. Contrary to my direct effects hypothesis, mothers' adverse childhood experiences were not uniquely, significantly associated with maternal sensitivity to infant distress at 2 months ($\beta = -.05, p = .59$). Similarly, mothers' remembered emotionally responsive parenting in childhood was not uniquely, significantly associated with lower maternal sensitivity to infant distress a 2 months ($\beta = -.16, p = .08$).

Effects of Mothers' Adverse Childhood Experiences on Prenatal SIP Factors (H1c)

To address this hypothesis, I examined the coefficients of the paths from mothers' adverse childhood experiences to prenatal negative cognition about infant crying, negative emotion in response to infant crying, physiological arousal in response to infant crying, and physiological regulation in response to infant crying. Contrary to prediction, mothers' adverse childhood experiences were not uniquely, significantly associated with prenatal negative cognition about infant crying ($\beta = -.12, p = .24$), negative emotion in response to infant crying ($\beta = -.12, p = .09$), physiological arousal in response to infant crying ($\beta = .09, p = .36$), and physiological regulation in response to infant crying ($\beta = -.05, p = .55$).

Effects of Mothers' Remembered Emotionally Responsive Parenting in Childhood on Prenatal SIP Factors (H1d)

To address this hypothesis, I examined the coefficients of the paths from mothers' remembered emotionally responsive parenting in childhood to prenatal negative cognition about infant crying, negative emotion in response to infant crying, physiological arousal in response to infant crying, and physiological regulation in response to infant crying. Consistent with prediction, mothers' remembered emotionally responsive parenting in childhood was uniquely associated with lower prenatal negative cognition about infant crying ($\beta = -.21, p = .02$) and negative emotion in response to infant crying ($\beta = -.20, p = .002$). Contrary to my hypothesis, mothers' remembered emotionally responsive parenting in childhood was not uniquely, significantly associated with prenatal physiological arousal in response to infant crying ($\beta = -.05, p = .50$) or prenatal physiological regulation in response to infant crying ($\beta = -.01, p = .93$).

Effects of Prenatal SIP Factors on Maternal Sensitivity to Infant Distress at 2 Months (H1c and 1d)

To address these hypotheses, I examined the coefficients of each path from mothers' prenatal negative cognition about infant crying, negative emotion in response to infant crying, physiological arousal in response to infant crying, and physiological regulation in response to infant crying to maternal sensitivity to infant distress at 2 months. Consistent with my hypothesis, higher prenatal negative cognition about infant crying was uniquely associated with lower maternal sensitivity to infant distress at 2 months ($\beta = -.37, p = .002$). Contrary to prediction, prenatal negative emotion in response to infant crying were not uniquely, significantly associated with maternal sensitivity to infant distress ($\beta = -.05, p = .57$), and neither

was prenatal physiological arousal in response to infant crying ($\beta = .10, p = .16$) or prenatal physiological regulation in response to infant crying ($\beta = .06, p = .36$).

Indirect Effects of Mothers' Adverse Childhood Experiences (H1c) and Remembered Emotionally Responsive Parenting in Childhood (H1d) on Maternal Sensitivity to Infant Distress at 2 Months Via Prenatal SIP Factors

Given that there were no significant effects of mothers' adverse childhood experiences on prenatal SIP factors, there were no possible indirect effects that warranted examination.

Likewise, there were no significant effects of mothers' remembered emotionally responsive parenting in childhood on prenatal physiological arousal or regulation in response to infant crying, therefore there were no indirect effects to test. Moreover, although mothers' remembered emotionally responsive parenting in childhood was significantly associated with lower prenatal negative emotion in response to infant crying, the path between prenatal negative emotion in response to infant crying and maternal sensitivity to infant distress at 2 months was non-significant, therefore there was no rationale to test an indirect effect.

However, as there were significant effects of mothers' remembered emotionally responsive parenting in childhood on prenatal negative cognition about infant crying, and prenatal negative cognition about infant crying on maternal sensitivity to infant distress at 2 months. As such, the indirect effect of mothers' remembered emotionally responsive parenting in childhood on maternal sensitivity to infant distress at 2 months via negative cognition about infant crying was examined. Consistent with prediction, the indirect effect of mothers' remembered emotionally responsive parenting in childhood on maternal sensitivity to infant distress at 2 months via negative cognition was significant, $B = .12, \beta = .08, 95\% \text{ CI } [.02, .31]$. Specifically, mothers with greater recollection of emotionally responsive parenting in childhood

had lower negative cognition about infant crying prenatally, which in turn was associated with higher maternal sensitivity to infant distress at 2 months.

Conditional Direct and Indirect Effects of Mothers' Adverse Childhood Experiences on Maternal Sensitivity to Infant Distress at 2 Months Via Prenatal SIP Factors (H2a and 2b)

To address my hypothesis about a conditional direct effect, in SEM model 2 (see Figure 4), I examined the coefficient of the interaction between mothers' remembered emotionally responsive parenting in childhood and adverse childhood experiences on maternal sensitivity to infant distress at 2 months. Contrary to my hypothesis, the interaction effect between mothers' remembered emotionally responsive parenting in childhood and adverse childhood experiences predicting maternal sensitivity to infant distress was not significant ($\beta = -.01, p = .96$).

To address my hypothesis about conditional indirect effects, I examined the coefficients of the interaction between mothers' remembered emotionally responsive parenting in childhood and adverse childhood experiences on maternal sensitivity to infant distress at 2 months via prenatal negative cognition about infant crying, negative emotion in response to infant crying, physiological arousal in response to infant crying, and physiological regulation in response to infant crying. Contrary to my hypothesis, the interaction between mothers' remembered emotionally responsive parenting in childhood and adverse childhood experiences was not a significant predictor of prenatal negative cognition about infant crying ($\beta = -.04, p = .64$), negative emotion in response to infant crying ($\beta = .05, p = .35$), physiological arousal in response to infant crying ($\beta = -.07, p = .51$), and physiological regulation in response to infant crying ($\beta = -.03, p = .75$). Given mothers' remembered emotionally responsive parenting in childhood did not moderate the paths from adverse childhood experiences to the four SIP factors, there was no evidence to support the proposed conditional indirect effects.

Post-hoc Analyses

Given the adapted SIP perspective argues that emotion in the moment might influence cognitive reactions to social stimuli, the observed pattern of correlations, and the serial ordering of our assessment battery in which emotional reactions to the cry videos were assessed prior to cognitive reactions, I conducted additional post-hoc analyses to examine if a model including a serial indirect effect of mothers' negative emotion in response to infant crying and negative cognition about infant crying explained how mothers' remembered emotionally responsive parenting in childhood was related to maternal sensitivity to infant distress at 2 months (see Figure 5 for results of the modified structural model). Inclusion of this pathway was warranted by the observed significant correlation between mothers' negative emotion in response to infant crying and mothers' negative cognition about infant crying ($r = .55, p < .001$). Mothers' physiological arousal and regulation in response to infant crying were not significantly correlated with mothers' negative cognition about infant crying and therefore were not included as a predictor of negative cognition about infant crying.

Model fit for the SEM was adequate, $\chi^2(210) = 496.83, p = .000, CFI = .86, RMSEA = .07, SRMR = .08$. The results indicated that mothers' remembered emotionally responsive parenting in childhood was associated with lower negative emotion in response to infant crying ($\beta = -.21, p = .002$). In turn, lower negative emotion in response to infant crying was associated with lower negative cognition about infant crying ($\beta = .56, p < .001$). Moreover, lower negative cognition about infant crying were associated with higher maternal sensitivity to infant distress at 2 months ($\beta = -.40, p < .001$). Examination of bootstrapped confidence intervals indicated the indirect effect of mothers' remembered emotionally responsive parenting in childhood on maternal sensitivity to infant distress at 2 months via negative emotion and negative cognition in

response to infant crying was significant, $B = .07$, $\beta = .05$, 99% CI [.01, .19]. Specifically, mothers who recalled more emotionally responsive parenting in childhood experienced lower negative emotion in response to infant crying, which in turn predicted lower negative cognition about infant crying which ultimately predicted higher maternal sensitivity to infant distress at 2 months. Notably, after the serial indirect effect was specified, mothers' remembered emotionally responsive parenting in childhood was no longer significantly associated with mothers' prenatal negative cognition about infant crying ($\beta = -.10$, $p = .28$). Thus, the effects of mothers' remembered emotionally responsive parenting in childhood on lower negative cognition about infant crying is explained by lower negative emotion in response to infant crying.

CHAPTER VI: DISCUSSION

Maternal sensitivity to infant distress is a unique predictor of several child socioemotional outcomes (Leerkes et al., 2009). As such, it is important for researchers to identify factors that predict maternal sensitivity to infant distress. Theoretical and empirical research have demonstrated that early childhood experiences, both positive and negative, and parent characteristics (i.e., cognition, emotion, and physiology) are important predictors of maternal sensitivity (Belsky & Jaffee, 2006). However, few studies have examined the effects of both positive and negative childhood experiences on parenting behaviors in the same model to determine if they are independent of one another or if they work in conjunction with one another. It is possible for individuals to recollect both positive and negative experiences in childhood with their caregivers, as these two experiences are not isolated from one another. Therefore, the first aim of the current study was to address this gap by simultaneously examining the effects of both mothers' adverse childhood experiences and remembered emotionally responsive parenting in childhood on maternal sensitivity to infant distress at 2 months. Additionally, the second aim was to expand upon prior research to understand the processes by which such effects occur by considering indirect effects via parenting-related cognition, parenting-related emotion, and emotion-related physiology, and moderating effects of remembered emotionally responsive parenting in childhood on the direct and indirect effects of adverse childhood experiences on maternal sensitivity to infant distress at 2 months. The following sections include a discussion of the results, implications and recommendations for practice and future research, and strengths and limitations of the current study.

Direct Effects of Mothers' Childhood Experiences on Maternal Sensitivity to Infant Distress at 2 Months

The results demonstrated that neither adverse childhood experiences nor remembered emotionally responsive parenting in childhood were directly related to maternal sensitivity to infant distress at 2 months. These findings were surprising and not consistent with prior research that has shown direct effects of adverse childhood experiences (Fuchs et al., 2015; Lyons-Ruth & Block, 1996; Pereira et al., 2012) and emotionally responsive parenting (Belsky et al., 2005; Kerr et al., 2009; Kovan et al., 2009; Shaffer et al., 2009) on maternal sensitivity. There are several possible explanations for why the findings in the current study differ from previous research. First, prior studies that have found direct effects of adverse childhood experiences on maternal sensitivity have focused specifically on mothers' experiences of childhood maltreatment (Fuchs et al., 2015; Lyons-Ruth & Block, 1996; Pereira et al., 2012) and witnessing domestic violence (Lyons-Ruth & Block, 1996), whereas the current study utilized a broader assessment of adverse childhood experiences that included childhood maltreatment, witnessing domestic violence, parental separation, and presence of mental illness, substance use, and incarceration of household members. It is possible that a global, cumulative measure of childhood adversity is not associated with later maternal sensitivity, but specific types of adversity like witnessing or experiencing abuse and neglect are more strongly related to maternal sensitivity to distress. Future research should continue to examine what types of childhood adversity are related to maternal sensitivity to distress to better understand the early adverse experiences that have lasting consequences.

Similarly, the absence of a direct effect of mothers' remembered emotionally responsive parenting in childhood on maternal sensitivity to distress is inconsistent with prior research that has demonstrated direct effects of responsive parenting experienced in childhood and later

sensitive parenting (Belsky et al., 2005; Kovan et al., 2009; Shaffer et al., 2009). A possible reason for the difference in results may be due to several methodological differences in how mothers' experiences of parenting in childhood and current parenting behaviors were assessed. First, there are differences in how responsive parenting in childhood was assessed across prior studies and in the current study. The current study relied on participants' retrospective reports of their parents' care/affection and emotional responsiveness during the first 16 years. Notably, each of the prior studies (Belsky et al., 2005; Kovan et al., 2009; Shaffer et al., 2009) drew on data from prospective longitudinal studies that span three generations in which parenting of generation 1 (i.e., original participants who had a child in the study) was concurrently assessed. Moreover, in these studies, assessments of responsive parenting by generation 1 included composites of parenting attitudes and style, observed parenting behaviors, and family emotional climate from early childhood to early adolescence (Belsky et al., 2005; Shaffer et al., 2009) and direct observational assessments of parenting during adolescence (Kovan et al., 2009). Although a methodological strength of Belsky et al. (2005) and Shaffer et al. (2009) includes the use of a multi-method measure of responsive parenting, it makes it difficult to ascertain if the direct effects found are being driven by specific parenting behaviors, parenting style, or the family climate in general. In fact, findings from Kovan et al. (2009) may indicate that there is a stronger association between observational assessments of parenting across generations, rather than self-reports of parenting style or retrospective reports of the type of parenting received in childhood. Certainly, this may be one explanation for the lack of direct effects in the current study. Second, there was variation in each study as to when and how the dependent variable of sensitive parenting was assessed. Shaffer et al. (2009) relied on self-reports of parenting involvement and perceived quality, and therefore the significant effects may be inflated due to shared method

variance (Shadish et al., 2002). The remaining two studies both used developmentally appropriate tasks aimed at eliciting child frustration to assess sensitivity (Belsky et al., 2005; Kovan et al., 2009), which is consistent with the approach used in the current study. However, the current study assessed maternal sensitivity during early infancy at 2 months old, whereas the prior studies assessed sensitive parenting at 2 (Kovan et al., 2009) and 3 years old (Belsky et al., 2009). Sensitive parenting looks different depending on the child's age and it is possible that direct effects are not present during the earliest periods of infancy but may emerge over time as children grow older. Researchers should continue to examine the intergenerational continuity of parenting to better understand when direct effects emerge.

In addition to methodological differences, there are analytic differences between the current study and prior research that might explain the absence of direct effects. First, one of the goals and a novel contribution of the current study is the inclusion of adverse childhood experiences and emotionally responsive parenting in the same model. Research that has demonstrated direct effects of mothers' childhood experiences has focused on either the independent effects of adverse childhood experiences (Fuchs et al., 2015; Lyons-Ruth & Block, 1996; Pereira et al., 2012) or responsive parenting (Belsky et al., 2005; Kovan et al., 2009; Shaffer et al., 2009) but has not tested both in the same analytic model. In the current study, the lack of remaining direct effects for both suggest that each type of childhood experience may be independently related to maternal sensitivity to distress; however, when considered at the same time neither is uniquely related to maternal sensitivity to distress. Second, the current study included several indirect effects via social information processes in addition to direct effects of mothers' childhood experiences. Prior studies that have tested direct and indirect effects of adverse childhood experiences on maternal sensitivity have primarily focused on maternal

psychopathology as an intermediary variable (Fuchs et al., 2015; Lyons-Ruth & Block, 1996). Relatedly, research that has examined direct and indirect effects of emotionally responsive parenting in childhood on later maternal sensitivity has either focused only on direct effects (Belsky et al., 2005; Kovan et al., 2009) or tested social competence in emerging adulthood as an intermediary variable (Kerr et al., 2009; Schaffer et al., 2009). Moreover, in the prior studies that have included intermediary variables (Fuchs et al., 2015; Kerr et al., 2009; Lyons-Ruth & Block, 1996; Schaffer et al., 2009), direct effects of childhood experiences have still emerged. Taken together, the lack of remaining direct effects (when controlling for the effects of social information processes) in the current study may indicate that the intergenerational legacy of parenting occurs primarily indirectly through social information processes.

Effects of Mothers' Adverse Childhood Experiences on Cognitive, Emotional, and Physiological Reactions to Infant Crying

Contrary to my hypothesis, mothers' adverse childhood experiences were not uniquely related to any of the four social information processes. The non-significant association between mothers' adverse childhood experiences and prenatal negative cognition about infant crying is unexpected and not congruent with prior research that has found childhood adversity to be related to more hostile and negative attribution biases (Clement & Chamberland, 2009; Daggett et al., 2000; Keil & Price, 2009; Price & Glad, 2003; Reid et al., 2002; Weiss et al., 1992; Ziv, 2012; Ziv et al., 2018a) and endorsement of abuse-related or corporal punishment parenting beliefs (Boppa & Rodriguez, 2017; Bower-Russa, 2005; Simons & Wurteke, 2010). There are two methodological differences between the current study and prior research that might explain the lack of significant findings. First, in the current study, my measure of adverse childhood experiences was a global measure that included items related to childhood maltreatment and

household challenges. Whereas prior research that has demonstrated associations between childhood adversity and maladaptive attribution biases has focused on experiences of physical abuse (Clement & Chamberland, 2009; Keil & Price, 2009; Price & Glad, 2003; Reid et al., 2002), harsh discipline (Daggett et al., 2000), and violence within the family and home context (Weiss et al., 1992; Ziv, 2012; Ziv et al., 2018a). That is, rather than focusing on the accumulation of adversity in childhood, prior research has utilized specificity approaches to examine how certain types of childhood adversity shape attributions about others' behavior. It is plausible that experiences that are characterized by aggression and violence have lasting consequences for the development of maladaptive attribution biases, whereas other adverse experiences, like substance use, neglect, or household mental illness do not. Similarly, research that has demonstrated associations between adverse childhood experiences and parenting beliefs has primarily focused on experiences of physical abuse and corporal punishment in childhood and the development of later abuse-related beliefs or beliefs about corporal punishment (Boppana & Rodriguez, 2017; Bower-Russa, 2005; Chung et al., 2009; Clement & Chamberland, 2009; Milner, 2000). Whereas in the current study, I was focused on spoiling and minimizing beliefs about infant crying that reflect an emphasis on the mothers' needs (e.g., I want my baby to stop crying because I cannot get anything done). It may be that through experiences of physical abuse or corporal punishment, individuals develop the belief that physical punishment is a normative experience. Indeed, this is consistent with theoretical frameworks on how harsh and abusive parenting are transmitted across generations (Belsky & Jaffee, 2006; Simons et al., 1991). That these effects have been limited to abuse-related beliefs or endorsement of beliefs related to corporal punishment may indicate that parenting beliefs are a learned product of one's

childhood experiences of abuse and are not generalizable to beliefs of alternative aversive behaviors, like infant crying.

Moreover, in contrast to my hypothesis, mothers' adverse childhood experiences were not uniquely related to their prenatal negative emotion in response to infant crying. Although this was unexpected, the null findings address an important gap in the literature, as very few studies have examined how adverse childhood experiences are specifically and uniquely related to emotional responses to infant distress. Most researchers have examined how childhood adversity is related to the development of empathy, which is considered a motivator for helping others in distress (McDonald & Messinger, 2011). Although empathy is a type of emotional response, it is distinct from feelings of frustration or self-oriented anxiety, which reflect self-oriented emotion in response to others' distress. Further, researchers who have focused on how indicators of childhood adversity predict negative emotional responses to child cues have exclusively focused on unresolved adult attachment classifications from the AAI. That this line of research has demonstrated associations between unresolved adult attachment and more negative emotional responses to child cues (DeOliveira et al., 2005; Haft & Slade, 1989; Jacobvitz et al., 2006; Lyons-Ruth et al., 1999) may indicate that how individuals make meaning of adverse childhood experiences has a lasting effect on their emotional responses to others' distress. In the current study, my measure of adverse childhood experiences did not include participants' perceptions of the adversity experienced, but rather was focused on if an event occurred or not. As such, the null findings may reflect that individuals can experience childhood adversity without it interfering with their emotional responses to infant distress. It would be beneficial for future researchers to include assessments of participants' perception on how each adverse childhood experience affected them.

That mothers' adverse childhood experiences were not uniquely related to mothers' physiological arousal in response to infant crying was also unexpected. Notably, adverse childhood experiences were associated with higher physiological arousal in response to infant crying in the preliminary correlations; however, in the full analytic model there were no significant effects. The preliminary results are consistent with research that has found associations between childhood adversity and high levels of physiological arousal in response to infant crying and laughter (Buisman et al., 2018) and expand upon these findings to demonstrate these effects may be specific to infant crying. However, it is important to interpret these preliminary correlations with caution as these effects were not significant above and beyond the effects of the other predictors and covariates. In the current study I included several covariates specified on my intermediary variables including variables related to demographics, psychological distress, and life stressors, whereas Buisman et al. (2018) controlled for age, gender, SES, substance use, and medications. In addition, I included several predictors within the same analytic model, whereas Buisman et al. (2018) tested multiple multi-level models across different indices of physiology. It is plausible that when other social information processes are included within the same model, mothers' adverse childhood experiences are not uniquely related to physiological arousal in response to infant crying. Nonetheless, more research is needed to better understand if these effects emerge in other samples.

Also contrary to prediction, mothers' adverse childhood experiences were not uniquely related to prenatal physiological regulation in response to infant crying. These findings are not entirely surprising as there has been mixed evidence for how childhood adversity shapes physiological regulation in response to stressors, with findings from a recent meta-analysis of 90 studies demonstrating null effects between childhood adversity and physiological regulation in

response to stress tests or emotion-eliciting tasks (Wesarg et al., 2022). Notably, Wesarg et al. (2022) identified participant age, recency of exposure to adversity, and vagal reactivity computation method as potential moderators. Specifically, childhood adversity was related to lower levels of physiological regulation in older-aged samples, in individuals who experienced adversity longer ago, and in studies where physiological regulation was assessed through mean levels within each task rather than change scores. The identification of potential moderators is particularly insightful for understanding the null effects in the current study. Given the variability in maternal age in this sample (18 to 47), it is plausible that in the current study, there is a negative association between adverse childhood experiences and physiological regulation in response to infant crying among mothers who are older, compared to mothers who are younger. It may be that the effects of cumulative childhood adversity have more long-term consequences for physiological regulation that emerge later in adulthood rather than immediate effects (Wesarg et al., 2022). As such, researchers should continue to examine how maternal characteristics may function as moderators of the association between mothers' adverse childhood experiences and physiological regulation. Furthermore, in the current study I used an average of change scores from baseline to each of the four infant cry videos to assess physiological regulation in response to infant crying. That small, but significant, effects were found in studies that assessed mean levels of physiological regulation during a task (Wesarg et al., 2022) may indicate that baseline regulatory levels serve an important role in understanding the complex effects of childhood adversity on changes in physiological regulation. Mothers with histories of childhood adversity may have persistently low resting regulatory levels (reflecting hypo-regulation), thus resulting in a lower capacity to regulate in response to stressors. The use of change scores from baseline to

task takes into consideration baseline regulatory levels and therefore may be a stronger approach for future researchers to consider.

Effects of Mothers' Remembered Emotionally Responsive Parenting in Childhood on Cognitive, Emotional, and Physiological Reactions to Infant Crying

Consistent with prediction, mothers' remembered emotionally responsive parenting in childhood was uniquely related to lower prenatal negative cognition about infant crying. Mothers who have greater recollections of emotionally responsive parenting in childhood may have developed secure mental representations about social cues that they in turn use as a guide for interpreting infant distress cues. As such, these mothers are less likely to make emotion minimizing (e.g., the baby is hungry) and negative (e.g., the baby is spoiled) attributions about infant distress and have less minimizing (e.g., I want baby to stop because I can't get anything else done) and spoiling (e.g., I could spoil baby with how I respond) beliefs about infant crying. Thus, it is possible that mothers who experienced emotional support and warmth in childhood have more adaptive views about infant crying. These findings are consistent with research that has demonstrated experiences of warmth and responsive parenting in childhood are associated with lower negative attribution biases (Domitrovich et al., 2001; Leerkes et al., 2016; Ziv et al., 2018b) and preliminary findings from Leerkes et al. (2016) that found significant simple correlations between mothers' coherence of mind (i.e., the ability to describe early attachment experiences in an organized manner) and lower negative attributions about infant crying. Moreover, results from the current study expand understanding as it demonstrates that emotionally responsive parenting in childhood is not limited to causal attributions about peer behavior because it predicts a latent variable of negative cognition about infant crying that reflects negative and minimizing attributions and minimizing and spoiling beliefs about infant

crying (Domitrovich et al., 2001; Ziv et al., 2018b). This is particularly noteworthy as there is an absence of empirical work that has examined how emotionally responsive parenting in childhood shapes parenting beliefs. Taken together, the results highlight that emotionally responsive parenting in childhood has an important role in minimizing mothers' negative cognition about infant crying during the prenatal period.

Also consistent with prediction and prior theory (Eisenberg, 2020; Leerkes & Augustine, 2019), mothers' remembered emotionally responsive parenting in childhood was uniquely related to lower prenatal negative emotion in response to infant crying. It is possible that mothers' own experiences of supportiveness and warmth from their caregivers serve as important emotion socialization behaviors to communicate that it is acceptable to display various emotions, particularly those that are negative. Mothers who reported experiencing higher levels of emotionally responsive parenting in childhood may be less likely to feel frustrated or anxious towards infant crying cues because they have greater feelings of concern or empathy for negative expressions of emotion. This is consistent with prior research that has found associations between maternal responsiveness and children's concern for others' distress (Taylor et al., 2013) and lower displays of anger during challenging interactions with others (Denham, 1993). Moreover, the current results expand prior research and demonstrate that these effects are not unique to the childhood period and are also present during adulthood and in response to infant cry stimuli. In fact, recent findings from an adult sample of non-parents found individuals with higher levels of attachment security reported less feelings of anxiety and hostility in response to infant crying (Rousseau et al., 2020). Results from the current study support these findings and demonstrate that similar effects exist in samples of expectant mothers. Taken together, results from the current study underscore that warm and emotionally responsive interactions with

caregivers during childhood have lasting effects on how expectant mothers' emotionally respond to infant distress.

Contrary to my hypothesis, mothers' remembered emotionally responsive parenting in childhood was not uniquely related to physiological arousal in response to infant crying during the prenatal period. However, this is partially consistent with the current literature as there have been mixed effects between experiences of emotionally responsive parenting in childhood and physiological arousal. Results from studies with young children have demonstrated concurrent effects between maternal sensitivity and minimal increases in infants' physiological arousal in response to a stressor (Enlow et al., 2014; Garner et al., 2008). However, it is less clear how emotionally responsive parenting in childhood is related to physiological arousal in adulthood. There is evidence that dismissing and preoccupied states of mind on the AAI are related to increases in arousal during the AAI (Dozier & Kobak, 1992; Roisman et al., 2004). However, consistent with results from the current study, adult attachment security, as assessed via the AAI, was unrelated to physiological arousal while answering questions from the AAI (Dozier & Kobak, 1992; Roisman et al., 2004). Responsive parenting in childhood is believed to lead to the development of a secure attachment and adaptive mental representations of close relationships (Bowlby, 1982). As such, it is possible that in the current study women who had greater recollections of emotionally responsive parenting in childhood also had secure internal working models and were able to watch videos of crying infants without becoming physiologically aroused. It may be that individuals with insecure, rather than secure, attachments are more likely to be defensive in response to emotion-eliciting stimuli and subsequently become physiological aroused. Indeed, this is consistent with Bowlby's (1980) assertions that adults with insecure attachments utilize strategies to avoid responding to attachment cues. Altogether, the current

findings may indicate that in adulthood, the feelings or meaning making associated with a lack of emotionally responsive parenting in childhood are predictive of physiological arousal in response to infant crying and recollections of emotionally responsive parenting are not.

Contrary to expectations, mothers' remembered emotionally responsive parenting in childhood was not uniquely related to physiological regulation in response to infant crying during the prenatal period. It is possible that mothers' recollections of the emotionally responsive parenting they experienced in childhood does not have lasting unique effects on their physiological regulatory abilities in adulthood and that these effects are more pronounced in childhood. Emotionally responsive parenting is characterized by warm and supportive parenting behaviors, particularly in response to displays of emotion, and it is likely that this serves as a source of security in childhood to help effectively regulate emotions. It is possible that over time, other proximal factors begin to exert similar effects and prior experiences of emotionally responsive parenting no longer have direct effects. That prior research examining associations between emotionally responsive parenting and physiological regulation have primarily been conducted with samples of children supports this view (Calkins et al., 2008; Dykas & Cassidy, 2011; Moore & Calkins, 2004; Perry et al., 2013; 2016; Zhang et al., 2020). Indeed, these studies demonstrated that maternal sensitivity was concurrently related to better physiological regulation in children. Future research should explore whether close relationships in adulthood (e.g., quality of current relationship with parents, satisfaction with romantic relationship) are more predictive of physiological regulation in response to infant crying rather than past experiences of parenting in childhood.

Effects of Mothers' Prenatal Cognitive, Emotional, and Physiological Reactions to Infant Crying on Maternal Sensitivity to Infant Distress at 2 Months

Consistent with my hypothesis, mothers' prenatal negative cognition about infant crying was uniquely related to maternal sensitivity to infant distress at 2 months, such that mothers who reported lower negative cognition about infant crying were observed to be more sensitive to infant distress. Mothers who are lower in negative cognition are less likely to interpret infant crying in a defensive and negatively biased manner—that is, they are less likely to attribute infant crying to being spoiled and are less likely to want infants to stop crying for their own self-focused reasons. It is plausible that mothers who are lower in negative cognition about infant crying have a greater understanding that infants cry because they are signaling the need for help. In turn, this may enable mothers to be able to focus on the needs of their child and respond quickly and appropriately to their distress. These findings are consistent with research that has demonstrated negative associations between negative attributions and beliefs about infant crying and maternal sensitivity to distress from 6 months to 2 years old (Leerkes et al., 2015; Leerkes et al., 2016; Leerkes et al., 2022) and expand upon these findings by demonstrating that unique effects exist in early infancy when infants are 2 months old.

Contrary to expectations and prior research, mothers' prenatal negative emotion in response to infant crying were not uniquely related to maternal sensitivity to infant distress at 2 months. Notably, mothers' prenatal negative emotion in response to infant crying were associated with lower maternal sensitivity to infant distress in the preliminary correlations; however, in the full analytic model there were no significant effects. The preliminary results are consistent with findings from Leerkes (2010) that found associations between composites of multiple negative emotions (e.g., anger, annoyance, frustration, anxiety) in response to infant cry

paradigms and lower maternal sensitivity. However, these correlations did not hold once other predictors and covariates were included in the model. It is plausible that when mothers' emotion and cognition are considered simultaneously, the effects of cognition are a stronger predictor of maternal sensitivity to distress. This is congruent with findings from Leerkes et al. (2022), that found mothers' prenatal emotion minimizing and negative attributions about infant crying to be related to maternal sensitivity across infancy but mothers' prenatal negative emotion in response to infant crying were not. Nonetheless, more research is needed to better understand how distinct parenting-related emotions are related to maternal sensitivity to distress.

Likewise, mothers' prenatal physiological arousal in response to infant crying was not uniquely associated with maternal sensitivity to infant distress at 2 months. This finding was unexpected as recent research drawing from cohort one of the iGrow study demonstrated evidence of promotive effects between mothers' physiological arousal in response to infant crying and maternal sensitivity at 2 months (Leerkes et al., 2023). Notably, the promotive effects were found in relation to a composite of maternal sensitivity across non-distress (i.e., free play and Still-face engagement episode) and distressing (i.e., Still-face re-engagement episode) contexts. Thus, when applying a domain-specific approach to maternal sensitivity, similar effects may not be present. Indeed, research using the same infant cry videos has demonstrated that it is the interaction between physiological arousal and regulation that is predictive of maternal sensitivity to infant distress (Leerkes et al., 2015, 2016). Specifically, well-regulated arousal was associated with higher maternal sensitivity to infant distress and poorly regulated arousal was associated with lower maternal sensitivity to distress. It may be that physiological arousal in response to infant crying is not directly related to mothers' sensitive behavior in response to infant distress, but rather it operates in conjunction with other maternal characteristics (e.g.,

conscious and unconscious regulatory abilities, psychopathology). An important area for future research would be to expand upon these findings and test moderators that may explain when and under which conditions mothers' physiological arousal in response to infant crying is related to maternal sensitivity to infant distress.

Similarly, mothers' prenatal physiological regulation in response to infant crying was not uniquely associated with maternal sensitivity to infant distress at 2 months. This is inconsistent with prior research that has found RSA withdrawal in response to videos of crying infants to be related to higher maternal sensitivity to distress (Ablow et al., 2013; Joosen et al., 2013). Notably, the current study included several intermediary variables that ranged from physiology, emotion, and cognition, whereas Ablow et al. (2013) focused on only physiology as an intermediary variable and Joosen et al. (2013) tested direct effects of physiology in response to infant crying on maternal sensitivity. It is possible that in the current sample, physiological regulation is not directly related to maternal sensitivity, but rather it is indirectly related through other processes. Indeed, research that has utilized the same infant cry videos as the current study supports this view as physiological regulation in response to infant crying has been found to have no direct effects with maternal sensitivity throughout infancy (Leerkes et al., 2015; 2016; 2022; 2023), but to be indirectly related to higher maternal sensitivity to infant distress through lower mother-oriented cry processing (a latent construct reflecting cognition about infant crying; Leerkes et al., 2016). Moreover, this is congruent with social information processing perspectives that emphasize the influential role of regulatory abilities on how social cues are interpreted and evaluated, and in turn what behavioral response is executed (Lemerise & Arsenio, 2000). As such, a promising area for future research would be to examine if expectant mothers' physiological regulation in response to infant crying influences their attributions and

beliefs about infant crying, and if that in turn shapes their later maternal sensitivity to infant distress.

Indirect Effects of Mothers' Remembered Emotionally Responsive Parenting in Childhood on Maternal Sensitivity to Infant Distress at 2 Months

There was partial support for my hypothesis regarding indirect effects of mothers' remembered emotionally responsive parenting in childhood on maternal sensitivity to infant distress at 2 months. Specifically, mothers who reported higher levels of emotionally responsive parenting in childhood reported fewer negative cognitions about infant crying prenatally, which in turn was related uniquely to higher maternal sensitivity to infant distress at 2 months. Importantly, these findings underscore that the legacy of emotionally responsive parenting is maintained through lower negative cognition about infant crying. These findings are consistent with social information processing perspectives (Crick & Dodge, 1994; Lemerise & Arsenio, 2000) that posit early childhood experiences shape how individuals encode and interpret social cues. It is likely that through mothers' own experiences of emotionally responsive parenting, they create and subsequently store mental representations that negative emotions are normative, and it is adaptive to display these emotions. Over time, and specifically in response to emotion-related stimuli, mothers may rely on this cognitive schema and interpret infant crying as a cue signaling the need for safety and comfort rather than viewing it as a nuisance. To date, research has primarily focused on the roles of self-esteem, positive social relationships, educational attainment, and personality in explaining how responsive parenting is transmitted across generations (Kerr & Capaldi, 2019), and only one study has demonstrated the significance of negative cognition about infant crying as an intermediary variable (Leerkes et al., 2020). Results from the current study indicate that findings from Leerkes et al. (2020) are not sample specific

and extend Leerkes' findings by demonstrating that similar effects emerge (a) in samples of multiparous and primiparous mothers and (b) when cognition about infant crying is assessed during the prenatal period rather than 6 months postpartum.

Furthermore, the post-hoc analyses including emotional responses to infant crying as a mediator of the effect between remembered emotionally responsive parenting in childhood and negative cognition about infant crying is also an extension of prior work by Leerkes. Leerkes has typically examined maternal cognition and emotion as part of broader latent constructs reflecting infant-oriented and mother-oriented cry processing (Leerkes et al., 2015, 2016), whereas in the current study I examined emotion and cognition as separate, but related, constructs. Indeed, the post-hoc results indicate that emotion and cognition are important and distinct constructs. This is consistent with social information processing perspectives (Lemerise & Arsenio, 2000) that emphasize emotions influence how information is processed and behaviors that are enacted. Notably, social information processing perspectives have primarily been applied to the study of peer and partner relationships, and the results from the post-hoc analyses demonstrate that similar processes exist for parent-child relationships. The post-hoc results are particularly insightful as it demonstrates that mothers' remembered emotionally responsive parenting in childhood (i.e., the database) influences mothers' emotional responses to infant crying (i.e., emotion), that then shape how infant cry cues are interpreted and evaluated (i.e., cognition), that then ultimately influence mothers' sensitivity to infant distress (i.e., behavioral response). Moreover, the serial indirect effect demonstrates that emotionally responsive parenting is maintained across generations through both emotion and cognition. This has important implications for parenting interventions and programs that will be discussed in the implications section.

**Buffering Effects of Mothers' Remembered Emotionally Responsive Parenting in
Childhood on the Direct and Indirect Associations Between Mothers' Adverse Childhood
Experiences and Maternal Sensitivity to Infant Distress at 2 Months**

Contrary to the proposed buffering effects, mothers' remembered emotionally responsive parenting in childhood did not serve as a protective factor for the effects of mothers' adverse childhood experiences on prenatal cognitive, emotional, or physiological reactions to infant crying, or maternal sensitivity to infant distress at 2 months. That emotionally responsive parenting in childhood exhibited promotive effects on mothers' cognition about infant crying but did not show evidence of protective effects for any variable of interest is congruent with compensatory frameworks of resilience that emphasize promotive factors as having opposite and independent effects on developmental outcomes than risks (Masten et al., 2021; Zimmerman, 2013). As such, emotionally responsive parenting in childhood did not modify the association between adverse childhood experiences and mothers' social information processes or maternal sensitivity to infant distress at 2 months, but rather it was independently related to lower negative cognition about infant crying.

In the current study, the non-significant buffering effects are not consistent with prior research that has identified positive childhood experiences as an important protective factor for several developmental outcomes (Crouch et al., 2019; Lieberman et al., 2005; Lieberman & Van Horn, 2008; Narayan et al., 2019; 2021; Sattler & Font, 2018). However, the discrepancy may be explained by differences in methodological approaches. Evidence of positive childhood experiences with caregivers operating as a protective factor has been found for individuals who reported experiencing four or more adverse childhood experiences (Bethell et al., 2019; Crouch et al., 2019), severe abuse in childhood (Egeland et al., 1988), and CPS-substantiated

maltreatment (Bartlett & Easterbrooks, 2015; Ward & Haskett, 2008). Given there was no negative main effect of mothers' adverse childhood experiences on maternal sensitivity to infant distress at 2 months, protective characteristics may be less relevant than risk characteristics. That is, when levels of childhood adversity are relatively low, there may only be negative implications for parenting outcomes in the presence of other risks. Although there was sufficient variability in the number of adverse childhood experiences reported, the average in the current study was 1.63, which is lower than the cut-off score of 3 that is typically used to distinguish high versus low adverse childhood experiences (Crouch et al., 2019; Marie-Mitchell & O'Connor, 2012; Melville, 2017). Notably, Crouch et al. (2019) found retrospective reports of care during childhood to buffer the negative consequences of adverse childhood experiences on mental and physical health outcomes in adulthood, but only among individuals who experienced high levels of adverse childhood experiences. It would be beneficial for future researchers to apply the cut-off scores of high and low adverse childhood experiences to assess if emotionally responsive parenting serves as a protective factor for those that may be most at risk for maladaptive cognitive, emotional, physiological, and behavioral responses to infant distress.

In addition to differences in how exposure to adverse childhood experiences was assessed, there are also differences in how positive childhood experiences with caregivers has been assessed across studies. In the current study, I included a retrospective measure of mothers' experiences of emotionally responsive parenting in childhood, whereas other researchers have utilized observational measures of parental sensitivity (Ward & Hasket, 2008), composites of observed and caregiver-reported emotional support (Sattler & Font, 2018), qualitative interviews of remembered care in childhood (Lieberman et al., 2005; Lieberman & Van Horn, 2008), and cumulative composites reflecting close relationships with caregivers, self-esteem, home routines,

and perceived quality of life (Merrick & Narayan, 2020; Narayan et al., 2018). The variety of ways in which researchers have assessed positive childhood experiences with caregivers makes it difficult to determine how or what kind of experiences with caregivers are most salient. Composites that include multiple indicators of care and support may capture a broader assessment of positive childhood experiences in comparison to the measure used in the current study. As such, it might be that positive childhood experiences in general act as a protective factor. Nonetheless, more research is needed to understand how global and domain-specific measures of positive childhood experiences might buffer the negative consequences of adverse childhood experiences on social information process and later parenting.

Additionally, in the current study I tested one possible protective factor, and it is likely that there are other moderators that buffer the deleterious effects of adverse childhood experiences on social information processes and maternal sensitivity to distress. For example, it is possible that nurturing relationships experienced in adulthood function as an important protective factor. In the current study, I was specifically focused on mothers' experiences of emotionally responsive parenting in childhood; however, there is evidence that positive relationships in adulthood disrupt the intergenerational continuity of child maltreatment, one type of adverse childhood experience (Thornberry et al., 2013). It may be that positive relationships in adulthood have a more salient role as a protective factor because feelings of support or care are more proximal in time compared to positive experiences in childhood. Although responsive parenting in childhood did not have protective effects, current relationship or parental satisfaction may be important moderators that decrease the likelihood of exhibiting maladaptive cognitive, emotional, physiological, and behavioral responses to infant distress. Alternatively, given there were relatively low levels of adverse childhood experiences in the currently sample,

it may be that adverse childhood experiences only undermine parenting cognition, emotion, physiology, and behavior in the context of other risks. As such, it may be beneficial for future researchers to apply dual risk or diathesis stress perspectives to understand if biological traits or contextual stressors exacerbate the negative effects of adverse childhood experiences on social information processes and behavior.

Implications for Research and Practice

Results from the current study are informative for the development of interventions and parenting education programs aimed at promoting positive parenting. That mothers' prenatal negative cognition about infant crying, above and beyond the effects of mothers' emotional and physiological responses to infant crying, was one mechanism for how emotionally responsive parenting in childhood is related to higher maternal sensitivity to infant distress at 2 months highlights the importance of targeting mothers' parenting-related cognition. Furthermore, results from the post-hoc analyses indicate that the effect of emotionally responsive parenting in childhood on mothers' negative cognition about infant crying is explained by mothers' negative emotion in response to infant crying. Taken together, these results demonstrate that interventions and parent education programs should include a focus on addressing how mothers emotionally and cognitively respond to infant cry cues. Infant crying is aversive and may evoke negative emotions that then prompt negative cognitions about infant crying. As such, helping mothers develop skills related to controlling their emotional responses may ultimately enhance their sensitivity to distress. Interventions like the Circle of Security-Parenting (Cassidy et al., 2017) and Attachment and BioBehavioral Catch-Up (Dozier et al., 2017) include enhanced regulation of negative affect as part of their curriculum and have found positive effects on parenting and several child emotional and behavioral outcomes (Hajal & Paley, 2020). It would be beneficial

for these interventions to also include a focus on reducing negative parenting-related cognition by providing mothers with information on why infants cry to help them understand that there are contextual and emotional factors that underlie infant crying, and to emphasize the importance of maternal responsiveness by helping mothers read infant cues and take the infant's perspective when interpreting distress. Relatedly, intervention and program developers should consider including assessments of mothers' emotion regulation skills and their emotional and cognitive reactions to infant crying throughout sessions to determine if the intervention is effective in promoting adaptive emotion and cognition in response to infant crying. This is particularly important as there is still considerable debate on what are the most important parenting skills to target to promote maternal sensitivity (Deans, 2020).

Furthermore, the current study addressed several gaps in the literature and identified areas for future research to expand on the findings. First, future research should continue to examine the processes by which mothers' childhood experiences shape their parenting behaviors. The current study identified one mechanism by which this occurs, and it is likely that there are others. Post-hoc analyses demonstrated that although mothers' prenatal emotion in response to infant crying did not operate as a mechanism for how remembered emotionally responsive parenting in childhood was related to maternal sensitivity to infant distress at 2 months, it did operate as part of a serial indirect effect. It may be that mothers with higher recollection of emotionally responsive parenting in childhood are observed to be high in sensitivity to infant distress because they learn that negative emotions are socially acceptable and therefore are less upset/personally distressed when confronted with crying which in turn leads them to have less maladaptive cognition about infant crying. This is consistent with theoretical research that has emphasized the interrelatedness between emotion and cognition in predicting behavior (Leerkes

& Augustine, 2019; Lemerise & Arsenio, 2000). In the primary analyses, I was focused on the unique contributions of cognition and emotion in predicting maternal sensitivity to infant distress, therefore I tested each as a separate intermediary variable. An alternative approach that is consistent with Lemerise and Arsenio (2000) is to examine how emotion influences cognitive processes and behavior. Results from the primary and post-hoc analyses highlight that negative emotions in response to infant crying may not be directly related to maternal sensitivity to infant distress at 2 months, but it does have an important role in how the intergenerational cycle of parenting is maintained.

Strengths and Limitations

The current study has several strengths and makes significant contributions to the literature in multiple ways. First, a primary goal of the current study was to simultaneously examine how mothers' positive (i.e., emotionally responsive parenting in childhood) and negative (i.e., adverse childhood experiences) childhood experiences were independently or jointly related to maternal sensitivity to infant distress. These experiences are primarily studied as separate lines of research, with few studies examining both in the same model. The current study makes a significant contribution to the literature as it highlights that independent of adverse childhood experiences, remembered emotionally responsive parenting in childhood has promotive effects on pregnant women's cognition and emotion in response to infant crying.

Relatedly, a strength of the current study is the inclusion of multiple social information processes as intermediary variables to understand how mothers' early childhood experiences shape their later parenting behavior. Researchers have primarily focused on understanding the continuity or discontinuity in early childhood experiences with caregivers across generations, and there has been little attention on *how* parenting is maintained across generations. The current

study makes a significant contribution to the literature by highlighting the important role of mothers' cognition about infant crying as an explanatory variable for how emotionally responsive parenting is maintained across generations.

Third, a methodological strength of the current study is the inclusion of two ecologically valid paradigms. An infant cry paradigm that has been well validated and widely used in parenting research (Leerkes et al., 2022) was administered to assess mothers' cognitive, emotional, and physiological responses to infant crying. This was paralleled by the use of the Still-Face paradigm, an extensively used and valid task (Tronick et al., 1978) to assess maternal sensitivity to infant distress. Moreover, in the current study I used a well-established coding scheme to measure maternal sensitivity to infant distress (NICHD ECCRN, 1999; Mills-Koonce et al., 2011), thus enhancing the replicability of the results to other studies that have used the coding scheme.

Fourth, the current study included a prospective longitudinal design with a diverse sample. That mothers' cognitive, emotional, and physiological responses to infant crying were assessed during the third trimester is a strength as my current findings highlight the prenatal period as an important period to promote positive parenting during early infancy. Additionally, participants varied with respect to race, age, education, income-to-need ratio, and parity, therefore enhancing the generalizability of the findings.

Fifth, the current study included several covariates related to socioeconomic status, maternal psychopathology and personality, recent life stressors, and infant characteristics. These covariates were purposefully selected as prior research has demonstrated that they are related to several key variables of interest in the current study. As such, the direct and indirect effects of

mothers early childhood experiences on maternal sensitivity to infant distress have been absolved of several third variables that could affect inferences.

In addition to strengths, there are also limitations that should be addressed. First, my measure of maternal sensitivity to distress is relatively brief as it was assessed during the 2-minute re-engagement phase of the Still-Face. However, this task was effective in eliciting infant distress as approximately 70% of infants were distressed in either the still-face or the re-engagement episode in which maternal sensitivity was assessed. Second, mothers' adverse childhood experiences, emotionally responsive parenting in childhood, negative cognition about infant crying, and negative emotion in response to infant crying were all maternal self-report. As such, the estimates between mothers' remembered emotionally responsive parenting in childhood and negative cognition about infant crying and negative emotion in response to infant crying may be inflated due to shared method variance. Relatedly, mothers' adverse childhood experiences and emotionally responsive parenting in childhood were both retrospectively reported. Though there is evidence that mothers' retrospective reports of positive and negative childhood experiences converge with prospective assessments (Nivison et al., 2021; Reuben et al., 2016), some recall and social desirability bias might still be present. Furthermore, the data are from a community sample with relatively low levels of adverse childhood experiences, as such there is a need for additional research with higher-risk samples to examine if these results are generalizable to other populations.

Conclusion

The current study examined how mothers' early childhood experiences were directly and indirectly related to maternal sensitivity to infant distress via parenting-related cognition, parenting-related emotion, and emotion-related physiology. Results demonstrated that mothers'

who remembered higher levels of emotionally responsive parenting in childhood reported lower negative cognition about infant crying, which in turn was related to higher maternal sensitivity to infant distress at 2 months. Notably, these effects were found independent of mothers' adverse childhood experiences, underscoring the influential role of emotionally responsive parenting in childhood on later maternal sensitivity to infant distress. Results from the current study expand and integrate prior research and provide areas for future research to continue to examine the processes by which mothers' childhood experiences shape their parenting. The findings also have important implications for programs and interventions aimed at promoting positive parenting.

REFERENCES

- Ablow, J. C., Marks, A. K., Shirley Feldman, S., & Huffman, L. C. (2013). Associations between first-time expectant women's representations of attachment and their physiological reactivity to infant cry. *Child Development, 84*(4), 1373-1391.
- Ainsworth, M. D., Bell, S. M., & Stayton, D. J. (1974). Infant-mother attachment and social development: Socialization as a product of reciprocal responsiveness to signals. The integration of a child into a social world, 1, 9-135.
- Alink, L. R., Cyr, C., & Madigan, S. (2019). The effect of maltreatment experiences on maltreating and dysfunctional parenting: A search for mechanisms. *Development and Psychopathology, 31*(1), 1-7.
- Alkon, A., Boyce, W. T., Tran, L., Harley, K. G., Neuhaus, J., & Eskenazi, B. (2014). Prenatal adversities and Latino children's autonomic nervous system reactivity trajectories from 6 months to 5 years of age. *PloS one, 9*(1), e86283.
- Ardizzi, M., Umiltà, M. A., Evangelista, V., Di Liscia, A., Ravera, R., & Gallese, V. (2016). Less empathic and more reactive: The different impact of childhood maltreatment on facial mimicry and vagal regulation. *PLoS one, 11*(9), e0163853.
- Bailes, L. G., & Leerkes, E. M. (2021). Maternal personality predicts insensitive parenting: Effects through causal attributions about infant distress. *Journal of Applied Developmental Psychology, 72*, 101222.
- Bakermans-Kranenburg, M. J., Van Ijzendoorn, M. H., & Juffer, F. (2003). Less is more: meta-analyses of sensitivity and attachment interventions in early childhood. *Psychological bulletin, 129*(2), 195.

- Bakkum, L., Oosterman, M., Verhage, M. L., Kunseler, F. C., Fearon, R. P., Schuengel, C., & Duschinsky, R. (2022). Psychophysiological responses underlying unresolved loss and trauma in the Adult Attachment Interview. *Development and Psychopathology*, *34*(1), 197-212.
- Barr, R. G., Fairbrother, N., Pauwels, J., Green, J., Chen, M., & Brant, R. (2014). Maternal frustration, emotional and behavioural responses to prolonged infant crying. *Infant Behavior and Development*, *37*(4), 652-664.
- Bartlett, J. D., & Easterbrooks, M. A. (2015). The moderating effect of relationships on intergenerational risk for infant neglect by young mothers. *Child abuse & neglect*, *45*, 21-34.
- Beckerman, M., van Berkel, S. R., Mesman, J., & Alink, L. R. (2018). Negative parental attributions mediate associations between risk factors and dysfunctional parenting: A replication and extension. *Child Abuse & Neglect*, *81*, 249-258.
- Belsky, J., Jaffee, S. R., Sligo, J., Woodward, L., & Silva, P. A. (2005). Intergenerational transmission of warm-sensitive-stimulating parenting: A prospective study of mothers and fathers of 3-year-olds. *Child development*, *76*(2), 384-396.
- Berlin, L. J., Dodge, K. A., & Reznick, J. S. (2013). Examining pregnant women's hostile attributions about infants as a predictor of offspring maltreatment. *JAMA pediatrics*, *167*, 549-553.
- Bernard, K., Zwerling, J., & Dozier, M. (2015). Effects of early adversity on young children's diurnal cortisol rhythms and externalizing behavior. *Developmental psychobiology*, *57*(8), 935-947.

- Bernstein, R. E., Measelle, J. R., Laurent, H. K., Musser, E. D., & Ablow, J. C. (2013). Sticks and stones may break my bones but words relate to adult physiology? Child abuse experience and women's sympathetic nervous system response while self-reporting trauma. *Journal of Aggression, Maltreatment & Trauma*, 22(10), 1117-1136.
- Berens, A. E., Jensen, S. K., & Nelson, C. A. (2017). Biological embedding of childhood adversity: from physiological mechanisms to clinical implications. *BMC medicine*, 15(1), 1-12.
- Bergman, K., Sarkar, P., O'Connor, T. G., Modi, N., & Glover, V. (2007). Maternal stress during pregnancy predicts cognitive ability and fearfulness in infancy. *Journal of The American Academy of Child & Adolescent Psychiatry*, 46, 1454-1463.
doi:10.1097/chi.0b013e31814a62f6
- Berlin, L. J., Appleyard, K., & Dodge, K. A. (2011). Intergenerational continuity in child maltreatment: Mediating mechanisms and implications for prevention. *Child development*, 82(1), 162-176.
- Berzenski, S. R., & Yates, T. M. (2022). The development of empathy in child maltreatment contexts. *Child Abuse & Neglect*, 133, 105827.
- Blandon, A. Y., Calkins, S. D., Keane, S. P., & O'brien, M. (2010). Contributions of child's physiology and maternal behavior to children's trajectories of temperamental reactivity. *Developmental Psychology*, 46(5), 1089.
- Bleker, L. S., van Dammen, L., Leeflang, M. M., Limpens, J., Roseboom, T. J., & de Rooij, S. R. (2020). Hypothalamic-pituitary-adrenal axis and autonomic nervous system reactivity in children prenatally exposed to maternal depression: a systematic review of prospective studies. *Neuroscience & Biobehavioral Reviews*, 117, 243-252.

- Boppana, S., & Rodriguez, C. M. (2017). Mediators between parenting history and expected at-risk parenting: Role of conformity, coping, and attitudes. *Journal of Child and Family Studies, 26*(11), 3237-3245.
- Bos, K. J., Fox, N., Zeanah, C. H., & Nelson, C. A. (2009). Effects of early psychosocial deprivation on the development of memory and executive function. *Frontiers in behavioral neuroscience, 16*.
- Bower-Russa, M. (2005). Attitudes mediate the association between childhood disciplinary history and disciplinary responses. *Child Maltreatment, 10*(3), 272-282.
- Bowlby, J. (1982). Attachment and loss: retrospect and prospect. *American journal of Orthopsychiatry, 52*, 664.
- Brophy-Herb, H. E., Schiffman, R. F., Bocknek, E. L., Dupuis, S. B., Fitzgerald, H. E., Horodynski, M., ... & Hillaker, B. (2011). Toddlers' social-emotional competence in the contexts of maternal emotion socialization and contingent responsiveness in a low-income sample. *Social Development, 20*(1), 73-92.
- Bryan, A. E., & Dix, T. (2009). Mothers' emotions and behavioral support during interactions with toddlers: The role of child temperament. *Social Development, 18*(3), 647-670.
- Bugental, D. B., Ellerson, P. C., Lin, E. K., Rainey, B., Kokotovic, A., & O'Hara, N. (2002). A cognitive approach to child abuse prevention. *Journal of Family Psychology, 16*(3), 243.
- Buisman, R. S., Pittner, K., Compier-de Block, L. H., van den Berg, L. J., Bakermans-Kranenburg, M. J., & Alink, L. R. (2018). The past is present: The role of maltreatment history in perceptual, behavioral and autonomic responses to infant emotional signals. *Child abuse & neglect, 77*, 23-34.

- Burrous, C. E., Crockenberg, S. C., & Leerkes, E. M. (2009). Developmental history of care and control, depression and anger: Correlates of maternal sensitivity in toddlerhood. *Infant Mental Health Journal: Official Publication of The World Association for Infant Mental Health*, 30(2), 103-123.
- Busso, D. S., McLaughlin, K. A., & Sheridan, M. A. (2017). Dimensions of adversity, physiological reactivity, and externalizing psychopathology in adolescence: Deprivation and threat. *Psychosomatic medicine*, 79(2), 162.
- Calkins, S. D., Graziano, P. A., Berdan, L. E., Keane, S. P., & Degnan, K. A. (2008). Predicting cardiac vagal regulation in early childhood from maternal–child relationship quality during toddlerhood. *Developmental Psychobiology: The Journal of the International Society for Developmental Psychobiology*, 50(8), 751-766.
- Calkins, S. D., & Hill, A. (2007). Caregiver influences on emerging emotion regulation. *Handbook of emotion regulation*, 229-248.
- Capaldi, D. M., Tiberio, S. S., Pears, K. C., Kerr, D. C., & Owen, L. D. (2019). Intergenerational associations in physical maltreatment: Examination of mediation by delinquency and substance use, and moderated mediation by anger. *Development and psychopathology*, 31(1), 73-82.
- Cassidy, J., Brett, B. E., Gross, J. T., Stern, J. A., Martin, D. R., Mohr, J. J., & Woodhouse, S. S. (2017). Circle of Security–Parenting: A randomized controlled trial in Head Start. *Development and psychopathology*, 29(2), 651-673.
- Cassidy, J., Jones, J. D., & Shaver, P. R. (2013). Contributions of attachment theory and research: A framework for future research, translation, and policy. *Development and psychopathology*, 25(4pt2), 1415-1434.

- Centers for Disease Control and Prevention. (2016) Adverse childhood experiences (ACEs). Retrieved from <https://www.cdc.gov/violenceprevention/acestudy/>
- Champagne, F. A., Weaver, I. C., Diorio, J., Dymov, S., Szyf, M., & Meaney, M. J. (2006). Maternal care associated with methylation of the estrogen receptor- α 1b promoter and estrogen receptor- α expression in the medial preoptic area of female offspring. *Endocrinology*, *147*(6), 2909-2915.
- Chen, J., Cross, W. M., Plummer, V., Lam, L., Sun, M., Qin, C., & Tang, S. (2019). The risk factors of antenatal depression: A cross-sectional survey. *Journal of clinical nursing*, *28*(19-20), 3599-3609.
- Chen, Z. Y., & Kaplan, H. B. (2001). Intergenerational transmission of constructive parenting. *Journal of Marriage and Family*, *63*(1), 17-31.
- Chen, Z. Y., Liu, R. X., & Kaplan, H. B. (2008). Mediating mechanisms for the intergenerational transmission of constructive parenting: A prospective longitudinal study. *Journal of Family Issues*, *29*(12), 1574-1599.
- Chung, E. K., Mathew, L., Elo, I. T., Coyne, J. C., & Culhane, J. F. (2008). Depressive symptoms in disadvantaged women receiving prenatal care: the influence of adverse and positive childhood experiences. *Ambulatory Pediatrics*, *8*(2), 109-116.
- Chung, E. K., Mathew, L., Rothkopf, A. C., Elo, I. T., Coyne, J. C., & Culhane, J. F. (2009). Parenting attitudes and infant spanking: The influence of childhood experiences. *Pediatrics*, *124*(2), e278-e286.
- Clément, M. È., & Chamberland, C. (2009). The role of parental stress, mother's childhood abuse and perceived consequences of violence in predicting attitudes and attribution in favor of corporal punishment. *Journal of Child and Family Studies*, *18*(2), 163-171.

- Coard, S. I., Foy-Watson, S., Zimmer, C., & Wallace, A. (2007). Considering culturally relevant parenting practices in intervention development and adaptation: A randomized controlled trial of the Black Parenting Strengths and Strategies (BPSS) Program. *The Counseling Psychologist, 35*(6), 797-820.
- Coard, S. I., & Sellers, R. M. (2005). African American families as a context for racial socialization. *African American family life: Ecological and cultural diversity, 264-284.*
- Compas, B. E., Forsythe, C. J., & Wagner, B. M. (1988). Consistency and variability in causal attributions and coping with stress. *Cognitive therapy and research, 12*(3), 305-320.
- Conradt, E., Degarmo, D., Fisher, P., Abar, B., Lester, B. M., Lagasse, L. L., ... & Hammond, J. A. (2014). The contributions of early adverse experiences and trajectories of respiratory sinus arrhythmia on the development of neurobehavioral disinhibition among children with prenatal substance exposure. *Development and psychopathology, 26*(4pt1), 901-916.
- Costa, P. T., & McCrae, R. R. (1992). NEO PI-R professional manual: Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI). Odessa, FL: Psychological Assessment Resources.
- Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological bulletin, 115*, 74
- Crockenberg, S. C., & Leerkes, E. M. (2011). Parenting infants.
- Crouch, E., Radcliff, E., Strompolis, M., & Srivastav, A. (2019). Safe, stable, and nurtured: Protective factors against poor physical and mental health outcomes following exposure to adverse childhood experiences (ACEs). *Journal of Child & Adolescent Trauma, 12*(2), 165-173.

- Cummings, E. M., & Cummings, J. S. (2002). Parenting and attachment. *Handbook of Parenting Volume 5 Practical Issues in Parenting*, 35
- Daggett, J., O'Brien, M., Zanolli, K., & Peyton, V. (2000). Parents' attitudes about children: associations with parental life histories and child-rearing quality. *Journal of Family Psychology*, 14(2), 187.
- Davidov, M., & Grusec, J. E. (2006). Untangling the links of parental responsiveness to distress and warmth to child outcomes. *Child development*, 77(1), 44-58.
- Davis, M. H., & Franzoi, S. L. (1991). Stability and change in adolescent self-consciousness and empathy. *Journal of research in Personality*, 25(1), 70-87.
- Deans, C. L. (2020). Maternal sensitivity, its relationship with child outcomes, and interventions that address it: A systematic literature review. *Early Child Development and Care*, 190(2), 252-275.
- Deater-Deckard, K., Chen, N., Wang, Z., & Bell, M. A. (2012). Socioeconomic risk moderates the link between household chaos and maternal executive function. *Journal of Family Psychology*, 26(3), 391.
- Del Vecchio, T., Jablonka, O., DiGiuseppe, R., Notti, J., & David, O. (2017). Psychometric evaluation of the parent anger scale. *Journal of Child and Family Studies*, 26(11), 3013-3025.
- Del Vecchio, T., Walter, A., & O'Leary, S. G. (2009). Affective and physiological factors predicting maternal response to infant crying. *Infant Behavior and Development*, 32(1), 117-122.
- Denham, S. A. (1993). Maternal emotional responsiveness and toddlers' social-emotional competence. *Journal of Child Psychology and Psychiatry*, 34(5), 715-728.

- DeOliveira, C. A., Moran, G., & Pederson, D. R. (2005). Understanding the link between maternal adult attachment classifications and thoughts and feelings about emotions. *Attachment & human development, 7*(2), 153-170.
- Dix, T. (1991). The affective organization of parenting: Adaptive and maladaptive processes. *Psychological bulletin, 110*(1), 3.
- Dix, T. (1993). Attributing dispositions to children: An interactional analysis of attribution in socialization. *Personality and Social Psychology Bulletin, 19*, 633-643.
- Dix, T., Gershoff, E. T., Meunier, L. N., & Miller, P. C. (2004). The affective structure of supportive parenting: depressive symptoms, immediate emotions, and child-oriented motivation. *Developmental psychology, 40*(6), 1212.
- Domitrovich, C. E., & Bierman, K. L. (2001). Parenting practices and child social adjustment: Multiple pathways of influence. *Merrill-Palmer Quarterly (1982-), 235-263*.
- Dotterer, A. M., Iruka, I. U., & Pungello, E. (2012). Parenting, race, and socioeconomic status: Links to school readiness. *Family Relations, 61*(4), 657-670.
- Dozier, M., Bernard, K., & Roben, C. K. (2017). Attachment and biobehavioral catch-up. *Handbook of attachment-based interventions, 27-49*.
- Dozier, M., & Kobak, R. R. (1992). Psychophysiology in attachment interviews: Converging evidence for deactivating strategies. *Child development, 63*(6), 1473-1480.
- Driscoll, J. R., & Easterbrooks, M. A. (2007). Young mothers' play with their toddlers: Individual variability as a function of psychosocial factors. *Infant and Child Development: An International Journal of Research and Practice, 16*(6), 649-670.

- Dube, S.R., Williamson, D.F., Thompson, T., Felitti, V.J., Anda, R.F., 2004. Assessing the reliability of retrospective reports of adverse childhood experiences among adult HMO members attending a primary care clinic. *Child Abuse Neglect* 28, 729–737.
- Dunbar, A. S., Leerkes, E. M., Coard, S. I., Supple, A. J., & Calkins, S. (2017). An integrative conceptual model of parental racial/ethnic and emotion socialization and links to children's social-emotional development among African American families. *Child Development Perspectives*, 11(1), 16-22.
- Dvir, Y., Ford, J. D., Hill, M., & Frazier, J. A. (2014). Childhood maltreatment, emotional dysregulation, and psychiatric comorbidities. *Harvard review of psychiatry*, 22(3), 149.
- Dykas, M. J., & Cassidy, J. (2011). Attachment and the processing of social information across the life span: theory and evidence. *Psychological bulletin*, 137(1), 19.
- Egeland, B., Jacobvitz, D., & Sroufe, L. A. (1988). Breaking the cycle of abuse. *Child development*, 1080-1088.
- Eisenberg, N. (2003). Prosocial behavior, empathy, and sympathy.
- Eisenberg, N. (2020). Findings, issues, and new directions for research on emotion socialization. *Developmental psychology*, 56(3), 664.
- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological inquiry*, 9(4), 241-273.
- Eisenberg, N., Fabes, R. A., Murphy, B., Maszk, P., Smith, M., & Karbon, M. (1995). The role of emotionality and regulation in children's social functioning: A longitudinal study. *Child development*, 66(5), 1360-1384.

- Eisenberg, N., Fabes, R. A., Shepard, S. A., Guthrie, I. K., Murphy, B. C., & Reiser, M. (1999). Parental reactions to children's negative emotions: Longitudinal relations to quality of children's social functioning. *Child development, 70*(2), 513-534.
- Eisenberg, N., & McNally, S. (1993). Socialization and mothers' and adolescents' empathy-related characteristics. *Journal of Research on Adolescence, 3*(2), 171-191.
- Eisenberg, N., Miller, P. A., Shell, R., Mcnalley, S., & Shea, C. (1991). Prosocial development in adolescence: A longitudinal study. *Developmental psychology, 27*(5), 849.
- Enlow, M. B., King, L., Schreier, H. M., Howard, J. M., Rosenfield, D., Ritz, T., & Wright, R. J. (2014). Maternal sensitivity and infant autonomic and endocrine stress responses. *Early human development, 90*(7), 377-385.
- Esposito, E. A., Koss, K. J., Donzella, B., & Gunnar, M. R. (2016). Early deprivation and autonomic nervous system functioning in post-institutionalized children. *Developmental Psychobiology, 58*(3), 328-340.
- Evans, G. W., & Kim, P. (2013). Childhood poverty, chronic stress, self-regulation, and coping. *Child development perspectives, 7*(1), 43-48.
- Fabes, R. A., Leonard, S. A., Kupanoff, K., & Martin, C. L. (2001). Parental coping with children's negative emotions: Relations with children's emotional and social responding. *Child development, 72*(3), 907-920.
- Feldman, R. (2007). Parent–infant synchrony: Biological foundations and developmental outcomes. *Current directions in psychological science, 16*(6), 340-345.
- Felitti, V.J., Anda, R.F., Nordenberg, D., Williamson, D.F., Spitz, A.M., Edwards, V., Koss, M.P., Marks, J.S., 1998. Relationship of childhood abuse and household dysfunction to

- many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *Am. J. Prev. Med.* 14, 245–258
- Field, T. (1995). Infants of depressed mothers. *Infant behavior & development*.
- Field, T., Healy, B., Goldstein, S., Perry, S., Bendell, D., Schanberg, S., ... & Kuhn, C. (1988). Infants of depressed mothers show "depressed" behavior even with nondepressed adults. *Child development*, 1569-1579.
- Fifer, W. P., Fingers, S. T., Youngman, M., Gomez-Gribben, E., & Myers, M. M. (2009). Effects of alcohol and smoking during pregnancy on infant autonomic control. *Developmental Psychobiology: The Journal of the International Society for Developmental Psychobiology*, 51(3), 234-242.
- Fishbane, M. D. (2012). Neurobiology and family processes. In F. Walsh (Ed.), *Normal family processes: Growing diversity and complexity* (4th ed., pp. 553–574). New York: Guilford.
- Fishbein, D., Warner, T., Krebs, C., Trevarthen, N., Flannery, B., & Hammond, J. (2009). Differential relationships between personal and community stressors and children's neurocognitive functioning. *Child maltreatment*, 14(4), 299-315.
- Flasbeck, V., Moser, D., Kumsta, R., & Brüne, M. (2018). The OXTR single-nucleotide polymorphism rs53576 moderates the impact of childhood maltreatment on empathy for social pain in female participants: evidence for differential susceptibility. *Frontiers in psychiatry*, 9, 359.
- Ford, J. D., Fraleigh, L. A., Albert, D. B., & Connor, D. F. (2010). Child abuse and autonomic nervous system hyporesponsivity among psychiatrically impaired children. *Child Abuse & Neglect*, 34(7), 507-515.

- Frodi, A. M., & Lamb, M. E. (1980). Child abusers' responses to infant smiles and cries. *Child Development*, 51, 238-241. doi: 10.2307/1129612
- Fuchs, A., Möhler, E., Resch, F., & Kaess, M. (2015). Impact of a maternal history of childhood abuse on the development of mother–infant interaction during the first year of life. *Child Abuse & Neglect*, 48, 179-189.
- Garner, P. W., Dunsmore, J. C., & Southam-Gerrow, M. (2008). Mother–child conversations about emotions: Linkages to child aggression and prosocial behavior. *Social development*, 17(2), 259-277.
- Gee, D. G., Gabard-Durnam, L. J., Flannery, J., Goff, B., Humphreys, K. L., Telzer, E. H., ... & Tottenham, N. (2013). Early developmental emergence of human amygdala–prefrontal connectivity after maternal deprivation. *Proceedings of the National Academy of Sciences*, 110(39), 15638-15643.
- George, C., Kaplan, N., & Main, M. (1996). The Berkeley Adult Attachment Interview. Unpublished manuscript. Department of Psychology, University of California, Berkeley.
- Greene, C. A., Haisley, L., Wallace, C., & Ford, J. D. (2020). Intergenerational effects of childhood maltreatment: A systematic review of the parenting practices of adult survivors of childhood abuse, neglect, and violence. *Clinical psychology review*, 80, 101891.
- Greenberg, D. M., Baron-Cohen, S., Rosenberg, N., Fonagy, P., & Rentfrow, P. J. (2018). Elevated empathy in adults following childhood trauma. *PLoS One*, 13(10), e0203886.
- Haft, W. L., & Slade, A. (1989). Affect attunement and maternal attachment: A pilot study. *Infant mental health journal*, 10(3), 157-172.

- Hajal, N. J., & Paley, B. (2020). Parental emotion and emotion regulation: A critical target of study for research and intervention to promote child emotion socialization. *Developmental Psychology, 56*, 403. <https://doi.org/10.1037/dev0000864>
- Haltigan, J. D., Leerkes, E. M., Burney, R. V., O'Brien, M., Supple, A. J., & Calkins, S. D. (2012). The infant crying questionnaire: Initial factor structure and validation. *Infant Behavior and Development, 35*, 876-883.
- Hamad, E. S. J., & AD-daghistani, S. I. (2022). Hostile Attribution Bias and Its Relationship to Attachment Methods. *Journal of Positive School Psychology, 7*486-7504.
- Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: review of the evidence. *Journal of child psychology and psychiatry, 45*, 260-273.
- Hastings, P. D., Klimes-Dougan, B., Kendziora, K. T., Brand, A., & Zahn-Waxler, C. (2014). Regulating sadness and fear from outside and within: Mothers' emotion socialization and adolescents' parasympathetic regulation predict the development of internalizing difficulties. *Development and psychopathology, 26*(4pt2), 1369-1384.
- Hechler, C., Beijers, R., Riksen-Walraven, M., & de Weerth, C. (2019). Prenatal predictors of postnatal quality of caregiving behavior in mothers and fathers. *Parenting, 19*(1-2), 101-119.
- Hildyard, K., & Wolfe, D. (2007). Cognitive processes associated with child neglect. *Child Abuse & Neglect, 31*(8), 895-907.
- Huffman, L. C., Bryan, Y., Del Carmen, R., Pederson, F., Doussard-Roosevelt, J., & Porges, S. W. (1998). Infant temperament and cardiac vagal tone: Assessments at twelve weeks of age. *Child Development, 69*, 624-635. doi: 10.2307/1132194

- Izard, C. E. (1994). Innate and universal facial expressions: evidence from developmental and cross-cultural research.
- Jacobvitz, D., Leon, K., & Hazen, N. (2006). Does expectant mothers' unresolved trauma predict frightened/frightening maternal behavior? Risk and protective factors. *Development and psychopathology, 18*(2), 363-379.
- Jaffee, S. R., & Price, T. S. (2007). Gene–environment correlations: A review of the evidence and implications for prevention of mental illness. *Molecular psychiatry, 12*(5), 432-442.
- Jansson, L. M., DiPietro, J. A., Elko, A., & Velez, M. (2010). Infant autonomic functioning and neonatal abstinence syndrome. *Drug and alcohol dependence, 109*(1-3), 198-204.
- Johnson, M., Deardorff, J., Davis, E. L., Martinez, W., Eskenazi, B., & Alkon, A. (2017). The relationship between maternal responsivity, socioeconomic status, and resting autonomic nervous system functioning in Mexican American children. *International Journal of Psychophysiology, 116*, 45-52.
- Joosen, K. J., Mesman, J., Bakermans-Kranenburg, M. J., Pieper, S., Zeskind, P. S., & Van Ijzendoorn, M. H. (2013). Physiological reactivity to infant crying and observed maternal sensitivity. *Infancy, 18*(3), 414-431.
- Kabacoff, R. I., Segal, D. L., Hersen, M., & Van Hasselt, V. B. (1997). Psychometric properties and diagnostic utility of the Beck Anxiety Inventory and the State-Trait Anxiety Inventory with older adult psychiatric outpatients. *Journal of Anxiety Disorders, 11*, 33-47. doi:10.1016/S0887-6185(96)00033-3
- Keil, V., & Price, J. M. (2009). Social information-processing patterns of maltreated children in two social domains. *Journal of Applied Developmental Psychology, 30*(1), 43-52.

- Kenny D.A. (2014). Measuring model fit. Retrieved February 6, 2023, from <http://davidakenny.net/cm/fit.htm>.
- Kerr, D. C., & Capaldi, D. M. (2019). Intergenerational transmission of parenting. *Handbook of parenting*, 443-481.
- Kerr, D. C., Capaldi, D. M., Pears, K. C., & Owen, L. D. (2009). A prospective three generational study of fathers' constructive parenting: Influences from family of origin, adolescent adjustment, and offspring temperament. *Developmental psychology*, 45(5), 1257.
- Khan, M., & Renk, K. (2019). Mothers' adverse childhood experiences, depressive symptoms, parenting, and attachment as predictors of young children's problems. *Journal of Child Custody*, 16(3), 268-290.
- Klimes-Dougan, B., & Kistner, J. (1990). Physically abused preschoolers' responses to peers' distress. *Developmental psychology*, 26(4), 599.
- Koss, K. J., & Gunnar, M. R. (2018). Annual research review: Early adversity, the hypothalamic–pituitary–adrenocortical axis, and child psychopathology. *Journal of Child Psychology and Psychiatry*, 59(4), 327-346.
- Kovan, N. M., Chung, A. L., & Sroufe, L. A. (2009). The intergenerational continuity of observed early parenting: a prospective, longitudinal study. *Developmental Psychology*, 45(5), 1205.
- Kuzminskaite, E., Vinkers, C. H., Elzinga, B. M., Wardenaar, K. J., Giltay, E. J., & Penninx, B. W. (2020). Childhood trauma and dysregulation of multiple biological stress systems in adulthood: Results from the Netherlands Study of Depression and Anxiety (NESDA). *Psychoneuroendocrinology*, 121, 104835.

- Lacey, R. E., & Minnis, H. (2020). Practitioner review: twenty years of research with adverse childhood experience scores—advantages, disadvantages and applications to practice. *Journal of Child Psychology and Psychiatry*, *61*(2), 116-130.
- Lanza, S. T., Rhoades, B. L., Greenberg, M. T., Cox, M., & Family Life Project Key Investigators. (2011). Modeling multiple risks during infancy to predict quality of the caregiving environment: Contributions of a person-centered approach. *Infant Behavior and Development*, *34*(3), 390-406.
- Laurent, H. K., Ablow, J. C., & Measelle, J. (2011). Risky shifts: How the timing and course of mothers' depressive symptoms across the perinatal period shape their own and infant's stress response profiles. *Development and psychopathology*, *23*(2), 521-538.
- Lazarus, R. S. (1991). Cognition and motivation in emotion. *American psychologist*, *46*(4), 352.
- Leerkes, E. M. (2010). Predictors of maternal sensitivity to infant distress. *Parenting: Science and Practice*, *10*(3), 219-239.
- Leerkes, E. M., & Augustine, M. E. (2019). Parenting and emotions. In *Handbook of parenting* (pp. 620-653). Routledge.
- Leerkes, E. M., Bailes, L. G., & Augustine, M. E. (2020). The intergenerational transmission of emotion socialization. *Developmental Psychology*, *56*(3), 390.
- Leerkes, E. M., Blankson, A. N., & O'Brien, M. (2009). Differential effects of maternal sensitivity to infant distress and nondistress on social-emotional functioning. *Child development*, *80*(3), 762-775.
- Leerkes, E. M., Buehler, C., Calkins, S. D., Shriver, L. H., & Wideman, L. (2020). Protocol for iGrow (Infant Growth and Development Study): biopsychosocial predictors of childhood obesity risk at 2 years. *BMC Public Health*, *20*, 1-14

- Leerkes, E. M., & Crockenberg, S. C. (2002). The development of maternal self-efficacy and its impact on maternal behavior. *Infancy, 3*(2), 227-247.
- Leerkes, E. M., Girod, S. A., Buehler, C., Shriver, L. H., & Wideman, L. (2023). Interactive effects of maternal physiological arousal and regulation on maternal sensitivity: Replication and extension in an independent sample. *Developmental Psychobiology, 65*(2), e22375.
- Leerkes, E. M., Parade, S. H., & Burney, R. V. (2010). Origins of mothers' and fathers' beliefs about infant crying. *Journal of Applied Developmental Psychology, 31*(6), 467-474.
- Leerkes, E. M., Parade, S. H., & Gudmundson, J. A. (2011). Mothers' emotional reactions to crying pose risk for subsequent attachment insecurity. *Journal of Family Psychology, 25*(5), 635.
- Leerkes, E. M., & Qu, J. (2020). The My Emotions Questionnaire: A self-report of mothers' emotional responses to infant crying. *Infant mental health journal, 41*, 94-107.
- Leerkes, E. M., & Siepak, K. J. (2006). Attachment linked predictors of women's emotional and cognitive responses to infant distress. *Attachment & Human Development, 8*(01), 11-32.
- Leerkes, E., Sommers, S., & Bailes, L. (2022). The Validity of Prenatal Assessments of Mothers' Emotional, Cognitive, and Physiological Reactions to Infant Cry. *Parenting, 22*(4), 286-314.
- Leerkes, E. M., Su, J., Calkins, S. D., Supple, A. J., & O'Brien, M. (2016). Pathways by which mothers' physiological arousal and regulation while caregiving predict sensitivity to infant distress. *Journal of Family Psychology, 30*(7), 769.
- Leerkes, E. M., Supple, A. J., O'Brien, M., Calkins, S. D., Haltigan, J. D., Wong, M. S., & Fortuna, K. (2015). Antecedents of maternal sensitivity during distressing tasks:

- Integrating attachment, social information processing, and psychobiological perspectives. *Child development*, 86(1), 94-111.
- Leerkes, E. M., Weaver, J. M., & O'Brien, M. (2012). Differentiating maternal sensitivity to infant distress and non-distress. *Parenting*, 12(2-3), 175-184.
- Lemerise, E. A., & Arsenio, W. F. (2000). An integrated model of emotion processes and cognition in social information processing. *Child development*, 71, 107-118
- Lieberman, A. F., Padrón, E., Van Horn, P., & Harris, W. W. (2005). Angels in the nursery: The intergenerational transmission of benevolent parental influences. *Infant Mental Health Journal: Official Publication of The World Association for Infant Mental Health*, 26(6), 504-520.
- Lieberman, A. F., & Van Horn, P. J. (2008). Psychotherapy with infants and young children: Repairing the effects of stress and trauma on early attachment. New York: Guilford Press
- Lizardi, H., & Klein, D. N. (2005). Long-term stability of parental representations in depressed outpatients utilizing the Parental Bonding Instrument. *The Journal of Nervous and Mental Disease*, 193(3), 183-8.
- Locher, S. C., Barenblatt, L., Fourie, M. M., Stein, D. J., & Gobodo-Madikizela, P. (2014). Empathy and childhood maltreatment: A mixed-methods investigation. *Annals of Clinical Psychiatry*, 26(2), 97-110.
- Lomanowska, A. M., Boivin, M., Hertzman, C., & Fleming, A. S. (2017). Parenting begets parenting: A neurobiological perspective on early adversity and the transmission of parenting styles across generations. *Neuroscience*, 342, 120-139.
- Lorber, M. F. (2012). The role of maternal emotion regulation in overreactive and lax discipline. *Journal of family psychology*, 26(4), 642.

- Lorber, M. F., Mitnick, D. M., & Slep, A. M. S. (2016). Parents' experience of flooding in discipline encounters: Associations with discipline and interplay with related factors. *Journal of Family Psychology, 30*(4), 470.
- Lorber, M. F., & O'leary, S. G. (2005). Mediated paths to overreactive discipline: Mothers' experienced emotion, appraisals, and physiological responses. *Journal of consulting and clinical psychology, 73*(5), 972.
- Lorber, M. F., & Smith Slep, A. M. (2005). Mothers' emotion dynamics and their relations with harsh and lax discipline: Microsocial time series analyses. *Journal of Clinical Child and Adolescent Psychology, 34*(3), 559-568.
- Lovejoy, M. C., Graczyk, P. A., O'Hare, E., & Neuman, G. (2000). Maternal depression and parenting behavior: A meta-analytic review. *Clinical psychology review, 20*, 561-592.
- Luke, N., & Banerjee, R. (2012). Maltreated children's social understanding and empathy: A preliminary exploration of foster carers' perspectives. *Journal of child and family studies, 21*(2), 237-246.
- Luthar, S. S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child development, 71*(3), 543-562.
- Luthar, S. S., & Eisenberg, N. (2017). Resilient adaptation among at-risk children: Harnessing science toward maximizing salutary environments. *Child development, 88*(2), 337-349.
- Luthar, S. S., Sawyer, J. A., & Brown, P. J. (2006). Conceptual issues in studies of resilience: Past, present, and future research. *Annals of the New York Academy of Sciences, 1094*(1), 105-115.
- Lyons-Ruth, K., & Block, D. (1996). The disturbed caregiving system: Relations among childhood trauma, maternal caregiving, and infant affect and attachment. *Infant Mental*

- Health Journal: Official Publication of The World Association for Infant Mental Health*, 17(3), 257-275.
- Madigan, S., Cyr, C., Eirich, R., Fearon, R. P., Ly, A., Rash, C., ... & Alink, L. R. (2019). Testing the cycle of maltreatment hypothesis: Meta-analytic evidence of the intergenerational transmission of child maltreatment. *Development and psychopathology*, 31(1), 23-51.
- Main, M., & George, C. (1985). Responses of abused and disadvantaged toddlers to distress inagemates: A study in the day care setting. *Developmental psychology*, 21(3), 407.
- Marie-Mitchell, A., & O'Connor, T. G. (2013). Adverse childhood experiences: translating knowledge into identification of children at risk for poor outcomes. *Academic pediatrics*, 13(1), 14-19.
- Masten, A. S. (2001). Ordinary magic: Resilience processes in development. *American psychologist*, 56(3), 227.
- 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, 521-549.
- McCormack, C., Lauriola, V., Feng, T., Lee, S., Spann, M., Mitchell, A., Champagne, F., & Monk, C. (2021). Maternal childhood adversity and inflammation during pregnancy: Interactions with diet quality and depressive symptoms. *Brain, behavior, and immunity*, 91, 172–180. <https://doi.org/10.1016/j.bbi.2020.09.023>
- McCrae, R. R., & Costa, P. T., Jr. (2004). A contemplated revision of the NEO Five-Factor Inventory. *Personality and Individual Differences*, 36, 587-596.

- McDonald, N. M., & Messinger, D. S. (2011). The development of empathy: How, when, and why. *Moral behavior and free will: A neurobiological and philosophical approach*, 333-359.
- McElwain, N. L., & Booth-LaForce, C. (2006). Maternal sensitivity to infant distress and nondistress as predictors of infant-mother attachment security. *Journal of family Psychology*, 20(2), 247.
- McElwain, N. L., Booth-LaForce, C., Lansford, J. E., Wu, X., & Justin Dyer, W. (2008). A process model of attachment–friend linkages: Hostile attribution biases, language ability, and mother–child affective mutuality as intervening mechanisms. *Child development*, 79(6), 1891-1906.
- McLaughlin, K. A., Sheridan, M. A., Alves, S., & Mendes, W. B. (2014). Child maltreatment and autonomic nervous system reactivity: Identifying dysregulated stress reactivity patterns by using the biopsychosocial model of challenge and threat. *Psychosomatic medicine*, 76(7), 538-546.
- Melville, A. (2017). Adverse childhood experiences from ages 0–2 and young adult health: Implications for preventive screening and early intervention. *Journal of Child & Adolescent Trauma*, 10(3), 207-215.
- Mills-Koonce, W. R., Appleyard, K., Barnett, M., Deng, M., Putallaz, M., & Cox, M. (2011). Adult attachment style and stress as risk factors for early maternal sensitivity and negativity. *Infant Mental Health Journal*, 32, 277-285.
- Mills-Koonce, W. R., Garipey, J.-L., Propper, C. B., Sutton, K., Calkins, S., Moore, G., et al. (2007). Infant and parent factors associated with early maternal sensitivity: A caregiver-

- attachment systems approach. *Infant Behavior and Development*, 30, 114-126. doi: 10.1016/j.infbeh.2006.11.010
- Mills-Koonce, W. R., Propper, C., Garipey, J., Barnett, M., Moore, G. A., Calkins, S., & Cox, M. J. (2009). Psychophysiological correlates of parenting behaviors in mothers of young children. *Developmental Psychobiology*, 51, 650-661. doi: 10.1002/dev.20400.
- Milner, J. S., & Crouch, J. L. (2000). Child physical abuse: Theory and research. *Family violence: Prevention and treatment*, 33-65.
- Milner, J. S., Crouch, J. L., McCarthy, R. J., Ammar, J., Dominguez-Martinez, R., Thomas, C. L., & Jensen, A. P. (2022). Child physical abuse risk factors: A systematic review and a meta-analysis. *Aggression and violent behavior*, 101778.
- Moore, G. A., & Calkins, S. D. (2004). Infants' vagal regulation in the still-face paradigm is related to dyadic coordination of mother-infant interaction. *Developmental Psychology*, 40(6), 1068.
- Moore, G. A., Hill, A. L., Propper, C. B., Calkins, S. D., Mills-Koonce, W. R., & Cox, M. J. (2009). Mother-infant vagal regulation in the face-to-face still-face paradigm is moderated by maternal sensitivity. *Child Development*, 82, 209–223. doi: 10.1111/j.1467-8624.2008.01255.x
- Moss, S. (2009). Fit Indices for Structural Equation Modeling. Retrieved February 22, 2023 from <http://www.psych-it.com.au/Psychlopedia/article.asp>.
- Muthén, B., & Muthén, L. (2017). *Mplus* (pp. 507-518). Chapman and Hall/CRC
- Narayan, A. J., Kalstabakken, A. W., Labella, M. H., Nerenberg, L. S., Monn, A. R., & Masten, A. S. (2017). Intergenerational continuity of adverse childhood experiences in homeless

- families: Unpacking exposure to maltreatment versus family dysfunction. *American Journal of Orthopsychiatry*, 87(1), 3.
- Nelson, D. A., & Coyne, S. M. (2009). Children's intent attributions and feelings of distress: Associations with maternal and paternal parenting practices. *Journal of abnormal child psychology*, 37(2), 223-237.
- NICHHD Early Child Care Research Network. (1999). Child care and mother-child interaction in the first 3 years of life. *Developmental Psychology*, 35, 1399-1413.
- Nivison, M. D., Vandell, D. L., Booth-LaForce, C., & Roisman, G. I. (2021). Convergent and discriminant validity of retrospective assessments of the quality of childhood parenting: Prospective evidence from infancy to age 26 years. *Psychological Science*, 32(5), 721-734.
- Norbeck, J. S., & Anderson, N. J. (1989). Life stress, social support, and anxiety in mid-and late-pregnancy among low income women. *Research in nursing & health*, 12, 281-287.
- Norcross, P. L., Bailes, L. G., & Leerkes, E. (2020). Effects of maternal depressive symptoms on sensitivity to infant distress and non-distress: Role of SES and race. *Infant Behavior and Development*, 61, 101498.
- Oosterman, M., Schuengel, C., Forrer, M. L., & De Moor, M. H. (2019). The impact of childhood trauma and psychophysiological reactivity on at-risk women's adjustment to parenthood. *Development and psychopathology*, 31(1), 127-141.
- Panter-Brick, C., & Leckman, J. F. (2013). Editorial commentary: resilience in child development—interconnected pathways to wellbeing. *Journal of child psychology and psychiatry*, 54(4), 333-336.

- Parker, G., Tupling, H., & Brown, L. B. (1979). A parental bonding instrument. *British Journal of Medical Psychology*, *52*(1), 1–10. <https://doi.org/10.1111/j.2044-8341.1979.tb02487.x>
- Pears, K. C., & Capaldi, D. M. (2001). Intergenerational transmission of abuse: A two-generational prospective study of an at-risk sample. *Child abuse & neglect*, *25*(11), 1439-1461.
- Pereira, J., Vickers, K., Atkinson, L., Gonzalez, A., Wekerle, C., & Levitan, R. (2012). Parenting stress mediates between maternal maltreatment history and maternal sensitivity in a community sample. *Child abuse & neglect*, *36*(5), 433-437.
- Perlman, S. B., Camras, L. A., & Pelphrey, K. A. (2008). Physiology and functioning: Parents' vagal tone, emotion socialization, and children's emotion knowledge. *Journal of Experimental Child Psychology*, *100*(4), 308-315.
- Perry, N. B., Calkins, S. D., & Bell, M. A. (2016). Indirect effects of maternal sensitivity on infant emotion regulation behaviors: The role of vagal withdrawal. *Infancy*, *21*(2), 128-153.
- Perry, N. B., Calkins, S. D., Nelson, J. A., Leerkes, E. M., & Marcovitch, S. (2012). Mothers' responses to children's negative emotions and child emotion regulation: The moderating role of vagal suppression. *Developmental psychobiology*, *54*(5), 503-513.
- Perry, N. B., Dollar, J. M., Calkins, S. D., Keane, S. P., & Shanahan, L. (2020). Maternal socialization of child emotion and adolescent adjustment: Indirect effects through emotion regulation. *Developmental psychology*, *56*(3), 541.
- Perry, N. B., Nelson, J. A., Swingler, M. M., Leerkes, E. M., Calkins, S. D., Marcovitch, S., & O'Brien, M. (2013). The relation between maternal emotional support and child

- physiological regulation across the preschool years. *Developmental psychobiology*, 55(4), 382-394.
- Pilkington, P. D., Bishop, A., & Younan, R. (2021). Adverse childhood experiences and early maladaptive schemas in adulthood: A systematic review and meta-analysis. *Clinical Psychology & Psychotherapy*, 28(3), 569-584.
- Plantes, M. M., Prusoff, B. A., Brennan, J., & Parker, G. (1988). Parental representations of depressed outpatients from a U.S.A. sample. *Journal of Affective Disorders*, 15(2), 149–155. [https://doi.org/10.1016/0165-0327\(88\)90083-3](https://doi.org/10.1016/0165-0327(88)90083-3)
- Pollak, S. D., Vardi, S., Putzer Bechner, A. M., & Curtin, J. J. (2005). Physically abused children's regulation of attention in response to hostility. *Child development*, 76(5), 968-977.
- Porges SW. (1985). *Respiratory sinus arrhythmia: An index of vagal tone*. In J. F. Orlebeke, G. Mulder, and L. J. P Van Dornen (Eds.), *Psychophysiology of Cardiovascular Control: Models, Methods, and Data* (pp. 437-450). New York: Plenum.
- Porges, S. W., Doussard-Roosevelt, J. A., & Maiti, A. K. (1994). Vagal tone and the physiological regulation of emotion. *Monographs of the society for research in child development*, 167-186
- Porges, S. W. (2007). The polyvagal perspective. *Biological psychology*, 74, 116-143.
- Portnoy, J., Cui, N., Raine, A., Frazier, A., Rudo-Hutt, A. S., & Liu, J. (2020). Autonomic nervous system activity and callous-unemotional traits in physically maltreated youth. *Child abuse & neglect*, 101, 104308.
- Powell, B., Cooper, G., Hoffman, K., & Marvin, B. (2013). *The circle of security intervention: Enhancing attachment in early parent-child relationships*. Guilford publications.

- Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, 36, 717-731.
- Price, J. M., & Glad, K. (2003). Hostile attributional tendencies in maltreated children. *Journal of Abnormal Child Psychology*, 31(3), 329-343
- Price, J. M., & Van Slyke, D. (1991). Social information processing patterns and social adjustment of maltreated children. In *biennial meeting of the Society for Research in Child Development, Seattle, WA..*
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.
- Raikes, H. A., & Thompson, R. A. (2008). Attachment security and parenting quality predict children's problem-solving, attributions, and loneliness with peers. *Attachment & human development*, 10(3), 319-344.
- Reijman, S., Alink, L. R., Block, L. H. C. D., Werner, C. D., Maras, A., Rijnberk, C., ... & Bakermans-Kranenburg, M. J. (2014). Autonomic reactivity to infant crying in maltreating mothers. *Child Maltreatment*, 19(2), 101-112.
- Reijman, S., Bakermans-Kranenburg, M. J., Hiraoka, R., Crouch, J. L., Milner, J. S., Alink, L. R., & van IJzendoorn, M. H. (2016). Baseline functioning and stress reactivity in maltreating parents and at-risk adults: Review and meta-analyses of autonomic nervous system studies. *Child maltreatment*, 21(4), 327-342.
- Reuben, A., Moffitt, T. E., Caspi, A., Belsky, D. W., Harrington, H., Schroeder, F., ... & Danese, A. (2016). Lest we forget: comparing retrospective and prospective assessments of

- adverse childhood experiences in the prediction of adult health. *Journal of Child Psychology and Psychiatry*, 57, 1103-1112.
- Rigterink, T., Fainsilber Katz, L., & Hessler, D. M. (2010). Domestic violence and longitudinal associations with children's physiological regulation abilities. *Journal of Interpersonal Violence*, 25(9), 1669-1683.
- Roberts, W. L., & Strayer, J. (1987). Parents' responses to the emotional distress of their children: Relations with children's competence. *Developmental psychology*, 23(3), 415.
- Robins, R. W., Fraley, R. C., Roberts, B. W., & Trzesniewski, K. H. (2001). A longitudinal study of personality change in young adulthood. *Journal of Personality*, 69, 617-640.
- Roisman, G. I., Tsai, J. L., & Chiang, K. H. S. (2004). The emotional integration of childhood experience: physiological, facial expressive, and self-reported emotional response during the adult attachment interview. *Developmental psychology*, 40(5), 776.
- Rousseau, S., Feldman, T., Harroy, L., Avisar, N., Wolf, M., Bador, K., & Frenkel, T. (2019). High emotionality to infant cry: associations with adult attachment, gender, and age. *Early Child Development and Care*.
- Runions, K. C., & Keating, D. P. (2007). Young children's social information processing: family antecedents and behavioral correlates. *Developmental psychology*, 43(4), 838.
- Rutherford, H. J., Wallace, N. S., Laurent, H. K., & Mayes, L. C. (2015). Emotion regulation in parenthood. *Developmental Review*, 36, 1-14.
- Ryan, R. M., & Padilla, C. M. (2019). Transition to parenthood. In *Handbook of parenting* (pp. 513-555). Routledge.
- Sattler, K. M., & Font, S. A. (2018). Resilience in young children involved with child protective services. *Child abuse & neglect*, 75, 104-114.

- Savage, L. É., Tarabulsky, G. M., Pearson, J., Collin-Vézina, D., & Gagné, L. M. (2019). Maternal history of childhood maltreatment and later parenting behavior: A meta-analysis. *Development and psychopathology, 31*(1), 9-21.
- Schuetze, P., & Eiden, R. D. (2006). The association between maternal smoking and secondhand exposure and autonomic functioning at 2–4 weeks of age. *Infant Behavior and Development, 29*(1), 32-43.
- Schuetze, P., Eiden, R. D., & Danielewicz, S. (2009). The association between prenatal cocaine exposure and physiological regulation at 13 months of age. *Journal of Child Psychology and Psychiatry, 50*(11), 1401-1409.
- Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). Experimental and quasi-experimental designs for generalized causal inference. Boston: Houghton Mifflin.
- Shaffer, A., Burt, K. B., Obradović, J., Herbers, J. E., & Masten, A. S. (2009). Intergenerational continuity in parenting quality: the mediating role of social competence. *Developmental psychology, 45*(5), 1227.
- Shaffer, A., Whitehead, M., Davis, M., Morelen, D., & Suveg, C. (2018). A model-based cluster analysis of maternal emotion regulation and relations to parenting behavior. *Family Process, 57*(3), 707-718.
- Simons, R. L., Whitbeck, L. B., Conger, R. D., & Wu, C. I. (1991). Intergenerational transmission of harsh parenting. *Developmental psychology, 27*(1), 159.
- Simons, D. A., & Wurtele, S. K. (2010). Relationships between parents' use of corporal punishment and their children's endorsement of spanking and hitting other children. *Child abuse & neglect, 34*(9), 639-646.

- Sledjeski, E. M., & Delahanty, D. L. (2012). Prior peritraumatic dissociative experiences affect autonomic reactivity during trauma recall. *Journal of trauma & dissociation, 13*(1), 32-50.
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. (1970). Test Manual for the State- Trait Anxiety Inventory. Palo Alto, CA: Consulting Psychologists Press.
- Spinrad, T. L., & Stifter, C. A. (2006). Toddlers' empathy-related responding to distress: Predictions from negative emotionality and maternal behavior in infancy. *Infancy, 10*(2), 97-121.
- Sturge-Apple, M. L., Skibo, M. A., Rogosch, F. A., Ignjatovic, Z., & Heinzelman, W. (2011). The impact of allostatic load on maternal sympathovagal functioning in stressful child contexts: Implications for problematic parenting. *Development and Psychopathology, 23*(3), 831-844.
- Taylor, Z. E., Eisenberg, N., Spinrad, T. L., Eggum, N. D., & Sulik, M. J. (2013). The relations of ego-resiliency and emotion socialization to the development of empathy and prosocial behavior across early childhood. *Emotion, 13*(5), 822.
- Tein, J. Y., Sandler, I. N., & Zautra, A. J. (2000). Stressful life events, psychological distress, coping, and parenting of divorced mothers: a longitudinal study. *Journal of family psychology, 14*(1), 27.
- Thornberry, T. P., & Henry, K. L. (2013). Intergenerational continuity in maltreatment. *Journal of abnormal child psychology, 41*(4), 555-569.
- Thornberry, T. P., Henry, K. L., Smith, C. A., Ireland, T. O., Greenman, S. J., & Lee, R. D. (2013). Breaking the cycle of maltreatment: The role of safe, stable, and nurturing relationships. *Journal of Adolescent Health, 53*, S25-S31.

- Tottenham, N. (2012). Human amygdala development in the absence of species-expected caregiving. *Developmental psychobiology*, 54(6), 598-611.
- Tottenham, N. (2020). Neural meaning making, prediction, and prefrontal–subcortical development following early adverse caregiving. *Development and psychopathology*, 32(5), 1563-1578.
- Tronick, E., Als, H., Adamson, L., Wise, S., & Brazelton, T. B. (1978). The infant's response to entrapment between contradictory messages in face-to-face interaction. *Journal of Child Psychiatry*, 17, 1–13. [https://doi.org/10.1016/S0002-7138\(09\)62273-1](https://doi.org/10.1016/S0002-7138(09)62273-1)
- Umaña-Taylor, A. J., & Hill, N. E. (2020). Ethnic–racial socialization in the family: A decade's advance on precursors and outcomes. *Journal of Marriage and Family*, 82(1), 244-271.
- Weiss, B., Dodge, K. A., Bates, J. E., & Pettit, G. S. (1992). Some consequences of early harsh discipline: Child aggression and a maladaptive social information processing style. *Child development*, 63(6), 1321-1335.
- Werner, E. E. (2000). Protective factors and individual resilience. *Handbook of early childhood intervention*, 2, 115-132.
- Wesarg, C., Van den Akker, A. L., Oei, N. Y., Wiers, R. W., Staaks, J., Thayer, J. F., ... & Hovee, M. (2022). Childhood adversity and vagal regulation: A systematic review and meta-analysis. *Neuroscience & Biobehavioral Reviews*, 104920.
- Wilhelm, K., Niven, H., Parker, G., & Hadzi-Pavlovic, D. (2005). The stability of the Parental Bonding Instrument over a 20-year period. *Psychological medicine*, 35(3), 387–393. <https://doi.org/10.1017/s0033291704003538>

- Wilhelm, K., & Parker, G. (1990). Reliability of the Parental Bonding Instrument and Intimate Bond Measure scales. *Australian and New Zealand Journal of Psychiatry*, *24*(2), 199–202. <https://doi.org/10.3109/00048679009077683>
- Winzeler, K., Voellmin, A., Hug, E., Kirmse, U., Helmig, S., Princip, M., ... & Wilhelm, F. H. (2017). Adverse childhood experiences and autonomic regulation in response to acute stress: the role of the sympathetic and parasympathetic nervous systems. *Anxiety, Stress, & Coping*, *30*(2), 145-154.
- Wolfe, D. A., Falrbank, J., Kelly, J. A., & Bradlyn, A. S. (1983). Child abusive parents' physiological responses to stressful and nonstressful behavior in children. *Behavioral Assessment*, *5*, 363-371.
- Yang, M. Y., Font, S. A., Ketchum, M., & Kim, Y. K. (2018). Intergenerational transmission of child abuse and neglect: Effects of maltreatment type and depressive symptoms. *Children and Youth Services Review*, *91*, 364-371.
- Yoon, Y., Cederbaum, J. A., Mennen, F. E., Traube, D. E., Chou, C. P., & Lee, J. O. (2019). Linkage between teen mother's childhood adversity and externalizing behaviors in their children at age 11: Three aspects of parenting. *Child abuse & neglect*, *88*, 326-336.
- Young-Southward, G., Svelnys, C., Gajwani, R., Bosquet Enlow, M., & Minnis, H. (2020). Child maltreatment, autonomic nervous system responsivity, and psychopathology: current state of the literature and future directions. *Child maltreatment*, *25*(1), 3-19.
- Yu, G., Li, S., & Zhao, F. (2020). Childhood maltreatment and prosocial behavior among Chinese adolescents: Roles of empathy and gratitude. *Child abuse & neglect*, *101*, 104319.

- Zeifman, D. M. (2003). Predicting adult responses to infant distress: Adult characteristics associated with perceptions, emotional reactions, and timing of intervention. *Infant Mental Health Journal: Official Publication of The World Association for Infant Mental Health*, 24(6), 597-612.
- Zhang, X., Gatzke-Kopp, L. M., Fosco, G. M., & Bierman, K. L. (2020). Parental support of self-regulation among children at risk for externalizing symptoms: Developmental trajectories of physiological regulation and behavioral adjustment. *Developmental psychology*, 56(3), 528.
- Zillig, L. M. P., Hemenover, S. H., & Dienstbier, R. A. (2002). What do we assess when we assess a Big 5 trait? A content analysis of the affective, behavioral, and cognitive processes represented in Big 5 personality inventories. *Personality and Social Psychology Bulletin*, 28(6), 847-858
- Zimmerman, M. A. (2013). Resiliency theory: A strengths-based approach to research and practice for adolescent health. *Health Education & Behavior*, 40(4), 381-383.
- Ziv, Y. (2012). Exposure to violence, social information processing, and problem behavior in preschool children. *Aggressive behavior*, 38(6), 429-441.
- Ziv, Y., Sofri, I., Capps Umphlet, K. L., Olarte, S., & Venza, J. (2018a). Children and caregivers' exposure to adverse childhood experiences (ACES): Association with children's and caregivers' psychological outcomes in a therapeutic preschool program. *International Journal of Environmental Research and Public Health*, 15(4), 646.
- Ziv, Y., Umphlet, K. L. C., Olarte, S., & Venza, J. (2018b). Early childhood trauma in high-risk families: associations with caregiver emotional availability and insightfulness, and

children's social information processing and social behavior. *Attachment & human development*, 20(3), 309-332.

Zvara, B. J., Mills-Koonce, W. R., Carmody, K. A., Cox, M., & Family Life Project Key Investigators. (2015). Childhood sexual trauma and subsequent parenting beliefs and behaviors. *Child abuse & neglect*, 44, 87-97.

Zvara, B. J., Mills-Koonce, R., & Cox, M. (2017). Maternal childhood sexual trauma, child directed aggression, parenting behavior, and the moderating role of child sex. *Journal of family violence*, 32(2), 219-229.

APPENDIX A: TABLES

Table A1. Descriptive Statistics for Variables of Interest

	<i>N</i>	<i>M</i> (%)	<i>SD</i>	Min.	Max.
Maternal Age	297	29.70	5.48	18.00	47.00
Maternal Education					
Graduate Degree	80	27.1			
Post-Graduate Work	13	4.4			
4-year College Degree	74	25.1			
2-year College Degree	24	8.1			
Some College	57	19.3			
High School Degree or GED	42	14.2			
Some High School Education	5	1.7			
Maternal Race					
White	165	57.3			
Black or African American	88	30.6			
Biracial	15	5.2			
Asian	6	2.1			
Multiracial	5	1.7			
Native Hawaiian or Pacific Islander	2	0.7			
American Indian or Alaskan Native	1	0.3			
Other Racial Group	6	2.1			
Hispanic, Latino, or Spanish Origin	23	7.8			
Income-to-needs Ratio	290	3.49	2.96	0.00	16.58
Maternal Depressive Symptoms	279	12.00	8.87	0.00	45.00
Maternal Anxiety	293	37.69	9.18	20.00	65.00
Maternal Agreeableness	294	3.87	0.47	2.33	4.92
Maternal Neuroticism	294	2.57	0.62	1.08	4.25
Prenatal Recent Life Events	292	2.15	2.25	0.00	11.00
2-month Recent Life Events	253	1.13	1.66	0.00	11.00
Observed Infant Distress	226	3.42	2.29	1.00	7.00
Adverse Childhood Experiences	286	1.63	1.94	0.00	9.00
Remembered Care – Mother	284	3.33	0.73	1.00	4.00
Remembered Care – Father	260	3.25	0.66	1.00	4.00
Remembered Emotional Responsiveness – Mother	282	3.09	0.84	1.00	4.00
Remembered Emotional Responsiveness – Father	257	2.92	0.78	1.00	4.00
Remembered Emotion Minimization – Mother	282	1.83	0.72	1.00	3.89
Remembered Emotion Minimization – Father	257	1.86	0.67	1.00	4.00
Minimizing Attributions	298	1.55	0.51	1.00	3.54
Negative Attributions	298	1.32	0.32	1.00	2.96
Minimizing Beliefs About Infant Crying	298	1.94	0.48	1.00	4.22
Spoiling Beliefs About Infant Crying	298	2.27	0.77	1.00	4.33
Self-Oriented Anxiety	298	1.31	0.37	1.00	3.06
Frustration at the Infant	298	1.12	0.21	1.00	2.75

RSA Withdrawal	281	.33	.82	-2.63	4.02
SCL Augmentation	295	1.35	1.78	-.98	12.84
Sensitivity to Distress SF Re-Engagement	112	3.89	1.13	1.00	7.00
Sensitivity to Non-Distress SF Re-Engagement	184	4.97	1.14	2.00	7.00
Intrusiveness SF Re-Engagement	226	2.11	1.23	1.00	7.00
Detachment SF Re-Engagement	226	1.35	0.85	1.00	6.00

Table A2. Bivariate Correlations Among Primary Manifest and Latent Variables

	1.	2.	3.	4.	5.	6.	7.	8.
1. Maternal Age	-							
2. Maternal Education	.49**	-						
3. Maternal Race ^a	-.18**	-.38**	-					
4. Income-to-Needs	.29**	.60**	-.43**	-				
5. Emotional Risk	-.20**	-.24**	.12	-.24**	-			
6. Prenatal Recent Life Events	-.26**	-.26**	.26**	-.30**	.45**	-		
7. 2-month Recent Life Events	-.13**	-.09	.12*	-.20**	.27**	.54**	-	
8. Observed Infant Distress	-.12	-.06	-.03	-.11	.01	-.08	-.10	-
9. Adverse Childhood Experiences	-.06	-.17**	.14*	-.20**	.21**	.42**	.21**	-.07
10. Emotionally Responsive Parenting in Childhood	.01	.08	-.07	.12*	-.24**	-.32**	-.16*	.03
11. Negative Cognition About Infant Crying	-.28**	-.27**	.23**	-.14*	.16*	.05	.00	.09
12. Negative Emotion to Infant Crying	-.13*	-.09	.06	-.12*	.19**	-.02	-.05	.08
13. RSA Withdrawal	.04	.10	-.13*	.04	-.08	-.06	.05	-.12
14. SCL Augmentation	-.12*	-.12*	-.10	-.08	-.01	-.02	.12	.08
15. Maternal Sensitivity to Distress	.11	.18**	-.09	.08	-.11	.03	.05	-.35**

	9.	10.	11.	12.	13.	14.	15.
1. Maternal Age							
2. Maternal Education							
3. Maternal Race ^a							
4. Income-to-Needs							
5. Emotional Risk							
6. Prenatal Recent Life Events							
7. 2-month Recent Life Events							
8. Observed Infant Distress							
9. Adverse Childhood Experiences	-						
10. Emotionally Responsive Parenting in Childhood	-.60**	-					
11. Negative Cognition About Infant Crying	.00	-.14**	-				
12. Negative Emotion to Infant Crying	.01	-.14*	.55**	-			
13. RSA Withdrawal	-.04	.02	-.11	-.10	-		
14. SCL Augmentation	.12*	-.10	.07	.00	.08	-	
15. Maternal Sensitivity to Distress	.06	-.08	-.38**	-.23**	.10	.10	-

Note: ^a Maternal race coded as 0 = White, 1 = Non-White; * $p < .05$, ** $p < .01$

Table A3. Bivariate Correlations Among Manifest Indicators

	1.	2.	3.	4.	5.	6.	7.
1. Maternal Age	-						
2. Maternal Education	.49**	-					
3. Maternal Race ^a	-.18**	-.38**	-				
4. Income-to-Needs	.29**	.59**	-.42**	-			
5. Maternal Depressive Symptoms	-.18**	-.25**	.17**	-.27**	-		
6. Maternal Anxiety	-.16**	-.20**	.09	-.19**	.75**	-	
7. Maternal Agreeableness	.14**	.35**	-.18**	.20**	-.28**	-.38**	-
8. Maternal Neuroticism	-.23**	-.24**	.09	-.22**	.66**	.82**	-.38**
9. Prenatal Recent Life Events	-.26**	-.27**	.27**	-.31**	.44**	.42**	-.29**
10. 2-month Recent Life Events	-.13**	-.08	.12**	-.20**	.21**	.24**	-.15*
11. Observed Infant Distress	-.12	-.06	-.03	-.11	-.02	-.01	-.17*
12. Adverse Childhood Experiences	-.08	-.18**	.15**	-.21**	.21**	.19**	-.20**
13. Remembered Care – Mother	.01	.17**	-.17**	.21**	-.30**	-.25**	.19**
14. Remembered Care – Father	.12*	.18**	-.16*	.18**	-.31**	-.32**	.27**
15. Remembered Emotional Responsiveness – Mother	-.03	.10	-.18**	.18**	-.26**	-.21**	.15**
16. Remembered Emotional Responsiveness – Father	.07	.14*	-.16*	.17**	-.27**	-.28**	.27**
17. Remembered Emotion Minimization – Mother	-.05	-.06	.07	-.12*	.23**	.19**	-.16**
18. Remembered Emotion Minimization – Father	-.04	-.03	-.03	-.01	.23**	.22**	-.19**
19. Minimizing Attributions	-.25**	-.21**	.20**	-.10	.06	.11	-.26**
20. Negative Attributions	-.20**	-.24**	.21**	-.15*	.07	.07	-.28**
21. Minimizing Beliefs About Infant Crying	-.05	.08	-.08	.14**	.09	.15*	-.19**
22. Spoiling Beliefs About Infant Crying	-.21**	-.24**	.18**	-.16**	.13*	.11	-.22**
23. Self-Oriented Anxiety	-.12*	-.11	.10	-.13*	.16**	.14*	-.11
24. Frustration at the Infant	-.10	-.04	.01	-.06	.05	.14*	-.11
25. RSA Withdrawal	.04	.10	-.13*	.04	-.10	-.07	.14*
26. SCL Augmentation	-.12*	-.12*	-.10	-.08	-.02	-.02	-.12*
27. Sensitivity to Distress SF Re-Engagement	.08	.09	-.03	-.05	-.07	-.09	.20*
28. Sensitivity to Non-Distress SF Re-Engagement	.10	.18*	-.11	.08	-.14*	-.07	.08
29. Intrusiveness SF Re-Engagement	.03	-.01	.02	.03	.06	.07	-.06
30. Detachment SF Re-Engagement	-.09	-.15*	.03	-.07	.10	.03	-.16**

	8.	9.	10.	11.	12.	13.	14.	15.
1. Maternal Age								
2. Maternal Education								
3. Maternal Race ^a								
4. Income-to-Needs								
5. Maternal Depressive Symptoms								
6. Maternal Anxiety								
7. Maternal Agreeableness								
8. Maternal Neuroticism	-							
9. Prenatal Recent Life Events	.34**	-						
10. 2-month Recent Life Events	.24**	.54**	-					
11. Observed Infant Distress	.02	-.08	-.11	-				
12. Adverse Childhood Experiences	.16**	.42**	.21**	-.08	-			
13. Remembered Care – Mother	-.16**	-.36**	-.13*	.06	-.59**	-		
14. Remembered Care – Father	-.24**	-.32**	-.26**	-.05	-.46**	.50**	-	
15. Remembered Emotional Responsiveness – Mother	-.13*	-.31**	-.11	.10	-.48**	.86**	.36**	-
16. Remembered Emotional Responsiveness – Father	-.20*	-.25**	-.25**	-.04	-.36**	.41**	.84**	.47**
17. Remembered Emotion Minimization – Mother	.14*	.27**	.09	-.06	.47**	-.69**	-.34**	-.58**
18. Remembered Emotion Minimization – Father	.17**	.20**	.10	.03	.40**	-.37**	-.61**	-.24**
19. Minimizing Attributions	.10	.05	.02	.02	.02	-.02	-.09	.04
20. Negative Attributions	.06	.03	-.05	.08	.01	-.10	-.13*	-.08
21. Minimizing Beliefs About Infant Crying	.13*	-.06	.01	.09	-.07	.07	-.01	.08
22. Spoiling Beliefs About Infant Crying	.10	.10	.05	.08	-.02	-.07	-.03	-.09
23. Self-Oriented Anxiety	.19**	.03	.00	.07	.06	-.07	-.07	.04
24. Frustration at the Infant	.18**	-.05	-.09	.08	-.05	-.04	-.06	.03
25. RSA Withdrawal	-.05	-.06	.05	-.12	-.05	.01	.06	-.02
26. SCL Augmentation	-.01	.02	.11	.07	.12*	-.09	-.11	-.02
27. Sensitivity to Distress SF Re-Engagement	-.12	.00	.02	-.53**	.14	-.19*	.03	-.18*
28. Sensitivity to Non-Distress SF Re-Engagement	-.13	.02	.06	-.27**	.05	.02	.04	.02
29. Intrusiveness SF Re-Engagement	.15*	-.06	-.08	.16*	-.07	.04	.03	.01
30. Detachment SF Re-Engagement	-.00	.06	-.07	.38**	.08	-.07	-.12	-.05

	16.	17.	18.	19.	20.	21.	22.	23.
1. Maternal Age								
2. Maternal Education								
3. Maternal Race ^a								
4. Income-to-Needs								
5. Maternal Depressive Symptoms								
6. Maternal Anxiety								
7. Maternal Agreeableness								
8. Maternal Neuroticism								
9. Prenatal Recent Life Events								
10. 2-month Recent Life Events								
11. Observed Infant Distress								
12. Adverse Childhood Experiences								
13. Remembered Care – Mother								
14. Remembered Care – Father								
15. Remembered Emotional Responsiveness –Mother								
16. Remembered Emotional Responsiveness – Father	-							
17. Remembered Emotion Minimization – Mother	-.23**	-						
18. Remembered Emotion Minimization – Father	-.50**	.64**	-					
19. Minimizing Attributions	-.01	.10	.13*	-				
20. Negative Attributions	-.10	.18**	.16**	.60**	-			
21. Minimizing Beliefs About Infant Crying	.03	.10	.15*	.37**	.41**	-		
22. Spoiling Beliefs About Infant Crying	-.05	.15**	.11	.22**	.37**	.33**	-	
23. Self-Oriented Anxiety	.02	.20**	.17**	.42**	.29**	.31**	.15**	-
24. Frustration at the Infant	-.00	.15*	.13*	.33**	.37**	.36**	.23**	.46*
25. RSA Withdrawal	.01	-.03	-.02	-.05	-.09	-.04	-.12*	-.11
26. SCL Augmentation	-.07	.02	.13*	.01	.06	.04	.10	-.03
27. Sensitivity to Distress SF Re-Engagement	-.00	.16*	.08	-.19*	-.17*	-.08	-.20**	-.14*
28. Sensitivity to Non-Distress SF Re-Engagement	-.02	.05	.03	-.28**	-.29**	-.12	-.18**	-.20**
29. Intrusiveness SF Re-Engagement	.04	-.02	.01	.24**	-.17**	.12	.10	.14*
30. Detachment SF Re-Engagement	-.06	.07	.14*	.24**	.33**	.12	.15*	.09

	24.	25.	26.	27.	28.	29.	30.
1. Maternal Age							
2. Maternal Education							
3. Maternal Race ^a							
4. Income-to-Needs							
5. Maternal Depressive Symptoms							
6. Maternal Anxiety							
7. Maternal Agreeableness							
8. Maternal Neuroticism							
9. Prenatal Recent Life Events							
10. 2-month Recent Life Events							
11. Observed Infant Distress							
12. Adverse Childhood Experiences							
13. Remembered Care – Mother							
14. Remembered Care – Father							
15. Remembered Emotional Responsiveness – Mother							
16. Remembered Emotional Responsiveness – Father							
17. Remembered Emotion Minimization – Mother							
18. Remembered Emotion Minimization – Father							
19. Minimizing Attributions							
20. Negative Attributions							
21. Minimizing Beliefs About Infant Crying							
22. Spoiling Beliefs About Infant Crying							
23. Self-Oriented Anxiety							
24. Frustration at the Infant	-						
25. RSA Withdrawal	-.07	-					
26. SCL Augmentation	.03	.07	-				
27. Sensitivity to Distress SF Re-Engagement	-.08	.19*	.12	-			
28. Sensitivity to Non-Distress SF Re-Engagement	-.16*	.07	.11	.70**	-		
29. Intrusiveness SF Re-Engagement	.23**	-.01	-.18**	-.51**	-.72**	-	
30. Detachment SF Re-Engagement	.11	-.11	.08	-.48**	-.45**	.11	-

Note: ^a Maternal race coded as 0 = White, 1 = Non-White; * $p < .05$, ** $p < .01$

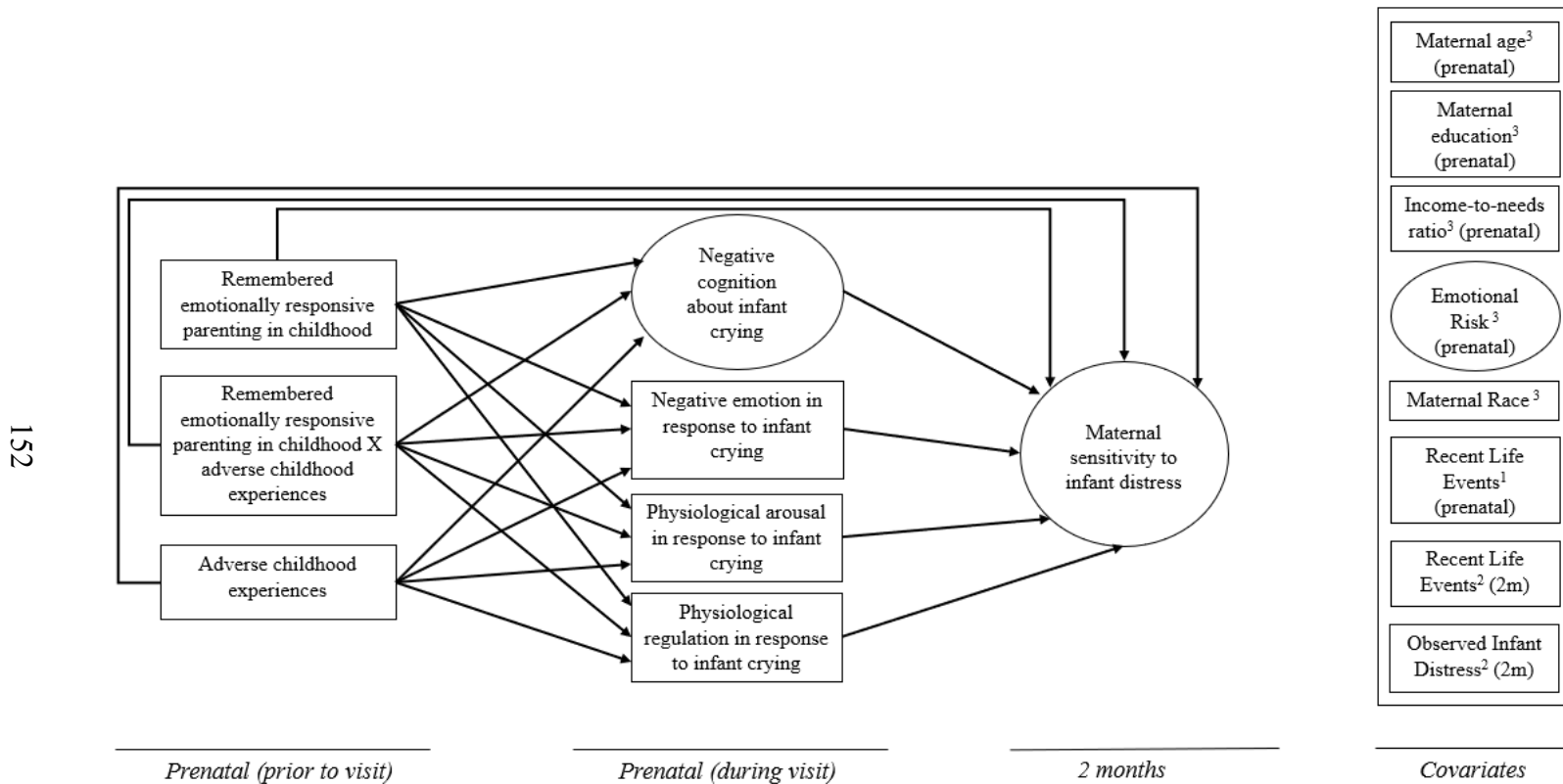
Table A4. Standardized Loadings and Residual Correlations for Measurement Model

Construct	Indicator	Loading
Negative Cognition About Infant Crying	→ Minimizing Attributions	.74**
	→ Negative Attributions	.79**
	→ Minimizing Beliefs	.52**
	→ Spoiling Beliefs	.44**
Maternal Sensitivity to Distress	→ Sensitivity to Distress Cues	.79**
	→ Sensitivity to Non-Distress Cues	.99**
	→ Intrusiveness	.71**
	→ Detachment	.44**
Emotional Risk	→ Maternal Depressive Symptoms	.79**
	→ Maternal Anxiety	.95**
	→ Maternal Neuroticism	.42**
	→ Maternal Agreeableness (reverse-scored)	.86**
Residual Correlations	→ Negative Cognition with Negative Emotions	.54**

* $p < .05$, ** $p < .01$

APPENDIX B: FIGURES

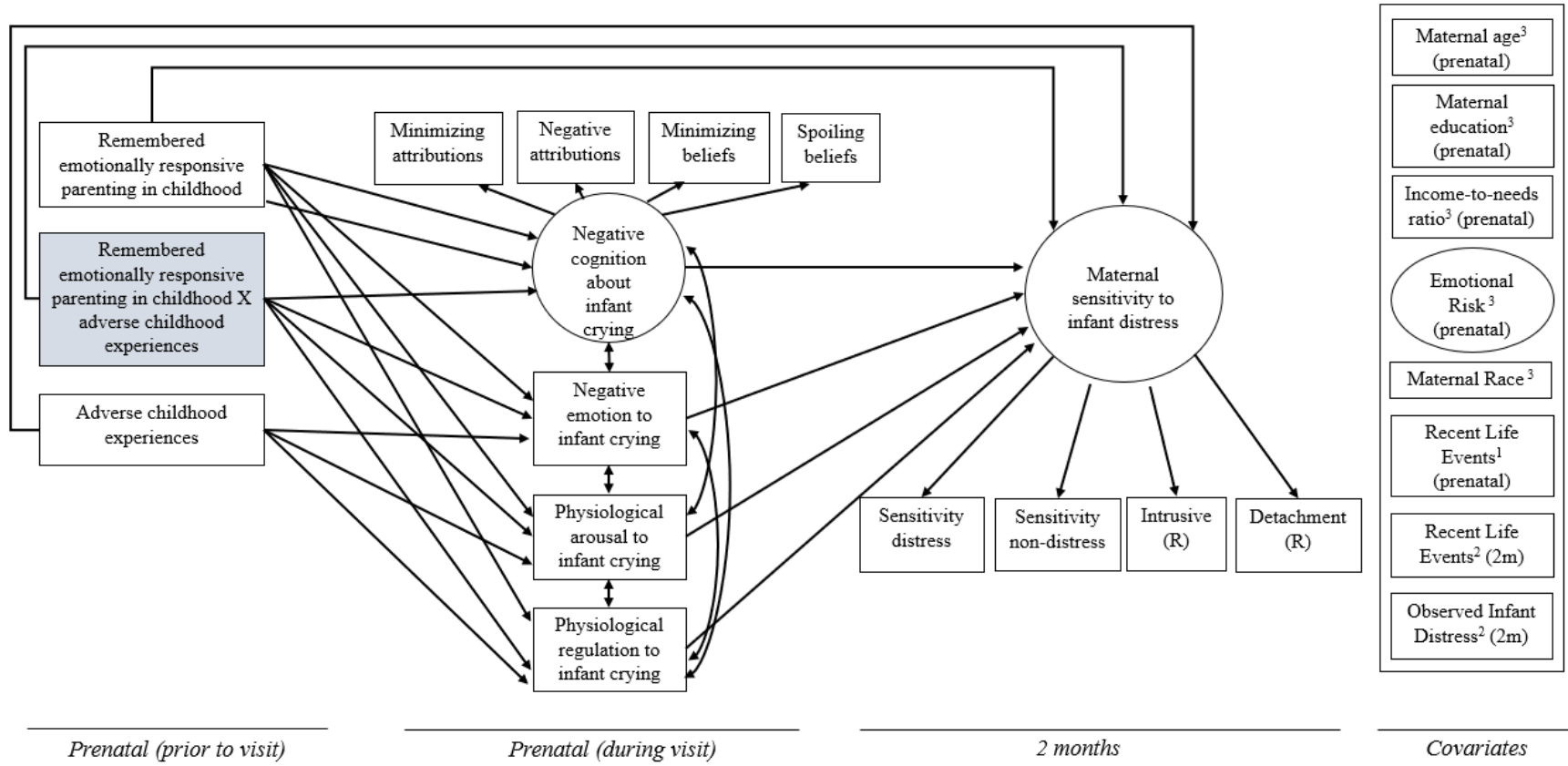
Figure B1. Conceptual Model for Current Study



Note: ¹ = specified on mediating variables only, ² = specified on maternal sensitivity to distress only, ³ = specified on mediating variables and sensitivity to infant distress; Emotional risk = latent variable of maternal depressive symptoms, anxiety, trait agreeableness, and trait neuroticism.

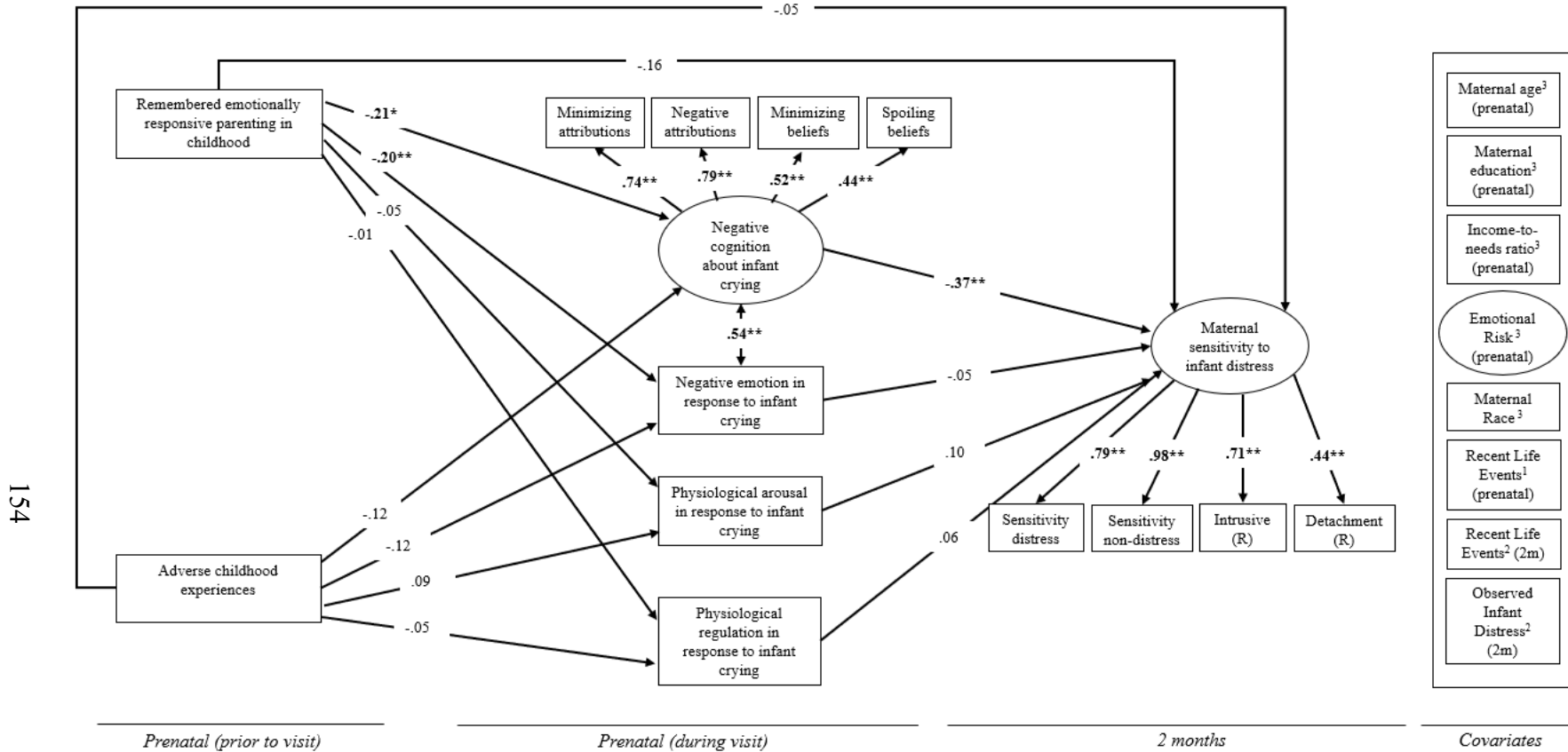
Figure B2. Proposed Structural Models for Current Study

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Note: Model 1 includes all paths shown except for the paths from the interaction term to the intermediary variables and dependent variable, which were added to model 2; ¹ = specified on mediating variables only, ² = specified on maternal sensitivity to distress only, ³ = specified on mediating variables and sensitivity to infant distress; Emotional risk = latent variable of maternal depressive symptoms, anxiety, trait agreeableness, and trait neuroticism.

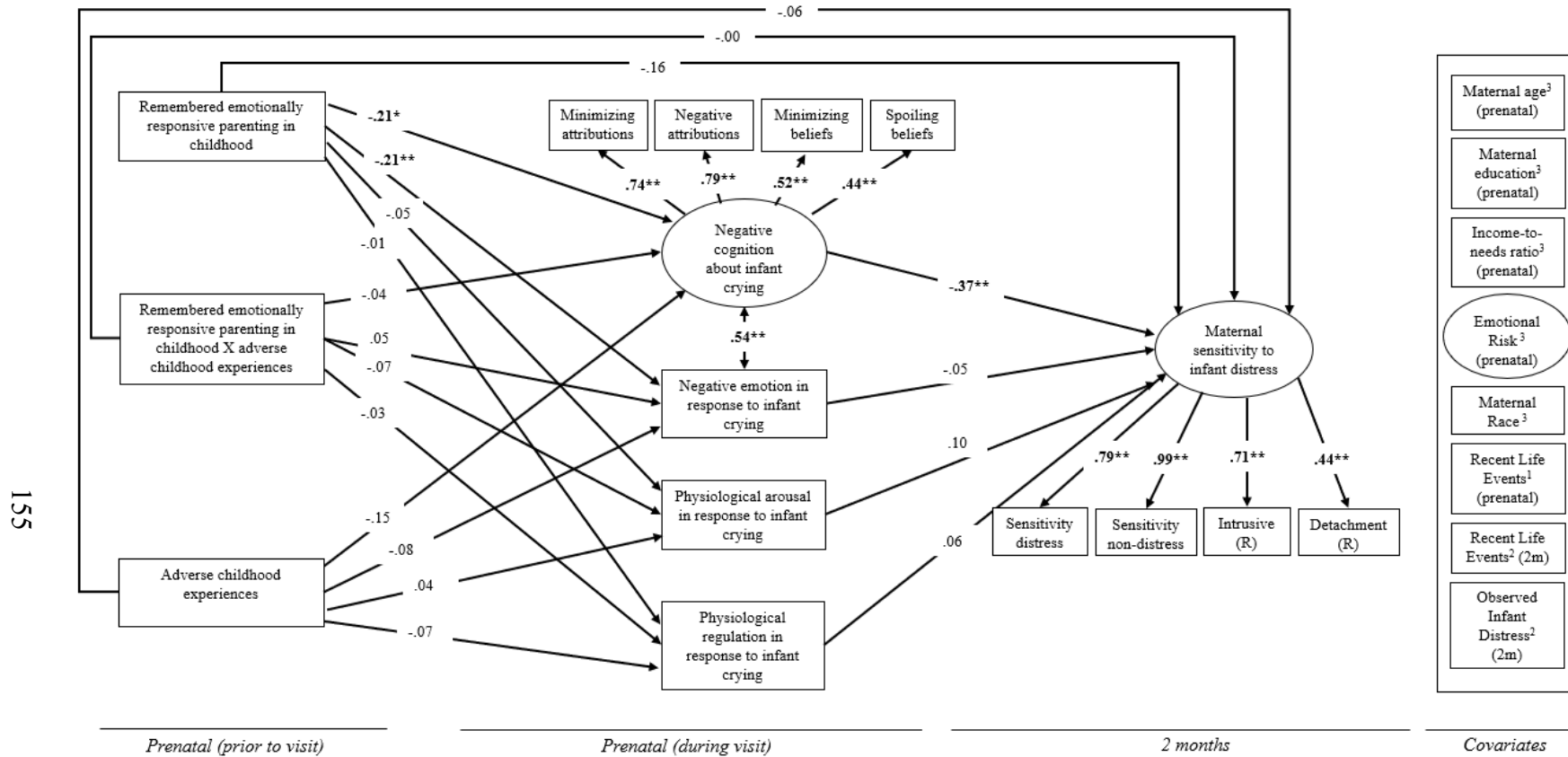
Figure B3. Final Structural Model for Model 1



Note: ¹ = specified on mediating variables only, ² = specified on maternal sensitivity to distress only, ³ = specified on mediating variables and sensitivity to infant distress; Emotional risk = latent variable of maternal depressive symptoms, anxiety, trait agreeableness, and trait neuroticism.

* $p < .05$, ** $p < .01$

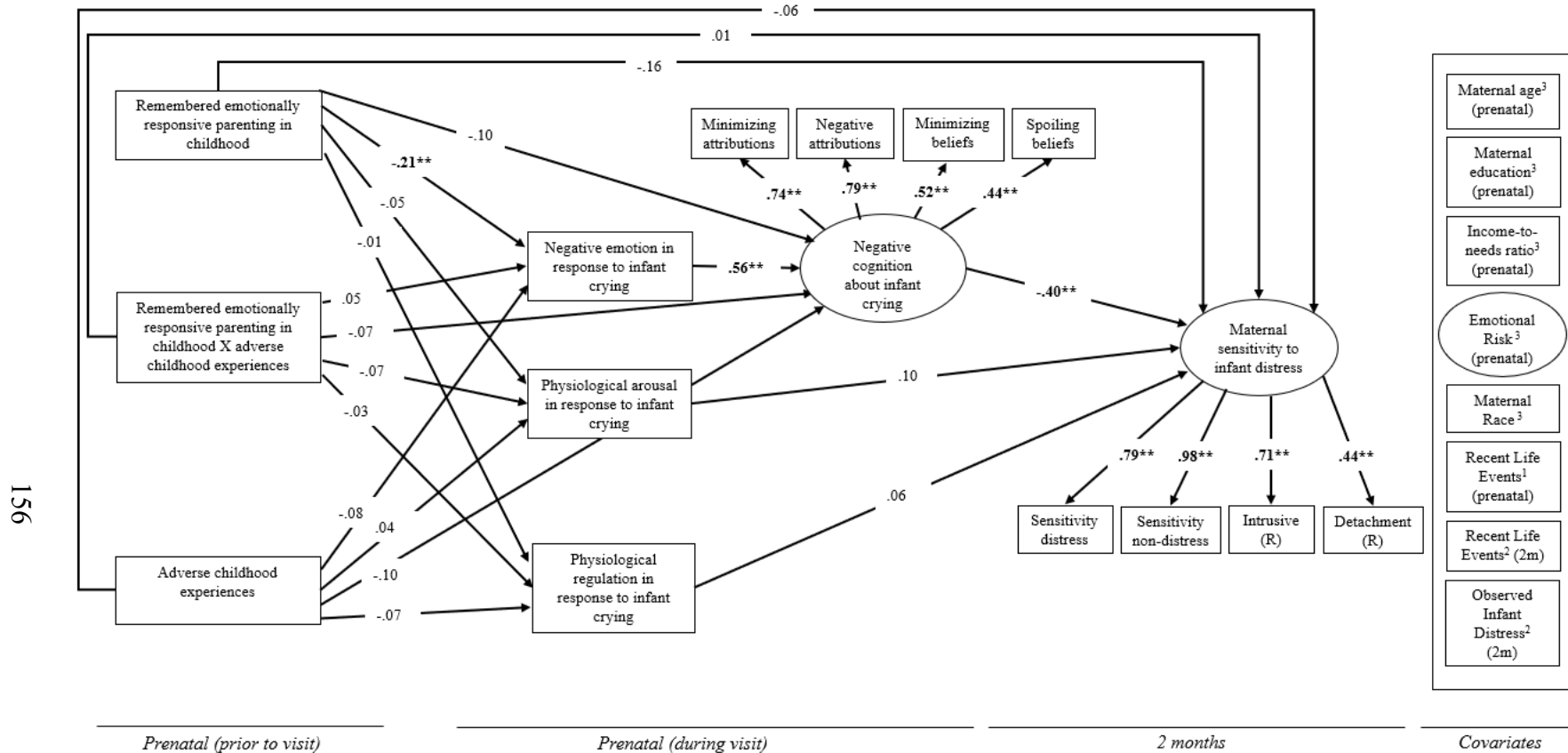
Figure B4. Final Structural Model for Model 2



Note: ¹ = specified on mediating variables only, ² = specified on maternal sensitivity to distress only, ³ = specified on mediating variables and sensitivity to infant distress; Emotional risk = latent variable of maternal depressive symptoms, anxiety, trait agreeableness, and trait neuroticism.

* $p < .05$, ** $p < .01$

Figure B5. Modified Structural Model Reflecting Post-Hoc Analysis



Note: ¹ = specified on mediating variables only, ² = specified on maternal sensitivity to distress only, ³ = specified on mediating variables and sensitivity to infant distress; Emotional risk = latent variable of maternal depressive symptoms, anxiety, trait agreeableness, and trait neuroticism.

* $p < .05$, ** $p < .01$