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# Mothers' Trauma Histories and Their Infants' Social-Emotional Development

Sarah Ahlfs-Dunn

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Mothers' Trauma Histories and Their Infants' Social-Emotional Development

by

Sarah Ahlfs-Dunn

Thesis

Submitted to the Department of Psychology

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for the degree of

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in

Clinical Psychology

Thesis Committee:

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Ypsilanti, Michigan

To my mother and grandmothers, who instilled in me preverbal and verbal memories of unconditional love and sensitive mothering that I will forever carry with me, and to my father, whose unwavering, calm, and supportive presence in my life, from the very beginning, has given me the roots through which I may always return home and the wings through which I may always pursue my dreams, no matter where they may lead.

And to the women and children of this study who have graciously shared their experiences of parent-child relations, experiences that began long before the pregnancy that connected them with this study, and who, in the process, have taught me so much.

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## ABSTRACT

Difficulties with emotion and physiological regulation (i.e., the ability to modulate or regulate arousal and physiological experiences) in infancy have been linked to significant social-emotional problems in childhood, adolescence, and adulthood. Mothers play a critical role in helping their infants regulate. Often mothers' experiences of childhood maltreatment and/or domestic violence leave them with limited emotional availability and caregiving ability. Subsequently, their infants may have difficulty learning self-regulation, which may compromise future social-emotional development. This study examined the relationships among mothers' experiences of childhood maltreatment and adult domestic violence and their infants' crying, feeding, and sleeping difficulties at 3 months of age. One hundred and twenty economically-disadvantaged pregnant women, aged 18 to 42 years, were recruited from the community via fliers advertising a longitudinal study about parenting. Data were collected during interviews with the women when they were in their third trimester of pregnancy and at 3 months postpartum. Results revealed that greater severity of maternal childhood maltreatment was related to greater severity of domestic violence during pregnancy; however, no significant associations were found between mothers' severity of childhood and adulthood interpersonal trauma and infant regulation. Thus, there was no support for domestic violence as a mediator between mothers' childhood maltreatment and infant regulation. Additionally, exploratory analyses revealed unique relationships between types of childhood maltreatment and types of domestic violence and infant regulation domains. Results from this study have important clinical implications related to working with mother-infant dyads, such as in the areas of prevention and intervention programs.

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## Mothers' Trauma Histories and Their Infants' Social-Emotional Development

### **Introduction**

In the immediate months after birth, infants begin the developmental task of emotion and physiological regulation but require substantial assistance by a caregiver (usually this is the mother). What happens when a mother does not aid her infant in learning to self-regulate? Mothers with experiences of childhood maltreatment and/or experiences of domestic violence as an adult may have reduced emotional availability and caregiving ability for their infants (George & Solomon, 2008; Krishnakumar & Buehler, 2000; Levendosky, Leahy, Bogat, Davidson, & von Eye, 2006; Lyons-Ruth & Block, 1996). In order to learn to self-regulate, infants need caregivers who accurately read their cues and respond to them sensitively and consistently (Weinfield, Sroufe, Egeland, & Carlson, 2008). Mothers with histories of interpersonal trauma may have impaired abilities to appropriately aid their infants in regulating emotional and physiological processes. Infants who are not helped to regulate these processes must try to regulate themselves, which compromises healthy social-emotional development (Tronick, 2007). Furthermore, dysregulation in infancy is related to social-emotional problems later in life (DeGangi, Breinbauer, Roosevelt, Porges, & Greenspan, 2000; DeSantis, Coster, Bigsby, & Lester, 2004).

There is a limited body of research focusing on the impact of mothers' experiences of interpersonal trauma on their infants' social-emotional development. In existing research, infants are typically studied when they are 1 year of age or older; however, social-emotional development, particularly in the form of emotion and physiological regulation, begins at birth, and mothers are an incredibly important aspect of this development (Sroufe, 1989; 1995; Thompson, 1994; Thompson, Lewis, & Calkins, 2008; Winnicott, 1987). Moreover,

low-risk samples and cross-sectional designs are typically used; however, high-risk populations overwhelmingly experience childhood and adulthood interpersonal trauma yet have the least amount of access to resources that could provide them with family prevention and intervention services (Gavin, Adams, Hartmann, Benedict, & Chireau, 2004; Scher, Forde, McQuaid, & Stein, 2004; Tjaden & Thoennes, 2000). Thus, more research that investigates the impact of mothers' trauma histories on infants' social-emotional development prior to their first birthday is needed in high-risk populations. This research would not only add to the literature about mothers' trauma histories and infant social-emotional development, but it would also help increase awareness about the need to screen caregivers and infants early, especially in high-risk populations, in order to provide intervention services quickly.

The first aim of this study is to advance the literature on infant social-emotional development by investigating the relationships between mothers' experiences of childhood maltreatment and recent experiences of domestic violence and their infants' regulation at 3 months of age within a high-risk sample of women. The second aim of this study is to replicate the finding that experiencing childhood maltreatment is a risk factor for later experiences of domestic violence in adulthood, with the specific focus on domestic violence experienced during pregnancy. Data for the present study were collected as part of an ongoing, longitudinal study examining the development of parenting over the course of pregnancy and during the infant's first two years of life. The literature review that follows provides an overview of early infant social-emotional development as well as risks to this area of development, specifically mothers' past and recent experiences of interpersonal

trauma. The cycle of interpersonal violence is also highlighted. Following the literature review, study hypotheses, methodology, and a discussion of the results are presented.

### **Social-Emotional Development in the First Three Months of Life**

Infant mental health is defined as:

The developing capacity of the child from birth to three to: experience, regulate, and express emotions; form close interpersonal relationships; and explore the environment and learn – all in the context of family, community, and mental health expectations for young children. Infant mental health is synonymous with healthy social and emotional development (Zero to Three, 2001, p. 1, as cited by Lieberman, 2004, p. 340).

This definition of infant mental health highlights two important features of social-emotional development. First, healthy social-emotional well-being begins developing at birth (if not earlier). Second, social-emotional development happens in the context of relationships. Infants, especially in the first few months of life, are dependent on their caregivers for their every need. This includes basic physical needs (e.g., nutrition), as well as social-emotional needs. Emotion regulation, i.e., the ability to modulate or regulate arousal and emotional experiences, develops through the manner in which these needs are met and regulated by the caregiver (Fox & Hane, 2008).

Crying (a behavior reflecting emotional distress), feeding, and sleeping are the primary regulatory processes and primary needs of the newborn, and these developmental tasks form a basis for investigating infant social-emotional development in the first 3 months of life. The ability to regulate these arousal and physiological states early in life may serve as a precursor to the development of the three infant mental health competencies indicated in

the above definition. Indeed, research has found that infants' affect regulation at 4 months of age is related to mother-infant attachment quality at 1 year of age (Braungart-Rieker, Garwood, Powers, & Wang, 2001), and sleep difficulties at 6 months of age are related to attachment quality at 15 months of age (McNamara, Belsky, & Fearon, 2003).

Dysregulation, such as that evidenced by excessive crying and feeding and sleeping difficulties, can also lead to atypical brain development (Schore, 2001a, 2003) and is a precursor to additional social-emotional difficulties in early and later childhood, adolescence, and even adulthood when left unresolved (DeGangi et al., 2000; DeSantis et al., 2004; Fonagy & Bateman, 2008; Ohr, Feingold, & Fagen, 2006; Touchette et al., 2007). It is also possible that atypical brain development can lead to crying, feeding, and sleeping difficulties though direction of causality is not always clear. Thus, identification of dysregulation early in an infant's life may provide the opportunity to correct the problem, through intervention services, before it results in additional social-emotional difficulties.

**Emotion and physiological regulation.** At 3 months of age, an infant's life largely involves crying (one of the main forms of communication present at birth), feeding, and sleeping. When caregivers do not assist their infants in learning to regulate these developmental processes, infants are left to experience excessive unpleasant states of arousal, which diminishes positive social-emotional learning opportunities and increases the probability of impaired social-emotional development (Emde, 1989; Schore, 2001a). Caregivers aid their infants in emotion regulation through helping them experience positive emotions and relieving their negative emotions, sensitively responding to their needs, structuring their environments so as not to be overwhelming, and demonstrating appropriate emotional responses to situations (see Crockenberg & Leerkes, 2000 for a review).

Infants, too, are involved in the regulation of their distress levels by eliciting assistance from their caregivers (Crockenberg & Leerkes, 2004; Lamb, 1977). Through mutual regulation (Tronick, 2007), infants send their caregivers messages in the form of affective displays when they have needs to be met. Upon receiving and interpreting the message, the caregiver usually then responds to meet the infant's needs. This then leads to a reciprocal response by the infant, i.e., a response from the infant that indicates whether or not the caregiver read the infant's cues correctly (e.g., an affective display of pleasure or increased crying). At times, caregivers accurately respond to meet their infants' needs, and at other times, they do not. Accurately meeting the infant's needs leads to positive affective states for the infant, whereas not meeting the infant's needs leads to negative affective states for the infant. Missing the infant's signals, and thus not accurately meeting his or her needs, often occurs in caregiver-infant relationships. However, attempts to repair those communication errors by both the caregiver and infant often follow in normative samples. For instance, when mothers stop interacting with their infants in studies using the Still-Face Paradigm (i.e., a procedure where the mother interacts with her infant normally and then momentarily removes all expression from her face to see how her infant will react), most infants actively try to reengage their mothers to reduce their distress. This process is a natural part of the development of emotion regulation in infants, and it appears to peak between 3 and 5 months of age (Lamb & Malkin, 1986; Lamb, Morrison, & Malkin, 1987). This process results in infants developing a view of themselves as effective and their caregivers as reliable over time (Tronick, 2007).

This reciprocal, emotion-regulating process becomes detrimental when infants experience more negative affect than positive affect during their interactions with caregivers.



This leads infants to attempt to regulate their own negative affective states to the exclusion of their other needs. It also eventually leads to views of the self as ineffective and of caregivers as unreliable. For example, in the Still-Face Paradigm, infants of intrusive mothers (i.e., mothers who physically manipulate the infant's body, are too close in proximity, and use loud, exaggerated verbal expressions) tend to spend most of their time looking away from their mothers and objects in order to manage the overwhelming negative affect that is prompted in them by their mother's intrusiveness. Infants of withdrawn mothers tend to protest and be distressed (Tronick, 2007).

Although infants play a role in eliciting caregiver responses and learning to self-regulate, caregivers are the critical influence in this developmental process. For instance, in the first 3 months of life, infants cry for a variety of reasons, such as to signal that they need their physical or psychological needs met, to signal that they want to be left alone, or to release energy or tension (Snow, 1998). When caregivers are consistently unable to accurately read their infants' cues and provide appropriate responses, infants may smile and vocalize less, cry and fuss more, look less at their caregivers, and appear to be more stressed by the interactions (Field, 1990). Sensitive caregivers, on the other hand, allow their infants to express their emotions freely, and they support their infants' communicative skills by responding to them promptly and appropriately (Grossmann & Grossmann, 1991). Mothers found to be higher in empathic understanding tend to be rated as more sensitive in their behavior (Coyne, Low, Miller, Seifer, & Dickstein, 2007), and infants of sensitive mothers have been found to cry less and express more happy vocalizations (Grossmann & Grossmann, 1991). Thus, it is consistently sensitive, responsive caregivers who aid their infants in learning to self-regulate affective states.

Caregivers also help regulate their infants' physiology through helping them establish homeostasis in feeding, sleeping, arousal, and body temperature (Foley, 2006), which aids in the development of emotion regulation. Successful regulation is evidenced by the infant's ability to maintain a calm and alert state and establish basic cycles and rhythms, and this is essential for adapting to the environment, developing sensory functions, learning to self-calm, and becoming emotionally responsive (Greenspan, Wieder, & DeGangi, 2001). The experience between caregiver and infant through which regulation develops is quite intimate and powerful. For instance, Acquarone (2003) points out that the feeding experience allows for the painful hunger feelings to be diminished, the caregiver to give the infant the experience of changing discomfort into comfort, the organization of the different sensations related to hunger and feeding, and the foundation for social-emotional development to be established.

Similarly, Emanuel (2004) highlights that "feeding" the emotional needs of an infant is as important as the nutrients being provided. Specifically, "good and bad experiences alike are taken in and digested – in some situations anxiety, hostility, terror, or resentment can be fed to the baby along with his feed" (Emanuel, 2004, p. 50). When feeding is not a positive and successful experience, infants have to find other experiences with their caregivers to develop their social and emotional skills. This may result in additional problems for both the infant and the caregiver-infant relationship (Acquarone, 2003). Similar to feeding, McNamara et al. (2003) theorize that a lack of security in knowing that one's needs will be consistently and sensitively met may lead to sleep difficulties in infancy. Specifically, if an infant's needs are not being met consistently, strategies that involve frequent night wakings

and taking longer to fall asleep after waking may develop in an attempt to establish and prolong contact with the caregiver in order to meet unmet emotional and relational needs.

In sum, the development of regulation is a dyadic process in infancy. It involves the regulation of arousal and physiological processes, such as crying, feeding, and sleeping, which form the early bases of social-emotional development. An attuned caregiver helps an infant learn how to self-regulate through accurately reading and sensitively responding to the infant's cues to be comforted, fed, or soothed. Dimensions of these arousal and physiological processes can also be viewed as part of the infant's temperament, yet it is still important for the caregiver to accurately and sensitively respond to the infant's cues within a context of what works best for the infant; inharmonious interactions can lead to dysregulation in the infant (Chess, Thomas, & Birch, 1959; Thomas, Chess, & Birch, 1970). Early in life, dysregulation can be evidenced by feeding, sleeping, or elimination difficulties, excessive crying, avoiding eye contact, being uncomfortable when held, getting upset too easily, hyperarousal, intense distress during transitions, and the inability to be soothed (Casas, 2002; Lieberman, 2004). The ability to learn to regulate one's emotions and physiological processes, initially with the assistance of the caregiver, is important in an infant's ongoing social-emotional development.

Because infant social-emotional development in the first 3 months of life is largely dependent upon the caregiver and the relationship with the caregiver, anything that impairs a caregiver's emotional availability or caregiving ability may directly or indirectly impact the infant's social-emotional development. In particular, recent and past experiences of interpersonal trauma may impair caregivers' emotional availability and/or caregiving ability (George & Solomon, 2008; Krishnakumar & Buehler, 2000; Levendosky, et al., 2006;

Lyons-Ruth & Block, 1996). However, research linking difficulties with crying, feeding, and sleeping, or any other regulatory processes in the first few months after birth, to caregivers' interpersonal trauma histories is absent. The research in this area is even quite limited for infants between 3 months and 1 year of age. Yet identifying regulation difficulties early in life is important for prevention and intervention of social-emotional problems.

Research has established, however, that caregivers' histories of interpersonal trauma affects infant attachment at 1 year and later (e.g., Zeanah et al., 1999), and as noted above, infant attachment begins to develop through the emotion and physiological regulation process. Indeed, Schore and Schore (2008) and Schore (2000; 2001b) have postulated that attachment theory is inherently a theory of regulation. An attuned caregiver reads an infant's cues and consistently responds sensitively, which not only helps the infant feel safe and secure, but it also helps the infant learn to self-regulate and cope with stressors. Furthermore, Schore (2001b) highlights that the regulating transactions that occur between caregivers and infants in the first year of life underlie the development of attachment. If caregivers' interpersonal trauma affects infant attachment, it is likely that it also may impact infant social-emotional development in other areas and at earlier time points, such as regulation at 3 months of age. Thus, a brief overview of attachment is warranted to understand the additional literature that will be reviewed in this paper.

**Attachment.** An infant's attachment behaviors, e.g., crying, gazing, and smiling, serve the purpose of meeting the infant's needs (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby 1969/1982; Cassidy, 2008). The quality of the attachment relationship that is formed between a caregiver and infant is vital to the infant's basic development and social-emotional well-being. As long as someone is available as a stable interactive figure, infants

will form an attachment (Weinfield et al., 2008). Attachment also aids in the survival of the infant by protecting the infant from internal or external threats that may be more than he or she can handle (Marvin & Britner, 2008). Infants' attachment behaviors may change depending on the response of the caregivers. Bowlby (1969/1982) pointed out that infants develop expectations of how their caregivers will respond to them based on how they have previously responded to them, and these expectations influence attachment behaviors and attachment "felt" security. Furthermore, the attachment relationship and infants' expectations of their caregivers become internalized as internal working models and influence the infants' views of themselves and others. A responsive and emotionally available caregiver encourages the infant to develop an internal working model of the self as effective and loved and others as responsive and loving. An unresponsive and emotionally unavailable caregiver encourages the infant to develop an internal working model of the self as ineffective and unloved and others as unresponsive and unloving (Dozier, Stovall, & Albus, 1999; Weinfield et al., 2008).

Through the use of the Strange Situation procedure, Ainsworth identified three infant attachment classifications that correspond to the caregiver-infant relationship: secure, anxious-ambivalent, and avoidant (Ainsworth et al., 1978). Infants classified as secure are at the largest advantage in social-emotional development (Fish, 2004; Vondra, Shaw, Swearingen, Cohen, & Owens, 2001; Weinfield, Ogawa, & Sroufe, 1997). The Strange Situation is a laboratory procedure that involves a series of different interactions, separations, and reunions among a mother, her infant, and a stranger (researcher). The use of the Strange Situation and the measurement of the attachment classifications cannot occur until the infant is 1 year of age so that the infant will developmentally be able to engage in proximity

seeking behaviors, such as crawling or, ideally, walking (Ainsworth et al., 1978). Thus, prior to 1 year of age, different procedures are needed to measure infant social-emotional development.

Main and Solomon (1990) identified a fourth attachment category that they labeled disorganized/disoriented. Infants classified as disorganized/disoriented show contradictory, conflicted, or disoriented behaviors in the presence of their caregivers because they cannot maintain an organized, coherent attachment strategy when distressed, as their caregivers are both sources of fear and sources of comfort (van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Caregivers of disorganized/disoriented infants tend to engage in frightened and/or frightening behavior (Main & Hesse, 1990), and the caregiving environment tends to be chaotic, unpredictable, traumatic, and frightening (Cassidy & Mohr, 2001). These infants are the most at-risk for social-emotional problems both concurrently and later in life (Carlson, 1998; Lyons-Ruth, Easterbrooks, & Cibelli, 1997; Stacks, 2007). Thus, it is evident that the caregiver-infant attachment relationship is extremely vital for infant social-emotional well-being. When a caregiver's emotional availability and/or caregiving ability is hindered, however, the caregiver-infant relationship, and thus, the infant's social-emotional development, suffers.

### **Risk Factors for Poor Social-Emotional Development in Infants**

Infants' dependency upon their caregivers, particularly their mothers, for their basic and social-emotional needs, makes them vulnerable when their mothers' abilities to be emotionally available or provide appropriate caregiving are compromised. In particular, a woman's experiences of interpersonal trauma, both as a child and as an adult, can impact her emotional availability and her ability to provide care for her infant. Experiencing

interpersonal trauma as a child, here defined as childhood maltreatment in the form of physical, sexual, or emotional abuse, or physical or emotional neglect, can limit a mother's emotional availability (Fonagy & Target, 1997; Lyons-Ruth & Block, 1996; Moehler, Biringen, & Poustka, 2007) and caregiving ability (George & Solomon, 2008; Solomon & George, 2006). Similarly, experiencing interpersonal trauma as an adult (i.e., male-to-female domestic violence) can limit a mother's emotional availability and caregiving ability (Holden, Stein, Richie, Harris, & Jouriles, 1998; Krishnakumar & Buehler, 2000; Levendosky et al., 2006; Theran, Levendosky, Bogat, & Huth-Bocks, 2005). Additionally, experiencing childhood interpersonal trauma increases women's vulnerability for experiencing adult interpersonal trauma (Renner & Slack, 2006). Thus, mothers' experiences of child and adult interpersonal trauma likely impact their young infants' social-emotional development.

**Impact of childhood interpersonal trauma on mothers.** Numerous children experience interpersonal trauma each year. In 2006, 25.2% of 3.6 million investigations by child protective services were confirmed cases of child abuse or neglect, and of these cases, 64.1% involved neglect, 16% involved physical abuse, 8.8% involved sexual abuse, and 6.6% involved emotional or psychological maltreatment (U.S. Department of Health and Human Services, Administration on Children, Youth, and Families, 2008). Often these traumatic experiences during childhood have long-lasting effects into adulthood, and many maltreated girls eventually become mothers. A mother who experienced interpersonal childhood trauma may have difficulty being emotionally available to and providing adequate care for her infant, as her own emotional needs went unmet.

Solomon and George (2006) and George and Solomon (2008) have highlighted the importance of the caregiving system with regard to providing for the care of offspring. The caregiving system includes mental representations of caregiving, i.e., feelings and beliefs about being the caregiver to a child, that largely develop through mothers' own childhood attachment experiences (George & Solomon, 2008). The caregiving system is typically activated in a mother when she perceives distress in or danger to her infant (Solomon & George, 2006). Activation of the caregiving system should lead a mother to provide her infant with security and protection, and thus, the child's attachment needs should take precedence over the mother's own needs (Solomon & George, 2006).

However, maternal experiences of childhood maltreatment may significantly impact caregiving representations and subsequent caregiving behaviors (Solomon & George, 2006). Specifically, childhood experiences of interpersonal trauma may lead to dysregulated or constricted caregiving (George & Solomon, 2008), which may be triggered by the infant (Fraiberg, Edelson, & Shapiro, 2003). Dysregulated caregiving in mothers is characterized by becoming flooded and overwhelmed by fears about their children and themselves and feeling helpless to protect or provide care for their children or themselves. These mothers' descriptions of themselves and their children tend to involve themes of inadequacy, vulnerability, loss of control, and inability to provide comfort (George & Solomon, 2008).

On the other hand, constricted caregiving in mothers is characterized by avoiding thinking about the caregiving-attachment relationship, withdrawing from caregiving situations, role-reversal, psychologically merging with their child, and viewing their child as never causing any problems (George & Solomon, 2008). Additionally, the emotional dysregulation that often accompanies experiences of interpersonal trauma in childhood



(Maughan & Cicchetti, 2002) may be carried forward to emotional difficulties in adulthood (Allen, 2008; Koren-Karie, Oppenheim, & Getzler-Yosef, 2004; Paivio & Laurent, 2001). Thus, mothers with a history of childhood interpersonal trauma may have limited emotional availability and caregiving ability, such as that required for assisting their newborns in regulation. For instance, traumatized mothers may become so emotionally overwhelmed themselves, with traumatic reminders or unpleasant affective states, that they are unable to put their own needs aside to assist their infants with their needs.

Research relating mothers' experiences of childhood interpersonal trauma to their perceptions of their children, their parenting behaviors, and their attachment relationships with their children also highlight the limited emotional availability and caregiving ability of traumatized mothers. Mothers' interpersonal traumatic childhood experiences may impact their perceptions of their infants as evidenced by their attributions, projections, and affective responses. Mothers' negative attributions of and negative projections onto their infants can begin prenatally and carry through postnatally to affect their emotional responses to their infants (Lieberman, 1999). For example, Leerkes and Crockenberg (2006) found that mothers who were emotionally rejected as children had less confidence in their ability to respond to their 6-month-old infants' distress cues, were less empathetic to their infants' distress, and experienced more negative emotions in response to their infants' distress than were mothers who did not report a history of childhood emotional rejection.

Leerkes and Siepak (2006) found similar results in a study of female undergraduate students who viewed video clips of two crying infants, each displaying a different emotion. They found that women who were emotionally rejected by their mothers and/or fathers as children were more likely to inaccurately attribute the infants' emotions (e.g., attributing the

infant's fear response to negative/internal causes), be less accurate in labeling the infants' emotions, and report mismatched responses to the infants' emotions (e.g., report feeling amused or neutral in response to the infant's fear). Similarly, Dixon, Hamilton-Giachritsis, and Browne (2005) found that parents who were physically and/or sexually abused as children were significantly more likely to make negative attributions and hold more unrealistic perceptions regarding their infants at 4 to 6 weeks of age and 3 to 5 months of age. Thus, recent findings suggest that experiencing interpersonal trauma during childhood may impair mothers' perceptions of and responses to their infants' emotions. In turn, mothers' consistently incorrect or negative attributions, projections, and affective responses toward their infants may be risk factors for infant social-emotional problems, such as difficulties self-regulating.

Interpersonal traumatic childhood experiences also appear to impact mothers' parenting behaviors as evidenced by sensitivity, responsiveness, and overall caregiving toward their own children. For instance, mothers' memories of maternal rejection have been found to be associated with lower levels of sensitivity to their 6-month-old infants (Crockenberg & Leerkes, 2003), and experience of childhood neglect has been found to be related to poorer parenting (Newcomb & Locke, 2001). Moreover, mothers who were physically and/or sexually abused as children have been found to be more intrusive when interacting with their 5-month-old infants (Moehler et al., 2007) and engage in significantly poorer caregiving (Dixon, Hamilton-Giachritsis et al., 2005). As the severity of past trauma increases, mothers' responsiveness to their infants has been found to decrease (Lyons-Ruth & Block, 1996). In particular, mothers who were physically abused as children were found to engage in more hostile-intrusive behaviors with their infants, and mothers who were sexually

abused as children were found to be less involved with their infants (Lyons-Ruth & Block, 1996). Mothers who have experienced childhood sexual abuse have also been found to be more aggressive in their parenting (e.g., using physical punishment even if not warranted; Newcomb & Locke, 2001). Child abuse can be considered an extreme form of “harsh” parenting and literature suggests that parents who were abused as children have increased child abuse potential (Bert, Guner, & Lanzi, 2009; Cohen, Hien, & Batchelder, 2008; Kim, 2009; Milner, Robertson, & Rogers, 1990; Ornduff, Kelsey, Bursi, Alpert, & Bada, 2002). Specifically, they are four times more likely to abuse their own infants in the first 13 months of life than are parents who were not abused as children (Dixon, Browne, & Hamilton-Giachritsis, 2005).

Last, a growing group of researchers have found that mothers who experienced attachment-related trauma during childhood, such as loss or physical or sexual abuse that they have not successfully resolved, are often classified as unresolved with respect to loss or trauma in the Adult Attachment Interview (AAI; George, Kaplan, & Main, 1984 as cited by Hesse, 2008; Main & Hesse, 1990; Stovall-McClough & Cloitre, 2006); these mothers also display notable caregiving difficulties, including authoritarian parenting, frightened/frightening behavior, and atypical maternal behavior, e.g., contradictory signaling to the infant, role confusion, and holding the infant away from the body with stiff arms (Busch, Cowan & Cowan, 2008; Goldberg, Benoit, Blokland, & Madigan, 2003; Jacobvitz, Leon, & Hazen, 2006; Madigan, Moran, & Pederson, 2006; Schuengel, Bakersman-Kranenburg, van IJzendoorn, 1999). The AAI is a semi-structured interview that focuses on asking adults about their childhood and adulthood relationships with their caregivers, as well as their experiences of loss and trauma (Hesse, 2008). Based on their responses, adults are

classified into categories similar to infant attachment classifications. In specific regard to mothers who have experienced attachment-related loss or trauma during their lives, those who have resolved their experiences will show an organized strategy for responding throughout the interview (i.e., responding to the interview questions with a consistent approach or strategy such as simply answering the questions, refusing to reveal or discuss any distressing experiences, or maintaining an excessive focus on different experiences triggered by the questions). These mothers will be classified as secure-autonomous, dismissing (analogous to avoidant), or preoccupied (analogous to ambivalent), depending on which consistent strategy they use. Mothers who are unresolved in regard to their experiences of attachment-related loss and trauma, on the other hand, will lack an organized or consistent strategy during the interview; specifically, they will demonstrate lapses in the monitoring of discourse or reasoning during the interview questions, particularly when discussing loss or trauma. These mothers will be classified as unresolved with respect to loss or trauma. Mothers who did not experience any loss or trauma while growing up will only be classified as one of the organized strategies, as at least one experience of loss or trauma is needed to be considered for the unresolved classification (Hesse, 2008).

Mothers with unresolved childhood trauma on the AAI have been found to engage in a number of frightened or frightening behaviors toward their infants, such as moving cautiously away and keeping a distance from their infants as though they are afraid of them or baring their teeth and growling while tickling their infants (Hesse & Main, 1999). These behaviors tend to influence disorganization and dysregulation in the infant and in the parent-child relationship (Cassidy & Mohr, 2001; Lyons-Ruth, Bronfman, & Parsons, 1999). These mothers have also been found to engage in disrupted affective communication (e.g., role

confusion or withdrawal) with their infants (Lyons-Ruth & Spielman, 2004; Lyons-Ruth, Yellin, Melnick, & Atwood, 2005; Madigan et al., 2006) and be less responsive to their toddlers' expressions of anger and sadness (Moran, Bailey, Gleason, DeOliveira, & Pederson, 2008). Thus, evidence suggests that mothers' exposure to interpersonal trauma during childhood may go on to negatively affect their parenting behaviors toward their own infants. Insensitive, unresponsive, harsh, and frightening parenting is a risk factor for social-emotional problems in young children. Specifically, infants who are not consistently sensitively responded to may have difficulty regulating and learning to self-regulate.

Mothers' interpersonal traumatic childhood experiences can also impact the quality of their relationships with their children, as evidenced by the attachment classification of their infants. Often, the types of attachment that mothers developed with their caregivers are the same types of attachment that their infants develop with them; often children who are maltreated tend to be classified as insecure, and this attachment classification tends to be perpetuated in relationships through adulthood (Morton & Browne, 1998). For instance, mothers classified as unresolved in regard to loss or trauma often have infants classified as disorganized or disoriented (Hesse & Main, 1999). As discussed previously, infants classified as disorganized/disoriented are the most at-risk for social-emotional difficulties.

In sum, mothers who have experienced childhood interpersonal trauma may have significant impairments in emotional availability and caregiving ability. As described above, these mothers' perceptions of, parenting behaviors toward, and attachment relationships with their infants highlight their difficulties being emotionally available to and providing adequate care for their infants. These difficulties put their infants at an increased risk for social-emotional problems, such as attachment insecurity or disorganization. Unfortunately,

attachment, which is an indicator of social-emotional development, cannot be measured until infants are about 1 year of age. As can be seen above, there is very limited research looking at the impact of mothers' interpersonal childhood trauma on their infants at less than 1 year of age, despite the indication that these mothers may have limited emotional availability and caregiving ability. However, in the studies that have been done with 5 and 6 month old infants and their mothers, it has been found that mothers who experienced interpersonal childhood trauma engage in behaviors (e.g., intrusiveness) that may hinder their infants' social-emotional development. Thus, it is likely that these mother-child disruptions are happening right away, as giving birth can even prompt reminders of childhood interpersonal trauma (Issokson, 2004; Leeners, Richter-Appelt, Imthurn, & Rath, 2006; Weinstein & Verny, 2004). Investigating social-emotional development in 3-month-old infants of mothers who experienced interpersonal childhood trauma would greatly add to the literature.

**Cycle of interpersonal violence with women.** In addition to emotional and caregiving difficulties, women who have experienced childhood interpersonal trauma may be at an increased risk of experiencing interpersonal violence as adults. Experiencing childhood abuse is a strong predictor of women becoming victims of domestic violence as adults (Renner & Slack, 2006; Stith et al., 2000; Whitfield, Anda, Dube, & Felitti, 2003). Hotaling and Sugarman (1986), in an analysis of 42 risk markers for wives being victimized physically by their husbands, found that being the target of violence during childhood was a significant predictor in 69% of the studies that they analyzed. More recently, Dixon, Brown, et al. (2005) found that being abused as a child increased the likelihood of a violent adult residing in one's adult home. Similarly, in a sample of battered women, Lewis et al. (2006) found that almost half of the sample (45%) had experienced both direct physical and emotional

abuse as children, whereas 20% had experienced only direct emotional abuse as children. Overall, the evidence suggests that women who experienced interpersonal childhood trauma are at an increased risk of experiencing domestic violence as adults.

Domestic violence is unfortunately a commonly occurring, traumatic event in the lives of women and children. The National Violence against Women Survey found that nearly 25% of women surveyed had experienced a physical assault and/or rape by an intimate partner in their lifetime (Tjaden & Thoennes, 2000). Others have found that about 55% of women surveyed had experienced physical, sexual, or psychological violence by an intimate male partner during their lifetime (Coker, Smith, McKeown, & King, 2000). In a recent study of high-risk women in Michigan who had given birth within the last 5 years, researchers found that 20.9% had experienced domestic violence in the last year (Rosen, Seng, Tolman, & Mallinger, 2007). Furthermore, pregnancy is a particularly vulnerable and common time for women to experience domestic violence. Prevalence of domestic violence during pregnancy is not entirely certain; however, the most commonly reported prevalence rate is 0.9% to 20.1% in the United States, with most studies reporting a range of 3.9% to 8.3% (Gazmararian et al., 1996). Moreover, it was recently estimated that 15.5 million American children, aged 0 to 17, live in families where domestic violence occurred at least once in the last year (McDonald, Jouriles, Ramisetty-Mikler, Caetano, & Green, 2006). In one county, over a 1-year period, children were present for 44% of substantiated domestic violence cases. Of the 81% of children who had direct sensory exposure to the event, 92% were children of the victims and 58% were under 6 years of age (Fantuzzo & Fusco, 2007). Like a history of childhood interpersonal trauma, domestic violence can impact mothers'

emotional availability and ability to provide care to their young infants, which subsequently influences infants' early social-emotional development.

**Impact of domestic violence on mothers.** Research relating mothers' experiences of domestic violence to their parenting behaviors, their attachment relationships with their children, and their perceptions of their children highlight the limited emotional availability and caregiving ability of battered mothers. In general, battered mothers acknowledge that their parenting has been affected in numerous ways by their experiences of violence (Levendosky, Lynch, & Graham-Bermann, 2000). One common finding is that battered women report significantly higher levels of parenting stress than do women in non-violent relationships (Holden et al., 1998; Ritchie & Holden, 1998). Higher parenting stress in battered women is significantly related to greater use of diversion, decreased proactive behavior (e.g., giving instructions before misbehavior happens), greater use of spanking, less use of positive reinforcement, and less physical affection with their children (Ritchie & Holden, 1998). Additionally, different patterns in type and quantity of parenting stress have differential effects on parenting (Hughes & Huth-Bocks, 2007).

In comparison to mothers who have not been battered, battered mothers are more likely to modify their parenting in the presence of their abusive partner, set fewer limits for their children, attend to their children less, and engage in more conflicts with their children (Holden et al., 1998). They also are more likely to engage in higher levels of permissiveness and non-follow-through (Rea & Rossman, 2005), have a higher potential for child abuse (Casanueva & Martin, 2007; Cohen et al., 2008), and are more hostile and disengaged and less sensitive and warm with their children during observed interactions (Levendosky et al., 2006). Furthermore, higher levels of domestic violence have been associated with poorer



parenting (Krishnakumar & Buehler, 2000). Rossman and Rea (2005) found that mothers who experienced the highest levels of verbal and physical abuse and resulting anxiety and trauma symptoms engaged in the highest levels of inconsistent parenting. Mothers who experienced the lowest levels of verbal and physical abuse and resulting anxiety and trauma symptoms reported engaging in predominantly authoritative parenting, believed to be the most sensitive form of parenting and most supportive of healthy social-emotional development in young children. Thus, recent research suggests that mothers in violent relationships are more likely to parent their children in an unstable, inconsistent, and less sensitive manner, thereby putting their children at risk for social-emotional problems, such as difficulty regulating physiological and affective states.

Mother-infant relationship quality and mothers' perceptions of their infants are also significantly impacted by domestic violence. A meta-analysis of 68 studies found that there is a significant positive relationship between marital relationship quality and parent-child relationship quality (Erel & Burman, 1995). Mothers in relationships characterized by higher conflict are more likely to have distorted views of their infants (Sokolowski, Hans, Bernstein, & Cox, 2007), as well as less secure representations of their caregiving, which then results in less secure mother-infant attachment security (Huth-Bocks, Levendosky, Bogat, & von Eye, 2004). Similarly, Huth-Bocks, Levendosky, Theran, and Bogat (2004) found that women who had experienced domestic violence during their pregnancies had significantly more negative, insecure prenatal representations of their infants and themselves as mothers than did women who had not experienced domestic violence during their pregnancies. Some characteristics of these negative, insecure representations were less flexibility, less caregiving sensitivity, and less acceptance of the child. The quality of such internal representations

impacts both the mother-infant attachment relationship, as well as how mothers emotionally regulate their infants (Rosenblum, Dayton, & McDonough, 2006).

Moreover, McGuigan, Vuchinich, and Pratt (2000) found that mothers who experienced domestic violence in their infants' first year of life were more likely to have negative views of their infants at 6 and 12 months of age, and these negative views mediated the relationship between domestic violence and child abuse risk. Furthermore, mothers who reported no domestic violence or less serious domestic violence were more likely to have securely attached infants, whereas mothers who reported more serious domestic violence were more likely to have infants with disorganized attachments (Zeanah et al., 1999). Thus, mothers' internal representations of their infants and their own caregiving behaviors are negatively impacted by domestic violence. In turn, insecure and disorganized infant attachment relationships, which are signs of and risk factors for social-emotional problems in infancy, are more commonly seen in infants exposed to domestic violence compared to infants not exposed to domestic violence.

Finally, Bancroft and Silverman (2002) highlight the effects that batterers have on family dynamics. They discuss the many ways in which a batterer may undermine the mother and the mother-child relationship. For instance, the physical assaults by batterers may not only impair mothers' abilities to physically meet their children's needs because of injuries, but they may also reduce mothers' emotional availability due to the overwhelming fear, shock, anger, anxiety, and sadness that mothers may feel for days afterward. Batterers may also force mothers to parent in certain ways or diminish their parenting self-esteem through constant belittling of their parenting competence. Batterers may prevent mothers from holding or comforting their distressed children, forbid them to breast feed, withhold

caregiving resources from them, restrict their ability to obtain medical care for their children or engage them in social activities, and use the children to threaten the mothers. These clinical examples further demonstrate how experiencing domestic violence can impact mothers' emotional availability and caregiving ability, which may reduce their ability to regulate their newborns. Moreover, multiple experiences of domestic violence are associated with mothers' own affect dysregulation (Alexander, 2009), which also may impair their ability to regulate their infants.

**Impact of domestic violence on infants.** The effect of domestic violence on children is profound, and many mothers recognize the numerous effects that witnessing domestic violence has on their children (DeVoe & Smith, 2002). There is ample evidence of a wide variety of effects that exposure to domestic violence may have on children aged 3 and older; however, research regarding the effects of domestic violence on infants is much more limited. In children aged 3 and older, exposure to domestic violence has been found to be significantly related to a number of problems that may be indicative of social-emotional difficulties. For instance, exposure to domestic violence is significantly related to internalizing and externalizing problems (Fantuzzo et al., 1991; Johnson & Lieberman, 2007; Lieberman, van Horn, & Ozer, 2005; Rea & Rossman, 2005; Ybarra, Wilkens, & Lieberman, 2007), posttraumatic stress disorder (PTSD) and trauma symptoms (Chemtob & Carlson, 2004; Kilpatrick, Litt, & Williams, 1997; Graham-Bermann & Levendosky, 1998; Levendosky, Huth-Bocks, Semel, & Shapiro, 2002), and higher physiological arousal (Saltzman, Holden, & Holahan, 2005).

Additionally, exposure to domestic violence has been found to be significantly related to decreased emotional awareness and increased emotional dysregulation (Katz,

Hessler, & Annest, 2007), emotional insecurity (Cummings, Schermerhorn, Davies, Goeke-Morey, & Cummings, 2006), and lower social competency (Fantuzzo et al., 1991) in children aged 3 and older. Often these effects in children are not only directly related to the domestic violence but also indirectly related to their mothers' level of parenting stress and their mothers' emotional availability (Sullivan, Nguyen, Allen, Bybee, & Juras, 2000). Effects in infancy from exposure to domestic violence may be similar in some respects but also may differ as developmental tasks faced by infants are considerably different than those faced by older children.

Although knowledge regarding the impact of domestic violence on infants is quite limited, it is clear that the impact is serious and aversive. Domestic violence experienced prior to and during pregnancy has been found to directly affect infants' externalizing behaviors (Levendosky et al., 2006). Brain development in children of all ages can be impacted by domestic violence; however, the most severe effects are likely to be found in infants because the majority of brain development happens in the first few years of life. Changes in brain development from trauma can lead to numerous adverse effects, such as difficulty regulating emotion (Perry, 1997; Schore, 2001a, 2003; Sheridan & Nelson, 2009). Similar to older children, trauma symptoms are also found in infants exposed to domestic violence. For instance, Bogat, DeJonghe, Levendosky, Davidson, and von Eye (2006) found that 37.5% of the infants in their sample experienced at least one trauma symptom, as reported by their mothers, in the 2 weeks that followed an episode of domestic violence that they had witnessed. Trauma symptoms included, for example, increased arousal, numbing, new fears, and increased aggression.

Furthermore, infants exposed to domestic violence have been found to become more distressed by adult verbal conflict at 1 year of age than infants not exposed to domestic violence (DeJonghe, Bogat, Levendosky, von Eye, & Davidson, 2005). McDonald, Jouriles, Briggs-Gowan, Rosenfield, and Carter (2007) also found that children between the ages of 1 and 3 who witnessed violence and/or angry adult verbal conflict toward a family member were more likely to have externalizing, internalizing, atypical/maladaptive problems, and difficulties with affective regulation than children not exposed to violence. Attachment disorders and symptoms resembling PTSD are also found in infants exposed to domestic violence (Zeanah & Scheeringa, 1997).

Few studies have attempted to investigate the link between parental experiences of violence and regulation in infants less than a year old. In those that have, however, marital conflict (rather than domestic violence per se) has been the variable of choice. In a sample of low-risk families, Porter, Wouden-Miller, Silva, and Porter (2003) found that mothers' self-report of conflict and love in their marriage was related to their 6-month-old infants' emotional and physiological regulation. Specifically, mothers who reported higher levels of marital conflict had infants with lower vagal tone ("cardiac vagal tone is thought to play a central role in the organization of behavior, emotion, and attention;" Moore, 2010, p. 23) and poorer emotional regulation on the Bayley Scales of Infant Development. Mothers who reported higher levels of love or marital harmony had infants with better heart beat indicators (e.g., interbeat period per 30 second epoch during an EKG and higher heart period range scores), as well as better emotion regulation.

Similarly, Moore (2010) found that 6-month-old infants from families with more reported marital conflict had lower respiratory sinus arrhythmia at baseline (RSA; a measure

of cardiac vagal tone, and low amounts tend to be associated with regulation difficulties), evidenced RSA withdrawal to a lesser degree than would be expected during the disengaged episode of the Still-Face Paradigm (infant RSA withdrawal is an indicator of engaging in effective self-regulation in response to the distress caused by the mothers' unavailability during this episode), and showed RSA withdrawal rather than RSA activation during the interaction and reunion episodes of the Still-Face Paradigm (RSA activation is the normative response during these non-distressing episodes of the Still-Face Paradigm) than lower conflict families. The author concluded that less RSA withdrawal, by the infants from the high conflict families, during the disengagement episode of the Still-Face Paradigm (the stressful episode which comes after the interaction episode) may indicate that these infants are over-relying on self-regulatory mechanisms because the infants were already expressing RSA withdrawal during the previous interaction episode of the Still-Face Paradigm. Thus, infants from higher conflict families seem to be relying on self-regulation strategies more often than are infants from lower conflict families, as these strategies are evident even when they are interacting with their mothers (a time when the strategies should typically only be needed to a limited extent). In a different study of low-risk families, verbal marital aggression was found to be associated with 6-month-old infants' withdrawal and distress in relation to exposure to novel toys (Crockenberg, Leerkes, & Lekka, 2007), which are signs of regulation difficulties.

Furthermore, studies related to cortisol levels in mothers and infants can provide further insight into the impact of domestic violence on infants. Cortisol is a stress hormone that indicates altered psychological states in response to stress; it is expected to increase in response to stressful situations. However, repeated exposure to the same psychological

stimulation can cause a lower cortisol response than if the stimulation was novel, unpredictable, and uncontrollable (Kirschbaum & Hellhammer, 1989). Exposure to traumatic events like maltreatment and domestic violence at an early age increases children's cortisol levels (De Bellis et al., 1999), and these early-life experiences of trauma appear to be linked to deleterious cortisol responses in adulthood (Carpenter et al., 2007; Trickett, Noll, Susman, Shenk, & Putnam, 2010).

Furthermore, the prenatal environment has the potential to negatively influence infant outcomes. For instance, exposure to high levels of glucocorticoids prenatally, which typically only occurs as a result of intense maternal stress, such as that caused by experiences of domestic violence, appears to have the potential to alter fetus' brain structure and negatively impact different areas of infant development, such as social-emotional development (Owen, Andrews, & Matthews, 2005). Similarly, it appears that the physiology of infants can be influenced by their mothers' symptomatic responses to trauma during pregnancy (Neigh, Gillespie, & Nemeroff, 2009). For example, women who had been exposed to a traumatic event during their third trimester of pregnancy and who then developed PTSD in response have infants with lower salivary cortisol levels at 9 months of age than do mothers who had not been exposed to a traumatic event during their third trimester of pregnancy (Yehuda et al., 2005).

Moreover, mothers and their infants can evidence the same physiological response to a stressful event simply as a function of the mother's response to the infant. Hibel, Granger, Blair, and Cox (2009) found that mother-infant dyads from families experiencing domestic violence had correlated cortisol levels both before and after emotionally challenging events (i.e., brief experimental procedures that are designed to be distressing to the infant and are

thereby distressing to the mother who watches) in comparison to mother-infant dyads not experiencing domestic violence. It was hypothesized that coordinated cortisol levels in mother-infant dyads experiencing domestic violence may be a result of the domestic violence experience influencing the mother's perception and reaction to her infant in the emotionally challenging task, which may then lead to the reciprocal cortisol response in the infant; the mother shapes the infant's response. These findings suggest that the dysregulation that mothers often experience in response to domestic violence can lead to the same physiological dysregulation in their infants, potentially through the mother's responses to the infant that have been influenced by her experience of domestic violence.

As can be seen, exposure to domestic violence during infancy has been found to be related to several different effects that may be indicative of social-emotional problems. Dysregulation has been one such effect. However, the research in this area is lacking and tends to be conducted with infants at 1 year of age or older and with low to medium-risk populations. The research also typically concerns domestic violence that occurred postnatally rather than prenatally or marital conflict rather than violence per se. If emotion and physiological dysregulation as a result of marital conflict can be found in 6-month-old infants from low-risk families, and if domestic violence experienced prior to and during pregnancy negatively influences infants, then it is likely that emotion and physiological dysregulation may also be found in violence exposed infants during pregnancy and the first few months following birth.

### **Limitations of Previous Research**

As indicated in the above literature review, researchers have established that infants' emotion and physiological regulation develops through their mothers' abilities to be



emotionally available and provide adequate caregiving. Also, research has found that infant emotion and physiological regulation at less than 1 year of age has been related to later social-emotional difficulties. Furthermore, researchers have demonstrated that mothers' experiences of childhood maltreatment and experiences of domestic violence as adults compromise their emotional availability and caregiving ability. Despite this knowledge, researchers have not investigated the link between mothers' experiences of childhood maltreatment and their infants' emotion and physiological regulation at less than 1 year of age and beyond the use of attachment measures. Moreover, there is limited research on the relationship between mothers' recent experiences of domestic violence and their infants' emotion and physiological regulation. In the research that has been done, the infants are typically between the ages of 6 months and 1 year, and complex procedures are used to identify dysregulation, which are difficult for service providers to adopt as a screening procedure. Additional limitations in the literature are the use of low to medium-risk populations, as defined by socio-economic and marital status, cross-sectional designs, and investigating marital conflict rather than domestic violence. Only looking at particular types of childhood maltreatment and domestic violence (i.e., predominantly physical and sexual abuse) or combining all types is another limitation in the literature.

### **The Present Study**

The current study addressed the above limitations in a number of ways. First, this study investigated the impact of mothers' childhood experiences of maltreatment and recent experiences of domestic violence on their 3-month-old infants' regulation. Emotion and physiological regulation were investigated using a questionnaire about crying, feeding, and sleeping patterns. Importantly, this study addressed the limited examination, in prior studies,

of these variables together (i.e., mothers' childhood and adulthood interpersonal trauma histories and infants' regulation), and, in particular, the limited inclusion of infants as young as 3 months old who have mothers with interpersonal trauma histories. These variables are important to study because mothers are critical for their infants' social-emotional development, and anything that compromises mothers' abilities to be emotionally available and provide adequate care for their infants, such as experiences of interpersonal trauma, potentially increases their infants' risk of social-emotional difficulties, such as difficulties regulating. Additionally, social-emotional development begins at birth; thus, identifying difficulties early in an infant's life may prevent additional difficulties later in life. Utilizing a self-report measure to identify these difficulties increases the likelihood that service providers could adopt similar procedures when screening parents of infants.

Second, this study utilized two panels of data that have been collected as part of a four panel study of pregnant, high-risk women. The initial assessments occurred during the third trimester of pregnancy, and the subsequent evaluation of infants' social-emotional development occurred at 3 months of age. A high-risk sample is important because of the limited research with this demographic and because high-risk families overwhelmingly endure childhood and adulthood interpersonal trauma yet have the fewest resources to reduce the negative effects that these experiences may have on mothers' caregiving and on their infants. This study may help increase awareness for the need to provide prevention and intervention services in the form of screening infants, from this population, very early for social-emotional difficulties and then providing intervention services if needed. Moreover, the longitudinal design allowed for the investigation of mothers' experiences of domestic violence during pregnancy, rather than having to investigate these experiences

retrospectively. This is especially important because domestic violence during pregnancy tends to be underreported (Johnson, Haider, Ellis, Hay, & Lindow, 2003), and retrospective recall may further decrease the amount reported.

Last, this study utilized measures of domestic violence and experiences of childhood maltreatment that allowed different types of these traumas (e.g., physical, sexual, and emotional violence or childhood abuse) to be individually explored. The literature often focuses on only physical or sexual childhood abuse or domestic violence or does not differentiate between types at all. Utilizing more inclusive measures contributes to the literature by identifying how particular types of childhood maltreatment and adult domestic violence may be differentially related to infant regulation. Furthermore, utilizing a domestic violence measure rather than a marital conflict measure allowed for mild, minor, and severe forms of aggression to be investigated, rather than only verbal aggression.

The hypotheses for the present study were 1) mothers' histories of childhood interpersonal trauma, in the form of childhood abuse or neglect, would have a direct effect on their infants' regulation at 3 months of age; specifically, greater severity of childhood maltreatment would be related to greater crying, feeding, and sleeping difficulties, 2) mothers' histories of childhood interpersonal trauma would be positively correlated with adult interpersonal trauma, in the form of recent domestic violence; specifically, greater severity of childhood maltreatment would be related to greater severity of recent domestic violence, 3) mothers' recent domestic violence, would have a direct effect on their infants' regulation at 3 months of age; specifically, greater severity of recent domestic violence would be related to greater crying, feeding, and sleeping difficulties, and 4) mothers' childhood interpersonal trauma would have an indirect effect on their infants' regulation at 3

months of age that would be mediated by mothers' recent domestic violence; specifically, mothers' childhood maltreatment would have less of an effect on infants' crying, feeding, and sleeping difficulties when mothers' recent domestic violence was accounted for (see Figure 1 for hypothesized mediation model).

It was proposed that if mothers' recent domestic violence did not fully mediate the relationship between mothers' childhood interpersonal trauma and their infants' regulation at 3 months of age, then an additive model would be explored. In this model, it was expected that both mothers' childhood maltreatment and recent domestic violence, when considered together, would predict a significant amount of their infants' crying, feeding, and sleeping difficulties.

Finally, the following were explored in the present study without any *a priori* hypotheses in order to examine associations between the severity of particular types of childhood maltreatment (e.g., physical abuse) and adult domestic violence (e.g., psychological violence) and infant regulation problems in each domain (e.g., crying, feeding, and sleeping): 1) the relationship between the severity of the different types of childhood maltreatment experienced by mothers (i.e., physical, sexual, and emotional abuse and emotional and physical neglect) and the severity of the different types of recent domestic violence that they experienced (i.e., psychological, physical, and sexual violence, and injury resulting from partner violence) in order to examine whether certain types of childhood maltreatment were related to certain types of adult domestic violence, 2) the relationship between the severity of the different types of childhood maltreatment experienced by mothers and the severity of their infants' crying, feeding, and sleeping difficulties at 3 months of age in order to examine whether certain types of childhood maltreatment were related to certain

infant regulation domains, and 3) the relationship between the severity of the different types of domestic violence experienced by mothers and the severity of their infants' crying, feeding, and sleeping difficulties at 3 months of age in order to examine whether certain types of domestic violence were related to certain infant regulation domains.

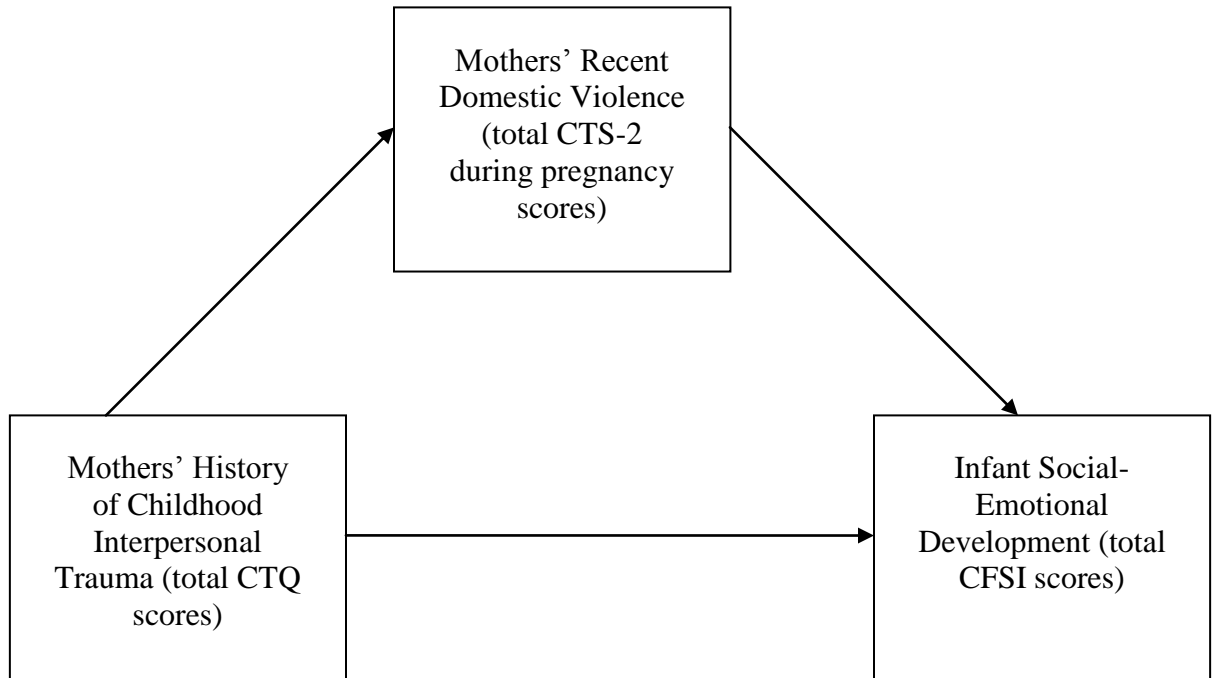


Figure 1

*Hypothesized Mediation Model*

## Method

### Participants

Participants included 120 primarily low-income women who are participating in a 4-panel longitudinal study on parenting over the course of pregnancy to the infant's second birthday. Data from the first two panels of the larger, ongoing longitudinal study were used in the present study. The first panel of data was collected when the participants were in their third trimester of pregnancy, and the second panel of data was collected when the participants' infants turned 3 months old on average (range = 2-4 months). This longitudinal design is ideal for investigating the effects of domestic violence experiences during pregnancy on infants' regulation at 3 months of age, without concerns of retrospective recall and excessive underreporting. Participants are between the ages of 18 and 42 ( $M = 26.2$ ,  $SD = 5.7$ ), and 47% are African American, 36% are Caucasian, 13% are Biracial, and 4% belong to other ethnic groups. Sixty-four percent of participants are single (never married), 28% married, 4% separated, and 4% divorced, and 30% are first time mothers. Furthermore, 20% of participants have a high school diploma/GED or less education, 44% have some college or trade school, and 36% have a college degree. The median monthly income for participants is \$1,500.00 (range = \$0 - \$10,416.00). Eighty-eight percent received services from WIC, 62% received food stamps, 90% received Medicaid, Mi-Child, or Medicare, and 20% received public supplemental income.

Participants were recruited from the Washtenaw and Wayne County communities via fliers advertising a study about parenting. Fliers were placed at areas primarily serving low-income or high-risk pregnant populations. This strategic distribution of fliers allowed for the specific recruitment of economically-disadvantaged, pregnant women, which was a specific focus of the overall study goals. Specifically, 23% of participants were recruited from

several community-based health clinics serving low-income and/or uninsured individuals, 18% from the Women, Infants, and Children (WIC) social service program, 16% from student areas in one regional-level university and one community college, 11% from a “community baby shower” sponsored by local social service programs, 11% heard about the study through word of mouth (friend, relative, another research study, or church), 7% from Head Start and local daycare programs, 7% from subsidized and/or temporary housing facilities, 5% from second-hand, donation centers for pregnant women and young children, and 2% from a parenting class.

### **Procedures**

Fliers requested that pregnant women interested in the study contact the research office. Upon contacting the research office, research assistants read a scripted description of the study to interested women. This description informed interested women of the intended purpose of the study, the logistics of the first interview (i.e., amount of time, location, types of questionnaires, confidentiality, longitudinal nature of the study, and compensation), and their rights as research participants. After the description was read, women were asked if they were still interested in participating, and if so, they were asked for verbal consent to continue gathering basic information from them to determine if they met eligibility criteria for the study. There were two inclusion criteria; participants needed to be pregnant and fluent English speakers, as bilingual translators were not available. Additionally, any infants born with known birth defects or significant health conditions were excluded from the study as these infants will have different social-emotional outcomes than infants born without these difficulties.

After determining eligibility, research assistants collected contact and demographic information. Interested participants who were currently in their third trimester of pregnancy when they contacted the research office were immediately scheduled for the first interview. Contact information on the remaining persons was retained and they were contacted upon reaching their third trimester; the first interview was then scheduled. This process was continued until the required number of participants had been interviewed for the first panel of the study.

The first interview was conducted in either the participant's home or at a research office on campus. Approximately 78% of interviews were conducted in the participant's home, and 22% were conducted at a research office on campus. Interviews lasted approximately 2½ to 3 hours and were conducted in rotated teams of two. One interviewer would lead the interview and the second would provide child care or observe the interview. Prior to interviewing, all research assistants were thoroughly trained on study procedures and protocol by the principal investigator.

Training involved going through the details of each study procedure and protocol as a research team, on a weekly basis, until every study procedure and protocol had been learned by all research team members. Then, advanced research assistants (i.e., graduate students) were observed leading interviews by the primary investigator. Next, only the advanced research assistants led the interviews while less advanced research assistants observed. Less advanced research assistants were able to lead interviews, with an advanced research assistant observing them, after they had observed at least two interviews, felt confident to start leading, and had demonstrated responsibility and competence in the team meetings. All research assistants met weekly as a team with the principal investigator to discuss recent



interviews completed and any questions or concerns that arose. This allowed for the principal investigator to evaluate adherence to study protocol. This also allowed junior and senior research assistants to learn from each other's experiences.

This first interview, held during the participant's third trimester of pregnancy, began with the research assistant reading the informed consent aloud. Then, both the researcher and participant signed two copies of the informed consent, allowing the participant to keep a copy. Next a brief demographic questionnaire was administered and then a semi-structured, 1-hour, audio-recorded interview regarding the participant's perceptions of her unborn baby was conducted. The remaining questionnaires were then administered in the same pre-determined order for every participant. This pre-determined order of the questionnaires was determined strategically by the principal investigator and allowed for rapport to be built with the participant prior to administering sensitive questionnaires in order to increase the participant's comfort and likelihood of giving candid answers.

The research assistant read all questionnaires aloud to the participant and recorded the participant's oral answers. Participants were given a questionnaire packet with which to follow along. At the end of the interview, the research assistant asked the participant's permission to stay in contact with her every 3 months until her baby turned 1 year old. Those agreeing to participate in follow-up interviews were asked to provide contact information for as many as three people who could provide information on the location of the study participant in case she could not be reached at the next contact interval (i.e., "recontact people"); this procedure was used to help minimize attrition at the later interview time points. Last, participants were thanked, given a long list of community resources, and were compensated with a \$25.00 Target gift card.

Prior to the second interview, each participant was contacted by a research assistant approximately 2 weeks after the anticipated due date of her baby to confirm the baby's date of birth, sex, and name. The participant's contact information was also updated. The second interview was typically conducted over the phone, but occasionally (less than 5%) at the participant's home, when the participant's infant was approximately 3 months old. If participants could not be contacted directly, they were contacted through one of the recontact people they had listed at the first interview.

This second interview lasted approximately 30 to 45 minutes. It was shorter than the first interview because the main purpose was to obtain information about the mothers' and infants' health and well-being during the infants' first 3 months of life. To begin the interview, the research assistant read aloud an informed consent to the participant who then verbally consented to the interview. Next, participants were administered a series of questionnaires that were in the same pre-determined order for each participant, for the same reasons noted above. After questionnaires had been presented, participants were asked to update their contact information and to update the contact information of their recontact people. Last, participants were thanked and sent a shortened list of community resources and a \$10.00 Meijer gift card in the mail.

## **Measures**

**Demographics questionnaire.** A brief demographic questionnaire was used to assess background characteristics such as age, marital status, ethnicity, educational level, and total family monthly income, among other things.

**Childhood interpersonal trauma.** The Childhood Trauma Questionnaire (CTQ; Bernstein & Fink, 1998) was used to assess for a history of childhood interpersonal trauma.

The CTQ is a 28-item self-report inventory designed to assess experiences of five types of childhood maltreatment: emotional, physical, and sexual abuse, and emotional and physical neglect. These five types of childhood maltreatment make up the scales of the CTQ with five items for each scale. Items on the five maltreatment scales are scored on a 5-point Likert-type scale based on frequency (1 = *never true*, 2 = *rarely true*, 3 = *sometimes true*, 4 = *often true*, 5 = *very often true*). Seven items are reverse scored. Scores can range from 5 to 25 for each scale, and higher scores indicate greater severity of childhood maltreatment. The 3-item minimization/denial subscale is endorsed on the same 5-point Likert-type scale; however, 1 point is given for each item endorsed as *very often true* and 0 points are given for all other frequency endorsements. A score of 1 to 3 on this scale suggests possible underreporting of maltreatment.

Bernstein and Fink (1998) reported on the psychometric properties of the CTQ based on data from seven diverse samples of clinical and non-clinical individuals, such as adult substance abusers, college students, and adolescent psychiatric inpatients. Median internal consistency reliability coefficients for each of the CTQ scales were satisfactory (emotional abuse  $\alpha = .89$ , physical abuse  $\alpha = .82$ , sexual abuse  $\alpha = .92$ , emotional neglect  $\alpha = .89$ , physical neglect  $\alpha = .66$ ). A total internal consistency reliability coefficient for the CTQ can be calculated from the above scale coefficients but has not been reported. Scores on the CTQ were stable over a 1 to 6-month period (overall  $r = .86$ , emotional abuse  $r = .80$ , physical abuse  $r = .80$ , sexual abuse  $r = .81$ , emotional neglect  $r = .81$ , physical neglect  $r = .79$ ). Furthermore, Bernstein and Fink (1998) found that the CTQ scales were significantly and strongly correlated ( $r = .42$  to  $.75$ ) with corresponding scales on three trauma measures (i.e., the Childhood Trauma Interview, the Childhood Maltreatment Interview, and the Evaluation

of Lifetime Stressors) and therapists' best-estimate maltreatment ratings of clients, but less strongly correlated ( $r = .06$  to  $.60$ ) with non-corresponding scales on the same measures. The CTQ minimization/denial scale was significantly correlated ( $r = .46$ ) with another measure of social desirability (i.e., the Balanced Inventory of Desirable Responses). Last, confirmatory factor analyses found that the five-factor model of the CTQ provided a good fit for the data (Bernstein & Finch, 1998). In the current study, the total CTQ score was used in primary analyses, and the five CTQ subscales were used in the exploratory analyses. Coefficient alphas were .96 for the total score, .91 for emotional abuse, .90 for physical abuse, .96 for sexual abuse, .92 for emotional neglect, and .83 for physical neglect.

**Domestic violence.** The Conflict Tactics Scales-2 (CTS-2; Straus, Hamby, & Warren, 2003) was used to assess for a history of violent or abusive partner interactions. The CTS-2 is a 78-item questionnaire designed to assess experiences of psychological, physical, and sexual partner violence as well as violence causing injury from a partner; 33 items assess perpetration and 33 items assess victimization. Additionally, 12 items (6 for self and 6 for partner) assess conflict negotiation. Due to the interests of this study, only the 33 items that assess experiences of victimization were used. Additionally, violence was assessed for two time periods: during the current pregnancy and the year before the current pregnancy; however, in this study, only violence assessed during the current pregnancy was examined. It is common practice for researchers to use only certain subscales of the CTS-2, to focus only on experiences of victimization, and to adjust the time periods being assessed depending on their interests (e.g., Bogat, Levendosky, Theran, von Eye, & Davidson, 2003; Hughes & Huth-Bocks, 2007; Johnson & Lieberman, 2007), and this is welcomed by the authors of the measure (Straus, Hamby, Boney-McCoy, & Sugarman, 1996). Response categories for each

item include 0 (*never*), 1 (*once*), 2 (*twice*), 3 (*3-5 times*), 4 (*6-10 times*), 5 (*11-20 times*), 6 (*more than 20 times*), and 7 (*not during these time periods, but it happened before*). The CTS-2 is scored by using a weighting system in which values are recoded (1 = 1, 2 = 2, 3 = 4, 4 = 8, 5 = 15, and 6 = 25). Higher scores indicate greater severity of partner violence and abuse.

The psychological aggression subscale is made up of four minor items and four severe items, and it assesses verbal and symbolic acts that may cause fear or emotional pain. The physical assault subscale is made up of five minor and seven severe items, and it assesses physically assaultive behaviors. The injury subscale is made up of two minor and four severe items, and it assesses injuries and medical needs that may result from physical altercations. Last, the sexual coercion subscale is made up of three minor items and four severe items, and it assesses coercion to engage in sexual acts. Again, the negotiation items were not used in the present study.

Straus et al. (2003) reported on data from a college student sample that indicated good internal consistency reliability for each of the five subscales of the CTS-2 (negotiation  $\alpha = .86$ , psychological aggression  $\alpha = .79$ , physical assault  $\alpha = .86$ , injury  $\alpha = .95$ , sexual coercion  $\alpha = .87$ ). Similar internal consistency values were also highlighted for two samples of high-risk postpartum mothers. A total internal consistency reliability coefficient for the CTS-2 can be calculated from the above subscale coefficients but has not been reported. Temporal stability reliability has not been reported for any portion of the CTS-2. However, there is preliminary evidence of convergent and discriminant validity. Specifically, physical assault scores were significantly correlated with several scales on a measure of personal and relationship risk markers for violence (i.e., the Personal and Relationships Profile), such as

the dominance, jealousy, antisocial personality, and violence approval scales (Straus et al., 2003), and there were non-significant correlations between the negotiation and injury subscales and the negotiation and sexual coercion subscales (Straus et al., 1996). Last, factor analyses have typically indicated that each CTS-2 item loads highest on its intended subscale (Straus et al., 2003). In the current study, the total CTS-2 score was used in the primary analyses, and the four CTS-2 subscales were used in the exploratory analyses. Coefficient alphas were .92 for the total score, .67 for psychological violence, .90 for physical violence, .81 for sexual violence, and .77 for injury from violence.

**Infant social-emotional development.** The Cry-Feed-Sleep Interview (CFSI; McDonough, n.d.; Seifer et al., 1994; St. James-Roberts & Halil, 1991) was used to assess infants' emotion and physiological regulation in the form of crying, feeding, and sleeping. The current version of the CFSI is an unpublished 56-item measure designed to assess details of an infant's crying or fussiness, feeding, and sleeping patterns and parents' perceptions of these patterns early in the first year of life. Crying, feeding, and sleeping make up the three major domains of the CFSI, and each area has a mixture of fixed (e.g., *yes* or *no*) and free response items (e.g., the number of hours and minutes for periods of crying). The crying, feeding, and sleeping domains are made up of 11, 10, and 35 items, respectively. There are no set subscales within the three domains; scoring is based on researcher aims. The following subscales and composites were created for the present study. Any items that had originally been coded so that higher numbers meant less regulatory problems were first reverse-scored so that higher numbers meant greater regulatory problems. Thus, higher scores on all CFSI subscales and composites indicate greater regulatory problems.

Six of the 11 crying domain items were used to create two subscales reflecting the infant's inability to be soothed when crying or fussing (i.e., crying behavior subscale) and the mother's perception of her infant's crying (i.e., crying perception subscale). Two items were used to create the crying behavior subscale. For the first item (item 5a – 5g) in the crying behavior subscale, 1 point was given for each endorsed situation (when the infant was especially likely to cry) for a maximum score of 7 points. If one or more additional situations were listed under “other” for item 5g, only 1 point was given. The second item (item 6) in the crying behavior subscale was scored dichotomously (0 = *no*, 1 = *yes*). No items were reverse scored on this subscale. Scores were summed across these items and could, therefore, range from 0 to 8 for the crying behavior subscale. Coefficient alpha for the crying behavior subscale was .42.

Four items were used to create the crying perception subscale. Three items (items 8, 10, 11) were scored dichotomously (0 = *no*, 1 = *yes*), and one item (item 9) was originally scored on a 3-point Likert-type scale. However, in order to be weighted the same as the other three items, item 9 was recoded into a dichotomous item. The responses “average,” “better than average,” or “don't know” were recoded to 0, while “worse than average” remained coded as a 1. Scores were then summed across these items and could range from 0 to 4 on the crying perception subscale. Coefficient alpha for the crying perception subscale was .47.

Nine of the 10 feeding domain items were used to create two subscales reflecting the infant's appetite and feeding difficulties (i.e., feeding behavior subscale) and the mother's perceptions of her infant's feeding, weight, and growth (i.e., feeding perception subscale). Three items were used to create the feeding behavior subscale (i.e., item 13, 14, and 15). The

first item (item 13) in the feeding behavior subscale was scored on a 3-point Likert-type scale but was recoded into a dichotomous item so that all items were weighted equally (i.e., 0 = *usually has a good appetite*, 0 = *sometimes has a good appetite*, 1 = *usually has a poor appetite*). The second item (item 14) in this subscale was also recoded to be dichotomous for the same reason (0 = *easy to feed*, 1 = *sometimes difficult to feed*, 1 = *often difficult to feed*). For the third item (item 15a – 15f) of the feeding behavior subscale, 1 point was given for each feeding problem endorsed. If one or more additional feeding difficulties were listed under “other” for item 15f, only 1 point was given. Scores were then summed across items in the feeding behavior subscale and could, therefore, range from 0 to 8. Coefficient alpha for the feeding behavior subscale was .46.

Six items were used to create the feeding perception subscale. Five items (items 17, 18, 19, 20, 21) were scored dichotomously (0 = *no*, 1 = *yes*), and one item (item 16) was originally scored on a 3-point Likert-type scale. Item 16 was recoded into a dichotomous item in order to be weighted the same as the other items in this subscale. The responses “average,” “better than average,” and “don’t know” were recoded to 0, while “worse than average” remained coded as a 1. Scores were subsequently summed across items on the feeding perception subscale and could range from 0 to 6. Coefficient alpha for the feeding perception subscale was .42.

Within the sleep domain, 31 of the 35 items were used to create two subscales reflecting the infant’s sleep behavior and regulation (i.e., sleeping behavior subscale) and the mother’s perceptions of her infant’s sleeping (i.e., sleeping perception subscale). Twenty-six items were used to create the sleeping behavior subscale, and all 26 items (items 30-48, 50-56) were scored on a 3-point Likert-type scale (0 = *rarely*, 1 = *sometimes*, 2 = *usually*). Five



items (items 30, 31, 32, 41, 52) were reversed scored. Items were summed to form the sleeping behavior subscale; scores could range from 0 to 52. Coefficient alpha for the sleep behavior subscale was .71.

Five items were used to create the sleeping perception subscale. Four items (items 26, 27, 28, 29) were scored dichotomously (0 = *no*, 1 = *yes*), and one item (item 25) was originally scored on a 3-point Likert-type scale. Item 25 was recoded for the same reason noted in the previous subscales. The responses “average,” “better than average,” and “don’t know” were recoded to 0, while “worse than average” remained coded as a 1. Scores were then summed across items on the sleeping perception subscale and could range from 0 to 5. Coefficient alpha for the sleeping perception subscale was .69.

Psychometric properties of the CFSI subscales were explored in depth, as psychometric data are currently unavailable for this measure. As can be seen in Table 1, with exception of the feeding domain subscales, the two subscales within each CFSI domain were significantly correlated with each other. Based on these results and for conceptual reasons, individual domain composites (i.e., crying, feeding, and sleeping) were created. However, prior to creating these composites, all six subscales were first *z*-scored since subscales were made up of a different number of items, and in the sleeping domain, items were scaled differently on the two sleeping subscales. *Z*-scoring the six subscales allowed the subscales to all be weighted equally when added together to create the CFSI domain composites. Coefficient alphas for the resulting crying, feeding, and sleeping domain composites were .55, .50, and .74, respectively. Subsequently, the three domain composites (i.e., crying, feeding, and sleeping) were also found to be significantly correlated with each other (see

Table 2); thus, a total CFSI dysregulation composite was created by summing the three CFSI domain composites. Coefficient alpha for the total CFSI composite was .78.

Table 1

*Inter-scale Correlations of the Six CFSI Subscales*

Variable	Cry Behav.	Cry Percept.	Feed Behav.	Feed Percept.	Sleep Behav.	Sleep Percept.
Cry Behav.	1.00					
Cry Percept.	.31**	1.00				
Feed Behav.	.44**	.27**	1.00			
Feed Percept.	.20*	.33**	.16	1.00		
Sleep Behav.	.21*	.38**	.30**	.21*	1.00	
Sleep Percept.	.24*	.48**	.26**	.58**	.38**	1.00

*Note.* CFSI = Cry-Feed-Sleep Interview; Cry Behav. = Crying Behavior Subscale; Cry Percept. = Crying Perception Subscale; Feed Behav. = Feeding Behavior Subscale; Feed Percept. = Feeding Perception Subscale; Sleep Behav. = Sleeping Behavior Subscale; Sleep Percept. = Sleeping Perception Subscale.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 2

*Inter-scale Correlations of the Three CFSI Domains*

Variable	Cry	Feed	Sleep
Cry	1.00		
Feed	.50**	1.00	
Sleep	.48**	.53**	1.00

*Note.* CFSI = Cry-Feed-Sleep Interview; Cry = Crying Domain Total; Feed = Feeding Domain Total; Sleep = Sleeping Domain Total.

\*  $p < .05$ . \*\*  $p < .01$ .

In order to further explore whether other composite variables were possible, a principal component analysis of the six subscales, using direct oblimin rotation, was conducted. This rotation method was chosen because the subscales were theoretically expected to be correlated and were, in fact, largely found to be correlated (see Table 1). Two factors accounting for 61.45% of the variance were identified. Subscales with factor loadings of .30 or greater were considered for interpretation. The first factor was composed of the crying, feeding, and sleeping perception subscales, as well as the sleeping behavior subscale (loadings were .59, .87, .87, and .41, respectively). The second factor was composed of the crying, feeding, and sleeping behavior subscales (loadings were .80, .84, and .36, respectively). Therefore, two new factors were created and labeled the Perception factor and the Behavior factor, respectively. For theoretical reasons and to reduce redundancy, the sleeping behavior subscale was retained only on the Behavior factor, rather

than on both factors, when creating the factor composites. Coefficient alphas for these two factors were .74 (Behavior factor) and .76 (Perception factor).

The current study utilized the three domain composites (i.e., crying, feeding and sleeping), the total composite (i.e., CFSI total), and the two new factor composites in analyses (i.e., Behavior factor and Perception factor).

## Results

### Missing Data

On the CTQ, two participants missed answering one different item each and one participant refused to answer all five items that made up the sexual abuse subscale, preventing a total CTQ score as well as some of the CTQ subscales from being calculated for these participants. On the CTS-2, one participant refused to answer all questions; therefore, a total CTS-2 score as well as the four CTS-2 subscales could not be calculated for this participant. Items from the CTQ and scales for the CTS-2 were estimated and imputed using an expectation maximization algorithm from SPSS 17.0 (single imputation) before any data analysis occurred. Subsequently, scale scores on these two measures were available for all 120 participants.

On the Cry-Feed-Sleep Interview, six participants missed answering one item each, preventing certain CFSI variables from being computed for these participants. These items were estimated at the item level. Additionally, four participants were missing all CFSI data; one participant could not be found after the first interview during pregnancy, thus, it is not known whether or not her infant is alive and living with her, and three participants reported that their infants had not lived with them since shortly after birth due to foster care and adoption. Due to the focus in this study on whether or not mothers' interpersonal trauma histories influence their infants' crying, feeding, and sleeping patterns at 3 months of age (presumably because the mother plays an important role in the infant's regulation at this age), it was decided that data regarding the infants' crying, feeding, and sleeping patterns for these four participants would not be estimated.

Furthermore, seven participants were not reached for the phone interview until their infants were greater than 4 months old. It was determined that only CFSI data would be used for infants between the ages of 2 and 4 months, with an average age of 3 months, as infants outside of this age range would be substantially different in their regulatory capacities. However, this age range designation did not require us to exclude all seven of these participants. Specifically, five of the seven participants who were reached after their infants turned 4 months old were asked the CFSI questions rendering their data not actually missing, and therefore, unable to be estimated and used. Two participants, on the other hand, who were reached after their infants turned 4 months old, were never asked the CFSI questions. Although these two participants were reached late, since the CFSI data were never collected from them, their data were able to be estimated and imputed at the scale level for the CFSI total, the three CFSI domains, and the two CFSI factors. All estimated data on the CFSI were estimated using an expectation maximization algorithm from SPSS 17.0 (single imputation) before any data analysis occurred.

In summary, one participant was excluded from all analyses due to lack of confirmation that her infant is alive and living with her, three participants were excluded from analyses due to the absence of contact that they had with their infants after birth, and five participants were excluded from analyses due to CFSI questions being asked outside of the designated infant age range. Thus, all analyses were based on 111 participants. Based on recommendations made by Cohen (1992), the current sample size has adequate power to achieve a medium effect size using two independent variables with an alpha set at .05.

Analyses revealed that the 9 excluded participants differed from the 111 included participants on family income and relationship status. The excluded participants had a

significantly lower average family income [ $t(114) = 4.29, p < .001$ ]; excluded participants had an average family income of \$959.67 per month ( $SD = \$643.93$ ), whereas the included participants had an average family income of \$2,242.69 per month ( $SD = \$2,158.55$ ). Additionally, excluded participants were significantly more likely to be divorced (33.3%) than included participants (2.7%), whereas the included participants were more likely to be single (64% vs. 55.6%), married (28.8% vs. 11.1%), or separated (4.5% vs. 0%) than were the excluded participants [ $\chi^2(3, 120) = 17.07, p < .01$ ]. The excluded and included participants did not differ significantly on age, race, or education.

### **Descriptive Statistics**

Descriptive data for study measures are provided in Table 3. In order to better interpret these data, descriptive data from two of the CTQ's original authors' studies (Bernstein & Fink, 1998) and from an article using the CTS-2 with two different groups of women (Lang, Stein, Kennedy, & Foy, 2004) have been added to the table; original references and associated data are indicated in parentheses for comparison purpose. Since psychometric data on the CFSI are not publicly available, there are not any comparison data listed in the table for this measure.

### **Correlations between Study Variables**

A correlation matrix showing the relationships between all variables involved in hypothesis testing is provided in Table 4.

### **Hypothesis One**

The first hypothesis stated that mothers' histories of childhood interpersonal trauma, in the form of childhood abuse or neglect, would have a direct effect on their infants' regulation at 3 months of age; specifically, greater severity of childhood maltreatment was

Table 3

*Descriptive Data for Study Variables (N = 111)*

Variable	<i>M</i>	<i>SD</i>	Sample Range	Possible Range	Skew	Kurtosis
Total CTQ (Bernstein & Fink., 1998)	43.02	19.99	25 - 119	25 - 125	1.40	1.39
Emotional Abuse	10.04 (10.70 <sup>a</sup> /9.20 <sup>b</sup> )	5.57 (5.90 <sup>a</sup> /4.80 <sup>b</sup> )	5 - 25	5 - 25	1.00	-.16
Physical Abuse	8.14 (9.00/6.90)	4.74 (5.10/3.40)	5 - 25	5 - 25	1.82	2.54
Sexual Abuse	7.45 (10.10/6.80)	5.12 (7.10/4.20)	5 - 25	5 - 25	2.32	4.61
Emotional Neglect	10.14 (10.90/10.50)	5.10 (5.30/5.00)	5 - 25	5 - 25	.83	-.33
Physical Neglect	7.25 (7.10/6.60)	3.49 (2.70/2.70)	5 - 23	5 - 25	1.95	4.03
Total CTS-2 (Lang et al., 2004)	14.43	30.61	0 - 253	0 - 825	5.55	37.90
Psychological Violence	12.40 (74.16 <sup>c</sup> /5.32 <sup>d</sup> )	21.50 (59.45 <sup>c</sup> /12.40 <sup>d</sup> )	0 - 158	0 - 200	4.00	21.69
Physical Violence	.85 (63.09/0.03)	5.62 (77.86/0.19)	0 - 58	0 - 300	9.79	99.69
Sexual Violence	.77 (26.95/0.21)	4.82 (43.73/0.83)	0 - 50	0 - 175	9.87	101.26
Injury from Violence	.42 (19.07/0.07)	3.16 (27.48/0.38)	0 - 33	0 - 150	10.13	104.97
Total CFSI	.00	3.93	-5.39 - 15.94	NA	1.38	2.64
Crying	.00	1.62	-2.19 - 7.18	NA	1.44	3.47
Feeding	.00	1.52	-1.62 - 6.64	NA	1.39	3.04
Sleeping	.00	1.66	-2.13 - 5.50	NA	1.39	1.94
Behavior Factor	.00	2.21	-3.44 - 8.97	NA	1.05	1.78
Perception Factor	.00	2.40	-1.95 - 7.95	NA	1.66	2.55

*Note.* CTQ = Childhood Trauma Questionnaire; CTS-2 = Conflict Tactics Scales-2; CFSI = Cry-Feed-Sleep Interview; NA = Not Applicable. <sup>a</sup> Bernstein & Fink (1998) – descriptive data from the female members of a substance abusing adult sample. <sup>b</sup> Bernstein & Fink (1998) – descriptive data from an all female HMO member sample. <sup>c</sup> Lang et al. (2004) – descriptive data from a sample of women who had experienced previous severe violence by a partner. <sup>d</sup> Lang et al. (2004) – descriptive data from a sample of women with no history of severe trauma.



Table 4

*Correlations between Childhood Maltreatment, Domestic Violence, and Infant Crying, Feeding, and Sleeping*

Variable	Total CTQ	Total CTS-2	Total CFSI	Cry	Feed	Sleep	Behavior	Perception
Total CTQ	1.00							
Total CTS-2	.22*	1.00						
Total CFSI	.17	-.12	1.00					
Cry	.12	-.12	.81**	1.00				
Feed	.16	-.10	.82**	.50**	1.00			
Sleep	.16	-.07	.83**	.48**	.53**	1.00		
Behavior	.18	-.06	.84**	.73**	.68**	.65**	1.00	
Perception	.12	-.15	.87**	.65**	.71**	.76**	.45**	1.00

*Note.* Total CTQ = Total Childhood Trauma Questionnaire; Total CTS-2 = Total Conflict Tactics Scales-2; Total CFSI = Total Cry-Feed-Sleep Interview (total crying, feeding, and sleeping dysregulation); Cry = CFSI Crying Domain Total; Feed = CFSI Feeding Domain Total; Sleep = CFSI Sleeping Domain Total; Behavior = CFSI Behavior Factor; Perception = CFSI Perception Factor.

\*\*  $p < .01$ .

expected to be related to greater crying, feeding, and sleeping difficulties. As can be seen in the correlation matrix in Table 4, total childhood maltreatment was not significantly related to any of the infant variables.

### **Hypothesis Two**

The second hypothesis stated that mothers' histories of childhood interpersonal trauma would be positively correlated with adult interpersonal trauma, in the form of recent domestic violence; specifically, greater severity of childhood maltreatment would be related to greater severity of recent domestic violence. This hypothesis was supported (see Table 4). Childhood maltreatment was significantly related to domestic violence, such that greater severity of childhood maltreatment was related to greater severity of domestic violence during pregnancy.

### **Hypothesis Three**

The third hypothesis stated that mothers' recent domestic violence would have a direct effect on their infants' regulation at 3 months of age; specifically, greater severity of domestic violence during pregnancy would be related to greater infant crying, feeding, and sleeping difficulties. As can be seen in Table 4, domestic violence was not significantly related to any of the infant variables.

### **Hypothesis Four**

The fourth hypothesis stated that mothers' experiences of domestic violence would mediate the relationship between childhood interpersonal trauma and infants' regulation at 3 months of age. As indicated above, only childhood maltreatment and domestic violence were significantly related. Childhood maltreatment and domestic violence were not related to any of the infant regulation variables. Due to these findings, mediation was not possible.

Additionally, as a result of the lack of associations between the interpersonal trauma variables and the infant regulation variables, an additive effect of mothers' childhood maltreatment and recent domestic violence on their infants' regulation was not possible. Thus, analyses were not continued past this point.

### **Exploratory Analysis One**

First, the relationships between the severity of the different types of childhood maltreatment (i.e., physical, sexual, and emotional abuse and physical and emotional neglect) and the severity of the different types of domestic violence (i.e., psychological, physical and, sexual violence, and injury resulting from partner violence) were explored through Bivariate correlations. As can be seen in Table 5, severity of emotional abuse during childhood was related to severity of psychological, physical, and sexual violence by a partner during pregnancy. Additionally, severity of physical abuse during childhood was related to severity of physical violence perpetrated by a partner during pregnancy as well as severity of injuries from partner violence during pregnancy. Furthermore, severity of emotional neglect during childhood was related to severity of psychological, physical, and sexual violence by a partner during pregnancy, whereas severity of physical neglect during childhood was related to severity of sexual violence by a partner during pregnancy. Severity of sexual abuse during childhood was not related to severity of any form of violence by a partner during pregnancy.

### **Exploratory Analysis Two**

Next, the relationships between the severity of the different types of childhood maltreatment and the severity of infants' crying, feeding, and sleeping difficulties at 3 months of age were explored. Table 6 shows that severity of sexual abuse during childhood was related to greater infant feeding difficulties, greater overall crying, feeding, and sleeping

Table 5

*Correlations between the Different Types of Childhood Maltreatment and the Different Types of Domestic Violence*

Variable	Psychological Violence	Physical Violence	Sexual Violence	Injury from Violence
Emotional Abuse	.26**	.19*	.19*	.16
Physical Abuse	.18	.28**	-.06	.25**
Sexual Abuse	.03	-.06	.15	-.04
Emotional Neglect	.23*	.19*	.22*	.16
Physical Neglect	.16	.02	.22*	.01

*Note.* Violence variables are subscales from the Conflict-Tactics Scale-2 and refer to violence from a partner. Abuse and Neglect variables are subscales from the Childhood Trauma Questionnaire and refer to abuse and neglect during childhood.

\*  $p < .05$ . \*\*  $p < .01$ .

Table 6

*Correlations between the Different Types of Childhood Maltreatment and Infant Crying, Feeding, and Sleeping*

Variable	Total CFSI	Cry	Feed	Sleep	Behavior	Perception
Emotional Abuse	.14	.09	.13	.12	.12	.11
Physical Abuse	.04	.01	.05	.05	.10	-.02
Sexual Abuse	.20*	.15	.19*	.14	.25**	.09
Emotional Neglect	.15	.10	.12	.14	.15	.10
Physical Neglect	.22*	.16	.16	.22*	.11	.26**

*Note.* Total CFSI = Total Cry-Feed-Sleep Interview (total crying, feeding, and sleeping dysregulation); Cry = CFSI Crying Domain Total; Feed = CFSI Feeding Domain Total; Sleep = CFSI Sleeping Domain Total; Behavior = CFSI Behavior Factor; Perception = CFSI Perception Factor. Abuse and Neglect variables are subscales from the Childhood Trauma Questionnaire and refer to abuse and neglect during childhood.

\*  $p < .05$ . \*\*  $p < .01$ .

dysregulation, and greater overall behavioral difficulties in crying, feeding, and sleeping at 3 months of age. Moreover, severity of physical neglect during childhood was related to greater infant sleeping difficulties, greater overall crying, feeding, and sleeping dysregulation, and greater maternal perceptions of problematic infant crying, feeding, and sleeping patterns at 3 months of age.

### **Exploratory Analysis Three**

Finally, the relationships between the severity of the different types of domestic violence experienced by mothers and the severity of their infants' crying, feeding, and sleeping difficulties at 3 months of age were explored. As indicated in Table 7, severity of the four different types of domestic violence was not significantly related to infant crying, feeding, or sleeping difficulties.

Table 7

*Correlations between the Different Types of Domestic Violence and Infant Crying, Feeding, and Sleeping*

Variable	Total CFSI	Cry	Feed	Sleep	Behavior	Perception
Psychological Violence	-.13	-.11	-.13	-.07	-.05	-.16
Physical Violence	-.09	-.13	-.05	-.04	-.06	-.10
Sexual Violence	-.05	-.05	-.04	-.02	-.05	-.03
Injury from Violence	-.08	-.12	-.03	-.03	-.05	-.08

*Note.* Total CFSI = Total Cry-Feed-Sleep Interview (total crying, feeding, and sleeping dysregulation); Cry = CFSI Crying Domain Total; Feed = CFSI Feeding Domain Total; Sleep = CFSI Sleeping Domain Total; Behavior = CFSI Behavior Factor; Perception = CFSI Perception Factor.

Violence variables are subscales from the Conflict-Tactics Scale-2 and refer to violence from a partner.

\*  $p < .05$ . \*\*  $p < .01$ .

## Discussion

The present study sought to investigate the relationships between mothers' experiences of childhood maltreatment and recent experiences of domestic violence and their infants' regulation at 3 months of age. More specifically, the present study sought to replicate the finding that experiencing childhood maltreatment is a risk factor for later experiences of domestic violence in adulthood, with the specific focus on domestic violence experienced during pregnancy; this study also aimed to examine domestic violence as a possible mediator between childhood maltreatment and infant regulation difficulties. Last, the relationships between severity of subtypes of these variables (i.e., types of childhood maltreatment, types of domestic violence, and domains of infant regulation) were explored. Overall, results revealed few associations between mothers' childhood and adulthood interpersonal trauma and their infants' regulation at 3 months of age. Findings, as well as the strengths and limitations of the present study, are further discussed below.

### Descriptive Results

Bernstein and Fink (1998) have reported descriptive data about severity of childhood maltreatment from a variety of adolescent and adult samples. Descriptive data from two of their different samples (i.e., a substance abusing adult sample and a HMO member sample, both listed in Table 3) provide important comparative information, as both of these samples have similarities to the current sample, although neither sample is a close match to the current one. Their substance abusing sample was predominantly male (85.6%) with an age range of 24 - 68 years ( $M = 40.2$  years,  $SD = 8.8$  years); however, descriptive data are provided in the table for only the females that were part of their sample. Overall, their sample was also predominantly African American (50.3%) and Hispanic (33.7%); only a



small portion were White (13.4%), and the majority of their sample lived in the inner city (Bernstein & Fink, 1998). Their HMO member sample, on the other hand, was composed of only women with an age range of 18 - 67 years ( $M = 41.8$ ,  $SD = 11.5$ ) who were part of an HMO in the northwestern United States. Most of that sample was White (78.9%) and middle class (Bernstein & Fink, 1998). Compared to these two samples, the current sample experienced similar severity levels of childhood maltreatment as the females from the substance abusing adult sample, except on the sexual abuse subscale where the current sample experienced a much lower level of severity. The current sample experienced slightly greater severity of childhood maltreatment than the HMO member sample.

Descriptive data involving weighted summed scores by the original authors of the CTS-2 were not available in their CTS-2 manual (Straus et al., 2003) nor elsewhere. Thus, the comparison descriptive data on the CTS-2, presented earlier, comes from a different study. Lang et al. (2004) reported descriptive data for two groups of women who were 18 to 57 years of age ( $M = 32.8$ ,  $SD = 10.3$ ). Their first group consisted of 42 women who had experienced physical and/or sexual violence by a partner in the past 2 years but had not been in an abusive relationship for at least the last 4 weeks. These women were 34.2 years on average ( $SD = 9.1$ ), over half were Non-White (64.3%), and most were separated, divorced, or widowed (69.9%). The second group consisted of 30 women with no history of severe trauma as defined by DSM-IV PTSD Criterion A; they were the no-trauma comparison group. These women were 30.7 years on average ( $SD = 11.8$ ), predominantly White (70%), and mostly single (66.7%). All women were asked about experiences of domestic violence in the last year. Compared to the data from the Lang et al. (2004) study, the current sample experienced severity levels of domestic violence that were closer to the no-trauma group of

women, although the current sample did experience slightly greater severity levels of domestic violence than the latter group. The current sample experienced much lower severity levels of domestic violence than the severe trauma group of women. Thus, overall, the current sample experienced relatively low to moderate severity levels of childhood and adulthood interpersonal trauma.

### **The Association between Mothers' Experiences of Childhood Maltreatment and their Infants' Regulation at 3 Months of Age**

This study was a first attempt to investigate the impact of mothers' experiences of childhood maltreatment on their infants' regulation at 3 months of age; previous research has not investigated the impact of mothers' childhood interpersonal trauma experiences on infants this young. Past research suggests that mothers' experiences of childhood maltreatment may negatively impact their infants' social-emotional development, such as their ability to develop appropriate regulation skills, because of the detrimental impact that these experiences have on the mothers' emotional availability and caregiving ability. Specifically, mothers with histories of childhood maltreatment are more likely to have potentially problematic caregiver representations, personal dysregulation, negative perceptions of their infants, parenting behaviors, and attachment relationships with their infants (e.g., George & Solomon, 2008; Jacobvitz et al., 2006; Leerkes & Siepak, 2006; Lyons-Ruth & Block, 1996; Maughan & Cicchetti, 2002; Moehler et al., 2007). These characteristics are often associated with poor infant social-emotional development. Results of the present study were unexpected; there were no significant associations between the severity of mothers' childhood maltreatment and their infants' crying, feeding, and sleeping difficulties at 3 months of age.

One possibility for the lack of findings may be defensive reporting. Mothers with histories of more severe childhood maltreatment may not have accurately reported on their infants' behaviors and how they perceive these behaviors because they struggle to admit, publicly or consciously, undesirable aspects related to their infants, such as problematic behaviors and negative perceptions. Indeed, examining the descriptive statistics for each of the six CFSI behavior and perception subscales revealed that the mothers in this sample endorsed, on average, a lower amount of problematic behaviors and negative perceptions than what would likely be expected in a normative sample; the mean for each of these six subscales was closest to the low end of the possible range for each subscale. This suggests that mothers with more severe childhood maltreatment may have reported on their infants' behaviors and their perceptions of these behaviors in a manner that was similar to mothers with less severe (or absent) childhood maltreatment. For mothers with more severe childhood maltreatment, endorsing problematic infant behaviors and negative perceptions of their infants' behaviors may trigger in them (often unconsciously) fears that they are not a good parent or that they are just like the adults who maltreated them. In other words, greater severity of childhood maltreatment may lead to more defensive reporting of children's negative behaviors, as well as negative feelings and subjective perceptions related to those behaviors.

Defensive reporting by mothers with histories of more severe childhood maltreatment in this particular sample may be a possibility for the lack of associations between maternal childhood maltreatment and infant regulation; however, plenty of past research has sampled women with a history of childhood maltreatment without readily apparent problems related to defensive reporting. Another possible reason for the lack of findings in this study is

potential measurement problems with the CFSI. Unfortunately, psychometric properties of the CFSI have not been published, which makes it difficult to interpret CFSI findings from this study, such as, for instance, whether scores were in the normative range or not. Furthermore, one of the main potential problems of the CFSI is that it requires self-report of another's behavior. Although there are always concerns about accuracy of self-report measures, it may be easier to more accurately report about oneself than about another person. Moreover, utilizing this measure with high-risk participants, who may not necessarily be accurate reporters because of life circumstances, could impact accuracy of data; this may be especially true during a time when participating women were likely still adjusting to having a new infant in the household (i.e., 3 months postpartum).

Also, research has a long history of reporting mixed results in regard to the believed accuracy of mothers' reports of their children's behavior (e.g., Chess, Thomas, & Birch, 1966; Montgomery et al., 1999; Rothbart, 1986; Sadeh, 1994). Different factors appear to influence discrepancies associated with mothers' reports of their children's behavioral and emotional functioning (De Los Reyes & Kazdin, 2005). Such factors include maternal mental health (Atella, DiPietro, Smith, & St. James-Roberts, 2003; Hennigan, O'Keefe, Noether, Rinehart, & Russell, 2006; Miner & Clarke-Stewart, 2008), parenting stress (Joyner, Silver, & Stavinocha, 2009; Zerk, Mertin, & Proeve, 2009), memory difficulties (Renk, Donnelly, McKinney, & Baksh, 2007), qualitative and quantitative aspects of parent-child relationships such as acceptance and time spent with the child (Truetler & Epkins, 2003), low socioeconomic status (Duhig, Renk, Epstein, & Phares, 2000), and marital discord (Rosenberg & Joshi, 1986; Christensen, Margolin, & Sullaway, 1992), to name a few.

Several of the above factors were characteristic of the mothers in the present study. Thus, it is possible that as a result of these factors, many of which often co-occur with recent and past maternal trauma histories, the mothers in the present study may have been less able to accurately report on their infants' crying, feeding, and sleeping patterns and less able to accurately report on the impact of these patterns on themselves, as well as how they and others perceive these patterns. Published psychometric properties on the CFSI would help determine the validity of this possibility. Furthermore, as a result of the many factors that can impact accurate reporting of children's behavioral and emotional functioning, the "gold standard" is to collect and integrate information from multiple informants (Renk, 2005). The present study was unable to do this, but it may be beneficial for future research on this topic and with infants this young in age to incorporate reports from multiple informants, such as the mother through self-report on her child and the research assistants through the use of an objective measure that involves the child (e.g., coded video observation or measuring cortisol levels).

### **The Association between Mothers' Experiences of Childhood Maltreatment and their Experiences of Recent Domestic Violence during Pregnancy**

Past literature has found that experiencing childhood maltreatment is a significant risk factor for females experiencing domestic violence as an adult (e.g., Hotaling & Sugarman 1986; Renner & Slack, 2006; Stith et al., 2000). The results from the current study supported this finding; severity of childhood maltreatment was significantly associated with severity of domestic violence. Furthermore, this study added to the literature by focusing on domestic violence during pregnancy, a particularly vulnerable time in a woman's life and a time when many might assume that partner violence would not occur. Domestic violence during

pregnancy has rarely been examined in association with childhood maltreatment, and thus, research, such as this study, is important for better understanding violence across one's lifetime.

This cycle of violence in women's lives has been theorized to exist for a variety of reasons. Researchers have suggested that social learning theory, which posits that growing up in a home where violence existed teaches one that violence is an expected or normal way of dealing with interpersonal conflict, may account for this cycle (Bandura, 1973; Kwong, Bartholomew, Henderson, & Trinke, 2003). Insecure attachment, which often develops in the context of experiences of childhood maltreatment, has also been proposed as a mechanism through which revictimization occurs. Specifically, insecure attachment patterns lead to views of the self as unworthy and ineffective and views of others as untrustworthy and unreliable. These internal working models may further transfer into problematic self and social functioning in the context of relationships through low self-esteem, chronic self-destructiveness, self-blame, high dependency need for approval by others, and a need to control others in relationships. These problematic characteristics can make one more vulnerable to victimization in adult relationships (Alexander, 1992; Bowlby, 1969/1982; Liem & Boudewyn, 1999).

Others have suggested that certain psychological states, such as low self-control, low self-esteem, shame, and helplessness develop as a result of childhood maltreatment, and these states then make one more vulnerable for future victimization (Fox, Gover, & Kaukinen, 2009; Kim, Talbot, & Cicchetti, 2009; Peterson & Seligman, 1983; Whiting, Simmons, Havens, Smith, & Oka, 2009). Still others have hypothesized that experiencing childhood maltreatment leads to increased psychological distress or poorer mental health

(Lindhorst, Beadnell, Jackson, Fieland, & Lee, 2009), emotionally avoidant coping behaviors (Polusny & Follette, 1995), the development of different relationship cognitive processes (Cloitre, 1998; Langhinrichsen-Rohling, Hankla, Stormberg, 2004), or the development of less efficient self-protective strategies in high-risk situations (Banyard, Arnold, & Smith, 2000; Finkelhor & Browne, 1985; van der Kolk, 1989), and all of these factors may increase women's likelihood of being revictimized in adulthood.

It is clear that a variety of pathways may increase the likelihood that a woman who experienced childhood maltreatment will experience domestic violence in adulthood; however, it is not certain whether these same pathways apply to women who experience domestic violence during pregnancy or if there is a different or one predominant pathway that accounts for the increased likelihood of violence during this particular time in a woman's life. One possibility may concern an interaction between the normative increase in women's dependency needs during pregnancy and their previously developed insecure attachment patterns, which vary in amount of dependency desired in relationships. The interaction of dependency needs as a result of pregnancy and attachment style may affect vulnerability to domestic violence during pregnancy, where those who are highly dependent may have an even more difficult time leaving an abusive relationship at this time of their life (i.e., pregnancy). This may be a fruitful area for researchers to study in the future.

### **The Association between Mothers' Experiences of Recent Domestic Violence during Pregnancy and their Infants' Regulation at 3 Months of Age**

Similar to the research suggesting that maternal experiences of childhood maltreatment may negatively impact mothers' emotional availability and caregiving ability toward their infants, research also suggests that maternal experiences of domestic violence

may do the same. Specifically, experiences of domestic violence also have the potential to detrimentally affect mothers' parenting behaviors, attachment relationships with and perceptions of their children, as well as their own regulation (e.g., Alexander, 2009; Rea & Rossman, 2005; Ritchie & Holden, 1998; Rosenblum et al., 2006; Sokolowski et al., 2007; Zeanah et al., 1999), any of which may then negatively impact their infants' social-emotional development. Indeed, exposure to domestic violence appears to negatively impact infants' social-emotional development (e.g., Bogat et al., 2006; DeJonghe et al., 2005; McDonald et al., 2007; Zeanah & Scheeringa, 1997); however, previous research has only investigated the impact of marital conflict and verbal aggression (not domestic violence per se) on infants as young as 6 months of age (e.g., Crockenberg et al., 2007; Porter et al., 2003; Moore, 2010). Thus, this study was a first attempt to investigate the impact of mothers' experiences of recent domestic violence on their infants' regulation at 3 months of age. Results of the present study, however, were unexpected; there were no significant associations between severity of mothers' domestic violence experiences and their infants' crying, feeding, and sleeping difficulties at 3 months of age.

Past research has found that marital conflict and verbal aggression is associated with more emotional and physiological dysregulation in infants as young as 6 months old (Crockenberg et al., 2007; Porter et al., 2003; Moore, 2010). One possibility for why the current study found different results than in previous studies may be infant age; the current study included much younger infants than past studies did. In the first 3 months of life, infants' main goals are to develop a capacity to self-regulate their body rhythms and their arousal levels and to become oriented to the external world, especially their caregivers (Greenspan & Greenspan, 1985). Biological and maturational influences are a large part of



development in the first few months of life, as are caregivers, whose responses to their infants' needs help shape the infants' crying, feeding, and sleeping patterns and responses to distress (Davies, 2004). Inconsistent responses by caregivers leave infants to cope with the distress and arousal on their own, which can then jeopardize their social-emotional development (Schore, 2001a; Tronick, 2007); however, the effects of early experiences of dysregulation via maternal trauma history may not be immediately noticeable because the infant's self-regulation skills at this time are still developing and may not be as dependent on external events (Davies, 2004) compared to children who are, for instance, 3 to 6 months of age. Thus, the impact of maternal trauma may need time to "catch-up" to the infant's behavior because so much of the infant's development at this time is being driven by internal regulatory systems and less by external experiences. Additionally, exposure to maternal trauma may take longer than 3 months to alter brain development and subsequent regulatory abilities.

Furthermore, the effects of early experiences of dysregulation may be more evident during developmental periods when the infant's ability to self-regulate is expected to be more well developed; when the infant's regulatory abilities differ from what is behaviorally expected, then regulatory difficulties may be easier to notice. Increased self-regulation is expected in the second half of the infant's first year of life (Davies, 2004), which may be why research has been better able to identify infant dysregulation and associations with exposure to marital conflict and domestic violence at 6 - 12 months of age (e.g., Bogat et al., 2006; Crockenberg et al., 2007; DeJonghe et al., 2005; Porter et al., 2003; Moore, 2010). It is possible that there is a critical period between 3 and 6 months of age where the influence of maternal trauma begins to interact with infant development to produce noticeable

dysregulation. In sum, it is possible that 3 months is just too early to identify the impact of maternal trauma on very young children. A longitudinal study that begins when infants are 3 months of age and then measures their social-emotional development periodically until they are 1 year of age, with multiple measurement time points, would be helpful in identifying and clarifying when the detrimental effects of maternal trauma catch up with infant development.

A second possibility for the lack of associations between domestic violence and infant regulation concerns mothers' willingness to report current experiences of domestic violence; specifically, mothers may have been less willing to report recent experiences of domestic violence. Indeed, examining the descriptive statistics for the present study revealed that participants' reports of recent domestic violence were typically substantially lower in severity range than what is possible for the measure. It is also notable that participants appeared to disclose substantially more experiences of recent psychological violence than physical, sexual, or injurious violence. It may be reasonable to assume that participants were less willing to disclose recent experiences of domestic violence that are often considered by lay people to be more severe and harmful than psychological violence.

There may be many reasons for this possible minimization of recent domestic violence experiences. For instance, women were asked about recent domestic violence experiences while they were pregnant. Participants may have been fearful of reporting recent domestic violence because they worried that it would result in them being reported to child protective services and having their children removed from them (anecdotally, several women explicitly asked project staff about this possibility). They may also have felt that they would be judged by the research assistants for being pregnant and being in an abusive

relationship. Or, they may have been in denial themselves as a result of how conflicting it may feel to be nurturing new life in a dangerous environment.

Additionally, only 30% of the sample was first time mothers, which means that the majority of the participants had other children and often these children may have been present during the interview. Research notes that difficulty of collecting accurate data on domestic violence experiences often increases when children are present. For instance, in health care settings, researchers have found that mothers prefer to be screened alone, but may be willing to be screened with children present if the questions are very general and avoid words like “hurt” and “afraid” that their children may more easily notice (Zink & Jacobson, 2003; Zink, Levin, Putnam & Beckstrom, 2007). Of course, as children become more verbal, asking questions about domestic violence out loud in their presence becomes more risky, as the potential that the child will disclose what was asked about to the abusive partner increases, which may increase the chance of retaliation against the mother by the abusive partner (Zink & Jacobson, 2003). To manage concerns of children overhearing such information, research assistants in the present study asked the domestic violence questions when children were out of the room or playing with another research assistant or allowed the mother to read the questions silently before responding with a number that would be meaningless to any children who may have been in the room. Despite these precautions, it is still possible that simply having children present in the home while doing the interview caused mothers to be more reticent about disclosing domestic violence.

Furthermore, the presence of other adults may decrease disclosure of domestic violence, depending upon whether the other adults are considered important members of the participant’s social support system in response to the domestic violence (Allen, 2009).

Researchers have found that married women are less likely to report domestic violence than are single women, perhaps because of the continued threat of abuse associated with the abusive partner's regular presence in the household (Allen, 2009); this finding could possibly be extended to cohabiting couples, which was relatively common in the present study. Moreover, the study by Allen (2009) found that if the spouse was present during the interview and the couple had a history of frequent relocations or had higher-income status, the probability of reporting was significantly reduced. Again, there were times when other adults were present in the home in the current study. Although research assistants required other adults to be in a separate location in the home and asked the domestic violence questions quietly or allowed the mother to read them to herself silently, it is possible that these women may have been more hesitant to disclose recent violence experiences.

Overall, it appears that numerous factors may limit disclosure of recent domestic violence. Although this study employed different means to increase disclosure and protect confidentiality, such as acknowledging during the informed consent procedure that domestic violence would not be reported, conducting the interview in a confidential space, and asking the questions about domestic violence either very quietly or allowing the participant to read the questionnaire to herself silently, mothers' concerns about disclosure may have remained. The anxiety and fear aroused by disclosing types of domestic violence that are often perceived by the public as being more severe and detrimental (i.e., physical, sexual, and injurious violence in comparison to psychological violence) may have been powerful enough to limit mothers' disclosure. Finally, as discussed previously, another possibility for the lack of findings may have been problems associated with the outcome measure (i.e., the CFSI).

## **The Association between Mothers' Experiences of Childhood Maltreatment and Recent Domestic Violence during Pregnancy and their Infants' Regulation at 3 Months of Age**

It was further hypothesized that mothers' recent domestic violence would mediate the relationship between mothers' childhood maltreatment and their infants' regulation at 3 months of age. Although mothers' experiences of childhood maltreatment and recent domestic violence were significantly related, the lack of significant relationships between mothers' childhood maltreatment and recent domestic violence with their infants' crying, feeding, and sleeping patterns did not support further investigation of a mediation model. Although lack of associations between maternal trauma variables and infant regulation variables did not support mediation in the present study, future research may benefit from investigating moderator effects. Variables that may be worth further investigation as moderators between maternal trauma and infant regulation difficulties include maternal self-efficacy, quality of caregiver representations, maternal mental health, maternal cortisol levels, maternal social support, and parenting practices.

## **The Association between Types of Childhood Maltreatment, Domestic Violence, and Infant Regulation Domains**

When investigating childhood maltreatment and domestic violence, researchers have tended to focus on either the construct as a whole or on physical or sexual violence only, which are often thought of as the most detrimental forms of violence to those who are exposed. However, it is possible that other types of childhood maltreatment (e.g., psychological abuse, emotional neglect, or physical neglect) and domestic violence (e.g., psychological violence) may also be associated with negative outcomes, such as infant dysregulation. It is also possible that certain types of childhood maltreatment put females at

increased risk for certain types of domestic violence. Knowing specific relationships between types of childhood maltreatment, domestic violence, and infant regulation at this precise level may help clinicians develop and focus their interventions more specifically, perhaps allowing them to address their clients' issues more intensely and more quickly.

The relationships between the severity of different types of childhood maltreatment and the severity of different types of domestic violence were examined first. The results suggested that specific types of childhood maltreatment are associated with specific types of domestic violence during pregnancy. Notably, severity of emotional maltreatment experiences (i.e., emotional abuse and emotional neglect) was related to the severity of most forms of domestic violence (3 out of 4 types). This suggests that future researchers investigating the effect of childhood maltreatment may want to include studying emotional forms of maltreatment, along with the usual physical and sexual types of maltreatment.

Next, the associations between the severity of different types of childhood maltreatment experienced by mothers and the severity of their infants' crying, feeding, and sleeping difficulties at 3 months of age were investigated. The results revealed specific associations between severity of sexual abuse during childhood, as well as severity of physical neglect during childhood, and severity of particular infant regulation domains, such as the infants' overall crying, feeding, and sleeping dysregulation. These results suggest that particular types of childhood maltreatment may influence how mothers' parent their infants, thereby causing particular difficulties in crying, feeding, and sleeping patterns.

Alternatively, it may be that particular types of childhood maltreatment influence what mothers pay attention to and perceive in regard to their infants' crying, feeding, and sleeping. For example, past research has found that mothers with a history of childhood sexual abuse

were more likely to be intrusive with their infants (Moehler et al., 2007), whereas mothers with a history of maternal rejection demonstrated lower levels of sensitivity with their infants (Crockenberg & Leerkes, 2003). Similar parenting issues may be happening in the present study resulting in particular crying, feeding, and sleeping issues in the infants.

Last, the associations between the severity of different types of domestic violence experienced by mothers and the severity of their infants' crying, feeding, and sleeping difficulties at 3 months of age were investigated. Results revealed that none of the four different types of domestic violence were significantly related to any of the infant crying, feeding, or sleeping variables. It may be that mothers' recent domestic violence does not put their 3-month-old infants at an increased likelihood for crying, feeding, and sleeping difficulties, or these findings may be a result of the issues discussed previously (e.g., mothers' minimization of recent domestic violence, 3 months postpartum being potentially too early to identify the effects of maternal trauma on infants, or inaccurate reporting of infants' crying, feeding, and sleeping patterns by mothers). Further investigation is needed in order to determine what may have led to the unexpected lack of associations between these variables.

It is notable that associations were found between types of maternal childhood maltreatment and infant regulation domains, but not between types of maternal domestic violence experiences and infant regulation domains. One possibility for this difference in findings may be that certain types of childhood maltreatment have more of a long-lasting and detrimental effect on women than experiences of domestic violence during adulthood and, thereby, impact their children's outcomes more and at an earlier age. It is during early childhood when attachment patterns and working models of self and other begin to develop

as a result of interactions with caregivers (Bowlby 1969/1982), and growth and change is regularly occurring in all areas of development (e.g., Rosenblum, Dayton, & Muzik, 2009); childhood maltreatment likely makes navigating developmental tasks adaptively increasingly difficult (Manly, Kim, Rogosch, & Cicchetti, 2001). Certain types of childhood maltreatment may be more influential on development and functioning than other types.

Furthermore, a substantial amount of research documents the long-term detrimental effects of childhood maltreatment on women. These effects include many areas of functioning (Anda et al., 2006; Briere & Jordan, 2009), such as physiological regulation as measured through startle response and cortisol levels under certain circumstances (Carpenter et al, 2009; Gonzalez, Jenkins, Steiner, & Fleming, 2009; Jovanovic et al., 2009), mental health and psychosocial functioning (Allison, Grilo, Masheb, & Stunkard, 2007; Banyard, 1999; Carr & Francis, 2009; Edwards, Holden, Felitti, & Anda, 2003; Gibb et al., 2001; Hankin, 2005; Lang, et al., 2008), physical health (Corso, Edwards, Fang, & Mercy, 2008; Rohde et al., 2007; Springer, Sheridan, Kuo, & Carnes, 2007), and quality of intimate relationships (Colman & Widom, 2004; Paradis & Boucher, 2010), to name a few areas. Perhaps certain types of childhood maltreatment impair women's functioning more than other types of childhood maltreatment and more than adulthood interpersonal trauma experiences, and these impairments in functioning lead to impairments in parenting that then lead to significant dysregulation in infants. Indeed, research has found that when considered together, it is childhood interpersonal trauma rather than adulthood interpersonal trauma that most influences adulthood functioning (Cloitre et al., 2009), and it is mothers' childhood experiences rather than their adulthood experiences of victimization that most influences their children's outcomes (Thompson, 2007).



## **Strengths**

Overall, the present study had several strengths. This study contributed to the literature by investigating the impact of mothers' experiences of childhood and adulthood interpersonal trauma on their 3-month-old infants; effects of maternal trauma on infants this young have not been examined before. Additionally, the present study utilized a high-risk sample as well as a longitudinal design. These features were important because high-risk families are typically in need of additional services, and thus it is important to better understand their needs. The longitudinal design was beneficial to address concerns about retrospective recall of domestic violence and also to more rigorously investigate the possible impact of maternal trauma on (later) infant outcomes. Last, the present study utilized measures of domestic violence and childhood maltreatment that allowed for a more detailed investigation into the associations between subtypes of these traumas (e.g., emotional abuse, emotional neglect, and psychological violence) and infant regulation domains.

## **Limitations**

Despite the strengths of the present study, there were still some limitations. One limitation was that causality cannot be completely determined by any of the associations found, as experiences of childhood maltreatment and domestic violence can not be systematically manipulated for obvious practical and ethical reasons. A second limitation was the relatively small sample size, which may have prevented the study from having adequate power to detect small differences between the variables; the sample size also limited the possibility of conducting more detailed analyses in order to investigate the study questions through a greater variety of statistical methods, for example, by comparing groups of women based on their violence exposure. Additionally, generalizability of the study

results may be limited by the recruitment of all participants from the same small, Midwestern, urban area in southeastern Michigan. Moreover, the participants who were excluded from analyses appeared to be more at-risk than the other relatively high-risk participants in the sample as they were more likely to be divorced and have a lower family income; having to exclude these participants may have influenced the results.

Last, the use of self-report measures to obtain maternal history of childhood maltreatment and recent domestic violence, as well as information on infant crying, feeding, and sleeping patterns, may be a limitation, as self-report measures are subject to issues like distortion, as a result of retrospective recall, and bias. However, the CTQ and the CTS-2 are well established measures that are often used to measure experiences of childhood maltreatment and domestic violence; options to obtain this information via methods other than self-report are likely to be much more tedious and perhaps no more fruitful. Utilizing an unpublished self-report measure that did not have a known scoring system to detect infants' crying, feeding, and sleeping difficulties also prevented comparisons of descriptive data obtained in the present sample with other samples, making interpretations of findings more difficult. Utilizing a more objective measure of infant regulation (e.g., coded video observations or cortisol levels), in conjunction with a maternal self-report measure, would have allowed for a multi-method, multi-informant comparison, and, thus, a more rigorous examination of the outcome of interest.

## **Conclusion**

In conclusion, the present study sought to investigate the impact of mothers' experiences of childhood and adulthood interpersonal trauma on their infants' crying, feeding, and sleeping patterns at 3 months of age. Investigating the impact of these variables

on infants as young as 3 months of age was not evident in previous literature. Results of the present study revealed few associations between maternal interpersonal trauma history and infant regulation problems with the exception of a significant, positive association between maternal childhood maltreatment and domestic violence during pregnancy and a few specific associations between types of maternal childhood maltreatment and types of recent prenatal domestic violence and infant regulation domains. Potential reasons for the present findings, as well as the lack of associations found, are varied and likely complicated. Overall, findings suggest that additional research should be done on this topic and with very young infants in order to further assess questions and concerns prompted by the present study.

Important clinical implications can be drawn from the associations found in this study, and, although this study did not find associations between mothers' recent domestic violence and infant outcomes, enough research suggests that domestic violence negatively impacts infants and children such that related clinical implications cannot be overlooked. Specifically, this study found that mothers with particular histories of childhood maltreatment may have infants with regulatory difficulties as early as 3 months postpartum. As part of on-going mother-infant care (e.g., well-baby check-ups), it is important that clinicians and practitioners screen mothers for recent and past trauma history, as these experiences can detrimentally impact their infants; practitioners also should ask about the infants' crying, feeding, and sleeping patterns in detail so as to identify patterns that suggest early dysregulation. If potential problematic patterns are noted, mothers should be connected with supportive resources even if they do not disclose that their infants' behaviors are distressing to them; early regulation difficulties can further develop into more pervasive

problems for the infant and the mother-infant relationship if early intervention does not occur.

Additionally, this study found that mothers with histories of childhood maltreatment are still at increased risk of domestic violence when they are pregnant. It is important for clinicians and practitioners to be aware that risk for domestic violence does not stop during pregnancy. This finding highlights the importance of screening women of childbearing age for both types of interpersonal trauma in order to make referrals to prevention and intervention services. Addressing issues related to experiences of childhood maltreatment may reduce one's likelihood of experiencing domestic violence, as risk factors that perpetuate the cycle of violence in women's lives may be reduced. Identifying domestic violence early in a woman's pregnancy may not only reduce the harmful effects of the violence on the woman, but also reduce the potential negative outcomes for the infant. Finally, recognizing that particular types of childhood maltreatment may be related to particular types of domestic violence during pregnancy and certain infant regulation domains may help clinicians more quickly address their client's underlying difficulties and, subsequently, reach symptom relief and better global functioning quicker. When working with mother-infant dyads, interventions that start to address the underlying problem (e.g., maternal history of childhood maltreatment) as quickly as possible will be most beneficial to the dyad, particularly the infant, as development proceeds extremely fast in the early months and years of life.

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