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Maternal Sensitivity As a Mediator of Maternal History of Care and Children's Emotion Regulation and Attachment at 2 ½ Years of Age

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MATERNAL SENSITIVITY AS A MEDIATOR OF MATERNAL HISTORY OF CARE AND CHILDREN'S EMOTION REGULATION AND ATTACHMENT AT 2 ½ YEARS OF AGE

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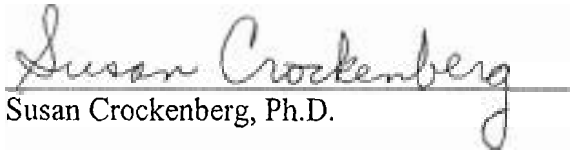

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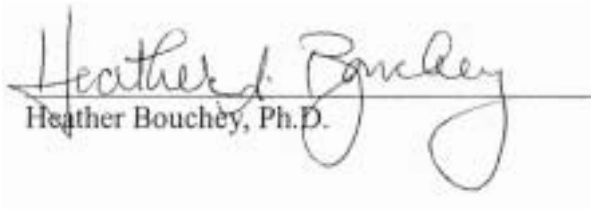

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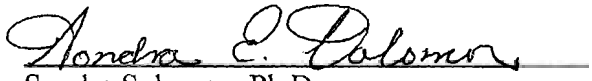

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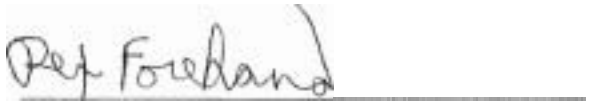

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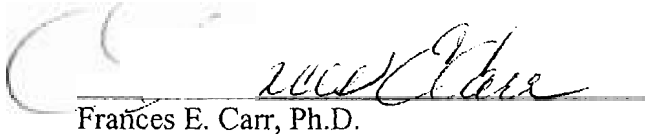

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Abstract

The aim of this study was to determine whether maternal sensitivity acts as a mediator in the associations between a mother's childhood history of care and her child's emotion regulation and attachment security at 2 ½ years of age. It was hypothesized that children of mothers who perceived their own childhood experiences with parents as caring and accepting would display more adaptive regulatory behaviors in fear-eliciting contexts and be more securely attached than children of mothers who recollected rejection in their own childhood experiences, with maternal sensitivity mediating these associations. Participants were 82 toddlers and their mothers. Mothers rated their childhood experiences of care and acceptance with their own parents prior to the laboratory procedure. Each child was presented with four novel stimuli, with mothers present, but not involved for the first two tasks and involved in the remaining two. Presentation of the novel stimuli was in pairs including one toy task (i.e., monster or robot) and one person task (i.e., clown or masks). Children's emotion regulation behaviors were coded continuously during the mother not involved condition, whereas observed maternal sensitivity was rated in the mother involved condition. Information about maternal sensitivity and children's attachment behaviors was reported by mothers using a diary technique. A path analysis was used to test the model examining the relationship between maternal history of care and sensitivity and children's attachment security and emotion regulation behaviors (i.e., distraction, withdrawal, contact with mother). Maternal sensitivity mediated the association between a mother's childhood history of care and acceptance and child attachment. Post-hoc analysis showed that this conditional indirect effect was significant only for children of mothers with less than a complete college education. In contrast, a childhood history of care and acceptance did not predict children's emotional regulation behaviors, although it interacted with education to predict distraction. Maternal sensitivity was associated positively with distraction and negatively with withdrawal, whereas children's attachment security was not associated with any emotion regulation behavior. Results are discussed in relation to attachment theory and continuities and discontinuities in the transmission process in mother-child relationships.

Dedication

This paper is dedicated to my family; my father Ricardo, who is not longer with us, my mother Susana, my sisters Jessica and Claudia, my brothers Ricardo, Gustavo, and Fernando, my niece Estefanía, my nephew Nicolás, and my granny Irma.

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Introduction

Early experiences with parents have been related to later outcomes in adulthood, such as caregiving and sensitivity (Ainsworth, Bell, & Stayton, 1971), including responsiveness to one's own child's temperament and negative affect (Chess & Thomas, 1996; Edelstein et al., 2004; Pettit & Bates, 1989), and have been related also to the ways parents perceive and react to their children (Belsky, 1984). One of the explanations for this association, provided by attachment theorists, is that individuals develop internal working models of their relationships with caregivers based on their experiences of parental care, warmth, and acceptance that allow them to develop confidence in caregivers' availability and responsiveness in times of need, which in turn influences later relationships with others (Bowlby, 1979; Bretherton & Munholland, 1999). Specifically, these early relationships with parents are important for the development of emotion regulation skills and secure attachment (Bowlby, 1969/1982; Braungart-Rieker, Garwood, Powers, & Wang, 2001; Cassidy 1994), and ultimately for their ability to parent in ways that foster secure attachments and effective regulation behaviors in their own children (Kogan & Carter, 1996; Mangelsdorf, Gunnar, Kestenbaum, Lang, & Andreas, 1990).

In this study, I investigated a conceptual model hypothesizing positive associations between mothers' recollection of their own childhood experiences of care with parents; mothers' responsiveness (i.e., sensitivity) toward their children's cues in novel situations, and their 2 ½ year-olds' developing emotion regulatory behaviors and attachment security behavior. The potential role of maternal sensitivity as a mediator between mothers' childhood history and their children's outcomes was also examined.

Maternal Developmental History and Maternal Sensitivity

Parental developmental history and parental behavior have been studied from several perspectives. Attachment theory, which focuses on internal working models of attachment that develop in the course of parent-child interactions (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969/1982), represents one of the most important assertions of the significance of parental care. Other approaches include parental acceptance-rejection theory, which identifies causes, consequences, and other implications of parental acceptance-rejection, using a cross-cultural perspective (Rohner, 1986), and the study of parental bonding patterns (Parker, Tupling, & Brown, 1979). A brief review of each of these theoretical perspectives is presented below.

Attachment Theory

Attachment theory is the cooperative work of John Bowlby and Mary Ainsworth (Bretherton, 1992). Attachment theorists argued that maternal characteristics, including maternal history and behavior, play an essential role in the development of attachment patterns (Belsky, 1984; Shulman, Becker, & Sroufe, 1999). Mothers perceive and behave towards their children in ways that reflect their own developmental history (Belsky, 1984), and the quality of maternal care is thought to foster a secure attachment relationship (Ainsworth et al., 1978; Bowlby, 1969/1982).

One key concept of attachment theory is the internal working model of relationships (Bowlby, 1973; Main, Kaplan, & Cassidy, 1985). According to this theory, individuals develop working models or cognitive representations of their interactions and attachment bonding with primary caregivers, usually mothers, and with others. These representations guide the interactions of both the child and the mother and serve to

regulate, interpret, and predict both the primary caregiver's and the self's attachment behavior, thoughts, and feelings (Bowlby, 1969/1982; Bretherton & Munholland, 1999). Thus, internal working models are built upon past and current situations and relationships, (a) facilitating the individual's response to his/her environment, (b) influencing the individual's expectations about the mother as a secure base from which to explore, and (c) contributing to the development of the individual's secure base behavior and responses to others (Bowlby, 1977; Bretherton & Munholland, 1999; Posada, Waters, Crowell, & Lay, 1995).

Attachment representations also involve thoughts and feelings of being worthy and loved (Bowlby, 1973; Pietromonaco & Barrett, 1997). For instance, individuals who have available and supportive mothers will develop working models of being worthy and loveable (secure), whereas children with unresponsive and unavailable mothers will develop working models of being unworthy and minimize the importance of their mothers as sources of comfort and affection (insecure) (Cassidy, 1994; Main & Solomon, 1986). Securely attached children are expected to seek proximity to their mothers in periods of stress, illness, or distress, and feel comforted by their presence (Ainsworth et al., 1978; van der Mark, Bakermans-Kranenburg, & van IJzendoorn, 2002), whereas insecurely attached children are expected to be either excessively clinging and fussy when separated from their mothers or very independent, with little distress during separation or joy upon reunion (Ainsworth et al., 1978).

Attachment issues have been theorized to be salient in adulthood also, especially after entering parenthood (Bowlby, 1973). Mothers' working models of significant relationships constructed in childhood are thought to influence maternal caregiving,

which in turn influences the relationships established between themselves and their children (Bowlby, 1969/1982; Main et al., 1985). The relationship is explained by the internal working models of attachment that mothers have developed, based on their interactions with their own parents; mothers whose own needs were met in childhood are expected to be attuned to their children's needs and signals, whereas mothers whose own needs were not acknowledged in childhood will have difficulty establishing responsive and warm relations with their children (Bowlby, 1973). Moreover, Sroufe and Fleeson (1986) suggest that individuals internalize not only that their parents are a source of comfort and support, but also learn parental roles and recreate them when they become parents themselves.

Main et al. (1985) suggest that parents' early attachment experiences correspond with the current care they provide to their children and foster children's secure base behavior (Thompson, 1998). Mothers with representations of being worthy and lovable are expected to be more sensitive, accepting, reliable, and consistent with their children, thus promoting secure attachments (Braungart-Rieker et al., 2001). The ways caregivers respond to their children and are attuned with their needs is thought to influence how children organize their secure base behavior. By having an available and responsive mother, children will rely on her as a source not only for comfort, but as a secure base from which to explore their environment, including contact with peers and other adults. Ainsworth (1967; 1968) identified main components of maternal care that contribute to the organization of secure base behavior in children, such as cooperation, psychological and physical availability, and acceptance of a child's needs. However, theorists and researchers have focused largely on maternal sensitivity. The mother's ability to perceive

and to interpret accurately the signals and communications underlying her child's behavior and to respond to them appropriately and promptly is what Ainsworth (1968) deemed sensitivity. A mother's responses must be appropriate to the situation and to the child's communications. There is no concrete set of behaviors that can be identified as "sensitive," as they are tuned to the child's signals and to the circumstances. Thus, the quality of mother-child attachment reflects not only the expectations of the child regarding availability and support from the mother, but also the mother's ability to respond to her child's needs and cues (Eisenberg, Cumberland, & Spinrad, 1998).

Therefore, the study of early caregiver relationships, specifically the internal working models of attachment that are formed in these interactions, has relevance for understanding the processes involved in the development of attachment relationships. The mental representations developed in childhood, during interactions with their parents, influence the way they relate to their children when they become parents.

Parental Acceptance-Rejection Theory

Parental acceptance-rejection theory (PARTheory; Rohner, 1986) is a model of the individual's socialization with parents that addresses the implications of parental acceptance and rejection on the individual's personality and psychological adjustment (Khaleque & Rohner, 2002). This theory is based on the assumption that individuals have evolved a biological emotional need for positive responses from the people most important to them, specifically their parents. In childhood, this need is for parental affection, warmth, support, comfort, attention, care, nurturance, or simply love, also considered parental acceptance (Rohner, 1986). Children's perception of parental acceptance and rejection are linked with their ability to relate with others, specifically

how emotionally dependent or independent they are in their relationships with their attachment figures (Khaleque & Rohner, 2002).

When children do not get their need for positive responses from attachment figures satisfied, they are biologically predisposed to respond emotionally and behaviorally with anxiety and insecurity. Rejected or neglected children feel unloved in their interactions with their parents and often unable to change their situation, thus developing mental representations of themselves as being unlovable and incompetent. As a result, lack of acceptance (i.e., parental rejection) may lead to the development of maladaptive socioemotional and cognitive dispositions, including impaired self-esteem, emotional unresponsiveness, and emotional instability (Khaleque & Rohner, 2002).

Parental Bonding Patterns

In the same line as attachment and parental acceptance-rejection theories, the study of parental bonding patterns emphasizes the importance of early interactions with parents in the individual's socioemotional development. Rooted in the parenting rearing practices literature, parental bonding refers to parenting received in childhood, as perceived and recalled in adulthood, specifically the dimensions of parental care and overprotection (Travis & Combs-Orme, 2007). Parental care involves the parents' expression of affection and empathy, whereas parental overprotection involves parents' discouragement of the child's exploration of the environment, both considered to contribute to the quality of the parent-child bond (Favaretto, Torresani, & Zimmermann, 2001). The "optimal rearing" combination occurs when parents behave affectionately toward their child and let him/her explore the environment (Uji, Tanaka, Shono, & Kitamura, 2006). On the other hand, if parents do not show adequate care and affection

towards their child, or are overprotective, bonding processes are expected to be disrupted, thus contributing to maladaptive socioemotional development (Ingram & Ritter, 2000).

In summary, maternal childhood history involves current perceptions of past experiences with a mother's own parents and refers to memories of having been cared for and loved, or conversely overprotected or rejected by them (Leerkes & Crockenberg, 2002). Moreover, early experiences with mothers are considered central for the development of internal working models of self and others, which in turn are related to mothers' current behaviors exhibited in their interactions with their children. In order to assess these key perceptions of one's childhood history, all three perspectives have developed retrospective measures that facilitate the recollection of early experiences, as described below.

Methodological Considerations

Developmental history in adults has been assessed using several instruments. Attachment researchers have developed the Adult Attachment Inventory (AAI; George, Kaplan & Main, 1985), a semi-structured interview meant to identify adult attachment styles and to provide information about adults' mental representations of their experiences with parents in childhood. Based on the transcripts of this interview, coders classify the individual as insecure dismissing, insecure preoccupied, or secure autonomous. Although the AAI is considered one of the leading instruments in attachment research, it mainly reports current states of mind with respect to attachment and categories of individuals' attachment styles, rather than information about parental styles in the family of origin.

In contrast, Rohner (2001) developed the Parental Acceptance-Rejection Questionnaire (PARQ) to assess individuals' perception of their childhood experiences of parental acceptance and rejection. Perceived maternal and paternal warmth and affection, hostility and aggression, indifference and neglect, and undifferentiated rejection are included (Khaleque & Rohner, 2002). This questionnaire produces an overall measure of perceived acceptance-rejection, thus eliminating the possibility of investigating each aspect separately.

Along the same lines, Parker and colleagues (1979) developed the Parental Bonding Instrument (PBI), a self-report measure that assesses two attachment dimensions, care and overprotection. Parental care involves how a parent is perceived as expressing care, warmth, understanding, affection, empathy, and closeness, versus indifference and rejection. Parental overprotection involves how a parent is perceived as controlling, intrusive, and overprotective, versus encouraging of independence and autonomy (Parker et al., 1979).

These approaches to assessing mothers' developmental histories highlight the importance of perceived positive and negative childhood experiences with their own parents and have been considered indications of current internal working models. For the purposes of this study, the PBI will be used to investigate mothers' recollections of parental care only.

Maternal Sensitivity and the Development of Emotion Regulation

Parents in general, and mothers in particular, are thought to be the main contributors to the development of children's ability to regulate emotion (Cassidy, 1994; Kopp, 1989; Thompson, 1994; Tronick, 1989). The development of emotion regulation

processes is influenced by experience in social interactions with parents (Moore & Calkins, 2004). Early in life, infants rely on their parents' responsiveness to their signals for the regulation of their emotions. Gradually infants develop the capacity to reduce the intensity and duration of their emotional reactions, in part through the learning that takes place during interactions with caregivers of behaviors that allow infants to regulate emotion (i.e., modulate distress) more effectively (Thompson, 1990). Children also learn from parents how to choose the emotional response that is more attuned to specific goals and situations (Thompson, 1994).

In particular, the quality of the parent-child relationship is one of the most relevant resources that influences children's responses to stress (Power, 2004). In younger children, this is especially true because often they are exposed to stressful events in the presence of or around their parents. Moreover, in early childhood, children are still dependent on the help their parents provide to cope with these situations and to regulate their own emotions. In toddlerhood and the preschool years, parental expressions of emotion, reactions to their children's affect, and emotion-related discussions with their children provide opportunities for the development and socialization of emotion regulation (Eisenberg et al., 1998; Spinrad, Stifter, Donelan-McCall, & Turner, 2004). This is because toddlers begin to be more aware of their own emotions and reactions and to recognize their mothers' responses to their behavior (Spinrad et al., 2004). As a result, mothers help their children to regulate emotions by encouraging their current self-regulation behaviors and teaching them alternative ways of responding (Kopp, 1989; Spinrad et al., 2004).

By being responsive and attuned to their children's requests and needs, mothers promote the development of children's ability to adaptively modulate levels of arousal and respond to changes in the environment, including separation from the mother (Braungart & Stifter, 1991; Cassidy, 1994). Thus, mothers support their children's adaptive use of emotion regulation behaviors through their interactions and experiences with them.

Children's Emotion Regulation

Defining emotion regulation has been challenging for both theorists and researchers, given the complexity of how individuals express and manage emotions. Even though there is a consensus regarding its relevance for many aspects of social and emotional development (Bridges, Denham, & Ganiban, 2004; Thompson, 1994), diverse conceptualizations of emotion regulation have been used, depending on a researcher's particular approach, such as its focus on emotions as regulating or regulated, or addressing specific physiological, behavioral, or cognitive aspects of regulation (Campos, Frankel, & Camras, 2004; Cole, Martin, & Dennis, 2004). For example, Moore and Calkins (2004) studied emotion regulation assessing physiological responses (i.e., vagal tone) in infants, based on the idea that these responses represent active regulation of stressful situations. On the other hand, Rothbart and Derryberry (1981) considered self-regulation as a psychological process that, together with reactivity, constitute an individual's temperament. From this perspective, emotion regulation is defined as the psychological strategies that individuals use to modulate reactivity to both internal (e.g., physiological) and external (e.g., environment) events. Moreover, Thompson (1994) defined emotion regulation as the processes responsible for monitoring, evaluating, and

modifying emotional responses to achieve one's goals, which includes both intrinsic (e.g., temperament, cognitive skills) and extrinsic (e.g., cultural and familial socialization, sibling and peer relationships) factors (Fox & Calkins, 2003). For Thompson (1994), the functional aspect of emotion regulation, the individual's goal attainment, is essential to understand individual differences, as well as developmental changes in self-regulatory behaviors. Ultimately, this leads individuals to avoid, approach, or ask for help when facing particular situations.

Emotion regulation has been referred to also as the behaviors used to cope with arousal or stress (Mangelsdorf, Shapiro, & Marzolf, 1995; Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996). Kopp (1989) considered emotion regulation as the processes and characteristics involved in coping with heightened levels of negative emotions (e.g., distress, discomfort, anger, fear). Moreover, Stifter and Braungart (1995) defined regulation as the processes that serve to cope, modulate, or redirect heightened levels of arousal. In the current study, emotion regulation refers to the behaviors that 2 ½ year-olds use to manage or modulate arousal and/or negative emotions toward novel or unfamiliar situations.

Other points of consensus in the field are that the emergence of emotion regulation processes begins early in development (Stifter, 2002) and that differences exist in the availability of regulation behaviors depending on the individual's age. This means that at different points in development individuals' attempts to modify the intensity or duration of negative emotions elicited by distressful events are affected by their physical and cognitive maturity. A brief review of these developmental changes in infancy and toddlerhood is provided below.

Developmental Changes in Emotion Regulation

Although emotion regulation is considered relevant to the individual's adjustment to distressful life events (Rothbart & Derryberry, 1981; Thompson, 1994), it is not fully available at birth, but rather develops and changes over time. For example, the ability to shift attention away from an unpleasant event is not available at birth; it requires neurobiological maturation in the context of experience for children to willingly switch their focus of attention from the current situation to focus or distract themselves to other stimuli (Posner & Rothbart, 2000; Ruff & Rothbart, 1996).

In her developmental review of regulation of distress and negative emotions, Kopp (1989) stated that young infants' discomfort, due to either physiological (e.g., hunger, cold, tiredness) or psychological changes (e.g., lack of social interaction), are modulated initially by preprogrammed reflex responses, such as sucking or head turning. During the first year of life, with the maturation of motor and visual abilities, infants are able to move their heads, hands, and arms in a more voluntarily manner. Manipulation of body parts or objects is enhanced, as well as self-soothing behaviors, such as hand clasping, rocking, or hair twirling (Kopp, 1989; Rothbart & Bates, 2006; Rothbart & Derryberry, 1981; Rothbart, Ziaie, & O'Boyle, 1992).

Furthermore, there is an evident growth in the quality of attention skills through the end of the first year and into the second year. By 12 months, children are able to maintain and change focus of attention at will, depending on the situation they are in (e.g., pleasant, uncomfortable, or novel), memorize spatial markers and familiar faces, and refer to others for support or help (Posner & Rothbart, 2000; Rothbart & Bates, 2006), thus enhancing gaze aversion, reorientation, distraction, and social referencing

(i.e., toward the caregiver or experimenter) (Kopp, 2002; Rothbart & Derryberry, 1981). During this time, infants continue to make use of caregivers as immediate regulators of their emotions. Moreover, increasing locomotion capability at 12 and 18 months of age enables children to seek proximity to a caregiver and to reach more pleasant objects to help them modulate their emotional or reactive responses to distressful stimuli, thus enhancing their capacity to self-regulate (Campos et al., 2000; Kopp, 1989).

Emotion regulation becomes increasingly autonomous over the second and third years of life (Kopp, 1989). Children's development of their cognitive and language abilities increase the number and type of regulatory behaviors available relative to younger infants (Bridges & Grolnick, 1995; Mangelsdorf et al., 1995; Parritz, 1996), as they gain an understanding of the causes and consequences of emotional reactivity (Spinrad et al., 2004). Thus, in toddlerhood, children are able to purposely communicate through language and ensure support from caregivers or others as a means of regulating their distress (Thompson, 1990; Thompson & Goodvin, 2005). In addition to intentional communication, a variety of cognitive and behavioral competencies are involved in the regulation of children's emotions, including attentional skills, motor inhibition, goal-directed planfulness, and the ability to switch positions (Rothbart & Derryberry, 1981). It appears that a child's capability to regulate emotion might be a function of that child's ability to utilize such cognitive, behavioral, and language skills (Rothbart, Derryberry, & Posner, 1994).

Emotion Regulation and Attachment

From an attachment perspective, the affective bond between the primary caregiver, usually the mother and her child, is considered a dyadic organization for

emotion regulation (Sroufe, 1996). In particular, a child's emotions are regulated to accomplish the goal of maintaining proximity to the attachment figure (Cassidy, 1994; Main, 1990; Main et al., 1985). In addition, some have suggested that attachment may be one aspect of a child's emotion regulation resources (Nachmias et al., 1996), in that children learn that certain regulatory behaviors serve the function of preserving the relationship with their mothers (Cassidy, 1994). Others have suggested that emotion regulation may represent one of the mechanisms through which attachment security relates to later socioemotional outcomes, such as compliance, peer acceptance, and reduced externalizing behaviors (Braungart-Rieker et al., 2001; Cassidy 1994).

Through a history of maternal sensitivity and responsiveness, mothers support their children's ability to modulate arousal and help them to develop behaviors to respond to these caregiving experiences, including regulation of feelings, behaviors, and cognitive processes (Cassidy, 1994; Kopp, 1989; Main et al., 1985). It is in the context of their interactions with their mothers that children learn to organize and regulate their emotional experience and felt security (Sroufe & Waters, 1977). Assuming that the mother provides appropriate responses to her child's signals and needs, a secure attachment relationship is then expected, and the mother-child dyad interacts to attain ongoing emotion regulation (Sroufe, 1996). The development of the mother-child attachment parallels the development of emotion regulation, including children's responses to changes in their environment and, specifically, to mother's behaviors.

Overall, securely attached children have mothers that are responsive to both their positive and negative emotions, allowing them to express themselves freely and to expect that their emotions will be responded to sensitively (Cassidy, 1994; Eisenberg et al.,

1998). Securely attached children are believed to anticipate support from their caregivers when exploring their environment and to receive comfort from them in times of distress (Bretherton, 1985; Calkins, 1994). Moreover, a secure attachment relationship may allow children to try out self-regulatory behaviors because they can count on their mothers to get involved if they cannot manage their emotional responses on their own, which ultimately fosters their regulatory skills (Braungart-Rieker et al., 2001; Diener, Mangelsdorf, McHale, & Frosch, 2002; van den Boom, 1994).

On the other hand, an insecure mother-child attachment will be apparent in dysfunctional dyadic emotion regulation (Sroufe, 1996). In particular, insecurely attached children with a history of maternal rejection or unresponsiveness are thought to learn extreme displays of negative emotions in distressful situations, either heightened levels of negative affect or overregulated arousal (Eisenberg et al., 1998). This is because children who develop insecure relationships with their mothers do not expect their caregivers to support them in times of distress, and in turn learn less adaptive ways of regulating their emotions, such as avoiding maternal referencing because mothers are emotionally unavailable, or by becoming overly distressed and unable to explore their environment (Bretherton, 1985; Cassidy, 1994; Eisenberg et al., 1998). Mothers of insecurely attached children may also interfere with their children's coping efforts by being intrusive and overcontrolling (Nachmias et al., 1996)

Consequently, the quality of the mother-child attachment relationship is related to the development of the children's emotion regulation behaviors. In particular, children's experience with a mother who is responsive, sensitive, and emotionally available is

central to helping them learn to regulate their own emotions, as well as to their felt security.

Review of Empirical Research

In this section, I review the empirical research evidencing the association between maternal childhood history and maternal sensitivity and linking maternal sensitivity to the development of children's emotion regulation. Next, I consider empirical evidence regarding children's emotion regulation, highlighting the importance of context and the effectiveness of regulation behaviors in potentially fear-eliciting situations. Finally, I present studies linking emotion regulation and attachment with each other and with maternal sensitivity.

Maternal Childhood History and Maternal Sensitivity

Experiences with parents in childhood are related to a myriad of later outcomes in adulthood. In early studies of developmental history and self, researchers found that individuals' memories of maternal acceptance in childhood correlated highly with a sense of worthiness, even after controlling for other maternal characteristics, such as personality (Epstein, 1980; 1994). Others focused on the relation between childhood history and current behavior. For instance, Main and colleagues (1985) found that mothers who had positive recollections of parental acceptance and care during childhood displayed more sensitive, responsive, and warm behaviors in interactions with their own children. In addition, maternal self-efficacy and the ability of mothers to respond to their children' cues and bids for attention have been related to the mothers' own remembered relationships with their parents (Crockenberg & Leerkes, 2003; Leerkes & Crockenberg, 2002), reflecting what is known as the intergenerational cycle (Belsky, Jaffee, Sligo,

Woodward, & Silva, 2005). Moreover, a childhood history of maternal care has been found to moderate the relation between maternal reports and laboratory observations of infant distress to unfamiliar situations (Leerkes & Crockenberg, 2003); mothers who had a history of being rejected by parents reported more negative reactivity in their children than was observed in the laboratory, when compared with mothers who had a history of being accepted in childhood.

Overall, how mothers think and feel about their experience of parent-child relationships during their own childhoods has been related to their parenting behavior (Cohn, Cowan, Cowan, & Pearson, 1992; Ward & Carlson, 1995) and to the quality of the attachment relationship that develops with their own children (Main et al., 1985; Posada et al., 1995; Zeanah et al., 1993). Using the Adult Attachment Interview (George et al., 1985), researchers found that mothers reporting warm and secure relationships with attachment figures tended to have secure children, whereas mothers reporting ambivalent and anxious relationships tended to have children who were insecurely attached (Main et al., 1985).

These findings indicate that retrospective reports of early care and protection during childhood are associated with parents' perceptions of and interaction with their own children.

Maternal Sensitivity and Emotion Regulation

The caregiver's ability to respond to infant signals (i.e., maternal sensitivity) is associated with and appears to foster the development of regulatory behaviors (Braungart-Rieker et al., 2001; Cassidy, 1994; Diener et al., 2002; Spinrad et al., 2004). Maternal sensitivity has been found to help organize children's emotions and attention

(Volling, McElwain, Notaro, & Herrera, 2002). Mothers modulate infants' negative affect through their behavioral interventions, such as facial expressions, vocalizations, and touch, which impact infants' responses in emotionally arousing situations (Crockenberg & Leerkes, 2004; Leerkes & Crockenberg, 2003). Thus, the development of emotion regulation occurs at an interpersonal level with mother-child interactions as the context in which this process takes place (Diener et al., 2002).

In studies examining maternal behaviors that help children regulate their negative emotions, maternal responses to infant emotional behavior were associated with the level of emotional distress shown by toddlers (Grolnick, Kurowski, McMenamy, Rivkin, & Bridges, 1998; Grossmann, Grossmann, & Schwan, 1986), as well as with the type of behaviors toddlers used to regulate emotion (Braungart & Stifter, 1991; Cohn & Tronick, 1989). Specifically, research indicates that mothers display a variety of behaviors in threatening situations when their children are toddlers. Variation in maternal behavior depends on the children's age and level of distress (Grolnick et al., 1998). For example, in their study of maternal regulatory behaviors used with distressed toddlers (12, 18, 24 and 32 months of age), Grolnick and colleagues (1998) found that mother-initiated active engagement decreased with age, whereas children tended to initiate more engagement when they were older. Overall, they found that mothers were more likely to adapt the behaviors they used with their children based on their toddlers' level of distress. Mothers used more active behaviors, such as redirecting attention and providing reassurance, when children were more distressed, suggesting that mothers tried to calm their children by actively engaging with them. On the other hand, mothers responded more passively,

often with little or no interaction, when children were less distressed (Grolnick et al., 1998).

Maternal regulatory behaviors may have differential effects on their children even though they are expected to contribute to the children's ability to regulate their emotions and emotional displays (Spinrad et al., 2004). Mothers who are comforting or accepting of their toddlers' emotional displays may contribute to their children's free expression of emotions, and these children may learn in turn to use their mothers for assistance in other challenging situations (Bridges & Grolnick, 1995; Cassidy, 1994; Thompson, 1990). On the other hand, simply comforting may not be an optimal response, because it may focus the child on his emotions (Spinrad et al., 2004), rather than fostering self-regulation.

In their study of maternal interactive style and toddlers' emotion regulation, Calkins, Smith, Gill, and Johnson (1998) examined mothers' behaviors to manage their children's behavior during three mother-child tasks (i.e., toy demonstration, teaching task, pretend play). Maternal negative control (e.g., anger expressions, physical control, verbal control) and positive guidance (e.g., praise, encouragement, suggestions) were investigated. Toddlers whose mothers used more positive guidance showed more compliance to maternal requests than toddlers whose mothers used more negative control (Calkins et al., 1998), whereas toddlers whose mothers used higher amounts of negative control behavior were less physiologically regulated, engaged in more orientation towards the distressful event, and used less distraction.

More recently, Smith, Calkins and Keane (2006) investigated mother-child interactions in different emotion-eliciting tasks, focusing on mothers' behavior and their 2-year olds' emotion expression and emotion regulation. Overall, supportive maternal

behavior (e.g., praising and guiding child) was related to children's use of mother-focused regulation (e.g., look, talk, reach or touch mother), which in turn was associated with less negative affect in both positive and fear-eliciting tasks. Moreover, lower levels of maternal control (e.g., negative statements, directives, threats) were related to toddler's expressions of positive emotion (Smith et al., 2006).

Together, these findings provide evidence of the association between maternal behavior and children's emotion regulation. In general, mothers who are positive and supportive in their interactions with their children appear to foster the development of their children's adaptive emotion regulation behaviors.

Children's Emotion Regulation: Context and Effectiveness

To review the empirical evidence on children's emotion regulation, it is necessary to incorporate the context in which it takes place, as context provides the basis for children's initial emotional reactions to a particular situation, which in turn may require using a different set of regulatory behaviors than do other emotions. In addition, findings regarding the effectiveness of emotion regulation behaviors in decreasing negative affect (i.e., fear) or distress are included.

Emotion regulation in context. Children appear to develop different repertoires of emotion regulatory behaviors depending on the context to which they are exposed, such as fear or anger-eliciting situations. Likewise, the intensity and frequency with which children experience fear and anger influence the emergence of different patterns of emotion regulation behaviors (see Bridges et al., 2004 for a review). In emotion-eliciting tasks, the targeted affect (i.e., fear, anger) has been found to be elicited more often during periods when mothers are asked not to directly intervene (Diener & Mangelsdorf, 1999).

Moreover, children's emotion regulation behaviors vary as a function of maternal involvement (Crockenberg & Leerkes, 2004; Diener & Mangelsdorf, 1999). In a study with children in their second year, Diener and Mangelsdorf (1999) found that, across tasks, children engaged in more help seeking towards mothers when they were not available, and played with the stimulus, looked at the mother, and engaged in more "leaving" behaviors (i.e., open the door or saying bye) when mothers were involved. These findings suggest that maternal support is expected in situations where children become distressed and that availability of the mother allows children to try out different regulatory behaviors.

In Buss and Goldsmith's study (1998), associations between emotion regulation behaviors and changes in fearful and angry distress in 6, 12, and 18 months-old infants were examined. Overall and across ages, those high in fear looked at their mothers more, interacted less, approached less, and withdrew more from the stimuli than those low in fear intensity. In addition, they found that the use of distraction, approach, and interaction with the stimulus reduced the observable intensity of anger displayed in the toy-behind-barrier and arm restraint tasks, but were less effective in reducing the intensity of fear toward novel toys (Buss & Goldsmith, 1998). In their study of 18 and 24-month old toddlers, Diener and Mangelsdorf (1999) found that emotion regulation behaviors varied as a function of the emotion-eliciting situation (e.g., fear or anger). Overall, and regardless of age or gender, toddlers tend to look, engage or ask mothers for help, solve problems, avoid, distract themselves, leave the room, and release their tension in the anger tasks (i.e., toy removal and delay of gratification) more than in the fear tasks (i.e., bouncing octopus and monster puppet). Moreover, avoidance (e.g., child moves or turns

away from the stimulus) was related to a minimizing effect in the fear tasks, but to a maintenance effect in the anger tasks, meaning that avoidance reduced subsequent expressions of fear, but not anger, more than expected by chance. In addition, tension release was related to a minimizing pattern in the frustration, but not in the fear tasks. However, one regulation behavior seemed to be effective despite the emotion-eliciting context or maternal involvement: fussing to mother was successful in reducing fear and anger expressions across tasks more than expected by chance (Diener & Mangelsdorf, 1999). As Kopp (1989) suggested, this finding supports the idea that toddlers in their second year of life communicate their needs to ensure support from their caregivers in regulating their emotions.

The above findings demonstrate that the different emotion-eliciting tasks and procedures used by researchers may lead to different patterns of child responses and regulatory behaviors. In this study, I wish to identify emotion regulation behaviors toddlers use in novel and unfamiliar situations. Thus, in the next section, I review the empirical evidence identifying effective emotion regulation behaviors used by infants and young children in fear-eliciting contexts.

Effectiveness of emotion regulation behaviors in fear-eliciting contexts. Although children build up a repertoire of regulation behaviors during different periods of time, developmental stages, and contexts to manage their negative affect, these behaviors are not always successful in decreasing their levels of negative emotions in all situations. Emotion regulation behaviors can be seen as both adaptive and maladaptive, or they can be effective in the moment, but detrimental in the long term (Cole et al., 2004). The effectiveness or adaptive quality of emotion regulation behaviors has been identified

based on reductions in negative affect or distress (Buss & Goldsmith, 1998). For example, the ability to shift attention away from a distressful stimulus *and* toward something else is seen as adaptive regulatory because it helps infants to reduce their levels of negative emotions or distress and also allows them to remain engaged with their environment (Buss & Goldsmith, 1998; Crockenberg & Leerkes, 2004; Pollak, Vardi, Putzer Bechner, & Curtin, 2005; Posner & Rothbart, 2000). In contrast, even though it may lessen negative affect in the moment, withdrawal (i.e., removing self from distressful stimuli without engaging in anything else) is seen as a maladaptive strategy because it limits children's engagement with their environment, thus reducing opportunities to learn and incorporate more adaptive alternative behaviors. Moreover, the use of withdrawal in infancy has been related to later internalizing problems. Crockenberg and Leerkes (2006) found that negative reactivity in conjunction with withdrawal to a novel stimulus at 6 months of age predicted anxious behavior at 2 ½ years.

Increased attention to the distressful stimuli has also been found to be an ineffective regulatory strategy, leading to higher levels of arousal. In their longitudinal study of facial expressions of pain and distress during routine pediatric vaccinations and visual attention, Axia, Bonichini, and Benini (1999) observed infants at 3, 5, and 11 months of age and found significant associations between measures of attention and duration of facial expressions of pain and distress across ages. Infants who paid attention for a shorter time period during the attention task showed pain or distress for a shorter time period during vaccinations as well.

Using fear-eliciting tasks, Buss and Goldsmith (1998) found that, among 6-month olds, withdrawal was identified as effective in decreasing the expression of fear towards a

novel toy more than expected by chance. Crockenberg and Leerkes (2004) found similarly that 6-month olds' withdrawal in response to novel toys was linked contingently to decrements in negative affect when mothers were not involved in the tasks. However, withdrawal was also the only infant behavior linked to increments in distress regardless of maternal involvement. This suggests that even though withdrawal serves a regulatory function in the moment, it is not necessarily adaptive. On the other hand, a significant number of 6-month olds in this sample reduced their negative responses to novelty more than chance by looking away from the new toy and towards the mother or other object, in both the maternal involved and uninvolved conditions. Moreover, some infants decreased their negative affect by self-soothing, but only when mothers were unavailable, although present in the room (Crockenberg & Leerkes, 2004). Similarly, Buss and Goldsmith (1998) found that in a novel situation, 18-month olds' withdrawal and distraction were linked to decreased negative affect more than expected by chance, and Diener and Mangelsdorf (1999) found avoidance to reduce fear expression more than expected by chance.

Finally, some findings suggest that even though some behaviors may not show a regulatory function (i.e., reducing negative emotion), they prevent distress from escalating. For example, Buss and Goldsmith (1998) found that approach, interacting with the stimulus, withdrawal, and distraction in a novel situation were not linked with decrements in fear expression, but with fewer increases in fear expression than expected in 12 and 18-month olds.

Taken together, these results show that there are differences in the use of emotion regulation behaviors depending on the developmental stage of the child and maternal

involvement, and that some behaviors are more effective than others in decreasing negative affect at different ages. Regulatory behaviors shown to be effective and adaptive in reducing fear expression in infancy include looking away from the novel stimulus and towards something else and distraction (e.g., playing with something else). Withdrawal, although effective, is considered a maladaptive behavior in reducing fear, whereas the effectiveness of orientation towards the mother is not clear. Children have been found to orient toward their mothers more when mothers are not involved or when they are highly fearful, which in turn has been related to withdrawal and less interaction with a novel stimulus. This suggests the possibility that as children get older and are increasingly able to self-regulate, high reliance on mothers may be less adaptive. On the other side, only fussing (i.e., negative distress vocalization) to mother has been found to decrease fear expressions, but very few studies have used such conceptualization of a regulatory behavior and only for younger children. Self-soothing appears to be an effective regulation behavior at least for infants, however its use decreases as the child grows older (Kopp, 1989), hence its effectiveness in toddlerhood is not evident.

To my knowledge, researchers have not yet examined the effectiveness of specific emotion regulation behaviors in fear-eliciting contexts in the third year of life. Thus, based on the above research on effective infant emotion regulation and on correlational studies of emotion regulation behaviors in toddlers, adaptive emotion regulation behaviors will include distraction by looking towards or playing with something else, whereas withdrawal will be considered a less adaptive regulation behavior. Seeking support from mother, self-soothing behaviors, and verbalizations about the novel stimulus

will be considered emotion regulation behaviors; however, their roles as adaptive behaviors are uncertain.

Emotion Regulation and Attachment

Both emotion regulation and the attachment behavioral system are likely to be activated in situations of distress or uncertainty, and hence to be related to one another. In their study of infants' (12-month-olds) regulation of negative emotion during the Strange Situation procedure, Braungart and Stifter (1991) found that children differed in the regulation behaviors they used based on their attachment relationships with their mothers and their levels of distress. Securely attached infants displayed mother-oriented behaviors upon reunion, signaling and communicating with them. Also, secure children show a correspondence between their level of distress and emotion regulation behaviors; secure children who displayed high levels of negative emotion displayed high levels of regulatory behaviors, whereas secure children who displayed low levels of negative emotion showed low levels of regulation (Braungart & Stifter, 1991). In their study of toddlers, Smith and colleagues (2006) found that higher levels of attachment security were associated with more positive emotion expressions by toddlers and lower levels of negative affect in fear and frustration-eliciting tasks (Smith et al., 2006).

On the other hand, infants distressed by the departure of the mother explored and played less with toys during separation and reunion (Braungart & Stifter, 1991). Distressed children also tended to orient more toward objects and less toward the mother during reunion, possibly in an attempt to modulate their negative affect. In doing so, children's level of distress may diminish, which would ultimately allow them to re-engage with the mother (Braungart & Stifter, 1991). In addition, children identified as

insecure-avoidant in their attachments avoided direct contact with their mothers in times of distress, but communicated to her when feeling at ease with the situation (Grossmann et al., 1986). Conversely, children identified as insecure-resistant increased their bids of attention to their mothers to ensure a response, even when the situation was not too distressful (Cassidy, 1994).

Links with maternal behavior. Associations have also been found between sensitive and positive maternal behavior and children's emotion regulation and attachment. In their longitudinal study, Braungart-Rieker and colleagues (2001) found that maternal sensitivity and infant affect regulation at 4 months were related to the mother-child attachment relationship at 12 months. In particular, mothers of infants that were later rated as securely attached to them, were more sensitive (e.g., contingent responding, appropriate stimulation, no intrusiveness) than mothers of infants rated as insecurely attached at 12 months of age. Moreover, sensitive mothers have infants who showed more self-regulation behaviors (e.g., soothing, look at something else), parent-focused regulation (look at mother), and positive affect (Braungart-Rieker et al., 2001).

Not surprisingly, insensitive maternal behavior has been linked to children's less adaptive emotion expression and regulation (Berlin & Cassidy, 2003; Smith et al., 2006) and to insecure attachment (Main, 1990). Nachmias and colleagues (1996) found that inhibited and insecurely attached 18-month olds showed higher levels of cortisol, a common physiological index of stress. The authors argued that mothers of these children showed more intrusive behaviors than mothers of securely attached children, by forcing their children to attend to novel events or by changing the environment (e.g., moving the

distressful stimuli) without letting the child attempt to regulate her own proximity and contact with the situation (Nachmias et al., 1996).

Overall, the research is consistent with the theoretical expectation that the mother-child attachment relationship is related to children's emotion regulation; specifically, securely attached children learn and use more adaptive emotion regulation behaviors than insecurely attached children. Moreover, attachment security and adaptive emotion regulation are linked by virtue of children's interactions with their mother. The mother's ability to be sensitive and responsive to her child's needs and emotions seems to guide and shape these two developmental processes. In turn, this maternal capability is based on the mother's own early childhood experiences with her parents and a sense of being worthy and competent as an adult.

The Current Study

One purpose of this study is to examine the patterns of relations between maternal history of care and observed emotion regulation behaviors in children facing novel situations, as well as with children's security of attachment, as reported by mothers when children are 2 ½ years old. The second goal is to test the potential mediating role of maternal sensitivity on the associations between maternal developmental history and toddlers' emotion regulation behaviors and concurrent attachment behaviors. A third goal is to test the relation between children's emotion regulation and security of attachment. Based on theoretical considerations and the extant empirical data, I propose a mediational model (see Figure 1), in which the following associations are hypothesized:

1. Mothers with a history of parental care and acceptance will have children who

display more adaptive emotion regulation behaviors and fewer maladaptive regulatory behaviors.

2. Mothers with a history of parental warmth and acceptance will have children who display greater attachment security.

3. Mothers with a history of parental warmth and acceptance will exhibit more sensitive reactions to their children's distress.

4. Maternal sensitivity will mediate between a maternal history of care and children's use of more adaptive emotion regulation behaviors.

5. Maternal sensitivity will mediate between a maternal history of care and attachment security.

6. Children with greater attachment security will use more adaptive and fewer maladaptive regulatory behaviors than children with lower attachment security.

Method

Participants

Participants were 102 children, 30 months of age (2 ½ years) and their mothers. Part of the sample (n = 30) were previously contacted through birth records and assessed for reactivity to novelty and emotion regulation at 4 months of age. The rest were contacted through birth records obtained from the Vermont Department of Health and through flyers posted in day cares and pediatricians' offices around Greater Burlington. Of these dyads, 82 had complete data and were included in the study. On average, mothers were 35 years old, had 16 years of education; 32% were stay-at-home mothers. Family income ranged from $10,000 to $180,000 ($M$ = $73,407). All children were born at term without any obvious risk characteristics or current illnesses. Fifty-five percent of

children were first born, 66% had one or more siblings, 35% were female, and 96% were White-Caucasian. Dyads with incomplete data for any of the main variables (n = 20) did not differ on any demographic characteristic or pertinent variable from those in the final sample.

Procedures

Letters of invitation were sent out to families before their children turned 2 ½ years of age (30 months). These letters briefly described the purpose and activities of the study and ways of contacting the research office for those interested. The P.I. then contacted the mothers who did not decline being contacted by phone or email and invited them to participate. In this initial contact, the P.I. provided more information about the study and the activities involved, as well as the time expected to be devoted to each. If mothers agreed to participate, a visit was scheduled and a first set of questionnaires, regarding child and maternal characteristics, including the Parental Bonding Instrument (PBI), was sent to them to be completed and returned at the visit. Directions to the Department of Psychology at the University of Vermont, as well as a written reminder of the scheduled visit, were included in this first packet.

One visit per family, which typically lasted about an hour, was conducted and videotaped in the UVM Baby Study laboratory. Before the procedures started, mothers were given the overview of the session, highlighting that they could stop their participation at any point during the activities if they thought it was necessary; then they signed the consent form. Instructions for the activities were provided, as well as a socio-demographic form to be completed in the first half of the laboratory procedures. When the visit was over, Maternal Attachment Diaries were given to the mothers, asking about

emotion-linked events that happen with their children during the next seven days. Self-addressed, stamped envelopes were provided to return the diaries when completed. Upon completion, families received $20 for participating.

Measures

Parental Bonding Instrument. The Parental Bonding Instrument (PBI; Parker et al., 1979) is a retrospective self-report measure that mothers completed regarding how they remembered their parents during their first 16 years of life, using a 4-point scale (1=very unlike, 4=very like). The PBI was designed to measure parental styles and the quality of the bond or attachment between parent and child (Canetti, Bachar, Galili-Weisstub, Kaplan De-Nour, & Shalev, 1997). It has two scales, *care* and *overprotection,* with separate scores on each scale for mothers and fathers. The care scale includes 12 items related to affection, emotional warmth, acceptance, empathy, and closeness on one end, and rejection, emotional coldness, indifference, and neglect on the other, (e.g., "made me feel I was not wanted", reverse coded, "appeared to understand what I needed or wanted"). It was used to assess maternal history of care and acceptance during childhood.

Participants responded to every item for both their own mothers and fathers; items were summed and averaged separately to derive maternal and paternal care scores. Two mothers did not report on father care; missing values were imputed based on level of education and maternal care, using the predicted value substitution method (Byrne, 2001; Kline 1998). Both maternal and paternal care had good internal consistency, Cronbach's α = .94 for each scale. The PBI is included in Appendix A.

Laboratory measure of regulatory behaviors. Children's reactions to unfamiliar stimuli were assessed in a laboratory-playroom, and the entire procedure was videotaped through a one-way mirror for later coding. Based on previous research on infant temperament and emotion regulation (Biederman, et al., 2001; Calkins, Fox, & Marshall, 1996; Diener & Mangelsdorf, 1999; Kagan, 1984; Kagan, Reznick, & Gibbons, 1989), and after piloting the appropriateness of each scenario, four tasks designed to elicit mild fear were selected: an adult dressed in a clown costume, an adult wearing masks, an electronic robot moving and talking, and a talking purple monster. Each activity period took three minutes.

Before the session began, mothers were given an outline of the activities, including specific instructions for each of the conditions described below. The session began with a warm-up episode, where the mother and the child interacted for three minutes in a small playroom, with available toys (e.g., car, baby doll, puzzles).

There were two maternal involvement conditions: for the first two novel stimuli, mothers were asked not to be involved with their children; for the last two novel stimuli, mothers were invited to be as involved with their children as they wished. The first condition allowed identification of the child's regulatory behaviors when mothers do not directly help their children to regulate. The second allowed identification of maternal behaviors that may encourage or discourage children's regulatory behaviors (Diener & Mangelsdorf, 1999). These two conditions were as follows:

Mother not involved: After the warm-up period, the P.I. came in and instructed the mother to sit in a chair located 5 feet away from her child, to start filling out the demographic questionnaire, and also to remain as neutral as possible, without initiating

any interaction with her child, and to respond briefly if the child approached or asked for her attention (e.g., "It's a 'name of the novel toy or situation"). If the child persisted, the mother was instructed to explain as follows: "Mommy has to finish this questionnaire right now. I will be finished in a few minutes." Then, a female research assistant introduced the novel stimuli to the child, one at a time, presenting how to make a toy work (i.e., robot, purple monster), how to wear a mask, or trying to engage the child in a game (i.e., clown).

Mother involved: Before the last two novel stimuli were presented to the child, the mother was instructed to interact with her child as she wished for this second half of the procedures (e.g., moving closer, remaining seated). Mothers were asked not to reach for, play, or turn off (if applicable) the stimuli provided by the research assistants to ensure that any approach or partial approach to the novel task was initiated by the child and not the mother. Mothers were also told that they could talk about the novelties with their children *only* if the children asked or talked about the tasks first.

In both conditions, the child was free to move around at will and to avoid the novel experience if she wished. Age-appropriate toys and books were available for the child to play with. Children's exposure to the different fear-eliciting activities was counterbalanced to control for task specific or order effects. The activities were presented in pairs, including one toy-task (i.e., monster or robot) and one person-task (i.e., clown or masks) for each maternal condition, resulting in eight different task presentations that were alternated for every visit, for boys and girls separately, to ensure that similar proportions of each gender were presented with all eight combinations. Although these situations were meant to elicit mild distress in the child, they were not meant to provoke

levels of distress higher than those that occur in comparable life situations (e.g., visiting Santa Claus). Between conditions, a toy phone was introduced to the playroom for a free-play transition period to limit carry over from the mother uninvolved into the mother involved condition.

Coding children's emotion regulation behaviors. Child behaviors, some of which were thought to serve a regulatory purpose, were scored continuously from the videotapes using the Video Coding System (Long, 1999). Trained research assistants coded the tapes in pairs and were blind to all other maternal and child data. A cut-off of kappa coefficient of .80 was used to train coders, using tapes coded by the primary investigator and faculty advisor as the comparison. Pairings varied to prevent pair-linked coder drift and 10% of the videotapes were double-coded initially and midway throughout data collection by the primary investigator to assess reliability. A 1-second window for agreement was used to compute inter-rater reliability; kappa coefficients ranged from .70 to .94 (mean $\kappa = .80$). Descriptions of the 25 emotion regulation behaviors are included in Appendix B.

The specific emotion regulation behaviors observed in the two tasks, during the mother uninvolved condition only, were coded to identify children's regulatory behaviors without direct maternal assistance. The number of behaviors used in each session ranged from 3-21 ($M = 10.77$ behaviors, $SD = 3.31$). Duration of occurrence in seconds were summed for each behavior, then divided by the total time for each session ($M = 6.5$ min., $SD = 27.61$ sec.) to correct for minor variations in the observation times. Accordingly, percentages of time children displayed the behaviors were used for analysis.

Maternal Attachment Diary. The Attachment Diary (Dozier & Stovall, 1997) was developed to assess sequences of interactions between children and their mothers. Although the original attachment diary was designed to be used with children younger than 2 years of age, it was adapted for use with toddlers (Burrous, Crockenberg, & Leerkes, in press).

In the diary, mothers were asked to recall four incidents that typically occur in any given day: child getting physically hurt, frightened, frustrated, and separated from the mother. Mothers reported the sequences of behaviors that occurred between herself and her child in each context from a checklist. For situations regarding the child's being hurt, frightened, or frustrated, mothers indicated the child's initial behavior, the mother's response to that behavior, and the child's reaction to the mother's response (e.g., "looked at me for reassurance", "picked child up", and "was soon calmed or soothed", respectively). For the separation situation, mothers reported the child's reactions to the separation and the reunion (e.g., "went after me" and "greeted me", respectively). Mothers checked all options that applied to their child's reaction and to their own response. In addition, mothers were asked to write a brief narrative describing each situation.

Mothers were asked to complete these diaries over a period of 7 days. Measures of maternal sensitivity and children's security of attachment were derived from the diaries. Data from the fear context *only* were included in the study because they were consistent with the context in which emotion regulation was assessed in the laboratory. For participants with missing values in sensitivity or attachment in fear situations, imputation was performed using the predicted value substitution method (Byrne, 2001;

Kline, 1998) based on participants' data from the other incidents included in the diary. Analyses were conducted with these cases excluded and included, revealing no differences in the results. The Maternal Attachment Diary is included in Appendix C.

Maternal sensitivity. Maternal sensitivity was rated on a 5-point scale based on how well a mother's responses matched the child's apparent need and the intensity of the child's distress, with 5 being very sensitive and 1 being very insensitive. Based on the conceptualization of maternal sensitivity proffered by Ainsworth and colleagues (1978), sensitivity ratings took into account the child's expressions of distress and need as well as the context in which the event occurred (e.g., leaving protesting 2 ½ yr old alone in movie theatre suggests mother is not attuned to child's needs, more so than leaving child in one room at home to go to another).

Sensitive responses included acknowledgement of child's feelings and use of warm, affectionate, and positive behaviors (e.g., hugged and/or held child, kissed child, rubbed back, stomach or head, spoke soothingly to child, asked how feeling, if okay). Insensitive responses included clear negative and rejecting responses (e.g., mother hits, slaps, or spanks child) without any mitigating positive response, and ignoring or minimizing child's distress (e.g., mother says "you are too old to act like that"). Two members of the research team rated maternal sensitivity, my faculty supervisor and a graduate student in the Psychology program, who were blind to other data. Identification numbers were removed from the diary transcripts to further reduce rater bias. Raters met to discuss disagreements and agree on a final sensitivity rating. To compute kappa coefficients, raters' agreements and disagreements were compared with the final rating for 50% of the sample. Inter-rater reliability for sensitivity in all diary events was $\kappa = .81$

and for sensitivity in fear situations was $\kappa = .78$. There were little intercorrelation of ratings across emotion contexts; however, fear and frustration were significantly associated ($r = .33$, $p < .05$), as were frustration and separation ($r = .28$, $p < .05$, one-tailed). Maternal sensitivity scores were summed across days and averaged. The entire rating scheme is displayed in Appendix D.

Observed sensitivity. To minimize source variance between reported measures of maternal sensitivity and children's attachment from the diaries, observed sensitivity was rated from the mother involved portion of the laboratory procedure by Wagar (2008) as part of her study investigating the extent to which self-report and observational measures of maternal sensitivity to child fear were congruent. Trained research assistants, blind to other maternal or child measurements, rated maternal sensitivity to the child's cues on a 4-point scale, with 4 being very sensitive and 1 being very insensitive. The scale allowed the use of half interval scores, yielding ratings from .5 to 4.0. Assistants coded in intervals of 45 seconds for a period of 3 minutes per task and a total of 4 intervals, first independently, and then in collaboration with a second assistant to obtain a consensus sensitivity rating. Kappa coefficient was computed for 30% of the sample. Inter-rater reliability for maternal sensitivity in the novel tasks was $\kappa = .76$. The coding scheme for the observed sensitivity measure is displayed in Appendix E.

Children's attachment security. Attachment security was derived from the child's initial responses to the fear situations and from their reactions to their mother's responses in those situations as reported by mothers. Child behaviors were scored for proximity seeking to mother, ability to be soothed, avoidance, resistance, and disorganization. Proximity seeking behaviors included looking at mother for reassurance, signaling to be

picked up or held, calling for the mother or seeking physical contact; ability to be soothed included being quickly calmed or soothed by the mother; avoidant behaviors included whimpering or crying briefly without looking at mother, looking at mother very briefly and then looking away and going on, or moving away from the mother when in need; resistant behaviors included acting angry or frustrated, seeking out the mother, wanting to be held and then fighting to get down; and disorganized behaviors included ordering the mother around or trying to comfort the mother. A separate team of coders rated children's secure behaviors (i.e., proximity seeking, soothing) and insecure behaviors (i.e., avoidance, resistance, and disorganization). Kappa coefficients were computed for 30% of the sample. Inter-rater reliability ranged from .66 to 1 (mean $\kappa = .93$).

Children with a secure pattern of behavior were expected to have higher scores for proximity seeking, along with the ability to be soothed, but fewer avoidant, resistant, and disorganized behaviors. On the other hand, children with an insecure pattern were expected to show more avoidant, resistant, and disorganized behaviors, but fewer proximity seeking and soothing behaviors. The scores for proximity seeking and ability to be soothed were summed across days and averaged. These scores correlated positively (r (80) = .40, $p < .01$) and were combined to create the *secure behavior* variable. Scores for avoidant, resistant, and disorganized behaviors were also summed across days and averaged. Both avoidant and resistant behaviors correlated positively and significantly with disorganized behaviors (r (80) = .23 and .43 respectively, $p < .05$), although not with each other. Because the purpose of the current study was not to classify, nor differentiate children by specific type of insecure behaviors, all three behaviors were combined to create the *insecure behavior* variable.

Fearfulness. Fearfulness was reported by the mother as part of the Early Childhood Behavior Questionnaire (ECBQ, Putnam, Gartstein, & Rothbart, 2006). The ECBQ is a 7-point scale, with 7 being always and 1 being never, designed to assess 18 temperamental dimensions in children between the ages of 18 and 36 months: activity level/energy, attentional focusing, attentional shifting, cuddliness, discomfort, fear, frustration, high-intensity pleasure, impulsivity, inhibitory control, low-intensity pleasure, motor activation, perceptual sensitivity, positive anticipation, sadness, shyness, sociability, and soothability. The fearfulness dimension has 11 items and refers to negative affect (e.g., unease, worry, or nervousness) to both social and non-social stimuli related to anticipated pain or distress and/or potentially threatening situations (e.g., startle to sudden events). The scale showed adequate internal consistency, Cronbach's α = .74. Items of the fearfulness subscale are included in Appendix F.

Data Reduction

Date reduction was conducted based on conceptual criteria and observed correlations in order to reduce the number of variables. Descriptions of the final variables included in the analysis as well as the measurement and operationalization of each construct are included in Table 1. Descriptive statistics were computed for each variable prior to transformation and reduction and are displayed in Table 2.

Childhood history. Maternal and paternal care correlated significantly with one another (r (80) = .60, $p < .01$), and were combined to create the *history of care* variable.

Combined maternal sensitivity. As reported by Wagar (2008), maternal sensitivity reported in the diaries and observed in the laboratory did not correlate with one another (r (80) = .03, *ns*). To assess further whether the two measures could be combined, Wagar

(2008) regressed parental care in childhood on reported and observed sensitivity measures simultaneously. Both reported sensitivity and observed sensitivity predicted parental history of care significantly and independently, (βs = .31 and .29 respectively, $p < .05$), lending support to the inference that they represent two aspects of maternal sensitivity and providing a basis for combining them into a single measure of maternal sensitivity. Scores for each measure were standardized, summed, and averaged to create the *maternal sensitivity* variable used in analyses.

Children's attachment security. A security continuum attachment score was obtained by subtracting the insecure behaviors from the secure behaviors for each participant. Thus, a continuous *attachment* variable was created and used in analyses, with higher scores representing higher security and lower scores representing lower security.

Emotion regulation behaviors. All emotion regulation behaviors, except distraction, soothing by contact with mother, and inspect plus withdrawal to mother, showed substantial positive skewness, and thus were transformed using the logarithmic 10 transformation. Correlations were computed between all emotion regulation behaviors. Looking at mother, engagement with the experimenter, and partial approach did not correlate with any other behavior or could not occur in all the assessment events (e.g., assistant performing the clown was treated as the novel stimuli, not as the experimenter), and hence were dropped from further consideration. Emotion regulation behaviors that occurred very rarely were also dropped (e.g., approach and self-soothing concurrently; only one child showed this behavior), or combined if they correlated or

reflected conceptually similar behaviors. Behaviors were combined using original scores and transformed or corrected afterwards, if necessary.

Contact with mother. Soothing by contact with mother, while looking at and looking away from the novel stimuli, correlated positively and significantly (r (80) = .51, $p < .01$), and thus were combined to create the *contact with mother* variable.

Distraction. Distraction and look away correlated as a positive trend (r (80) = .19, $p < .10$, one-tailed) and were combined to create the *distraction* variable as both involved looking away from the novel situation towards, or engaging with, something else.

Withdrawal. Although large withdrawal and withdrawal to mother did not intercorrelate, conceptually they both refer to behaviors involving avoidance of the novel situation and disengagement from the environment. Each correlated positively with the composite *change* environment variable (i.e., attempts to modify the situation) described below (r (80) = .18 and .19 respectively, $p < .05$, 1-tailed), which also involved avoiding or not wanting to deal with the new situation. Thus, large withdrawal, withdrawal to mother, and composite change were combined to create the *withdrawal* variable.

Attempts to change the situation. Active physical control of novelty, verbal control of novelty (while looking at and looking away), expressions of fear, and withdrawal *while* looking at the novel situation, were combined because they correlated with each other (rs ranged from .23 to .58, $p < .05$) and represented, as a whole, the child's attempts to *change, modify,* or *keep track* of the novel situation.

Verbalizations about the stimuli. Talking to self when looking at and when looking away from the novel stimulus did not intercorrelate, but were combined as both

implied *talking* about the novel situation. This variable did not correlate with any other regulation or main variable under investigation, and therefore was considered no further.

Self-soothing. Self-soothing while looking at and away from the novel event correlated positively and significantly (r (80) = .55, $p < .01$), and were combined in the *self-soothing* variable. This variable correlated with no other regulation variable or predictor and was dropped from further consideration.

Demographic Data

Based on the socio-demographic form completed by the mother during the laboratory session, information regarding parental ethnicity, parental educational level, parental occupation, family income, child's birth order position, and number of siblings was obtained. The socio-demographic form is included in Appendix G.

Results

Preliminary Analyses

Descriptive Statistics

For each variable, outliers, skewness, and kurtosis were examined and corrected or transformed if necessary, as recommended by Tabachnick and Fidell (5th ed., 2007). All three emotion regulation behaviors showed substantial positive skewness and thus were transformed using the logarithmic 10 transformation. Univariate outliers were identified and their impact reduced by transformation or by changing the scores, adding or subtracting a one unit difference of the next two most extreme scores in the distribution. No multivariate outliers were found in the sample. Descriptive statistics were computed for each combined variable (i.e., history of care, maternal sensitivity,

attachment security, distraction, contact with mother, and withdrawal) prior to transformation and are displayed in Table 3.

Potential Covariates

Potential covariates were identified by examining correlations among the continuous demographic variables (maternal age, maternal education, family income), predictor (history of care), proposed mediator (maternal sensitivity), and outcome variables (emotion regulation behaviors and attachment), and by testing mean differences of those variables as a function of task combination, child's gender, birth order position, and having siblings or not. The eight task presentations were reduced to four possible combinations: monster-clown, masks-monster, clown-robot, and robot-masks, despite which activity was presented first, to ensure enough participants in each combination when testing for mean differences.

Maternal education correlated with history of care as a positive trend (r (80) = .22, $p < .06$) and significantly with sensitivity (r (80) = .29, $p < .01$), and therefore was included in the model to control for its effect (see Figure 3). Distraction differed as a function of task combination. Children who were presented with a combination of monster-clown or masks-monster tasks engaged in more distraction (M = 33.80, SD = 19.81 and M = 35.63, SD = 19.76 respectively) than children who were presented with a clown-robot combination (M = 16.80, SD = 16.38). To account for this task effect, residuals (i.e., the difference between an observed value and its predicted value) were retained from the univariate general linear model analysis used to examine differences in distraction by task combination. The standardized residuals for distraction were used in the analysis. No other associations were significant.

Primary Analyses

Correlations and regressions between all relevant variables were examined to determine whether the criteria for testing the hypothesized mediating effects were met. Then, a model-testing procedure, path analysis, was used to evaluate the proposed associations among the variables using AMOS 5 (Arbuckle, 2003). The sample covariance matrix for this test was estimated using a maximum-likelihood solution, which allowed estimation of all model parameters simultaneously (Kline, 1998). Potential misspecification of the model was examined through the standardized residuals and modification indices. Finally, a delta chi-square test was conducted to examine if the overall fit of the final model (see Figure 3) was enhanced by the omission of the direct paths of history of care and education on attachment. This examination was used to identify the potential complete mediator role of sensitivity in the model.

Correlations and Regressions

Table 4 shows the zero-order correlations between all main variables. Contrary to hypothesis 1, maternal history of care did not correlate positively with more adaptive emotion regulation behaviors (i.e., distraction, contact with mother), nor negatively with a more maladaptive regulatory strategy (i.e., withdrawal). However, hypothesis 2 was supported as maternal history of care correlated positively and significantly with children's attachment security (r (80) = .25, $p < .05$). As recommended by Kenny (2008), attachment was regressed on history of care to establish that there was an effect that may be mediated. History of care predicted attachment significantly ($\beta = .25$, $p < .05$). In addition, maternal history of care correlated positively and significantly with sensitivity (r (80) = .26, $p < .05$), thus supporting hypothesis 3. Again, following Kenny's (2008)

recommendation, sensitivity was treated as an outcome and regressed on history of care. History of care predicted sensitivity significantly (β = .26, p < .05).

Finally, maternal sensitivity correlated positively and significantly with children's attachment (r (80) = .40, p < .01). Because the significant correlation is not sufficient to demonstrate that the mediator affects the outcome variable (Kenny, 2008), attachment was regressed on history of care and sensitivity simultaneously. Sensitivity predicted attachment (β = .36, p < .01), after controlling for history of care, thus supporting hypothesis 5. Moreover, the reduction in the unstandardized coefficient of history of care to attachment when maternal sensitivity was controlled (B = .65 to .41 respectively) was .24, suggesting at least a partial mediating effect (Todman & Dugard, 2007).

Contrary to hypothesis 4, due to the lack of significant associations between history of care and any of the emotion regulation behaviors, conditions were not met to test the proposed mediating effect of maternal sensitivity between history of care and emotion regulation behaviors (Baron & Kenny, 1986). In addition, contrary to hypothesis 6, attachment did not correlate positively with any of the adaptive emotion regulation behaviors (i.e., distraction, contact with mother), nor did it correlate negatively with withdrawal. On the other hand, distraction correlated negatively and significantly with both contact with mother (r (80) = -.53, p < .01) and withdrawal (r (80) = -.29, p < .05), whereas contact with mother and withdrawal correlated positively and significantly with each other (r (80) = .59, p < .01).

Path Analysis

The goodness-of-fit linking the observed variance-covariance matrix and the hypothesized model was tested through a chi-square test and goodness-of-fit statistics.

Three of these fit indexes, the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) were included in the study. The first two allowed comparison of the hypothesized model with an independent or null model where all variables are assumed to be uncorrelated. Values of .95 or higher are recommended; those below would suggest that the model does not fit the data well or that it needs respecification (Byrne, 2001; Dumka & Roosa, 1993). The RMSEA is a non-centrality parameter that tests for error of approximation in the population if optimal parameter values were available. Values less than .05 reflect good model fit, whereas values less than .08 indicate reasonable error of approximation. Values between .08 and .10, and above, reveal bad to poor fit (Byrne, 2001).

Hypothesized model. The hypothesized model showed a good fit in the population as the null hypothesis, "the model fits the data in the population" was not rejected (χ^2 (3, N = 82) = 1.95, p =.58). The value of the CFI statistic was 1.00 and the value of the TLI statistic was 1.064, both indicative of a good model fit. The RMSEA estimate was .00 (90% CI = .00, .16, p =.66), meaning that the error of approximation was zero in the population, thus supporting the fit of the model (see Figure 2).

Standardized estimates of path coefficients. History of care significantly predicted sensitivity (β = .26, p < .05), however, it did not directly predict attachment (β = .16, *ns*). Contrary to our hypothesis, history of care did not significantly predict any of the emotion regulation behaviors after controlling for all else in the model (βs ranged from -.07 to .00). Conversely, sensitivity significantly predicted attachment (β = .36, p < .01), distraction (β = .24, p < .05), and withdrawal (β = -.23, p < .05) in the expected direction, but did not predict contact with mother (β = -.03, *ns*).

Squared multiple correlations. The squared multiple correlations (R^2) provided information about how much variance the exogenous (i.e., predictor) accounted for in the endogenous (i.e., mediator, outcome) variables. The R^2 of attachment was .19 (unexplained variance = .81) and of sensitivity was .07 (unexplained variance = .93). These proportions of explained variance are considered small (Cohen, 1992). The R^2 statistics of history of care, distraction, and withdrawal (.05 each) were very low. Finally, the R^2 of contact with mother (.003) was extremely low.

Identification of model misspecification. In order to identify any misfit in the model, standardized residuals and modification indices were computed. Standardized residuals showed no discrepancies between the restricted covariance matrix of the hypothesized model and the sample covariance matrix. None of the values exceeded the cut-off of 2.58 *SD*'s from the zero residuals (i.e., when model fit is perfect), as recommended by Joreskog and Sorbom (1988), meaning that there were no statistically significant discrepancies among variables in the covariance matrixes. None of the fixed parameters or error covariances indicated a need to be modified or removed from the model to improve the model fit, indicating that the hypothesized model was appropriately described (Byrne, 2001).

Significance of the mediation effect of maternal sensitivity. The Sobel test was used to test the significance of the mediation effect of sensitivity between history of care and child attachment (Sobel, 1982; Todman & Dugard, 2007). As shown in Table 6, sensitivity was a significant mediator of the association between history of care and attachment ($Z = 1.97$, $p < .05$).

Based on the fitted model, standardized estimates, absence of areas of misspecification in the model, and the Sobel test, the hypothesized mediation model, which proposed a direct link between maternal history of care and children's outcomes (i.e., security of attachment and emotion regulation behaviors), as well as an indirect effect through maternal sensitivity, the mediator, was partially supported.

Model including maternal education. To control for the effect of maternal education in the hypothesized model, education was included in the model as an exogenous variable with direct links to history of care, sensitivity, and attachment. A new path analysis was conducted in which the model showed a good fit in the population as the null hypothesis was not rejected (χ^2 (6, N = 82) = 6.47, p =.37) (see Figure 3). Moreover, the value of the CFI statistic was .99 and the value of the TLI statistic was .98, indicating that the model did fit in the population. In addition, the RMSEA estimate was .03 (90% CI = .00, .15, p =.50), thus supporting the fit of the model.

Standardized estimates of path coefficients. Maternal education significantly predicted history of care (β = .22, p < .05). In addition, education significantly predicted sensitivity (β = .25, p < .05) and attachment (β = -.26, p < .05). History of care predicted both sensitivity (β = .20) and attachment (β = .20), at a .06 significance level. However, and contrary to hypothesis, history of care did not significantly predict any of the emotion regulation behaviors after controlling for all else in the model (βs ranged from -.07 to .00). On the other hand, sensitivity significantly predicted attachment (β = .43, p < .01), distraction (β = .24, p < .05), and withdrawal (β = -.23, p < .05), but not contact with mother (β = -.03, *ns*). Standardized estimates, direct, indirect, and total effects are included in Table 5.

Squared multiple correlations. The R^2 of attachment was .25 (unexplained variance = .75) and of sensitivity was .12 (unexplained variance = .88). These proportions of explained variance are considered small to moderate (Cohen, 1992). The R^2 statistics of history of care, distraction, and withdrawal (.05 each), were very low. Finally, the R^2 of contact with mother (.003) was extremely low.

Identification of model misspecification. Once more, standardized residuals and modification indexes were computed to identify any misfit in the model. Standardized residuals showed no significant discrepancies with the covariance matrix and modification indices were not identified.

Significance of the mediation effect of maternal sensitivity. The Sobel test was used to test the significance of the mediation effect of sensitivity in the path between maternal education and child attachment (Sobel, 1982; Todman & Dugard, 2007). As shown in Table 6, examination of the Sobel approximate formula showed that sensitivity was a significant mediator in the association between maternal education and attachment ($Z = 2.34$, $p < .05$).

Based on the fitted model, standardized estimates, absence of areas of misspecification in the model, and the Sobel test, the partial mediation model including maternal education was supported, with child attachment as the outcome, but not for emotion regulation behaviors, controlling for all other variables in the model.

Comparison between Partial and Complete Mediation Models

A nested (i.e., reduced) model of the final fitted model, including education, was tested to examine the potential complete mediator effect of *maternal sensitivity* on the associations between maternal education, history of care, and attachment. The

assumption of a complete mediator effect was that the education and history of care had an impact on attachment only as indirect effects through sensitivity, controlling for all other variables in the model. Direct paths from education and history of care to attachment were then constrained to zero to test the complete mediating effect of sensitivity.

The same chi-square test of model fit was used as with the hypothesized model to test the adequacy of the reduced (i.e., nested) model with the direct paths of education and history of care to attachment constrained. Again, the null hypothesis was that the model fits in the population. The chi-square was 14.91, with 8 degrees of freedom, p = .06. Therefore, I failed to reject the null hypothesis and concluded that the model fit the data. However, when taking into consideration the fit indexes, this model did not fit as well as the previous fitted model. The goodness-of-fit indexes, CFI = .93, TLI = .81, and RMSEA = .10 (90% CI = .00, .18, p = .13) indicated that the reduced model did not represent an adequate fit to the data as the full model did.

Delta chi-square test. Next, a comparison test was conducted to see if the model with direct paths omitted (i.e., complete mediation) was a "better fitting" model than the final fitted model (i.e., partial mediation). To compare the two models, the delta chi-square was calculated. The null hypothesis was that the complete mediation model and partial mediation model would be equal to 0, simultaneously in the population. The delta chi-square was obtained by subtracting the χ^2 for the partial mediation model (6.47) from the χ^2 for the complete mediation model (14.91); the correspondent degrees of freedom were also subtracted from one another. The delta chi-square ($\Delta\chi^2$ = 8.44, Δdf = 2) was significant because it exceeded the χ^2 critical value (α = .05, df = 2) of 5.99. Therefore,

the null hypothesis was rejected; on average, the complete mediation model and partial mediation model were not equal to 0 simultaneously in the population. This means that by constraining the direct paths from maternal education and history of care to attachment, the model was overly simplified. Consequently, the best-fitting model was the partial mediation model with both direct and indirect links among education, history of care, and sensitivity to attachment.

Post Hoc Analyses

Several steps were taken to identify significant associations that were not hypothesized in the model and to explain the lack of expected significant associations. First, maternal education, a significant covariate, was tested in its potential role as a moderator in the relationship between (a) history of care and maternal sensitivity, (b) history of care and attachment, (c) history of care and each emotion regulation behavior, (d) maternal sensitivity and attachment, and (e) maternal sensitivity and each emotion regulation behavior.

Second, a moderated mediation analysis was conducted to test the strength of the indirect effect of maternal sensitivity on the association between history of care and attachment as a function of the level of maternal education.

Third, the lack of associations between contact with mother and either history of care or sensitivity, and the lack of associations of distraction and withdrawal with history of care, were investigated by examining non-linear associations between the variables (e.g., patterns of association at different values between predictors and outcomes).

Finally, in an effort to explain the lack of association between maternal sensitivity and contact with mother, and based on conceptual and empirical considerations,

information about children's temperament (i.e., fearfulness) available for the sample, but not included in the current study, was examined as a possible moderator of the relationship between the variables.

Moderating Effect of Education

Maternal education is thought to play a significant role in a family's well-being and in a child's development because it influences multiple levels of the family's environment. For instance, higher levels of education have been related to greater social support, less depression, and perceptions of children as less difficult (Diener, Nievar, & Wright, 2003). In particular, maternal education has been found as an important contextual factor (i.e., ecological variable) that predicts maternal sensitivity (Biringen et al., 2000) and children's attachment security (Diener et al., 2003; Tarabulsy et al., 2005), with higher education levels related to greater sensitivity and attachment security. Because a significant negative association was found between maternal education and child attachment security, whereas positive associations were found between education, history of care, and maternal sensitivity, it was important to investigate education as a moderator on the associations between the variables.

Multiple regression analyses were conducted testing the potential interactive effect of education on the association between history of care, maternal sensitivity, and attachment. In an effort to explain the absence of significant associations between history of care, maternal sensitivity, and emotion regulation behaviors, additional multiple regression analyses were performed to examine the potential effect of maternal education on the associations between care, sensitivity, and emotion regulation behaviors.

Interactive effect of maternal education and history of care. To investigate the moderating effect of maternal education on the association between history of care and sensitivity, sensitivity was regressed on education, history of care, and the interaction of education and care. As shown in Table 7, maternal education predicted sensitivity at entry; however, it did not interact with history of care to predict sensitivity after the main effects were entered in the equation (β = -.19, p < .08), although there was a statistical trend.

To test the moderating effect of maternal education on the association between history of care and attachment, attachment was regressed on education, history of care, and the interaction of education and care. Maternal education did not predict attachment at entry; however, it interacted with history of care to predict attachment after the main effects were entered in the equation (β = -.40, p < .01) (see Table 7). As shown in Figure 4, when education was low (less than a bachelors/college degree level), history of care was positively associated with attachment, whereas when education was high (more than a bachelors/college degree level), there was not a significant association between history of care and attachment. This means that the effect of history of care on attachment (and to a lesser extent on sensitivity) depended upon the mother's level of education: children of less educated mothers who experienced care and acceptance during their own childhood, were more securely attached than children of less educated mothers who experienced more rejection in childhood, whereas children of highly educated mothers did not differ on attachment security due to their mothers' histories of care or rejection.

To investigate the moderating effect of maternal education on the association between history of care and all three emotion regulation behaviors, contact with mother,

withdrawal, and distraction were regressed, one at the time, on education, history of care, and the interaction of education and care. Maternal education did not predict any of the emotion regulation behaviors at entry; however, it interacted with history of care to predict distraction, after the main effects were entered into the equation (β = -.24, p < .05). As shown in Figure 5, when education was high, history of care was negatively associated with distraction, whereas when education was low, there was not a significant association between history of care and distraction. This means that children of highly educated mothers who experienced more rejection during childhood engaged in more distraction than children of highly educated mothers who experienced high acceptance in childhood, whereas children of less educated mothers did not differ on the time they engaged in distraction. However, children of less educated and rejected mothers showed less distraction than children of highly educated and rejected mothers.

Interactive effect of maternal education and maternal sensitivity. To investigate the moderating effect of maternal education on the association between maternal sensitivity and attachment, attachment was regressed on education, maternal sensitivity, and the interaction of education and sensitivity. Maternal education did not predict attachment at entry; however, it interacted with maternal sensitivity to predict attachment, after the main effects were entered in the equation (β = -.36, p < .01). As shown in Figure 6, when education was low or moderate, maternal sensitivity was positively associated with attachment, whereas when education was high, there was not a significant association between sensitivity and attachment. This means that children of mothers with low and moderate education levels were less securely attached if their mothers were low

in sensitivity, whereas no such effect was apparent for children of highly educated mothers.

To investigate the moderating effect of maternal education on the association between maternal sensitivity and all three emotion regulation behaviors, contact with mother, withdrawal, and distraction were regressed, one at the time, on education, maternal sensitivity, and the interaction of education and sensitivity. Maternal education did not predict any of the emotion regulation behaviors at entry and did not interact with maternal sensitivity to predict any of the regulation behaviors after main effects were entered in the equation.

To test for potential differences in the distributions of maternal sensitivity ratings among highly and less educated mothers, a comparison of means and variances was conducted. On average, highly educated mothers had higher sensitivity scores than less educated mothers ($t = 3.71$, $p < .001$). Additionally, although Levene's test of equal variances was not significant, there was a trend for highly educated mothers to vary less in maternal sensitivity than less educated mothers ($F = 2.96$, $p < .10$).

Conditional Indirect Effects

To test the magnitude of the indirect effect of maternal sensitivity on the association between history of care and attachment as a function of the level of maternal education (i.e., conditional indirect effect), a moderated mediation analysis was conducted. There are several ways to approach conditional indirect effects (Preacher, Rucker, & Hayes, 2007). Because an interactive trend of maternal education and history of care on maternal sensitivity was identified, as well as a significant moderating effect of maternal education on the association between maternal sensitivity and attachment, the

fifth model specified by Preacher and colleagues (2007) was used in the analysis. In this model, the moderator (i.e., education) affects the path between the predictor (i.e., history of care) and the mediator (i.e., sensitivity), as well as the path between the mediator and the outcome (i.e., attachment). This model allows examining both, whether the moderating effect is mediated, a case often referred to as mediated moderation, and whether the mediating effect is moderated (Muller, Judd, & Yzerbyt, 2005; Preacher et al., 2007).

Table 8 shows the results of the multiple regression analysis conducted to predict maternal sensitivity from education, history of care, and the interaction between education and care, as well as the results from the multiple regression analysis predicting children's attachment from maternal education, history of care, maternal sensitivity, the interaction between education and care, and the interaction between education and sensitivity. The partial effect of history of care on attachment was not significant (coefficient = .35, *ns*), whereas the partial effect of sensitivity on attachment was significant (coefficient = .33, $p < .01$). Additionally, the effect of history of care on attachment depended on maternal education (interaction coefficient = -.30, $p < .05$), meaning that the residual direct effect of history of care on attachment, controlling for maternal sensitivity, was moderated by maternal education. At the same time, the effect of maternal sensitivity on attachment depended on maternal education (interaction coefficient = -.13, $p < .05$), meaning that the partial effect of sensitivity on attachment was also moderated by maternal education.

Examination of the conditional indirect effect of history of care on attachment through maternal sensitivity, at different values of maternal education (i.e., mean and ± 1

SD), showed that the conditional indirect effect was significant only at the value of education 1 *SD* below the mean (indirect effect = .54, $p < .05$). By examining the conditional indirect effects at increments of maternal years of education, it was possible to identify the upper and/or lower bounds of values of education for which the indirect effect was statistically significant (Preacher et al., 2007). Indirect effects at values between 12 and 15.15 were all significant at a .05 alpha level, whereas values at and larger than 15.60 years were not significant. Thus, the effect of history of care on attachment through maternal sensitivity was statistically significant when maternal education was at most 15.15 years (i.e., less than a completed, 4-year college education).

Non-linear Associations of Emotion Regulation Behaviors

To investigate the potential non-linear associations between all three emotion regulation behaviors and history of care, quadratic curve estimation regressions were conducted with history of care as the independent variable and contact with mother, withdrawal, and distraction as the outcome variables, considered individually. Contact with mother was also regressed on maternal sensitivity to examine the presence of a non-linear association. No significant curvilinear associations were found.

Moderating Effect of Fearfulness

In an attempt to explain the absence of a direct association between maternal sensitivity and contact with mother, additional multiple regression analyses were conducted testing a possible moderating effect of fearfulness on the association between the constructs. Examination of child fearfulness was deemed pertinent based on theoretical and empirical grounds. Child fearfulness is thought to be involved in the development of emotion regulation and adjustment (Kochanska, Aksan, & Joy, 2007;

Mangelsdorf et al., 1995), with the interactive relationship between temperament and parenting behavior addressed in several studies (Belsky, 1984; Crockenberg & Leerkes, 2006; Rothbart & Bates, 2006). In particular, emotion regulation behaviors during unfamiliar events have been found to differ as a function of temperament, with more wary or fearful children staying in closer contact with their mothers during the arousing events (Mangelsdorf et al., 1995). Moreover, mothers may elicit behaviors from their children that are consistent with their beliefs about their children's temperament (Kochanska et al., 2007).Thus, if mothers believe that their children are fearful, they may encourage them to stay in closer proximity.

To test the moderating effect of fearfulness on the association between sensitivity and contact with mother, contact with mother was regressed on fearfulness, sensitivity, and the interaction of fearfulness and sensitivity. Fearfulness did not predict contact with mother at entry; however, it interacted with sensitivity to predict contact with mother after the main effects were entered in the equation (β = -.25, p < .05) (see Table 9). When children were less fearful (1 *SD* below the mean), sensitivity was positively associated with contact with mother, whereas when children were more fearful (1 *SD* above the mean), the association was negative (see Figure 7). This means that less fearful children increased contact with more sensitive mothers, whereas more fearful children increased contact with less sensitive mothers.

Discussion

In this study, I tested a model linking mothers' histories of care and acceptance in childhood to children's attachment security and emotion regulation behaviors, through their association with sensitive maternal behavior. As predicted, maternal sensitivity

mediated the association between a mother's childhood history of care and acceptance and the child's attachment security, controlling for other variables in the model. In contrast, mothers' childhood histories of care and acceptance did not predict children's emotional regulation behaviors, although maternal sensitivity was associated positively with distraction and negatively with withdrawal, as expected. In addition, maternal education was identified as a covariate that also interacted with history of care and sensitivity to predict attachment security.

Maternal History of Care and Maternal Sensitivity

The finding that mothers' recollections of early experiences of care and acceptance with their own parents predicted their sensitivity to their children in novel situations supports the view that early experiences with parents affect mothers' caregiving behaviors with their own children. Mothers whose own care needs are met in childhood are expected to be attuned to their children's signals, whereas mothers whose own needs are not acknowledged in childhood are expected to have difficulty establishing responsive relations with their children (Bowlby, 1973). From an attachment perspective, this relationship is explained by the internal working models that mothers have developed during interactions with their own parents (Bowlby, 1973; Main et al., 1985). Mothers who grow up with caring and supportive parents are thought to develop a sense of self as being worthy and loveable, whereas mothers who grow up with unresponsive and rejecting parents are thought to develop a self of sense as being incompetent and unwanted.

Possible factors involved in these pathways include self-esteem, confidence in their own capabilities as parents (i.e., self-efficacy), accuracy identifying a child's

emotions, and depressive symptoms (Cassidy & Berlin, 1994; Crockenberg & Leerkes, 2003; Kiel & Buss, 2006; Leerkes & Crockenberg, 2002; Main, 1990). For example, a childhood history of care and acceptance has been related to positive evaluations of self, which in turn have been associated with maternal self-efficacy (Leerkes & Crockenberg, 2002), whereas a childhood history of parental rejection has been associated with negative evaluations of self and depressive symptoms (Crockenberg & Leerkes, 2003; Hankin, Kassel, & Abela, 2005). Additionally, a childhood history of rejection has been related to mothers' inaccuracy perceiving and interpreting their own children's emotions and behaviors (Kiel & Buss, 2006; Leerkes, Crockenberg, & Burrous, 2004). This inability may preclude mothers from responding sensitively to their children by either minimizing or maximizing their negative affect (Cassidy & Berlin, 1994; Leerkes et al., 2004).

Moreover, the association of mothers' early experiences of care and acceptance with their sensitivity to their children supports the commonly accepted belief that parenting behaviors and parental styles are transmitted across generations (Belsky et al., 2005; Sroufe & Fleeson, 1986). To some degree, mothers with parents who were caring and accepting of them while they were growing up behaved similarly with their own children. Similarly, mothers who interacted with less affectionate parents, or who were rejected by them during childhood, recreated a similar parental style with their children. However, this was apparent only among less educated mothers, as discussed below.

Maternal History of Care and Child's Attachment

Consistent with the conceptual model, maternal history of care was linked indirectly, through sensitivity, to children's attachment security. Mothers with positive

memories of their early experiences with their own parents were likely to have more securely attached children than mothers with more negative memories of parental care and acceptance. The process explaining this association was the mothers' sensitive responsiveness to their children's distress. This result is consistent with previous findings in which mothers who reported having positive relationships with their attachment figures in childhood were more likely to have securely attached children than those reporting rejecting or anxious relationships with their caregivers (Fonagy, Steele, & Steele, 1991; Main et al., 1985). To illustrate the indirect links, Cohn et al. (1992) found that secure mothers were warmer, more engaged, and provided more structure during interactions with their children than insecure parents. In addition, Ward and Carlson (1995) found secure parents to be more sensitive in their parenting than parents in the three insecure groups (i.e., dismissing, preoccupied, and disorganized) combined. Thus, it is expected that the intergenerational transmission of parenting behaviors experienced in childhood supports the development of secure attachment behaviors in their children.

Mediating effect of maternal sensitivity. It is assumed that the way mothers respond to their children and are attuned with their needs influences how children organize their secure base behavior (Davidov & Grusec, 2006). Overall, children who have responsive mothers rely on them as sources not only for comfort in times of distress, but also as secure bases from which to explore and relate to their environment (Ainsworth et al., 1978; van der Mark et al., 2002). In contrast, children with unresponsive and insensitive mothers either cling excessively or are unable to calm through contact with their mothers, or avoid their mothers when they are distressed, both insecure patterns of behavior (Ainsworth et al., 1978).

As predicted, maternal sensitivity was related to children's attachment security in fear situations and mediated the association between a childhood history of care and attachment security. Testing the conditional indirect effect of maternal sensitivity on the association between a childhood history of care and children's attachment security as a function of maternal education showed that the effect of history of care on attachment through sensitivity was statistically significant only when mothers had less than a complete college level education.

Mothers with less education who matched their behaviors to their children's cues and acknowledged their feelings when they were afraid, or simply in novel situations, had more securely attached children than those who did not take their children's needs into consideration. For these mothers, it appears that the internal working models of their own experiences with parents in childhood act as blueprints for their interactions with their children, who will likely form comparable expectations of support and comfort provided by their mothers. On the other hand, children with more educated mothers did not differ in their attachment security due to their mothers' sensitive or insensitive responsiveness. This finding may be explained by the lower variability in maternal sensitivity ratings among highly educated mothers relative to less educated mothers, which influences our ability to detect associations between maternal sensitivity and attachment security. Similarly, if children of highly educated mothers had been better prepared to face novel environments, they may not have needed constant support or sought proximity to their mothers, both indicators of attachment security in this study.

Discontinuity in Maternal Developmental History

Attachment theorists have recognized that the assumptions regarding developmental trajectories in parent-child relationships can be altered or modified based on current experiences, such as positive relationships, stresses, and supports (Belsky, 1984; Bowlby, 1988). The reduction of the impact of a childhood history of care and acceptance on attachment, after adding maternal sensitivity, and the role of maternal education on these associations, appear to reflect such current experiences.

Maternal education. Mothers' educational level moderated the relation between childhood history of care and attachment and the relation between maternal sensitivity and attachment. Both a history of care and acceptance and maternal sensitivity were positively and significantly related to children's attachment security only when maternal education was low. These associations were not significant for highly educated mothers, suggesting that highly educated mothers with less caring parents or who were less sensitive themselves had as securely attached children as comparable mothers with more caring parents or who were more sensitive. Education also moderated, at trend level, the association between history of care and sensitivity. Similarly, a history of parental care and acceptance in childhood was positively related to maternal sensitivity only when maternal education was low, whereas the association was not significant among highly educated mothers, suggesting that highly educated mothers with less caring parents were as sensitive as mothers with more caring parents.

Although mothers are expected to develop internal working models and to learn parental roles based on the quality of their relationships with their own parents (Sroufe & Fleeson, 1986), having a college education may help mothers to compensate for a

childhood history of low care and acceptance. Mothers with more education may have had more opportunities to learn about and better access to information regarding positive parenting behaviors and to become more knowledgeable about the importance of parent-child interactions early in life than mothers with less education. Thus, more educated mothers with histories of parental rejection, but who purposely tuned their behaviors to attend and respond to their children's needs in times of distress, contribute to the formation of their children's secure attachments. In support of this interpretation, Travis and Combs-Orme (2007) reported that resilient mothers, who were able to overcome negative parental bonds and to exhibit good parenting with their children, experienced fewer life stressors, had higher incomes, and reported lower levels of illegal drugs consumption than vulnerable mothers (i.e., childhood experiences of rejection and current maladjustment). On the other hand, resilient mothers showed similar educational level, incomes, adaptive functioning, and life stressors to those of positive care-adaptive mothers.

Conversely, mothers with less than a college education may have had experiences in life that did not allow them to reduce the impact of a history of low care with their own parents on their interactions with their children. In this case, the transmission of poor parental bonds on parenting behaviors, presumably through insecure internal working models, remained stable, as did the transmission of positive histories of care and acceptance on their sensitive responsiveness.

Because maternal education was not expected to moderate the associations between a childhood history of care, maternal sensitivity, and child attachment, this effect merits further investigation. Factors related to mothers' level of education, which may

help to explain its moderating effect include having partners with comparable educational levels, access to more resources than less educated mothers (e.g., counseling services, parenting books, child care), and fewer life stressors.

Maternal History of Care and Emotion Regulation Behaviors

Contrary to expectations, a mother's history of care in childhood was not associated with any of the emotion regulation behaviors under investigation (i.e., distraction, contact with mother, and withdrawal), although it interacted with maternal education to predict child distraction, such that children of mothers with more education, who experienced rejection by their parents during childhood, used more distraction, an arguably adaptive response, relative to the children of less educated mothers who experienced rejection by their parents during childhood.

Absence of direct effect. One reason for the relative lack of associations between childhood history of care and children's emotion regulation behaviors may be that the development of emotion regulation in young children involves other aspects of socialization (Easterbrooks et al., 1998; Fox, 1998), rather than those directly related to a childhood history of care and acceptance. Even though adults' own expression of emotions may be rooted in internal representations of their interactions with parents in childhood, parents in general and mothers in particular may have specific attitudes regarding appropriate and socially accepted children's emotional expressiveness that could influence how they organize and respond to their emotional arousal (Thompson, 1994; Wang & Fivush, 2005). In this case, mothers' internal working models of early experience may influence how their children regulate emotion less than do mothers' current attitudes and beliefs about the expression of negative emotion. An alternative

reason may be that some mothers' positive recollections of parental care and acceptance in their own childhood reflected a dismissive pattern of attachment, in which idealizations of early experiences with own parents and lack of emotional involvement are common. Conversely, some mothers with negative recollections of parental care, but with the ability to confront these experiences and come to a resolution of their difficulties with their parents (Main & Goldwyn, 1984) may be as able as accepted mothers to foster adaptive emotion regulation in their children.

Absence of indirect effect. An explanation for the absence of an indirect effect of a childhood history of care on children's emotion regulation behaviors through maternal sensitivity could be that alternative mediators exist between mothers' perceptions of parental care and children's emotion regulation behaviors. For example, emotional availability has been used as a broader construct of maternal behavior, which involves not only maternal sensitivity, but maternal structuring, nonintrusiveness, and nonhostility, as well as child responsiveness and involvement (Biringen et al., 2000). Although emotional availability has parallels with and has been influenced by attachment theory, it focuses on emotion and refers to the mothers' emotional responsiveness and affect-attunement to their children's goals and needs, with emphasis on the acceptance of a wide range of emotions rather than sensitive responsiveness to distressful situations (Bretherton, 2000; Easterbrooks & Biringen, 2000). It is during mother-child emotional exchanges when mothers are emotionally available that children are able to practice their emotion regulation skills (Bretherton, 2000). Moreover, children develop expectations regarding mothers' availability to help regulate their emotions and learn that emotional states can be tolerated and changed (Easterbrooks, Biesecker, & Lyons-Ruth, 2000).Thus, the

construct of emotional availability identifies another pathway that may explain how a mother's childhood history of care influences her child's emotion regulation behaviors.

History of care and distraction. A possible explanation for the moderating effect of maternal education on the association between history of care and distraction is that mothers with more education, but childhood histories of low care, may have learned how to foster their children's emotion regulation, and thus do so despite their rejecting childhood histories. Possibly having more access to parenting information, services, or other resources, may have allowed more educated mothers to reflect on their own developmental histories and resolve to protect their children from negative emotions or distress, which distraction has been found to reduce (Axia et al., 1999). The fact that children of highly educated and rejected mothers used more distraction than children with less educated and rejected mothers tentatively supports this interpretation. However, in order for highly educated mothers to foster distraction in times of children's distress, evidence of a moderating effect of maternal education on the association between maternal sensitivity and distraction should be present, but is not. Nevertheless, if other aspects of maternal behavior (e.g., emotional availability, cultural beliefs) are in fact involved in the development of children's emotion regulation, this could explain the absence of a moderating effect.

Maternal Sensitivity and Emotion Regulation Behaviors

Maternal sensitive responsiveness to distress is theorized to be essential not only for the development of attachment security, but also for the development of regulation of negative affect or stress (Davidov & Grusec, 2006). Children rely on their caregivers for the regulation of their negative emotions and learn patterns of response through their

interactions with their parents (Thompson, 1990). Thus, children whose mothers respond sensitively to them when distressed learn behaviors to regulate their own negative emotions, through modeling and active involvement (Davidov & Grusec, 2006; Thompson, 1994).

Consistent with this expectation, maternal sensitivity was positively associated with distraction, an adaptive emotion regulation behavior, and negatively associated with withdrawal, a less adaptive regulation behavior. Taken together, these findings suggest that children's use of more or less adaptive regulation behaviors when facing novel situations depends in part on the quality of their interactions with and responsiveness of their mothers in novel situations. In contrast, maternal sensitivity was not significantly related to the child behavior *contact with mother*. Additionally, contact with mother correlated positively with child withdrawal and negatively with child distraction, suggesting that being in contact with the mothers for long periods of time in novel situations is not wholly adaptive during the third year of life. Potential explanations for the lack of association between sensitivity and contact with mother are presented below.

Distraction. As expected, children with more sensitive mothers used distraction as an emotion regulation strategy more often than children with less sensitive mothers. There is evidence that the attentional cognitive system that allows shifting attention away from a source of distress facilitates the modulation of emotional arousal (Rothbart & Bates, 2006). Thus, the ability to disengage from stressful stimuli constitutes an adaptive regulation behavior because a child becomes engaged with something other than the novel or stressful event (i.e., distracts herself). This supports the idea that sensitive responses to children's cues are related to adaptive ways of regulating emotions. This

finding may be especially relevant during the third year of life, when both children and mothers begin to more commonly use attention management behaviors to regulate emotions (Thompson, 1994).

Withdrawal. Also as expected, children with less sensitive mothers tended to show more withdrawal when faced with novel situations than children with more sensitive mothers. This finding is consistent with the literature indicating that low maternal sensitivity is related to children's reactivity to novelty and withdrawal behaviors (Hane & Fox, 2006). Mothers who do not respond sensitively to their children are unable to model appropriate emotion regulation behaviors for their children. At the same time, children with insensitive mothers may use withdrawal as a way to lessen negative affect in the moment. Doing so prevents them from engaging with their environment, thus reducing their opportunities to develop alternative and more adaptive behaviors (i.e., distraction).

Contact with mother. The emotion regulation behaviors displayed by children in the laboratory took place when mothers were not available to interact, but present in the same room. This meant that, without the mother's direct guidance, a child may have attempted few or many behaviors to deal with the stressful situation, based upon her past experiences with her mother. In addition, remaining with the mother for longer periods of time may have further reduced opportunities for the child to engage with the stressful stimuli. Psychologists argue that, although children at this age are in the process of acquiring emotion self-management, they still need the external intervention of others, such as mothers, to help them regulate during stressful events (Easterbrooks et al., 1998; Thompson, 1994). Moreover, children's emotion regulation behaviors have been found to

vary as a function of maternal involvement and contingent maternal responsiveness (Crockenberg & Leerkes, 2004; Field, 1994). It follows that children whose mothers have been unavailable to them in the past, or available but not inclined to encourage self-regulation, may have had fewer opportunities to learn how to regulate without their assistance. In the absence of alternative regulation behaviors, such children may seek and remain in contact with their mothers in an effort to regulate their negative reactions to novelty. This inference is consistent with the positive correlation of contact with mother and withdrawal, a less adaptive emotion regulation behavior. In contrast, the negative linear association of contact with mother and distraction suggests that children who sought contact with their mothers for briefer periods of time may then have been able to disengage from the novel event and turn their attention to something else, as we would expect if children use their mothers as a secure base from which to explore the environment.

Finally, a non-hypothesized moderating effect was found in relation to the association between sensitivity and contact with mother. The child's temperamental fearfulness moderated that association, with sensitivity positively associated with contact with mother in less fearful children and negatively associated in more fearful children. More fearful children sought contact with their mothers more often, or stayed with them longer, when their mothers were *less* sensitive. It may be that the anticipation of possible, but not guaranteed empathy from their mothers prompted more fearful children to try to get their attention by being in contact more than those who were less fearful, or who had more sensitive mothers. This supports the idea that children may learn to amplify their emotions in order to achieve the maternal response they need when their mothers are less

attuned to more subtle cues (Cassidy, 1994). Thus, these results imply that contact with mother may be both adaptive and maladaptive, depending on whether the mother serves as a secure base for exploration or as an unreliable source of comfort. Alternatively, children with less sensitive mothers may need to rely on their support because they lack the capacity to self-regulate.

Emotion Regulation and Attachment

Contrary to prediction, distraction, an adaptive regulation behavior, was not positively associated with attachment security, nor did withdrawal, a less adaptive regulation behavior, correlate negatively with attachment security. The findings that maternal sensitivity: (a) mediated the relationship between history of care and attachment; and (b) was associated with distraction and withdrawal in the expected direction only as a direct effect, suggest that different, albeit related, features of maternal sensitivity may influence the development of emotion regulation behaviors and attachment. Moreover, if other aspects of maternal behavior contribute to children's emotion regulation, the potential association between attachment security and emotion regulation may be attenuated.

Likewise, experiences with other adults, siblings, and peers may also shape a child's emotional expressiveness and ability to self-regulate. For example, Fox (1998) has suggested that children who are in some type of child care learn from caregivers and peers how to react to novel situations in that context, and may try out these behaviors in other settings. Thus, whereas a child's attachment is a reflection of a mother's childhood history and the sensitive responsiveness that originates from it, her emotion regulation behaviors are derived not only from interactions with her mother, but from interactions

with other agents of socialization as well. The lack of association between attachment and emotion regulation may reflect the more numerous sources of influence on the development of emotion regulation, relative to attachment security with mother.

An alternative explanation of the absence of an association between attachment security and children's use of more and less adaptive emotion regulation behaviors is methodological in origin. The attachment security measure used in this study did not distinguish between avoidant and resistant children, who tend to cope differently with the stress of separation. For example, during reunions, avoidant children are characterized by avoiding their mothers, whereas resistant children tend to cling to their mothers (Ainsworth et al., 1978). Thus, no one type of maladaptive emotion regulation behavior would have characterized insecure children, undermining the ability to detect a positive association between attachment security and emotion regulation behaviors.

Limitations and Future Directions

The advantages of using path analysis to test the conceptual model were the possibility of testing all variables simultaneously, the identification of potential misspecifications in the model, and the exploration of other potential associations among the constructs. However, a number of limitations of the current study should be addressed in future research, testing a similar model of maternal childhood history and sensitivity and their relation to children's attachment security and emotion regulation behaviors.

First, the cross-sectional nature of the study represents the implicit assumption that parameters in the model are stable across participants and over time. Future research should test the model at different points in time during early childhood to determine whether variables predict behavior at Time 2, controlling for Time 1 behavior.

Accordingly, longitudinal studies that include predictors in infancy and outcomes in toddlerhood would allow a more rigorous test of the developmental trajectories inferred from concurrent data in this study. For example, using a longitudinal design, Braungart-Rieker et al. (2001) found that emotion regulation in infancy mediated the association between maternal sensitivity and later child attachment.

Second, for theoretical and practical purposes, mothers are often used as the main source of information in developmental studies. However, meta-analysis findings suggest that characteristics of one parent-child relationship may be exclusive to that dyad (van IJzendoorn & De Wolff, 1997) and unrelated to outcomes with the other parent (i.e., father). Therefore, it would be important to test the model including fathers, or, alternatively, another primary caregiver (e.g., grandmother), to examine similarities or differences in the associations among the parameters, and as a basis for later examination of moderating effects of father variables on the associations between maternal characteristics and child outcomes.

Third, although the model tested in this study was based on relevant theoretical assumptions and empirical research, inclusion of other factors (e.g., emotional availability, maternal self-esteem and depression, family risk factors, child temperament) might help to unravel the complex processes by which children's experiences in families contribute to developmental outcomes. Maternal characteristics, such as self-esteem and depression, may underscore other ways in which a childhood history of care is transmitted to maternal behavior. For example, lower levels of self-esteem have been found to mediate the association between remembered parental rejection (i.e., insecure parental bonds) and depressive symptoms in young adults (Hankin et al., 2005) and

mothers (Crockenberg & Leerkes, 2003). At the same time, depressed mothers who are emotionally unavailable to their children are thought to contribute to maladaptive or disorganized emotion regulation through their lack of response to children's cues in emotional arousing situations (Field, 1994).

Moreover, examination of environmental risk and protective factors (e.g., life stressors, social support) may help to explain continuities and discontinuities of the intergenerational transmission of parental acceptance and secure internal working models. For example, recent findings suggest that current supportive relationships and fewer life stressors act as buffers against the negative impact of childhood rejection by having a positive impact on parenting behaviors (Belsky et al., 2005; Caldera & Lindsey, 2006; Travis & Combs-Orme, 2007).

In addition, it may be important to consider children's characteristics in future model specifications. For example, children's age and reactive temperament have been found to predict poorer emotion regulation of negative affect (Davidov & Grusec, 2006). A child with a reactive temperament may also elicit different responses from the mother, who in turn may be less successful in modeling adaptive regulation behaviors for her child. In addition, as a child gets older, peers become significant agents of socialization, and the formation of friendships, even at an early age, contributes to the development of a child's self-regulation ability (Fox, 1998).

Taken together, these arguments call for the consideration and inclusion of other factors that will inform our understanding of the development of maternal behavior and children's emotion regulation and attachment.

Fourth, interactions between mothers and their children are interdependent, with variations in either one expected to affect the other (Sameroff, 1975; Woody & Sadler, 2005). By studying individual responses of each dyad member, researchers fail to address the interpersonal nature of their relationship (Kenny, Kashy, & Cook, 2006). In the past, the lack of alternative methods to standard statistical analysis was an issue when examining dyadic interdependence. However, recent efforts to address this problem provide researchers with means to test *nonindependence* in dyads (Kenny et al., 2006; Olsen & Kenny, 2006; Woody & Sadler, 2005). For example, observations of how mothers and their children respond to novel situations would take into account the effect of the mothers' behavior on children's responses and of children's behavior on mothers' responses (e.g., Crockenberg & Leerkes, 2004). All variables would then be specified in a model and analyzed using structural equation modeling techniques, such as dyadic confirmatory factor analysis (Olsen & Kenny, 2006).

Fifth, the assessment of child outcomes in different contexts, (i.e., emotion regulation in the laboratory and attachment at home) and the use of different methodologies, (i.e., continuous observation and mother-report, respectively) may have contributed to the failure to find some of the predicted associations. Events that happen at home on a daily basis may be qualitatively and quantitatively different from behaviors that occur in a structured laboratory procedure designed to elicit mild fear. For example, children who are exposed to few unfamiliar situations, or have mothers that remove most sources of potential distress, may behave differently in the laboratory than those who are more often exposed to this type of event, due to their lack of experience. Children with little exposure to novel situations may not know how to react without the guidance of

their mothers. On the contrary, children with more experience with such situations may have developed a set of behaviors that they can use when facing unfamiliar events, even if their mothers are not readily available, as was the case in the laboratory assessment.

Finally, the attachment security measure used in this study had the disadvantage of not distinguishing between avoidant and resistant children, who tend to use different responses to regulate their emotions. In future research, it would be helpful to include a measurement of attachment security earlier in a child's life and to examine the pathways to emotion regulation in toddlerhood based on different insecure attachment classifications or behaviors.

Implications

Early interactions with parents are central in mothers' development of sensitive responsiveness to their own children; however, these early experiences do not completely determine maternal behavior. Based on the findings of the present study and other empirical evidence, a mother's sensitivity reflects not only her perceptions of her early experiences with parents, but also depends on other maternal characteristics, such as level of education. It seems likely also that other life experiences (e.g., few life stressors, access to support services, a caring relationship with current partner) contribute to more sensitive parenting and to the child outcomes under examination in this study.

Nevertheless, the ways mothers responded to their children when they experienced fear or were exposed to novel situations were linked to children's attachment security and to their adaptive emotion regulation behaviors, and partially mediated the association of a childhood history of care and attachment security when controlling for maternal education. These findings suggest that it is important to help mothers whose

own parents provide little acceptance or actively reject them to adopt more responsive parenting behaviors, by helping them to identify and respond to their children's cues and needs in times of distress and to model and encourage adaptive emotion regulation behaviors, such as distraction, and by fostering their own confidence as parents, through encouragement and positive feedback.

Table 1

Description of Measurements and Operationalization of Variables

Variable	*Measurement*	*Operationalization*
Maternal Education	Socio-Demographic Form	Years of education
History of Care	Parental Bonding Instrument	Scores for maternal and paternal care combined
Reported Maternal Sensitivity	Attachment Diary	Ratings of mother's responses to child fear
Observed Maternal Sensitivity	Mother Involved Condition of Laboratory Exposure to Novelty	Ratings of mother's responses to child in novel contexts
Children's Attachment Security	Attachment Diary	Frequency of secure-insecure behaviors when child afraid
Children's Emotion Regulation Behaviors	Mother Not Involved Condition of Laboratory Exposure to Novelty	Duration of child distraction, withdrawal, contact with mother

Table 2

Descriptive Statistics

	N	*M*	*SD*	Range
Maternal Education	82	16.20	2.17	12-21
Childhood History				
Maternal Care	82	3.33	.65	1.67-4.00
Paternal Care	82	3.14	.68	1.42-4.00
Maternal Sensitivity				
Sensitivity to Fear	82	3.52	.60	1.09-4.39
Attachment				
Secure Behavior	82	3.35	1.52	.50-8.00
Insecure Behavior	82	.53	.73	0-3.75
Emotion Regulation				
Distraction	82	21.34	18.41	0-70.61
Look Away	82	5.69	7.96	0-55.88
Soothing with Mother	82	12.78	16.09	0-59.42
Talk to Self	82	1.25	3.23	0-20.58
Verbal Control	82	.316	1.44	0-11.52
Self-soothing	82	2.11	4.67	0-24.20
Large Withdrawal	82	.15	.74	0-6.26
Withdrawal to Mother	82	1.70	3.61	0-20.00

Table 3

Descriptive Statistics: Composite Variables

	N	*M*	*SD*	Range
Childhood History				
History of Care	82	3.23	.59	1.67-4.00
Maternal Sensitivity				
Combined Sensitivity	82	.02	1.41	-3.72-2.95
Security of Attachment				
Attachment	82	2.81	1.89	-3.25-8.00
Emotion Regulation				
Distraction	82	27.03	20.39	0-88.28
Contact with Mother	82	18.30	22.54	0-77.22
Withdrawal	82	3.13	4.55	0-20.38

Table 4

Zero-Order Correlations between Maternal and Children Variables

	2.	3.	4.	5.	6.	7.
1. Maternal Education	.22[t]	.29**	-.09	.16	-.09	.02
2. History of Care	-	.26*	.25*	-.01	-.05	-.06
3. Sensitivity to Fear		-	.40**	.22*	-.04	-.23*
4. Attachment			-	.01	-.02	-.01
5. Distraction				-	-.53**	-.29*
6. Contact Mother					-	.59**
7. Withdrawal						-

$N = 82$

[t]$p < .10$; *$p < .05$; **$p < .01$

Table 5
Parameter Estimates of Standardized Effects for a Model of Attachment and Emotion Regulation

	Endogenous Variables					
Causal variable	History of Care	Sensitivity	Attachment	Distraction	Withdrawal	Contact with mother
Maternal Education						
Direct effect	.22*	.25*	-.26*	-	-	-
Indirect via Care	-	.04	.04	-	-	-
Indirect via Sensitivity	-	-	.11*	-	-	-
Indirect via Care and Sensitivity	-	-	.02	-	-	-
Total effect	.22*	.29*	-.09	-	-	-
History of Care						
Direct effect	-	.20[t]	.20[t]	-.07	-.001	-.04
Indirect via Sensitivity	-	-	.08*	.04	-.05	-.01
Total effect	-	.20[t]	.28*	-.03	-.05	-.05
Sensitivity						
Direct effect	-	-	.43**	.24*	-.23*	-.03

[t]$p < .10$; *$p < .05$; **$p < .01$

Table 6

Sobel Test for Significance of Mediation Effect of Maternal Sensitivity

IV ---- Mediator	Outcome	a	SE_a	b	SE_b	*Z*
History of Care ---- Sensitivity	Attachment	.61	.26	.40	.11	1.97*
Education ---- Sensitivity	Attachment	.19	.07	.51	.11	2.34*

Note. a = unstandardized regression coefficient for independent variable (IV) on mediator; SE_a = standard error of a; b = unstandardized regression coefficient for mediator on outcome variable when independent variable is also a predictor; SE_b = standard error of b; $N = 82$.

*$p < .05$

Table 7

Predicting Sensitivity and Attachment from Moderating Effect of Education

	Sensitivity			*Attachment*		
Variable	*B*	β	ΔR^2	*B*	β	ΔR^2
Main effects						
1. Education	.19	.29**	.09**	-.06	-.09	.01
2. History of Care	.48	.20^t	.04^t	.74	.28*	.08*
Interactive effect						
3. Education x Care	-.21	-.19^t	.04^t	-.49	-.40**	.16**
Total Model			.16**			.24**

Note. B is unstandardized and β is standardized beta at entry; $N = 82$.

$^t p < .10$; *$p < .05$; **$p < .01$.

Table 8

Least Square Regression Results for Moderation Mediation

	First Model (criterion: Attachment)		Mediator Model (criterion: Sensitivity)		Outcome Model (criterion: Attachment)	
Predictors	Coefficient	*SE*	Coefficient	*SE*	Coefficient	*SE*
1. History of Care	.61*	.26	.42^{t}	.26	.35	.25
2. Education	-.13^{t}	.07	.15*	.07	-.20**	.07
3. Care*Education	-.49**	.12	-.21^{t}	.12	-.30*	.12
4. Sensitivity					.33**	.11
5. Sensitivity*Education					-.13*	.06

$N = 82$.

$^{t}p < .10$; *$p < .05$; **$p < .01$.

Table 9

Regression Analysis Testing Moderating Effect of Child Fearfulness on the Association of Maternal Sensitivity with Contact with Mother

	Contact with Mother		
Variable	*B*	*β*	ΔR^2
Main effects			
1. Fearfulness	.16	.15	.02
2. Sensitivity	-.03	-.05	.01
Interactive effect			
3. Fearfulness x Sensitivity	-.21	-.25*	.05*

Note. *B* is unstandardized and *β* is standardized beta at entry; *N* = 82.

*$p < .05$.

Figure 1

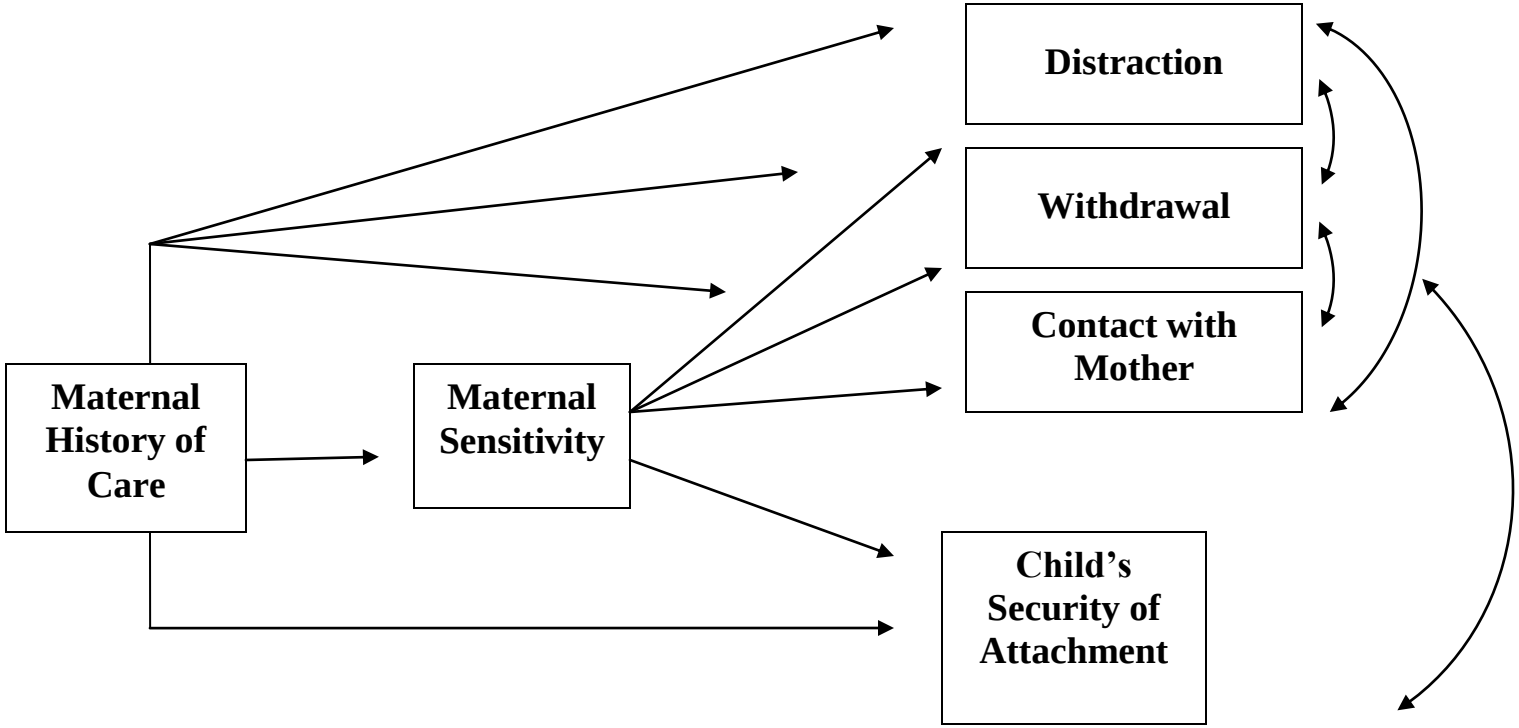

Distraction
Withdrawal
Contact with Mother
Maternal History of Care
Maternal Sensitivity
Child's Security of Attachment

Figure 2

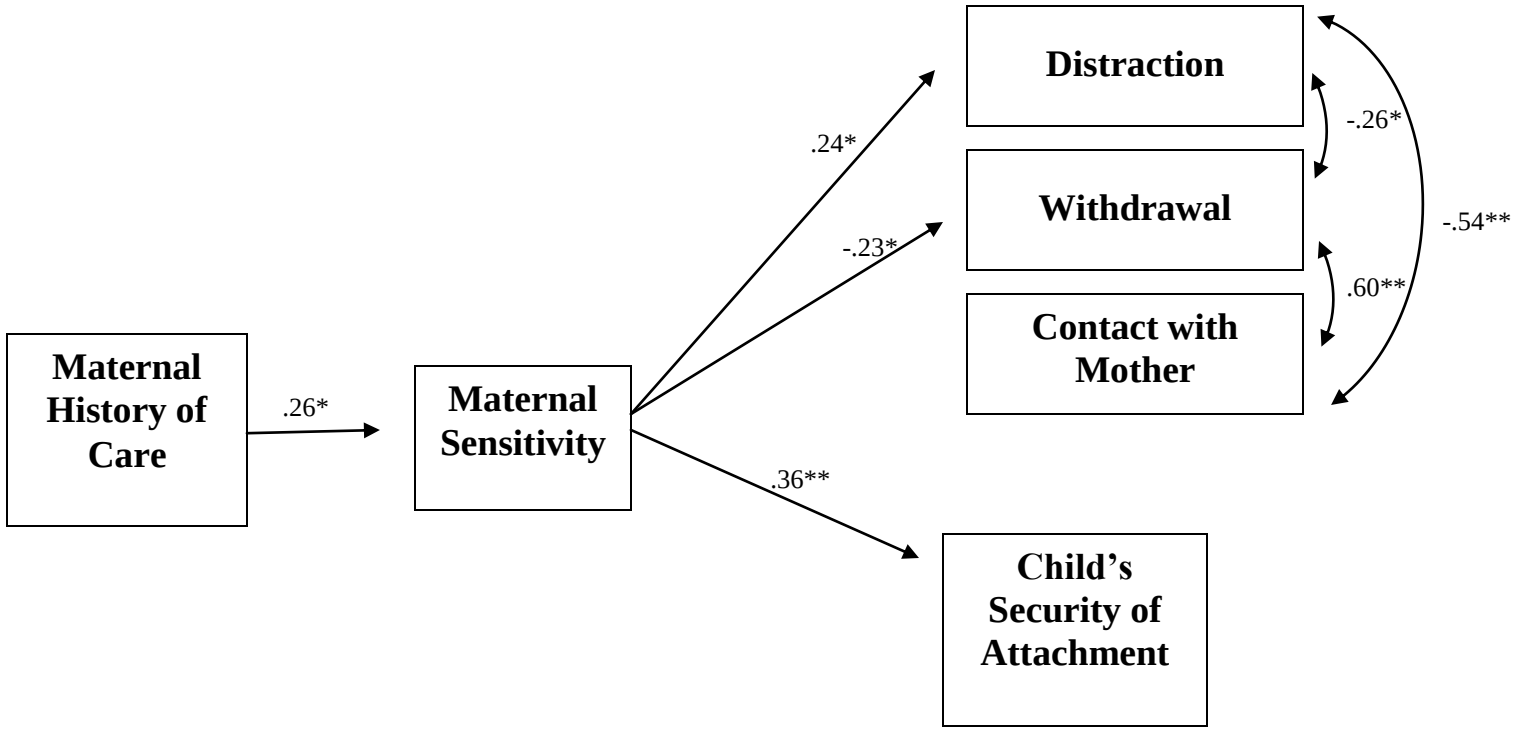

Maternal History of Care
.26*
Maternal Sensitivity
.24*
-.23*
.36**
Distraction
Withdrawal
Contact with Mother
-.26*
-.54**
.60**
Child's Security of Attachment

Figure 3

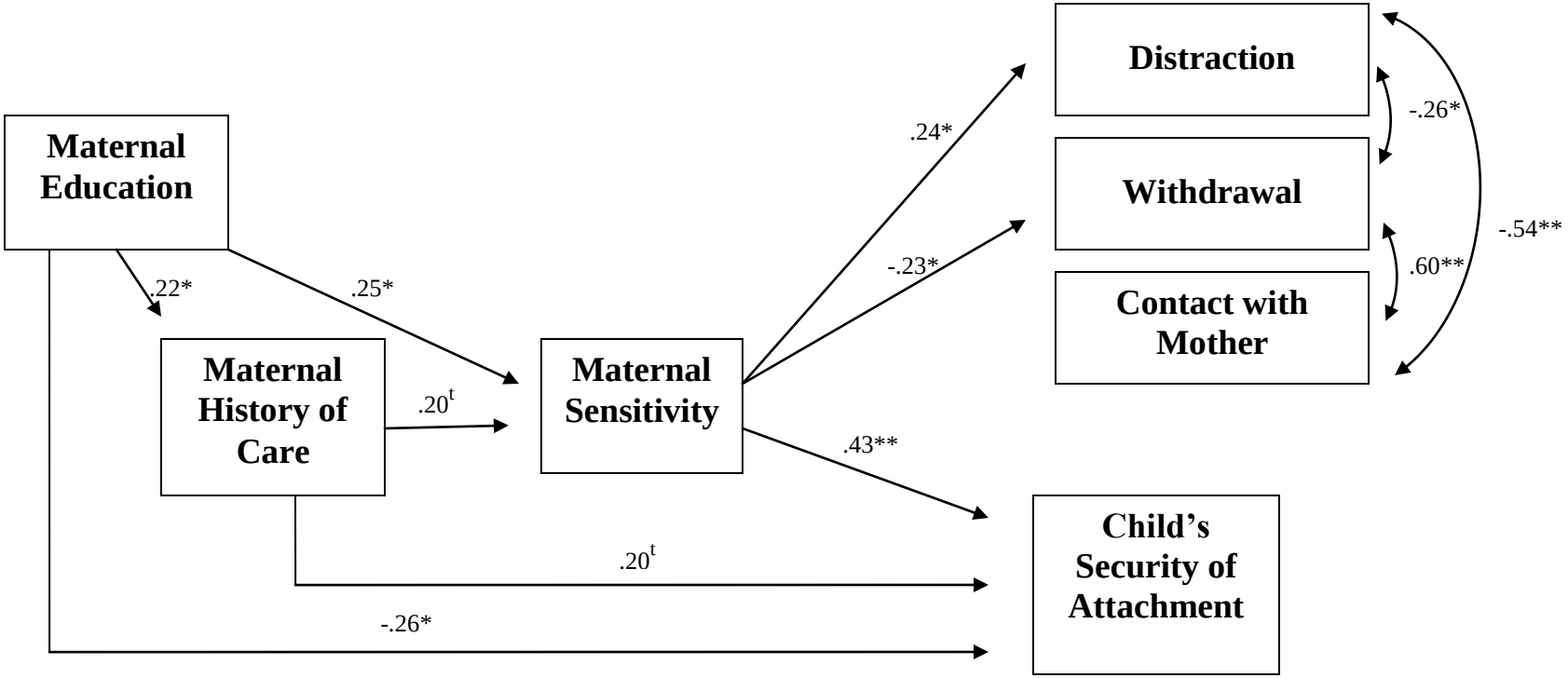

Maternal Education
Maternal History of Care
Maternal Sensitivity
Distraction
Withdrawal
Contact with Mother
Child's Security of Attachment
.22*
.25*
.20t
.24*
-.23*
.43**
.20t
-.26*
-.26*
.60**
-.54**

Figure 4

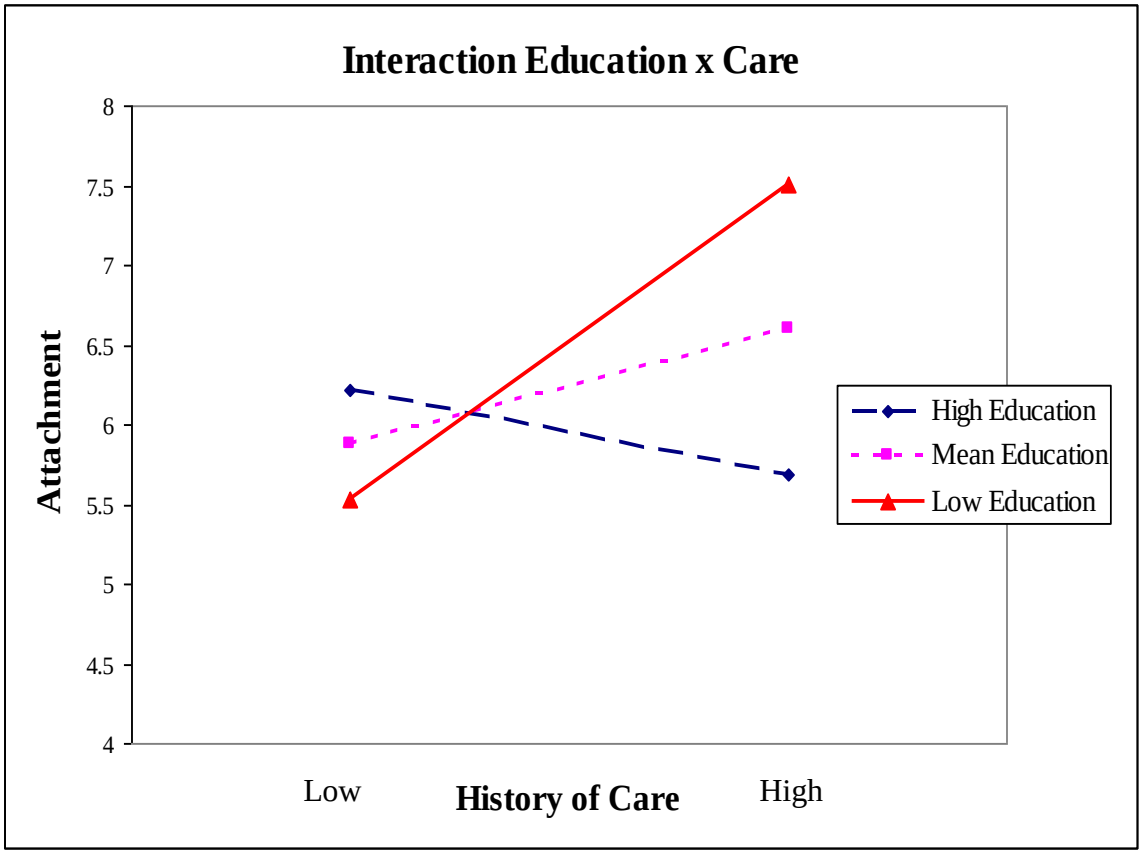

Interaction Education x Care
Attachment
8
7.5
7
6.5
6
5.5
5
4.5
4
Low
History of Care
High
High Education
Mean Education
Low Education

Figure 5

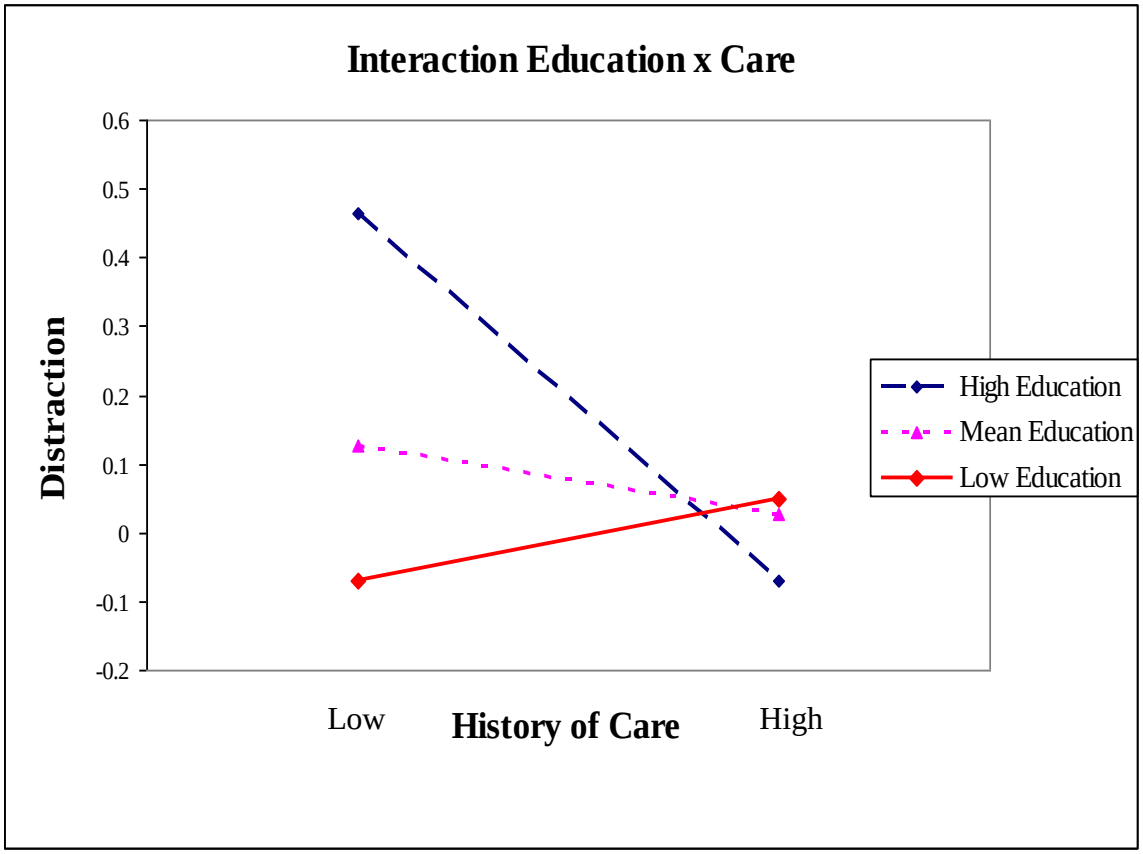

Interaction Education x Care
Distraction
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
Low
History of Care
High
High Education
Mean Education
Low Education

Figure 6

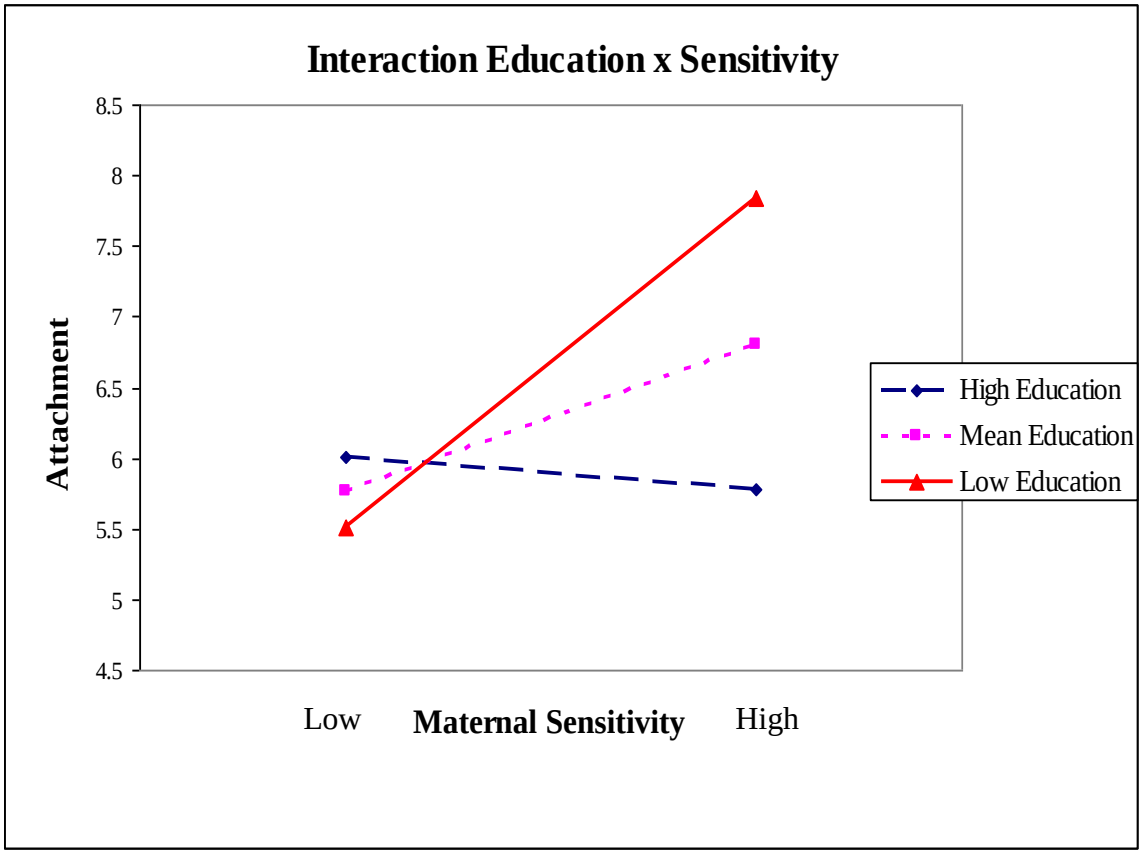
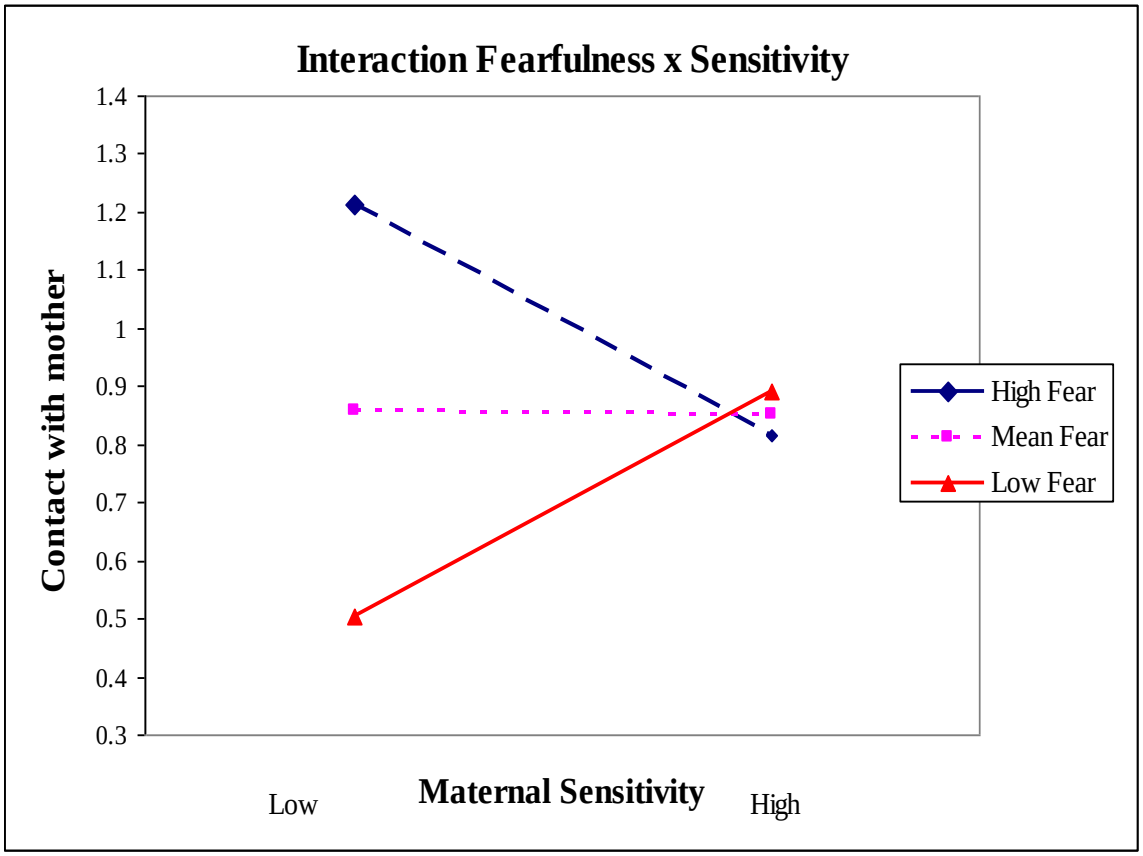

Interaction Education x Sensitivity
8.5
8
7.5
7
6.5
6
5.5
5
4.5
Attachment
Low
Maternal Sensitivity
High
High Education
Mean Education
Low Education

Figure 7


Interaction Fearfulness x Sensitivity
Contact with mother
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
Low
Maternal Sensitivity
High
High Fear
Mean Fear
Low Fear

References

Ainsworth, M. D. S. (1967). *Infancy in Uganda: Infant care and the growth of love.* Baltimore: John Hopkins University Press.

Ainsworth, M. D. S. (1968). Objects relations, dependency, and attachment: A theoretical review of the infant-mother relationship. *Child Development, 40,* 969-1025.

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J. (1971). Individual differences in strange-situation behavior of one-year-olds. In H. R. Schaffer (Ed.), *The origins of human social relations* (pp.17-58). London: Academic Press.

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation.* Hillsdale, New Jersey: Erlbaum.

Arbuckle, J. L. (2003). *Amos 5.0 update to the Amos user's guide*. Chicago: Smallwaters.

Axia, G., Bonichini, S., & Benini, F. (1999). Attention and reaction to distress in infancy: A longitudinal study. *Developmental Psychology, 35,* 500-504.

Baron, R. K., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182.

Belsky, J. (1984). The determinants of parenting: A process model. *Child Development, 55,* 83-96.

Belsky, J., Jaffee, S. R., Sligo, J., Woodward, L., & Silva, P. A. (2005). Intergenerational transmission of warm-sensitive-stimulating parenting: A prospective study of mothers and fathers of 3-year-olds. *Child Development, 76,* 384-396.

Berlin, L. J., & Cassidy, J. (2003). Mothers' self-reported control of their preschool children's emotional expressiveness: A longitudinal study of associations with infant-mother attachment and children's emotion regulation. *Social Development, 12,* 477-495.

Biederman, J., Hirshfield-Becker, D. R., Rosenbaum, J. F., Hérot, C., Friedman, D., Snidman, N., et al. (2001). Further evidence of association between behavioral inhibition and social anxiety in children. *American Journal of Psychiatry, 158,* 1673-1679.

Biringen, Z., Brown, D., Donaldson, L., Green, S., Krcmarik, S., & Lovas, G. (2000). Adult Attachment Interview: Linkages with dimensions of emotional availability for mothers and their pre-kindergarteners. *Attachment and Human Development, 2,* 188-202.

Bowlby, J. (1969/1982). *Attachment and loss. Vol. I, Attachment.* New York: Basic Books.

Bowlby, J. (1973). *Attachment and loss. Vol. II, Separation.* New York: Basic Books.

Bowlby, J. (1977).The making and breaking of affectional bonds: Aetiology and psychopathology in the light of attachment theory. *British Journal of Psychiatry, 130,* 201-210.

Bowlby, J. (1979). *The making and breaking of affectional bonds*. London: Tavistock.

Bowlby, J. (1988). *A secure base. Clinical applications of attachment theory*. London: Routledge.

Braungart, J. M., & Stifter, C. A. (1991). Regulation of negative reactivity during the

Strange Situation: Temperament and attachment in 12-month-old infants. *Infant Behavior and Development, 14,* 349-364.

Braungart-Rieker, J. M., Garwood, M. M., Powers, B. P., & Wang, X. (2001). Parental sensitivity, infant affect, and affect regulation: Predictors of later attachment. *Child Development, 72,* 252-270.

Bretherton, I. (1985). Attachment theory: Retrospect and prospect. In I. Bretherton & E. Waters (Eds.), Growing points of attachment theory and research. *Monographs of the Society for Research in Child Development, 50,* 3-35.

Bretherton, I. (1992). The origins of attachment theory: John Bowlby and Mary Ainsworth. *Developmental Psychology, 28,* 759-775.

Bretherton, I. (2000). Emotional availability: An attachment perspective. *Attachment and Human Development, 2,* 233-241.

Bretherton, I., & Munholland, K. (1999). Internal working models in attachment relationships: A construct revised. In J. Cassidy & P. Shaver (Eds.) *Handbook of attachment: Theory, research, and clinical applications* (pp. 89-111). New York: Guilford Press.

Bridges, L. J., Denham, S. A., & Ganiban, J. M. (2004). Definitional issues in emotion regulation research. *Child Development, 75,* 340-345.

Bridges, L. J., & Grolnick, W. S. (1995). The development of emotional self regulation in infancy and early childhood. In N. Eisenberg (Ed.), *Review of personality and psychology* (pp. 185-211). Newbury Park, California: Sage.

Burrous, E., Crockenberg, S. C., & Leerkes, E. M. (in press). Developmental history of care and control, anger and depression: Correlates of maternal sensitivity in toddlerhood. *Infant Mental Health Journal*.

Buss, K. A., & Goldsmith, H. H. (1998). Fear and anger regulation in infancy: Effects on the temporal dynamics of affective expression. *Child Development, 69*, 359-374.

Byrne, B. M. (2001). *Structural equation modeling with AMOS. Basic concepts, applications, and programming*. New Jersey: Lawrence Erlbaum Associates, Inc.

Caldera, Y. M., & Lindsey, E. W. (2006). Coparenting, mother-infant interaction, and infant-parent attachment relationships in two-parent families. *Journal of Family Psychology, 20,* 275-283.

Calkins, S. D. (1994). Origins and outcomes of individual differences in emotion regulation. In N. A. Fox (Ed.), The development of emotion regulation: Biological and behavioral considerations. *Monographs of the Society for Research in Child Development, 59,* 53-72.

Calkins, S. D., Fox, N. A., & Marshall, T. R. (1996). Behavioral and physiological antecedents of inhibition in infancy. *Child Development, 67,* 523-540.

Calkins, S. D., Smith, C. L., Gill, K. L., & Johnson, M. C. (1998). Maternal interactive style across contexts: Relations to emotional, behavioral and physiological regulation during toddlerhood. *Social Development, 7,* 350-369.

Campos, J. J., Anderson, D. I., Barbu-Roth, M. A., Hubbard, E. M., Hertenstein, M. J., & Witherington, D. (2000). Travel broadens the mind. *Infancy, 1,* 149-219.

Campos, J. J., Frankel, C. B., & Camras, L. (2004). On the nature of emotion regulation. *Child Development, 75,* 377-394.

Canetti, L., Bachar, E., Galili-Weisstub, E., Kaplan De-Nour, A., & Shalev, A. (1997). Parental bonding and mental health in adolescence. *Adolescence, 32,* 381-394.

Cassidy, J. (1994). Emotion regulation: Influences of attachment relationships. In N. A. Fox (Ed.), The development of emotion regulation: Biological and behavioral considerations. *Monographs of the Society for Research in Child Development, 59,* 228-249.

Cassidy, J. & Berlin, L. J. (1994). The insecure-ambivalent pattern of attachment: Theory and research. *Child Development, 65,* 971-991.

Chess, S., & Thomas, A. (1996). *Temperament, theory and practice.* New York: Brunner/Mazel.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112,* 155-159.

Cohn, D., Cowan, P., Cowan, C., & Pearson, J. (1992). Mothers' and fathers' working models of childhood attachment relationships, parenting styles, and child behavior. *Development and Psychopathology, 4,* 417-431.

Cohn, J. F., & Tronick, E. Z. (1989). Specificity of infants' response to mothers' affective behavior. *Journal of the American Academy of Child and Adolescent Psychiatry, 28,* 242-248.

Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development, 75,* 317-333.

Crockenberg, S. C., & Leerkes, E. M. (2003). Parental acceptance, postpartum depression, and maternal sensitivity: Mediating and moderating processes. *Journal of Family Psychology, 17,* 80-93.

Crockenberg, S. C., & Leerkes, E. M. (2004). Infant and maternal behaviors regulate infant reactivity to novelty at six months. *Developmental Psychology, 40,* 1123-1132.

Crockenberg, S. C., & Leerkes, E. M. (2006). Infant and maternal behavior moderate reactivity to novelty to predict anxious behavior at 2½. *Development and Psychopathology, 18,* 17-34.

Davidov, M., & Grusec, J. E. (2006). Untangling the links of parental responsiveness to distress and warmth to child outcomes. *Child Development, 77,* 44-58.

Diener, M. L., & Mangelsdorf, S. C. (1999). Behavioral strategies for emotion regulation in toddlers: Associations with maternal involvement and emotional expressions. *Infant Behavior and Development, 22,* 569-583.

Diener, M. L., Mangelsdorf, S. C., McHale, J. L., & Frosch, C. A. (2002). Infants' behavioral strategies for emotion regulation with fathers and mothers: Associations with emotional expressions and attachment quality. *Infancy, 3,* 153-170.

Dozier, M., & Stovall, K.C. (1997). Parents' attachment diary. Unpublished manuscript, University of Delaware.

Dumka, L. E., & Roosa, M. W. (1993). Factors mediating problem drinking and mothers' personal adjustment. *Journal of Family Psychology, 7,* 333-343.

Easterbrooks, M. A., & Biringen, Z. (2000). Guest editors' introduction to the special issue: Mapping the terrain of emotional availability and attachment. *Attachment and Human Development, 2,* 123-129.

Easterbrooks, M. A., Biesecker, & Lyons-Ruth, (2000). Infancy predictors of emotional availability in middle childhood. The roles of attachment and maternal depressive symptomatology. *Attachment and Human Development, 2,* 170-187.

Easterbrooks, M. A., Chaudhuri, J. H., Slaboda, M. J., Poodiack, J. S., Roberto, K., & Morgan, C. (1998). The family context of toddler emotional regulation. *Infant Behavior and Development, 21,* 392.

Edelstein, R. S., Alexander, K. W., Shaver, P. R., Schaaf, J. M., Quas, J. A., Lovas, G. S., et al., (2004). Adult attachment style and parental responsiveness during a stressful event. *Attachment and Human Development, 6,* 31-52.

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

Epstein, S. (1980). The self concept: A review and proposal of an integrated theory of personality. In E. Staub (Ed.), *Personality: Basic aspects and current research* (pp. 82-132). Englewood Cliffs, New Jersey: Prentice-Hall.

Epstein, S. (1994). Integration of the cognitive and the psychodynamic unconscious. *American Psychologist, 49,* 709-724.

Favaretto, E., Torresani, S., & Zimmermann, C. (2001). Further results on the reliability of the Parental Bonding Instrument (PBI) in an Italian sample of schizophrenic patients and their parents. *Journal of Clinical Psychology, 57,* 119-129.

Field, T. (1994). The effects of mother's physical and emotional unavailability on emotion regulation. In N. A. Fox (Ed.), The development of emotion regulation: Biological and behavioral considerations. *Monographs of the Society for Research in Child Development, 59,* 208-227.

Fonagy, P., Steele, H., & Steele, M. (1991). Maternal representations of attachment during pregnancy predict the organization of infant-mother attachment at one year of age. *Child Development, 62,* 891-905.

Fox, N. A. (1998). Temperament and regulation of emotion in the first years of life. *Pediatrics, 102,* 1230-1235.

Fox, N. A., & Calkins, S. D. (2003). The development of self-control of emotion: Intrinsic and extrinsic influences. *Motivation and Emotion, 27,* 7-26.

George, C., Kaplan, N., & Main, M. (1985). *The Adult Attachment Interview*. Unpublished manuscript, University of California at Berkeley.

Grolnick, W. S., Kurowski, C. O., McMenamy, J. M., Rivkin, I., & Bridges, L. J. (1998). Mothers' strategies for regulating their toddlers' distress. *Infant Behavior and Development, 21,* 437-450.

Grossmann, K. E., Grossmann, K., & Schwan, A. (1986). Capturing the wider view of attachment: A reanalysis of Ainsworth's Strange Situation. In C. E. Izard & P. B. Read (Eds.), *Measuring emotions in infants and children* (pp.124–171). New York: Cambridge University Press.

Hane, A. A., & Fox, N. A. (2006). Ordinary variations in maternal caregiving influence human infants' stress reactivity. *Psychological Science, 17,* 550-556.

Hankin, B. L., Kassel, J. D., & Abela, J. R. Z. (2005). Adult attachment dimensions and specificity of emotional distress symptoms: Prospective investigations of cognitive risk and interpersonal stress generation as mediating mechanisms. *Personality and Social Psychology Bulletin, 31,* 136-151.

Ingram, R. E., & Ritter, J. (2000). Vulnerability to depression: Cognitive reactivity and parental bonding in high-risk individuals. *Journal of Abnormal Psychology, 109*, 588-596.

Joreskog, K. G., & Sorbom, D. (1988). *LISREL 7: A guide to the program and applications.* Chicago: SPSS, Inc.

Kagan, J. (1984). *The nature of the child*. New York: Basic Books.

Kagan, J., Reznick, J. S., & Gibbons, J. (1989). Inhibited and uninhibited types of children. *Child Development, 60,* 838-845.

Kenny, D. A. (2008, January 10). *Mediation*. Retrieved April 12, 2008, from http://davidakenny.net/cm/mediate.htm

Kenny, D. A., Kashy, D. A., & Cook, W. (2006). *Dyadic data analysis.* New York: Guildford Press.

Khaleque, A., & Rohner, R. P. (2002). Perceived parental acceptance-rejection and psychological adjustment: A meta- analysis of cross-cultural and intracultural studies. *Journal of Marriage and Family, 64,* 54-64.

Kiel, E. J., & Buss, K. A. (2006). Maternal accuracy in predicting toddlers' behaviors and associations with toddlers' fearful temperament. *Child Development, 77,* 355-370.

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: The Guilford Press.

Kochanska, G., Aksan, N., & Joy, M. E. (2007). Children's fearfulness as a moderator of parenting in early socialization: Two longitudinal studies. *Developmental Psychology, 43,* 222-237.

Kogan, N., & Carter, A. (1996). Mother-infant reengagement following the still-face: The role of maternal emotional availability in infant affect regulation. *Infant Behavior and Development, 19,* 359-370.

Kopp, C. B. (1989). Regulation of distress and negative emotions: A developmental view. *Developmental Psychology, 25,* 343-354.

Kopp, C. B. (2002). Commentary: The codevelopments of attention and emotion regulation. *Infancy, 3,* 199-208.

Leerkes, E. M., & Crockenberg, S. C. (2002). The development of maternal self-efficacy and its impact on maternal behavior. *Infancy, 3,* 227-247.

Leerkes, E. M., & Crockenberg, S. C. (2003). The impact of maternal characteristics and sensitivity on the concordance between maternal reports and laboratory observations of infant negative emotionality. *Infancy, 4,* 517-539.

Leerkes, E. M., Crockenberg, S. C., & Burrous, C. E. (2004). Identifying components of maternal sensitivity to infant distress: The role of maternal emotional competencies. *Parenting: Science and Practice, 4,* 1-23.

Long, J. (1999). *Video coding system: Reference guide.* Caroga Lake, New York: James Long Company.

Main, M. (1990). Cross-cultural studies of attachment organization: Recent studies, changing methodologies, and the concept of conditional strategies. *Human Development, 33,* 48-61.

Main, M., & Goldwyn, R. (1984). Predicting rejection of her infant from mother's representations of her own experience: Implications for the abused-abusing intergenerational cycle. *Child Abuse and Neglect, 8,* 203-217.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood and adulthood: A move to the level of representation. In I. Bretherton & E. Waters (Eds.), Growing points of attachment theory and research. *Monographs of the Society for Research in Child Development, 50,* 66-104.

Main, M., & Solomon, J. (1986). Discovery of an insecure-disorganized/ disoriented attachment pattern: Procedures, findings and implications for the classification of behavior. In T. B. Brazelton & M. Yogman (Eds.), *Affective development in infancy* (pp. 95-124). Norwood, New Jersey: Ablex.

Mangelsdorf, S., Gunnar, M., Kestenbaum, R., Lang, S., & Andreas, D. (1990). Infant proneness-to-distress temperament, maternal personality, and mother-infant attachment: Associations and goodness of fit. *Child Development, 61,* 820-831.

Mangelsdorf, S. C., Shapiro, J. R., & Marzolf, D. (1995). Developmental and temperamental differences in emotion regulation in infancy. *Child Development, 66,* 1817-1828.

Moore, G. A., & Calkins, S. D. (2004). Infants' vagal regulation in the still-face paradigm is related to dyadic coordination of mother-infant interaction. *Developmental Psychology, 40,* 1068-1080.

Muller, D., Judd, C. M., & Yzerbyt, V. Y. (2005). When moderation is mediated and mediation is moderated. *Journal of Personality and Social Psychology, 89,* 852-863.

Nachmias, M., Gunnar, M., Mangelsdorf, S., Parritz, R., & Buss, K. A. (1996). Behavioral inhibition and stress reactivity: The moderating role of attachment security. *Child Development,* 67, 508-522.

Olsen, J. A., & Kenny, D. A. (2006). Structural equation modeling with interchangeable dyads. *Psychological Methods, 11,* 127-141.

Parker, G., Tupling, H., & Brown, L. B. (1979). A parental bonding instrument. *British Journal of Medical Psychology, 52,* 1-10.

Parritz, R. H. (1996). A descriptive analysis of toddler coping in challenging circumstances. *Infant Behavior and Development, 19,* 171-180.

Pettit, G. S., & Bates, J. E. (1989). Family interaction patterns and children's behavior problems from infancy to 4 years. *Developmental Psychology, 25,* 413-420.

Pietromonaco, P. R., & Barrett, L. F. (1997). Working models of attachment and daily social interactions. *Journal of Personality and Social Psychology, 73,* 1409-1423.

Pollak, S. D., Vardi, S., Putzer Bechner, A. M., & Curtin, J. J. (2005). Physically abused children's regulation of attention in response to hostility. *Child Development, 76,* 968-977.

Posada, G., Waters, E., Crowell, J., & Lay, K. L. (1995). Is it easier to use a secure mother as a secure base? Attachment Q-set correlates of the adult attachment interview. In E. Waters, B. Vaughn, G. Posada, & K. Kondo-Ikemura (Eds.), Caregiving, cultural and cognitive perspectives on secure-base behavior and working models: New growing points of attachment theory and research. *Monographs of the Society for Research in Child Development, 60,* 133-145.

Posner, M. I., & Rothbart, M. K. (2000). Developing mechanisms of self-regulation. *Development and Psychopathology, 12,* 427-441.

Power, T. G. (2004). Stress and coping in childhood: The parent's role. *Parenting: Science and Practice, 4,* 271-317.

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderation mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research, 42,* 185-227.

Putnam, S. P., Gartstein, M. A., & Rothbart, M. K. (2006). Measurement of fine-grained aspects of toddler temperament: The Early Childhood Behavior Questionnaire. *Infant Behavior and Development, 29,* 386-401.

Rohner, R. P. (1986). *The warmth dimension: Foundations of parental acceptance-rejection theory.* Newbury Park, California: Sage Publications, Inc.

Rohner, R. P. (2001). *Handbook for the study of parental acceptance and rejection (Rev. ed.)* Storrs, CT: Rohner Research.

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In W. Damon (Editor-in-chief), N. Eisenberg (Vol. Ed.), *Handbook of child psychology (6th ed.). Vol. 3. Social, emotional, and personality development* (pp. 105-176). New York: Wiley.

Rothbart, M. K., & Derryberry, D. (1981). Development of individual differences in temperament. In M. E. Lamb & A. L. Brown (Eds.), *Advances in developmental psychology* (pp. 37-86). Hillsdale, New Jersey: Erlbaum.

Rothbart, M. K., Derryberry, D., & Posner, M. I. (1994). A psychobiological approach to the development of temperament. In J. E. Bates & T. D. Wachs (Eds.), *Temperament: Individual differences at the interface of biology and behavior* (pp.83-116). Washington, DC: American Psychological Association.

Rothbart, M. K., Ziaie, H., & O'Boyle, C. (1992). Self-regulation and emotion in infancy. *New Directions for Child Development, 55,* 7-23.

Ruff, H. A., & Rothbart, M. K. (1996). *Attention in early development. Themes and variations*. New York: Oxford University Press.

Sameroff, A. J. (1975). Early influences on development: Fact or fancy? *Merrill-Palmer Quarterly, 21*, 267-294.

Shulman, S., Becker, A., & Sroufe, L. A. (1999). Adult-child interactions as related to adult's family history and child's attachment. *International Journal of Behavioral Development, 23*, 959-976.

Smith, C. L., Calkins, S. D., & Keane, S. P. (2006). The relation of maternal behavior and attachment security to toddlers' emotions and emotion regulation. *Research in Human Development, 3,* 21-31.

Sobel, M. E. (1982). Asymptotic confidence intervals for indirect effects in structural equation models. In S. Leinhardt (Ed.), *Sociological methodology 1982* (pp. 290-312). Washington DC: American Sociological Association.

Spinrad, T. L., Stifter, C. A., Donelan-McCall, N., & Turner, L. (2004). Mothers' regulation strategies in response to toddlers' affect: Links to later emotion self-regulation. *Social Development, 13,* 40-55.

Sroufe, L. A. (1996). *Emotional development: The organization of emotional life in the early years.* New York: Cambridge University Press.

Sroufe, L. A., & Fleeson, J. (1986). Attachment and the construction of relationships. In W. Hartup & Z. Rubin (Eds.), *Relationships and development* (pp. 51-71). Hillsdale, New Jersey: Erlbaum.

Sroufe, L. A., & Waters, E. (1977). Attachment as an organizational construct. *Child Development, 48*, 1184-1199.

Stifter, C. A. (2002). Individual differences in emotion regulation in infancy: A thematic collection. *Infancy, 3,* 129-132.

Stifter, C. A., & Braungart, J. M. (1995). The regulation of negative reactivity in infancy: Function and development. *Developmental Psychology, 31,* 448-455.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Boston: Allyn & Bacon.

Thompson, R. A. (1990). Emotion and self-regulation. In R. A. Thompson (Ed.), *Nebraska Symposium on Motivation. Vol. 36. Socioemotional Development* (pp. 367-467). Lincoln: University of Nebraska Press.

Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. In N. A. Fox (Ed.), The development of emotion regulation: Biological and behavioral considerations. *Monographs of the Society for Research in Child Development, 59,* 25-52.

Thompson, R. A. (1998). Early sociopersonality development. In W. Damon (Editor-in-chief), N. Eisenberg (Vol. Ed.), *Handbook of Child Psychology (5th ed.). Vol. 3. Social, Emotional, and Personality Development* (pp. 25-104). New York: Wiley.

Thompson, R. A., & Goodvin, R. (2005). The individual child: Temperament, emotion, self, and personality. In M. H. Bornstein & M. E. Lamb (Eds.), *Developmental science: An advanced textbook (5th ed.)* (pp. 391-428). Mahwah, New Jersey: Erlbaum.

Todman, J., & Dugard, P. (2007). *Approaching multivariate analysis. An introduction for Psychology*. New York: Psychology Press.

Tronick, E. Z. (1989). Emotions and emotional communication in infants. *American Psychologist, 44,* 112-119.

Travis, W. J., & Combs-Orme, T. (2007). Resilient parenting: Overcoming poor parental bonding. *Social Work Research, 31,* 135-149.

Uji, M., Tanaka, N., Shono, M., & Kitamura, T. (2006). Factorial structure of the Parental Bonding Instrument (PBI) in Japan: A study of cultural, developmental, and gender influences. *Child Psychiatry & Human Development, 37,* 115-132.

van den Boom D. C. (1994). The influence of temperament and mothering on attachment and exploration: An experimental manipulation of sensitive responsiveness among lower-class mothers with irritable infants. *Child Development, 65,* 1457-1477.

van der Mark, I. L., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2002). The role of parenting, attachment, and temperamental fearfulness in the prediction of compliance in toddler girls. *British Journal of Developmental Psychology, 20,* 361-378.

van IJzendoorn, M. H. (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview. *Child Development, 117,* 387-403.

van IJzendoorn, M. H., & De Wolff, M. S. (1997). In search of the absent father: Meta-analysis of infant-father attachment. A rejoinder to our discussants. *Child Development, 68,* 604-609.

Volling, B. L., McElwain, N. L., Notaro, P. C., & Herrera, C. (2002). Parents' emotional

availability and infant emotional competence: Predictors of parent-infant attachment and emerging self-regulation. *Journal of Family Psychology, 16,* 447-465.

Wang, Q., & Fivush, R. (2005). Mother-child conversations of emotionally salient events: Exploring the functions of emotional reminiscing in European-American and Chinese families. *Social Development, 14,* 473-495.

Wagar, J. (2008). Measuring maternal sensitivity. Unpublished honor's thesis, University of Vermont.

Ward, M., & Carlson, E. (1995). Associations among adult attachment representations, maternal sensitivity, and infant-mother attachment in a sample of adolescent mothers. *Child Development, 66,* 69-79.

Woody, E., & Sadler, P. (2005). Structural equation models for interchangeable dyads: Being the same makes a difference. *Psychological Methods, 10,* 139-158.

Zeanah, C. H., Benoit, D., Barton, M., Regan, C., Hirshberg, L. M., & Lipsitt, L. (1993). Representations of attachment in mothers and their one year old infants. *Journal of the American Academy of Child and Adolescent Psychiatry, 32,* 278-286.

Appendix A

Parental Bonding Instrument (PBI)

Below is a list of experiences children have with parents. Please circle the number that best describes how you remember your **mother** and then your **father** during your first 16 years.

	MOTHER				**FATHER**			
	very unlike	somewhat unlike	somewhat like	very like	very unlike	somewhat unlike	somewhat like	very like
1. Made me feel like a burden.	1	2	3	4	1	2	3	4
2. Spoke to me in a warm and friendly voice.	1	2	3	4	1	2	3	4
3. Made me feel loved.	1	2	3	4	1	2	3	4
4. *Did not help me as much as I needed.*	1	2	3	4	1	2	3	4
5. Made me feel special.	1	2	3	4	1	2	3	4
6. *Seemed emotionally cold to me.*	1	2	3	4	1	2	3	4
7. Made me feel incompetent.	1	2	3	4	1	2	3	4
8. Appeared to understand my problems and worries.	1	2	3	4	1	2	3	4
9. Ignored me when I was upset.	1	2	3	4	1	2	3	4
10. Was affectionate to me.	1	2	3	4	1	2	3	4
11. Comforted me when I was sad.	1	2	3	4	1	2	3	4
12. Liked me to make my own decisions.	1	2	3	4	1	2	3	4
13. Helped me to calm down when I was mad.	1	2	3	4	1	2	3	4
14. Did not want me to grow up.	1	2	3	4	1	2	3	4
15. Told me to get over it when I was disappointed.	1	2	3	4	1	2	3	4

	MOTHER				FATHER			
	very unlike	somewhat unlike	somewhat like	very like	very unlike	somewhat unlike	somewhat like	very like
16. Tried to control everything I did.	1	2	3	4	1	2	3	4
17. Tried to help me feel better if I felt let down.	1	2	3	4	1	2	3	4
18. Invaded my privacy.	1	2	3	4	1	2	3	4
19. Helped me to be less afraid gradually.	1	2	3	4	1	2	3	4
20. Enjoyed talking things over with me.	1	2	3	4	1	2	3	4
21. Tended to baby me.	1	2	3	4	1	2	3	4
22. Frequently smiled at me.	1	2	3	4	1	2	3	4
23. Felt I could not look after myself unless he/she was around.	1	2	3	4	1	2	3	4
24. Got annoyed with me when I was sad.	1	2	3	4	1	2	3	4
25. Made me do things I was afraid of before I was ready.	1	2	3	4	1	2	3	4
26. Punished me for showing I was mad.	1	2	3	4	1	2	3	4
27. *Did not seem to understand what I needed or wanted*.	1	2	3	4	1	2	3	4
28. Got angry at me when I was frustrated.	1	2	3	4	1	2	3	4
29. Let me decide things for myself.	1	2	3	4	1	2	3	4

	MOTHER				FATHER			
	very unlike	somewhat unlike	somewhat like	very like	very unlike	somewhat unlike	somewhat like	very like
30. Did not like it when I cried.	1	2	3	4	1	2	3	4
31. Tried to make me dependent on him/her.	1	2	3	4	1	2	3	4
32. *Made me feel I wasn't wanted*.	1	2	3	4	1	2	3	4
33. Was overprotective of me.	1	2	3	4	1	2	3	4
34. Gave me as much freedom as I wanted.	1	2	3	4	1	2	3	4
35. Could make me feel better when I was upset.	1	2	3	4	1	2	3	4
36. Tried to be understanding when I was sad.	1	2	3	4	1	2	3	4
37. *Did not talk to me very much*.	1	2	3	4	1	2	3	4
38. Told me it was OK to feel afraid sometimes.	1	2	3	4	1	2	3	4
39. Felt badly for me when I cried.	1	2	3	4	1	2	3	4
40. *Did not praise me*.	1	2	3	4	1	2	3	4
41. Let me dress any way I pleased.	1	2	3	4	1	2	3	4

NOTE: Care items are underlined; italics refer to reversed care items.

Appendix B

Descriptions of Children's Emotion Regulation Behaviors

1. Behaviors toward the new situation

Inspect: Looking at, or keeping track of the new toy or person even if holding a toy.

Approach: Behaviors aimed at making physical contact with the new situation (e.g., walking to, reaching for, touching/playing with the stimulus, accepting or saying "yes"). Verbalizations about the new toy or person may be included.

Partial approach: Child plays with toy provided by novel stimulus (i.e., clown) and plays with it or child engages with toy or novel event but remains very close to mother or is being soothed by contact with her.

Active physical control of novelty: Child approaches and attempts to get rid of the toy by moving or pushing it. It may include verbalizations, in which case active physical control of novelty would take precedence over them.

Verbal control of novelty: Vocalizations expressing attempts to modify the situation by verbalizing wishes (e.g., "put it away", "clown can't come in", "turn it off", "I don't want/like that") while looking at the new person or toy.

Distraction: Manipulating or playing with other objects in the room (look away from new object). It includes also when the child does not turn to the experimenter when she speaks. The child may also be talking to self.

Visual attention away: Look away from new situation and looking at other toy, object or mirror.

Talks to self about new toy or person: Vocalizations clearly related to the new situation; descriptions or comments about the new situation directed to themselves. Assume inspect unless otherwise specified.

Visual attention away and talks to self: Child looks away from new situation while talking to self about it.

Large withdrawal: Child physically moves away from where he/she was in response to new situation; attempts to leave are included here. Child is turned away from the toy, without playing with anything else in the room; eyes may be closed or covered.

Small withdrawal: Child takes one or two steps away from the new situation; staying in their original position while focusing on the new toy or person. Assume inspect unless otherwise specified. It is important to note that whenever the child stops the small withdrawal, you may code inspect if he/she is still looking at the new situation.

Looks away and verbal control of novelty: Looking away from new situation and toward something else while verbalizing wishes to modify the situation.

Inspect and large withdraw: Walks or runs away from the new situation, but looks at or keeps track of it.

Approach and self soothing: Plays with or explores the new situation while showing self soothing behaviors.

2. Behaviors toward mother or experimenter:

Engagement with the experimenter: Looking at, talking, playing with or verbal/non-verbal requests for help to the experimenter when she is *not* the novel object.

Looking at/toward or talking with mother: Looking at the mother or in her direction, or talking with her about the new toy or person, comments or descriptions or requests to play.

Ask mother for help: Verbal and non-verbal requests for help or comfort (e.g., read a book or climbing on mother and/or her chair).

Soothing by contact with the mother: Comfort through physical contact with mother (e.g., child leans, touches, puts hands on, rub chicks, sits on mother's lap). Assume inspect unless otherwise specified. Also, assume contact with mother if child is touching the chair where she is sitting or the questionnaire/pen that she is holding.

Looking away and soothing with mom: Looking away from new situation and toward something else, while seeking comfort through contact with the mother.

Withdrawal to the mother: Physically moves away from where he/she was in response to new situation, and to mother. Child is turned away from the toy, without playing with or looking at anything else in the room; eyes may be closed or covered. If the child is already in contact with the mother and he/she closes the eyes or hides the face, code withdrawal to the mother.

Inspect and withdrawal to mother: Look at/keeps track of new situation while withdrawing to mother.

3. Behaviors toward him/herself:

Self soothing: Self manipulative behaviors to calm oneself such as thumb sucking, fingering clothing, or twirling hair. This may include also comfort through contact with a toy (e.g., doll, phone) or object (e.g., pillow, chair). Assume inspect unless otherwise specified. Hands need to be together and touching to consider it self soothing.

Looking away and self-soothing: Looking away from new object *and* comforting self or by contact with toy or object.

Verbal expression of fear or being afraid: Vocalizations expressing fear of being afraid (e.g., “I’m scared”, “I’m afraid”) while looking at the new toy or person.

Refusals: Refuses to play with (says or indicates “no” to) the new toy or person if invited to do so.

4. Non-behavioral codes

No code: Use before the start of the session and once the session is over. Also use it when child’s face cannot be seen in the monitor screen.

Appendix C

Maternal Daily Diary

Date: _____ Parent Code: _____

Age of child: _____ Child Code: _____

Directions: For each question, try to answer as honestly as possible. There are no "right" or "wrong" answers. Please remember that neither your name nor your child's name should be anywhere on this form. This form will be identified by a code number and will only be seen by research staff. This diary works best when filled out each night. If, for some reason, you are not able to fill it out one night, you may fill it out first thing in the morning. Please do not fill it out any later.

I filled this diary out:

- ☐ at the end of the day
- ☐ first thing the next morning

For questions 1-4 try to think of a SPECIFIC INCIDENT THAT OCCURRED TODAY. Do not use the same incident for more than one question.

1. Think of one time today when your child got physically hurt and answer the following:

A. What did your child do when he/she was hurt? **CHECK ALL THAT APPLY.**

- ☐ told me not to help (ex. go away mommy)
- ☐ went off by him/herself
- ☐ looked at me for reassurance
- ☐ acted cool or aloof
- ☐ acted as if nothing was wrong
- ☐ called for me; asked for help
- ☐ stomped feet, kicked legs; threw/hit something
- ☐ came to me
- ☐ looked at me very briefly then looked away and went on
- ☐ cried
- ☐ asked to be picked up or held, reached for me
- ☐ comforted self (ex. got stuffed animals)
- ☐ did <u>not</u> signal he/she wanted or needed me
- ☐ told me what happened, where hurt
- ☐ whimpered/cried briefly and kept on going, did not look at me
- ☐ yelled at me, called me names, blamed me
- ☐ tried to be physically closer to me (but contact did not occur)
- ☐ hit, kicked, threw something at me
- ☐ other(s) _____

B. What was your immediate response(s)? **CHECK ALL THAT APPLY.**

- ☐ hugged and/or held my child
- ☐ waited to see if my child needed me
- ☐ rubbed back, stomach, head, etc.
- ☐ picked my child up
- ☐ kissed my child
- ☐ spoke soothingly to my child
- ☐ did not touch my child in any way
- ☐ hit, slapped, spanked my child
- ☐ asked my child to hop up or get up
- ☐ laughed
- ☐ spoke firmly to my child
- ☐ ignored my child
- ☐ remained silent
- ☐ went to another room
- ☐ restricted my child (ex. time out chair, other room)
- ☐ tried to distract my child with something else (ex. toy or food)
- ☐ gave my child medicine, band aid, etc.
- ☐ said something like “you’re not hurt” or “don’t be upset”
- ☐ called a doctor, friend, relative for help
- ☐ said something like “I’m sorry you’re hurt”
- ☐ asked how feeling, if okay

☐ other(s) _____

C. What did your child do next? **CHECK ALL THAT APPLY.**

☐ began playing but kept an eye on me
☐ wouldn't say how he/she felt when I asked
☐ was soon calmed or soothed
☐ comforted self (ex. got blanket/toy)
☐ stomped feet, kicked legs; threw/hit something
☐ acted cool or aloof; wouldn't play or talk with me
☐ remained upset, was difficult to soothe
☐ did not indicate he/she needed my help
☐ continued to play, did not notice me
☐ turned away when picked up or made contact
☐ hit or kicked at me; pushed me away
☐ held on to me until calmed down
☐ turned from me angrily or in frustration
☐ did not easily let me hold him/her but remained upset (ex. squirmed, put arm in between us)
☐ ignored me
☐ calmed down and then got upset again
☐ held on to me or went after me if I tried to put him/her down or go away
☐ yelled at me, called me names (ex. bad mommy)
☐ rejected my help (ex. go away, mommy)
☐ exaggerated his/her crying
☐ ordered me around
☐ said something like, "it hurts, I'm sad"
☐ turned or walked away from me as if nothing was wrong
☐ tried to reassure me (ex. don't worry, mommy)
☐ other(s) _____

Describe this situation in 2-3 sentences:

_____
_____
_____
_____

2. Think of one time today when your child was frightened or afraid of something. (This should not include dropping child off, leaving child, or any other separations)

A. What did your child do when he/she was frightened? **CHECK ALL THAT APPLY.**

- ☐ told me not to help (ex. go away mommy)
- ☐ went off by him/herself
- ☐ looked at me for reassurance
- ☐ acted cool or aloof
- ☐ acted as if nothing was wrong
- ☐ called for me; asked for help
- ☐ stomped feet, kicked legs; threw/hit something
- ☐ came to me
- ☐ looked at me very briefly then looked away and went on
- ☐ cried
- ☐ asked to be picked up or held, reached for me
- ☐ comforted self (ex. got stuffed animals)
- ☐ did not signal he/she wanted or needed me
- ☐ told me what happened, why afraid
- ☐ whimpered/cried briefly and kept on going, did not look at me
- ☐ yelled at me, called me names, blamed me
- ☐ tried to be physically closer to me (but contact did not occur)
- ☐ hit, kicked, threw something at me
- ☐ froze in place
- ☐ trembled/breathed rapidly
- ☐ other(s) _____

B. What was your immediate response(s)? **CHECK ALL THAT APPLY.**

- ☐ hugged and/or held my child
- ☐ waited to see if my child needed me
- ☐ rubbed back, stomach, head, etc.
- ☐ picked my child up
- ☐ kissed my child
- ☐ spoke soothingly to my child
- ☐ did not touch my child in any way
- ☐ hit, slapped, spanked my child
- ☐ asked my child to hop up or get up
- ☐ laughed
- ☐ spoke firmly to my child
- ☐ ignored my child
- ☐ remained silent
- ☐ went to another room
- ☐ restricted my child (ex. time out chair, other room)
- ☐ put my child in another room
- ☐ gave my child medicine, band aid, etc.
- ☐ tried to distract my child with something else (ex. toy or food)

- ☐ said something like “you’re not scared” or “don’t be upset”
- ☐ said something like “I’m sorry you’re scared”
- ☐ called a doctor, friend, relative for help
- ☐ asked how feeling, if okay
- ☐ other(s) _____

C. What did your child do next? **CHECK ALLTHAT APPLY.**

- ☐ began playing but kept an eye on me
- ☐ wouldn’t say how he/she felt when I asked
- ☐ was soon calmed or soothed
- ☐ comforted self (ex. got blanket/toy)
- ☐ stomped feet, kicked legs; threw/hit something
- ☐ acted cool or aloof; wouldn’t play or talk with me
- ☐ remained upset, was difficult to soothe
- ☐ did not indicate he/she needed my help
- ☐ continued to play, did not notice me
- ☐ turned away when picked up or made contact
- ☐ hit or kicked at me; pushed me away
- ☐ held on to me until calmed down
- ☐ turned from me angrily or in frustration
- ☐ did not easily let me hold him/her but remained upset (ex. squirmed, put arm in between us)
- ☐ ignored me
- ☐ calmed down and then got upset again
- ☐ held on to me or went after me if I tried to put him/her down or go away
- ☐ yelled at me, called me names (ex. bad mommy)
- ☐ rejected my help (ex. go away, mommy)
- ☐ exaggerated his/her crying
- ☐ ordered me around
- ☐ said something like, “I’m scared”
- ☐ turned or walked away from me as if nothing was wrong
- ☐ tried to reassure me (ex. don’t worry, mommy)
- ☐ other(s) _____

Describe this situation in 2-3 sentences:

_____
_____
_____
_____

3. Think of one time today when your child was frustrated or angry. (This should not include dropping child off, leaving child, or any other separations)

A. What did your child do when he/she was frustrated or angry? **CHECK ALL THAT APPLY.**

- ☐ told me not to help (ex. go away mommy)
- ☐ comforted self (ex. got stuffed animals)
- ☐ stomped feet, kicked legs; threw/hit or tried to destroy source of frustration
- ☐ told me what happened, why upset
- ☐ yelled at me, called me names, blamed me
- ☐ threw/hit something or someone else (not source of frustration)
- ☐ hit, kicked, threw something at me
- ☐ gave up trying to get/do what he/she wanted
- ☐ asked to be picked up or held, reached for me
- ☐ yelled at/called someone or something else names
- ☐ did not signal he/she wanted or needed me
- ☐ looked at me very briefly then looked away and went on
- ☐ yelled at source of frustration, called names
- ☐ went off by him/herself
- ☐ tried to be physically closer to me (but contact did not occur)
- ☐ acted cool or aloof; said didn't care about it anyway
- ☐ called for me; asked for help
- ☐ acted as if nothing was wrong
- ☐ came to me
- ☐ cried/made angry, frustrated sound
- ☐ other(s) _____

B. What was your immediate response(s)? **CHECK ALL THAT APPLY.**

- ☐ hugged and/or held my child
- ☐ went to another room
- ☐ rubbed back, stomach, head, etc.
- ☐ tried to distract my child with something else (ex. toy or food)
- ☐ kissed my child
- ☐ did not touch my child in any way
- ☐ called a friend, relative for help
- ☐ spoke firmly to my child
- ☐ asked how feeling, if needed help
- ☐ remained silent
- ☐ said something like "I'm sorry you're upset"
- ☐ restricted my child (ex. time out chair, other room)
- ☐ said something like "you're too old to act like that"
- ☐ said something like "don't be upset"
- ☐ waited to see if my child needed me
- ☐ told my child to give up, took away source of frustration
- ☐ picked my child up

- ☐ spoke soothingly to my child
- ☐ helped my child get or do what he/she wanted
- ☐ hit, slapped, spanked my child
- ☐ laughed
- ☐ did or got what my child wanted
- ☐ ignored my child
- ☐ other(s) _____

C. What did your child do next? **CHECK ALLTHAT APPLY.**

- ☐ played but kept an eye on me
- ☐ acted cool or aloof; wouldn't play or talk with me
- ☐ was soon calmed or soothed
- ☐ stomped feet, kicked legs; threw/hit something
- ☐ hit or kicked at me; pushed me away
- ☐ remained upset, was difficult to soothe
- ☐ turned from me angrily or in frustration
- ☐ did not indicate he/she needed my help
- ☐ ignored me
- ☐ turned away when picked up or made contact
- ☐ calmed down and then got upset again
- ☐ held on to me until calmed down
- ☐ yelled at me, called me names (ex. bad mommy)
- ☐ held on to me or went after me if I tried to put him/her down or go away
- ☐ exaggerated his/her crying frustration
- ☐ turned or walked away from me as if nothing was wrong
- ☐ said something like, "I'm mad"
- ☐ tried to destroy source of frustration
- ☐ rejected my help (ex. go away, mommy)
- ☐ started another activity
- ☐ ordered me around
- ☐ said source of frustration bad
- ☐ wouldn't say how he/she felt when I asked
- ☐ comforted self (ex. got blanket/toy)
- ☐ other(s) _____

Describe this situation in 2-3 sentences:

_____
_____
_____
_____

4. Think of a time today when you and your child were separated - preferably when your child became upset or distressed. (This can include leaving to go out, going to another room, dropping the child off, etc. This does not include putting child to bed.)

A. How did your child respond to the separation? **CHECK ALL THAT APPLY.**

- ☐ cried, screamed or yelled
- ☐ went off by him/herself
- ☐ went after me
- ☐ held on to me, wouldn't let go
- ☐ was happy to keep doing what he/she was doing
- ☐ stomped feet, kicked legs; threw/hit something
- ☐ was upset but did not signal that he/she wanted or needed anyone
- ☐ whimpered or cried briefly and kept going, did not look at me
- ☐ tried to be physically closer to me (but contact did not occur)
- ☐ comforted self (ex. got stuffed animals, blanket)
- ☐ acted as if nothing was wrong
- ☐ called after me; told me not to go
- ☐ asked to be picked up or held, reached for me
- ☐ acted cool or aloof
- ☐ hit, kicked, or pushed me
- ☐ froze in place
- ☐ trembled/breathe rapidly
- ☐ yelled at me, called me names
- ☐ other(s) _____

B. What was your immediate response(s)? **CHECK ALL THAT APPLY.**

- ☐ hugged and/or held my child
- ☐ kissed my child, said "I love you"
- ☐ did not touch my child in any way
- ☐ said "I'd be back soon"
- ☐ did not respond in any way
- ☐ spoke firmly to my child
- ☐ said something like "I know you don't like me to leave you"
- ☐ told him/her not to make such a fuss
- ☐ laughed
- ☐ ignored my child
- ☐ picked my child up
- ☐ tried to distract my child (ex. toy or food)
- ☐ asked someone else to help
- ☐ told my child if he/she was good I'd bring something back for him/her
- ☐ said something like "don't be upset"
- ☐ reassured my child from other room
- ☐ hit, slapped, spanked my child
- ☐ snuck out to avoid upset
- ☐ sent my child away (ex. time out chair, other room)

- ☐ showed I was annoyed by my face or tone
- ☐ stayed with him/her until he/she was willing to have me leave
- ☐ came back several times when he/she cried
- ☐ asked someone to restrain my child
- ☐ gave my child favorite comfort object (ex. blanket, toy)
- ☐ spoke soothingly to my child
- ☐ explained where I was going and why
- ☐ other(s) _____

C. What was your child's immediate reaction when he/she saw you again? **CHECK ALLTHAT APPLY.**

- ☐ greeted me (ex. smiled, said my name, said hello)
- ☐ came to me
- ☐ brought me a toy or other object
- ☐ turned away as I picked up or made contacted
- ☐ if upset, was easily soothed and calmed by me
- ☐ pushed me away angrily
- ☐ walked away when he/she saw me
- ☐ held on to me until calmed down
- ☐ did not easily let me hold him/her but remained upset (ex. put arm in between us)
- ☐ whimpered quietly to him/herself
- ☐ continued doing what he/she was doing before (didn't notice me)
- ☐ looked at me briefly then looked away, did not smile or greet me
- ☐ started to approach me then turned and wandered somewhere else
- ☐ if upset, was NOT easily soothed and/or calmed by me
- ☐ stomped feet, kicked legs; threw/hit something
- ☐ signaled to be held and/or picked up
- ☐ acted as if he/she was angry with me
- ☐ acted cool or aloof; wouldn't play or talk with me
- ☐ hit or kicked at me; pushed me away
- ☐ cried/yelled and remained where he/she was
- ☐ cried/screamed
- ☐ yelled at me, called me names (ex. bad mommy)
- ☐ ignored me
- ☐ exaggerated his/her crying
- ☐ ordered me around
- ☐ comforted self
- ☐ began playing but kept an eye on me
- ☐ wouldn't say how he/she felt when I asked
- ☐ calmed down and then got upset again
- ☐ told me to go away
- ☐ tried to reassure me (ex. I'm okay mommy, are you okay?)
- ☐ said something like, "I missed you, mommy"
- ☐ other(s) _____

Describe this situation in 2-3 sentences: _____

Appendix D

Maternal Diary Ratings of Maternal Sensitivity

General Rating Guidelines

The sensitivity of maternal responses is rated based on how well they match the child's needs and the intensity of the child's distress.

Description of the event provides information on the context, and may inform coding (e.g., leaving protesting 2 ½ yr old alone in movie theatre suggests mother is not attuned to child's needs, more so than leaving child in one room at home to go to another).

If no description of the event is provided, maternal responses can still be coded if the child's initial response and mother's response are reasonably clear.

If child does not show distress (i.e., went off by himself, happy to keep doing what he was doing), sensitivity cannot be coded (presume child not distressed). However, looks to mom is a signal, even if mom does not perceive it as such, and requires a response.

In coding frustration/anger events: if child "hits, kicks, or throws something towards mother" or behaves in ways that may harm someone else, limit setting is expected as part of a sensitive response. NOT ALL frustration situations require limit setting.

Picking up a child may not be sensitive when it is part of limit setting.

Telling child not to be upset, that too old to act that way, that not hurt, sneaking out at separation, or hitting, slapping, or spanking are always considered insensitive, but are weighed in relation to the mother's empathic, warm, and helpful responses in determining a rating. Typically, responses that include such actions are rated no higher than a 3.

Specific Rating Guidelines

A 5-point scale is used to rate maternal behavior: 5-very sensitive→1-very insensitive.

5 = *Very Sensitive* responses include acknowledgement of child's feelings and use of warm/affectionate/positive behaviors, with responses commensurate to level of child's distress (e.g., child looked at mother for reassurance, called mother, cried, came to mother; mother hugged and/or held child, kissed child, rubbed back, stomach or head, spoke soothingly to child, asked how feeling, if okay).

If event involves anger/frustration, a 5 rating needs to include appropriate limit setting *if the situation requires it* (e.g., mothers speaks firmly to a child who hits or throws something at a parent or other child), as well as acknowledgment of child's feelings (e.g.,, "I'm sorry you are upset) and/or other nurturing responses (e.g.,, spoke soothingly, hugged/held child, helped child to get what he wanted). In absence of limit setting, the same response is rated a 4.

If mother waits to see if child needs her, she must then respond fully (e.g., picked child up, hugged and/or helped child, said something like "I'm sorry you're hurt/scared/upset", spoke soothingly to child) in order for her response to be rated a "5", regardless of the prompting event.

4 = *Moderately sensitive* responses include some warm/ empathic/helpful reactions to the child's feelings, but mother *should* have done more given the child's degree of upset *or* the precipitating event. May include an insensitive response if mother compensates fully by acknowledging/accepting child's feelings together with other nurturing behavior. If not, rate as "3" or lower.

3 = *Neither sensitive nor insensitive* responses include substantially less than what child requests/signals, but on balance, are neither sensitive, nor insensitive, either because mother responds with some positive (i.e., child asked to be picked up or held; mother spoke soothingly to child), or because child not too distressed /provocation is mild and child tells mom not to help.

A response to a frustrating event might be rated a "3" if it includes limited setting when the situation requires it, but warm/helpful/empathic actions are not sufficient to constitute an overall sensitive response, although sufficient to prevent it from being even moderately insensitive.

2 = *Moderately insensitive* responses occur *when: a) child signals mild distress* and there is *no response* (e.g., child looked to mother for reassurance when he saw a bee, told mother what happened, why afraid; mother waited to see if child needed her, watched to see how child would handle it); *b) child signals any level of distress* and mother responds *insensitively* (e.g., "don't be upset", "you're too old to act like that", "you're not hurt", "sneaks out", "hits, spanks", or sets limit when child is afraid, hurt, or separating), *with only minimal compensating sensitivity* (e.g., child whimpered/cried, called after mother not to go; mother spoke firmly to child, said "I'll be back."); c) *child is very distressed and mother responds with only minimal sensitivity* (e.g., child screams, calls "mommy", asks to get off carnival ride; mother says, "The ride is almost over.")

1 = Very insensitive responses occur when*: a) child is very distressed* and there is *no response*; or *b) child displays any level of distress and there is an insensitive response (see above) or a limit setting response to any situation/emotion, with no mitigating sensitivity* (e.g., mother says "you are too old to act like that", "don't be upset", "you're not hurt", or hits, slaps, spanks child).

Appendix E

Mother-Child Interaction Ratings-Observational Coding Scheme

Sensitivity/Response to Distress

1 = *Not at all characteristic*. This rating should be given when caregiver is very insensitive and unresponsive. When child is upset, the caregiver responds not at all, very slowly, or inappropriately. If there is a response, it is only after the child becomes very demanding, and the response is so delayed that it cannot be construed as contingent upon the child's behavior. A mother who appears oblivious or punitive to the child's distress would receive this score. She provides minimal comfort.

2 = *Minimally characteristic*. This rating should be given when mothers display infrequent or weak sensitivity/responsivity. While mother is sometimes sensitive, the balance is clearly in the direction of insensitivity. The mother responds rarely or slowly to the child's distress signals. The responses are minimal or perfunctory or otherwise inappropriate. The mother's actions appear to increase the child's distress.

3 = *Moderately characteristic*. This rating should be given when caregivers are predominately sensitive/response. The mother responds to child's distress and demand signals, but there is some time in which clear child signals do not receive a response or in which the response in somewhat delayed or ineffective. Some of the mother's responses are mixed i.e., some are half-hearted or perfunctory, but the majority are full responses.

4 = *Highly characteristic*. This rating should be given when caregivers are exceptionally sensitive and responsive to distress. The caregiver responds quickly and appropriately to the child's distress. If the child is upset, the caregiver takes time to soothe and calm the child. There may be proportionally few instances of ignoring and/or minimally responding to the distress, but overall, most responses are prompt, appropriate, and effective.

9 = No opportunity to observe.

(Half-interval scores for responses falling between sensitivity ratings.)

Sensitivity/Response to Non-Distress

1 = *Not at all characteristic*. There are no signs of mother sensitivity. The mother may be either predominately intrusive or detached. The mother rarely responds appropriately to the child's cues, and does not manifest an awareness of the child's needs. Interactions, if they occur at all, are characteristically ill timed or inappropriate.

2 = *Minimally characteristic*. This should be given when mothers display infrequent or weak sensitivity/responsivity. While mother is sometimes sensitive, the balance is clearly in the direction of insensitivity.

3 = *Moderately characteristic*. This rating should be given when mothers are predominately sensitive/responsive. The mother demonstrates sensitivity in many interactions but not in others, or may show some insensitivity while being predominantly sensitive (e.g., available and responsive to child's needs but some responses are more adult-driven than child driven).

4 = *Highly characteristic*. This rating should be given when mothers are exceptionally sensitive and responsive to non-distress. Instances of insensitivity are rare and never striking. Interactions are characteristically well-timed and appropriate.

(Half-interval scores for responses falling between sensitivity ratings.)

Appendix F

Early Childhood Behavior Questionnaire (ECBQ)

Fearfulness Subscale

INSTRUCTIONS. As you read each description of the child's behavior below, please indicate how often the child did this during the last two weeks by circling one of the numbers in the right column. These numbers indicate how often you observed the behavior described during the last two weeks.

never	very rarely	less than half the time	about half the time	more than half the time	almost always	always	does not apply
1	2	3	4	5	6	7	NA

During everyday activities, how often did your child

- startle at loud noises (such as a fire engine siren)?
- seem frightened for no apparent reason?

While at home, how often did your child

- show fear at a loud sound (blender, vacuum cleaner, etc.)?
- seem afraid of the dark?

While watching TV or hearing a story, how often did your child

- seem frightened by 'monster' characters?

While in a public place, how often did your child

- seem uneasy about approaching an elevator or escalator?
- cry or show distress when approached by an unfamiliar animal?
- seem afraid of large, noisy vehicles?
- show fear when the caregiver stepped out of sight?

When visiting a new place, how often did your child

- not want to enter?
- go right in? (reversed)

Appendix G

Socio-Demographic Form

ID: _____

Demographics

1. Date of child's birth: _____ /_____ /_____

2. Gender: ____

3. Birth order position: ____

4. Siblings (Name, date of birth, sex): _____

_____

5. Child's race/ethnicity: _____

6. Child's primary caregiver: _____

7. Major health problems since birth (include any illnesses/surgery): Yes ____ No ____

What? _____

When? _____

8. Current separations from primary caregiver if any: Yes ____ No ____

* If yes, please describe when they occur, for how long, and their impact:

_____

_____

9. Mother's age: _____

10. Mother's education (degree and years): _____

11. Mother's occupation (past 3 years): _____

_____

12. Mother's race/ethnicity: _____

13. Father's age: _____

14. Father's education (degree and years): _____

15. Father's occupation (past 3 years): _____

_____

16. Father's race/ethnicity: _____

17. Approximate family yearly income: $_____

18. Are there any members of your extended family living with you? Yes ____ No ____

* If yes, how many are they? _____

19. Currently in child care? Yes _____ No _____