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Maternal Sensitivity, Maternal Mind-mindedness, and Infant Socioemotional Functioning: An Examination of Concurrent Associations

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MATERNAL SENSITIVITY, MATERNAL MIND-MINDEDNESS, AND INFANT
SOCIOEMOTIONAL FUNCTIONING: AN EXAMINATION OF CONCURRENT
ASSOCIATIONS

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Nancy Ignacia Longoria

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West Lafayette, Indiana

Dedicated to:

Augustina Aleman Del Valle

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ABSTRACT

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Associations between maternal sensitivity, maternal mind-mindedness, and infant socioemotional (SE) functioning were examined in a sample of 40 mother-infant dyads. Semi-structured home observations were conducted to assess maternal sensitivity and collect maternal ratings of maternal depression and infant SE functioning. Mind-mindedness was assessed during free play and teaching interactions during the home visit. Sensitivity at home was positively associated with mind-mindedness during a free play interaction, but not during a teaching interaction. Neither sensitivity nor mind-mindedness was significantly associated with total infant SE scores, or scores on 3 SE subscales (adaptive functioning, self-regulation, and interaction with people). A trend between mind-mindedness and self-regulation explored via a regression analysis was revealed to be non-significant. Multiple regressions were conducted to explore the degree of linear relationship between two criterion variables (total infant SE and self-regulation scores) and three predictors (sensitivity, attuned MM, and depression). None of the regression models tested significantly predicted infant SE. Overall, results were consistent with prior research in terms of the associations revealed between sensitivity and mind-mindedness during the free-play interaction, and between sensitivity and

depression. Associations revealed between sensitivity and mind-mindedness as a function of task type suggest that the situational context of mother-infant interactions may influence the nature and strength of the relationship between sensitivity, mind-mindedness, and infant socioemotional functioning.

CHAPTER 1. INTRODUCTION

1.1 Introduction

Attachment theory hypothesizes that the quality of caregiving received during early years of life is associated with healthy socioemotional functioning in later development (Bowlby, 1982). Support for this hypothesis has been established by an extensive body of empirical research demonstrating that security in the attachment relationship between primary caregivers and their infants is associated with positive outcomes in later childhood and adolescence, while insecurity in such relationships tends to predict poorer developmental outcomes and psychopathology (Belsky & Pasco-Fearon, 2002; DeKlyen & Greenberg, 2008; Sroufe, Egeland, Carlson, & Collins, 2005; Thompson, 2008). An understanding of caregiver behavior associated with development of secure attachments is crucial to development of interventions serving to promote positive socioemotional development during infancy, and to prevent development of behavioral and emotional disorders in childhood and adolescence.

Meta-analytic research confirmed existence of two antecedents to security in mother-infant relationships identified in prior research: maternal sensitivity (De Wolff & van IJzendoorn, 1997) and adult representation of attachment (internal working models) (van IJzendoorn, 1995). A meta-analysis of attachment enhancing interventions revealed that interventions specifically targeting caregiver *sensitivity* proved more effective in both

enhancing caregiver sensitivity and in reorganizing infant security than interventions targeting adult attachment representations or social support (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003). Effectiveness was associated with the intervention having a clear, behavioral focus, of its being of moderate to short duration, and its effort to enhance the provision of sensitive caregiving (Bakermans-Kranenburg et al., 2003).

The purpose of this study is to examine associations between current infant socioemotional functioning and two maternal behavioral characteristics identified in the attachment literature as being linked to the development of secure attachment, and as such, are appropriate targets for intervention: *maternal sensitivity* as operationalised by Ainsworth and colleagues (Ainsworth, Blehar, Waters, & Wall, 1978), and *maternal mind-mindedness* (Meins, 1999). Sensitivity refers to a caregiver's skill in accurately perceiving her infant's behavioral signals and communications and responding to them promptly, appropriately, and in a manner that supports her child's exploratory behavior (Ainsworth, Bell, & Stayton, 1971; Ainsworth et al., 1978). Although the association between maternal sensitivity and attachment security is well documented (Ainsworth et al., 1971; De Wolff & van IJzendoorn, 1997; Grossman, Grossman, & Waters, 2006; Isabella, 1993), the association has been described as only moderately strong (De Wolff & van IJzendoorn), leading researchers to suggest that sensitivity "is an important but not exclusive condition of attachment security" (p. 571).

Efforts to identify other salient maternal characteristics that precede security of attachment yield promising research in the assessment of a mother's capacity to treat her child as a psychological agent (Sharp & Fonagy, 2008). This *mentalising* capacity involves the ability to reason about the "goals, intentions, and beliefs" of one's self and

others, and to use this capacity in order to “anticipate and influence our own and others’ behavior” (Sharp & Fonagy, p. 738). Meins (1999) attempted to operationalise this cognitive aspect of sensitivity as *mind-mindedness*, defined as a caregiver’s proclivity to “treat their infants as individuals with minds, rather than merely entities with needs that must be met” (p. 332). Mind-mindedness, specifically appropriate mind-related comments made by the mother about her infant’s internal state during interactions, is hypothesized to be the behavioral manifestation of the mother’s internal working model, or state of mind with regard to attachment during interaction with her child (Meins, 1997; 1999). Research examining the nature of the relationship between sensitivity, mind-mindedness and attachment security has revealed significant associations between mind-mindedness and sensitivity (Laranjo, Bernier, & Meins, 2008, Meins, Fernyhough, Fradley, & Tuckey, 2001; Meins et al., 2002, Meins et al., 2003), and between mind-mindedness and attachment security (Laranjo et al., 2008; Meins et al. 2001). At least two studies have revealed some support for the hypothesis that the relation between mind-mindedness and security is either mediated (Lundy, 2003), or partially mediated by maternal sensitivity (Laranjo et al., 2008, Meins et al., 2002).

The current study attempts to further the understanding of the nature of the relationship between sensitivity, mind-mindedness, and infant socioemotional functioning by examining the relation between mind-mindedness and infant socioemotional functioning as assessed by a measure *other than* attachment security. The rationale for using an infant outcome other than security is both theoretical and practical. Although the capacity to attribute mental states to others, and think about the self and others in terms of mental states is considered key to the development of self and affect

regulation (Fonagy & Target, 1997; Fonagy, Gergely, & Target, 2008), few have examined the relation between mind-mindedness and specific domains of socioemotional development directly. Given prior associations revealed between maternal mind-mindedness and attachment security (Meins et al., 2001), the present study will examine the association between mind-mindedness and a mother-reported index of infant socioemotional development which serves to assess specific domains of socioemotional development such as self-regulation and social responsiveness to others (Squires, Bricker, & Twombly, 2002).

On the practical side, security as assessed categorically using the *Strange Situation* procedure (Ainsworth, Bell, & Stayton, 1971), or continuously as per q-sorting methods (Waters, 1995) involve specialized training or time-intensive observation procedures. The low-cost, parent-completed assessment of infant socioemotional functioning used in the present study represents the kind of instrument more commonly utilized by state and local agencies in evaluating the need for further psychosocial services (Cooper & Vick, 2009), and is listed as meeting the screening performance standards of *Head Start* and *Early Head Start* programs (Printz, Bord, & Demaree, 2003). The primary goals of the present study are to, a) examine the nature and strength of the relationship between maternal sensitivity, maternal mind-mindedness, and concurrent infant socioemotional functioning, and b) test the hypothesis that the association between mind-mindedness and infant socioemotional development is either mediated or partially mediated by maternal sensitivity in the manner expected, given prior research indicating that sensitive caregiving mediates the relation between mind-mindedness and security.

CHAPTER 2. REVIEW OF THE LITERATURE

2.1 Infant Socioemotional Functioning

Infant socioemotional (SE) functioning reflects the status of an infant's development of social and emotional competencies relative to normative standards established by a particular society. These competencies develop within the context of interacting biological, relational, and cultural systems (Zeanah & Zeanah, 2001). For the purposes of this study, infant SE will be defined as an infant's "capacity to experience, regulate, and express emotions, form close and secure relationships, and explore the environment and learn" (Zeanah & Zeanah, 2009, p.6). Infant capacity as defined here reflects the infant's current level of functioning in terms of her ability to utilize both internal and external resources to promote positive outcomes in social and emotional interactions (Denham, Lydick, Mitchell-Copeland, & Sawyer, 1996). In the following, stages of SE development during the 1st year of life are described, highlighting the social and emotional capacities that develop and build on each other as the infant enters toddlerhood.

Regulation and emerging sociability (0 – 3 months). With caregiver assistance, regulation during infancy involves gaining competency in managing physiological states such as arousal, distress, sleep/wake cycles, and hunger (Denham et al., 1996; Rosenblum, Dayton, & Muzik, 2009). An infant's self-regulation and increased attention to her social

world is promoted when interactions with caregivers are routinely “smooth and harmonious”, become increasingly synchronized, and are contingently responsive (Denham et al., 1996; Rosenblum et al., 2009; Sroufe, 1996). Emerging sociability is evident in the infant’s increased eye contact with caregivers, and the infant’s provision of social smiles and vocalizations during infant-caregiver interactions (Rosenblum et al.).

Tension management (3 – 6 months). As the infant’s motor and cognitive abilities mature, situations arise that can challenge the infant’s ability to manage frustration or *tension* when distressed (Sroufe, 1996). Competence in managing tension reflects the infant’s ability to wait for caregiver assistance when distress is low, their ability to gain both the caregiver’s attention and comfort when distress is high, and their emerging ability to self-comfort until assistance is available (Denham, et al., 1996; Sroufe). Positive affect from the caregiver (smiles and laughter) is considered an important factor in facilitating the infant’s capacity to maintain behavioral organization during new or challenging experiences (Sroufe). The infant’s developing physiological regulation and emerging skill in managing tension are hypothesized to set a foundation for the development of an attachment or emotional bond to a primary caregiver (Denham et al., Sroufe).

Effective attachment relationship (7 – 12 months). During this period, the infant takes a more active role during interactions with caregivers, as evidenced by increasing amounts of joint attention, initiation of interactions, use of caregiver for social referencing, and increased intentionality (demonstrates preferences for caregivers, activities, and objects, and initiates goal-directed activities) (Rosenblum et al., 2009; Sroufe, 1996). The infant’s interactional experiences with a primary caregiver have

provided them with some sense of the caregiver's accessibility and responsiveness during times of distress, and their utility as a secure base from which they can explore the world around them (Rosenblum et al., Sroufe).

Exploration and mastery (13 – 18 months). The degree to which an infant feels secure or confident about their caregiver's accessibility and responsiveness impacts the extent to which the infant continues to utilize the caregiver's assistance in gaining affective and behavioral regulatory skills, forming close relationships with others, and exploring their environment (Denham et al., 1996; Sroufe, 1996; Zeanah & Zeanah, 2009). The infant's ongoing capacity to access this key relationship for assistance encourages the development of social competence, self-confidence and autonomy, and exploratory behavior (Sroufe, 1989; 1996). Although separation anxiety may be heightened during this period, infant confidence in the caregiver's ability to respond promptly to their distress, and to assist them in organizing their behavior under stressful conditions promotes further development of competency in social and emotional domains (Sroufe; Zeanah & Zeanah, 2009).

Toddlerhood and beyond. By the end of the first year of life and throughout developing toddlerhood, an infant who is functioning competently in both social and emotional domains is one who, a) is gaining an understanding of his or her own emotions and becoming aware of the emotions of others, b) is gaining an emerging capacity for empathy, c) has learned and continues to learn how to cope effectively when situations arise that challenge self-regulatory processes, d) can form secure and emotional attachments with significant others, e) can utilize attachment relationships effectively as a source of support and safety during exploration and play, and f) can access and build on

these social and emotional competencies within the context of social relationships throughout continued development (Rosenblum et al., Waters & Sroufe, 1983; Sroufe, 1996; 2005). It is the emerging attachment relationship between an infant and their primary caregiver that provides the social context or arena within which SE functioning develops (Sroufe, 1989; Zeanah & Zeanah, 2009), and an attention to, and understanding of this primary relationship is essential in the assessment and treatment of child behavioral problems.

2.2 Attachment Relationships

Attachment relationships are bonds formed with significant primary caregivers (Ainsworth, 1989). Our ability to maintain contact and proximity with primary attachment figures is regulated by an *attachment behavioral system* (Waters, Kondo-Ikemura, Posada, & Richters, 1991), a *purposive* control system serving to promote infant survival through efforts to maintain proximity to caregivers (Ainsworth et al., 1978). Newborn infants do not discriminate between caregivers, and attachment behaviors (such as crying and clinging), initially serve to gain proximity to any available caregiver. As the infant develops, behaviors that serve to keep caregivers close become more goal-directed and focused on a particular caregiver, and separation from the preferred caregiver is stressful (Ainsworth). Attachment behaviors lead to the development of an *attachment*, the “bond, tie, or enduring relationship” that develops between a child and his or her primary caregiver (Ainsworth et al., p. 17). Attachments have been described as the “psychological tether” that binds caregiver and child together and represents more than just an ability to discriminate among caregivers, attachment reflects “preferential treatment of attachment figures” (Sroufe & Waters, 1977, p. 1187).

2.2.1 Classification of Infant Attachment

Through time-intensive observations of mother-infant interactions in natural settings in Uganda (Ainsworth, 1967) and Baltimore (Ainsworth et al., 1978), Ainsworth and colleagues were able to tie interactional patterns of maternal and infant behavior observed in the home to categorical differences in infant attachment security as assessed in the laboratory via the *Strange Situation* procedure (SSP). This procedure was developed to assess the quality of an infant's attachment to her mother by purposively activating the attachment behavioral system under conditions of moderate stress that mother-infant dyads could expect to encounter during the course of daily living (brief separation and reunion episodes in the periodic presence of a stranger) (Ainsworth et al.).

Observations of infant behavior during the course of the SSP, particularly during reunion episodes with mother, are used to classify the infant's attachment to her mother in terms of the infant's use of mother as a "secure base" for exploration, and as "safe haven" to return to when distressed (Ainsworth et al., 1978.). To be clear, the SSP assesses the quality of the attachment between a particular caregiver and infant, reflecting the quality of their relationship, not an individual type of personality. In secure mother-infant attachment relationships, responsive and accessible caregivers are viewed as a source of security and safety, a secure base from which the infant can explore their world, whereas insecure mother-infant attachment relationships are characterized by anxiety about the caregiver's accessibility and responsiveness (Ainsworth et al.; Bowlby, 1988; Waters et al., 1991). The SSP classified infant attachment to mother in the Baltimore study as being secure (group B), insecure-avoidant (group A), or insecure-resistant/ambivalent (group C). A third category, insecure-disorganized/disoriented

(group D), was added later after the Baltimore study to better describe patterns of infant behavior not accounted for by the original three categories in both normative and at-risk samples (Main & Solomon, 1986; 1990).

2.2.2 Differences in Maternal Behavior During Infant's First Year

A primary assumption of attachment theory is that qualitative differences in the interactional style of mother-infant dyads over time help explain differences in the security of their attachment relationship (Ainsworth, 1967; Ainsworth et al., 1978; Bowlby, 1982). Mother-infant interactions of 23 mother-infant dyads observed by the Ainsworth team revealed significant associations between maternal behavior in the home during the 1st and 4th quarters of their infant's life, and infant behavior in the SSP at the end of the 4th quarter (Ainsworth et al.).

1st quarter maternal behavior. Group B (secure) mothers compared to non-B group mothers (avoidant and resistant) were more responsive to infant crying, more affectionate when picking up their infants, and more adept and careful when holding their infants. B-mothers were more adept during feedings in terms of how well they timed feedings, and how well they responded to their infant's signals in determining how much to feed them, what to feed them, the appropriate pace to use during feeding, and in ending feeding time. B-mothers paced face-to-face interactions with their infants according to the infant's signals. Non-B mothers were generally occupied with some sort of routine (e.g., feeding or clothing baby) when holding their infants, exhibited more aversion to bodily contact, and provided their infant with a less pleasurable experience during holding time. Throughout the first year of infant life, non-B mothers were characterized

by more rigidity in their caregiving practices and an overall lack of emotional expression (Ainsworth et al., 1978).

4th quarter maternal behavior. Security of attachment was associated with maternal behavior in response to infant crying, behavior during separations and reunions, behavior involved in close bodily conduct, and behaviors related to gaining infant obedience. Compared to non-B mothers, group B mothers responded to infant crying more promptly and were more affectionate when picking up their infant. Compared to B-mothers, A-mothers were more abrupt or interfering when picking up their infant, tended to be less skillful in physically handling them, and tended to employ more physical interventions to enforce commands. B-mothers acknowledged their infant more often when entering the room than A-mothers, by initiating some type of interaction (e.g., smile, look, comment). Compared to B-mothers, C-mothers were more inept when physically handling their infant, tended to be less tender and careful when holding them, and were generally occupied with some type of routine during holding time. There was a tendency for C-mothers to acknowledge their infant less when entering the room than B-mothers (Ainsworth et al., 1978).

Qualitative differences in maternal behavior. Ainsworth et al. (1978) identified four dimensions of general maternal characteristics associated with infant attachment behavior. These four highly inter-correlated dimensions are generally referred to as *sensitivity* and consist of the following: a) sensitivity-insensitivity: caregiver understanding of her infant's communication signals, and her prompt and appropriate response towards meeting the needs being communicated, b) acceptance-rejection: degree to which a caregiver balances positive and negative feelings about her infant, and has

resolved this balance; c) cooperation-interference: degree to which a caregiver's interactions with her infant are timed and geared towards meeting her infant's needs, moods, or interests versus interfering with or interrupting her infant's activities, and d) accessibility-ignoring: extent to which caregiver is physically and psychologically accessible to her infant, even in the face of competing demands.

Maternal behaviors observed along these 4 dimensions were rated on 9-point scales during the 4th quarter of the infant's first year (Ainsworth et al., 1978). The sensitivity scales clearly distinguished group B-mothers from mothers in groups A and C. Group B-mothers displayed significantly more sensitivity to infant signals and communications, and were more positive in their acceptance of their infants. Interactions between mother-infant dyads in the B group were more harmonious overall, given that B-mother displayed more cooperation in respecting their infant's autonomy and less interference during their infant's activities. B-mothers as a whole were more psychologically accessible in responding to their infant's signals, and in adapting their own behavior to meet their infant's needs, wishes, and interests (activities) (Ainsworth et al.). Mothers in the anxious attachment groups (A and C) were more insensitive and rejecting during interactions with their infants, were more intrusive, and ignored them more. Behaviors that distinguished A-mothers from the other two groups were lower scores on all 4 sensitivity dimensions, and behaviors associated with picking up their infants; A-mothers did this with less affection and were more abrupt or interfering when doing so. Behaviors that distinguished C-mothers from the other two groups were responsiveness to their infant's crying; C-mothers ignored more crying episodes overall, and it took them longer to respond to their infant's crying. C-mothers were less

affectionate when picking up their infants, and when holding their infants, did so as a matter of routine (Ainsworth et al.).

2.2.3 Maternal Sensitivity and Infant Behavior Organization

Associations revealed between maternal and infant behavior, both at home and during the SSP provided support for the hypothesis that maternal behavior plays an important role in influencing how infants organize their attachment behavior during the first year of life (Ainsworth et al., 1978). Infants of highly sensitive mothers (B-group) cried less frequently at home and displayed less distress during brief separations from mother; they were happy to see mother when she returned after a separation and greeted her upon reunion. B-group infants were described as more active and excited when seeking physical contact with mother, sinking in to mother's body, and as a whole finding bodily contact with mother to be a pleasurable experience. B-group infant attachment to their mothers was characterized by harmony in their interactions, and with less anger, promoting more cooperative interactions and compliance to maternal directives than the insecure group (Ainsworth et al., Ainsworth, 1993).

Infants of less sensitive mothers (groups A and C) exhibited more anxiety in their interactions with mother by crying more, exhibiting more anger, and more separation distress. The C-group infants (resistant) demonstrated the most anxiety, especially during the SSP; they cried more and used crying as a means of communication more often than A-group infants (avoidant). Compared to the secure group, C-group infants tended to follow mother significantly less when she left the room, but cried the most when mother returned. A key factor discriminating the insecure groups from the secure group were interactions involving close bodily contact. Infants in the A-group in particular were

more tentative in initiating contact with mother, did not follow mother if she left the room, sunk in less to mother's body than B-group infants, and generally did not respond positively to physical contact with mother. C-group infants sunk into mother's body, but reacted much more negatively to both being picked up and put down than B-group infants (Ainsworth et al., Ainsworth, 1993).

2.2.4 Maternal Sensitivity and Socioemotional Development

Subsequent observational studies in the attachment field have provided evidence to support the findings from Ainsworth's seminal study regarding the important role maternal sensitivity plays in the organization of early infant behavior and subsequent attachment security (Grossman, Grossman, & Waters, 2006; Isabella, 1993; Isabella & Belsky, 1991; Pederson et al., 1990; Posada, Carbonell, Alzate, & Plata, 2004; Posada, Kaloustian, Richmond, & Moreno, 2007; Sroufe et al., 2005). Causal association among these variables has been demonstrated by intervention research (Bakermans-Kranenburg et al., 2003). The formation of an effective attachment relationship with a primary caregiver is generally viewed as *the* outcome in assessing healthy socioemotional development at the end of the 1st year (Sroufe, 1996; Sroufe et al., 2005), and is associated with a number of psychosocial benefits for the child, including development of self-reliance or autonomy (Sroufe et al., 2005; Sroufe, Fox, & Pancake, 1983), self-regulation (Berlin & Cassidy, 2003; Diener, Mangelsdorf, McHale, & Frosch, 2002; Kochanska, Coy, & Murray, 2001; NICHD, 2004; Sroufe et al., 2005), social/peer competence (Pastor, 1981; Sroufe et al., 2005), empathy (Kestenbaum, Farber, & Sroufe, 1989), and development of a conscience (Kochanska, 2002).

These kinds of positive socialization outcomes (social and emotional competencies), highlight the critical function sensitive caregiving serves in promoting a harmonious context whereby socioemotional development can flourish “by rendering children more *socializable*” (Richters & Waters, 1991, pp. 8-9). It is within such contexts that infants develop a representational model of their caregiver as being responsive and accessible, making it more likely that they will use their caregiver as a secure base from which to explore their environment (Ainsworth 1993; Waters et al., 1991). Insensitive caregiving does not promote this level of confidence in a caregiver, and as demonstrated by the work of Ainsworth and colleagues, may instead serve to promote distance from caregivers (anxious-avoidant attachment), or promote affectively negative interactional strategies to gain proximity to caregivers (anxious-resistant).

2.2.5 Maternal Sensitivity and the Transmission Gap

In addition to impacting development of secure versus insecure attachment relationships, early experiences with caregivers are hypothesized to serve as the impetus for an evolving representation of the self and others that influences how we approach and behave in relationships (Thompson, 1999). Our working models influence how accessible and responsive we find significant others to be, as well as how we organize our behaviors and feelings in our relationships with them (Waters & Cummings, 2000). This has important implications for future generations, as working models are believed to directly influence the quality of caregiving we in turn provide to our own children (Bowlby, 1982; Main, Kaplan, & Cassidy, 1985). This hypothesis reflects a transmission model of attachment security whereby maternal sensitivity is hypothesized to mediate the relation between adult representations and subsequent attachment security (van IJzendoorn, 1995).

Although extensive observational research supports the hypothesis that sensitivity is one mechanism through which adult representations are transmitted to infants, the association has been described as only moderately strong ($r = .24$), leading researchers to search for additional antecedents to attachment security that may help explain intergenerational continuity in attachment security. In an effort to meet this challenge, at least three research groups have attempted to operationalise caregiver mentalising capacity and examine its relation to key attachment constructs (adult representation of attachment, maternal sensitivity, and security), and its role in the intergenerational transmission of attachment.

Fonagy and colleagues (1991) hypothesized that intergenerational continuity in the quality of attachment relationships would depend in part on adult capacity for reflective functioning, defined as the “caregiver’s capacity to conceive of and think about relationships in terms of mental processes and functions” (Fonagy, Steele, Steele, Moran, & Higgitt, 1991, p. 208). Two groups, one led by Peter Fonagy (Fonagy et al., 1991) and another led by David Oppenheim and Nina Koren-Karie, have focused on investigating mentalising at the level of representation via the Adult Attachment Interview (Main & Goldwin, 1990) in the former case, and parental state of mind with regard to attachment within the context of parenting via parental interview in the latter (Oppenheim & Koren-Karie, 2002). Research conducted by these two teams has demonstrated that adult mentalising capacity, when assessed at the level of representation, is associated with differences in the classification of both adult representation and security of attachment (Fonagy et al., 1991; Oppenheim & Koren-Karie, 2001; 2002). While this research suggests that caregiver mentalising is an appropriate target for intervention, its

assessment at the level of representation is time-intensive, involving specialized training which may limit its utility to interventionists or research-practitioners working in community health settings. A continuous measure of mentalising, evidenced at the *behavioral* level (mentalising in action) could serve as a practical alternative to assessment at the level of representation in intervention studies.

2.3 Maternal Mind-mindedness

Meins (1999) has focused on examining mentalising defined as *mind-mindedness* in two ways, by asking mothers to describe their infants, and by assessing mind-mindedness at the behavioral level during live interactions between mothers and their infants. According to Meins, sensitivity “involves a degree of interpretation” on the mother’s part if she is to be successful in understanding and responding to her child’s needs both promptly and appropriately (Meins, 1999, p. 329). Meins hypothesized that maternal willingness to attribute *intent* to her child’s efforts to communicate during infancy would be a key characteristic of mothers with a proclivity to treat their child as an individual with a mind (Meins, 1998). Meins found support for this idea in early research efforts examining the relationship between security of attachment and maternal attribution of meaning to infant vocalizations.

Meins (1998) hypothesized that mothers of securely attached children would be more likely to attribute meaning to infant use of non-standard words (vocalizations used in place of standard English words) and less likely to report verbal but meaningless speech (VBM; vocalizations that mother reported being unable to decipher) because they were more mind-minded, and as such, attributed intent behind these types of vocalizations. In contrast, mothers of insecurely attached children were hypothesized to

be less likely to focus on interpreting their infant's vocalizations, and/or would have a tendency to ignore some forms of communicative acts. Meins examined linguistic diaries completed by mothers of infants from 11 to 20 months of age and found that, consistent with her hypotheses, mothers of secure infants were more likely to report use of non-standard words and less likely to report that their infant engaged in VBM (Meins). Meins argued that maternal attribution of intent reflects a tendency for mothers of secure infants to view their children as mental agents with the ability to express intention, and caregiver willingness to attribute intent to infant vocalizations was hypothesized to facilitate the development of effective communication skills (Meins).

In a follow-up, Meins and colleagues examined the development of child symbolic and mentalising skills and their association with sensitivity (via Ainsworth sensitivity scales) and security (Meins, Fernyhough, Russell, & Clark-Carter, 1998). Citing prior work by Fonagy and colleagues demonstrating that mothers of securely attached children tended to describe others in mentalistic terms (Fonagy et al., 1991), Meins et al. (1998) developed a maternal interview composed of one question (“*Can you describe [child] for me?*”) to assess maternal mind-mindedness (MM) when the children reached age 3. Mothers of securely attached children were more likely to focus on describing their child's mental attributes during the maternal interview, and this effect was revealed to be independent of SES and maternal verbosity (Meins et al.).

In a follow up at age 4, researchers examined the relation between security of attachment and child understanding of mental states of a story character during an unexpected transfer task (Meins et al., 1998). Correct answers were associated with secure attachment during infancy, sensitive caregiving at age 3, and maternal tendency to

use mental attributes to describe her child at age 3 (Meins et al.). Performance on the unexpected transfer task at age 3 proved the best predictor of advanced mentalising and general cognitive ability at age 5 (Meins et al.). The proclivity to treat her child as a mental agent, as evidenced by her use of mental terms to describe her child at age 3, was associated with the child's development of symbolic and mentalising skills, and this proclivity was strongly associated with security (Mein et al.).

In an effort to examine continuity in maternal MM over time, Meins and Fernyhough (1999) used the same sample to examine relations between child linguistic acquisitional style (LAS; infant use of common nouns and/or frozen phrases), maternal MM, and child mentalising development. Maternal attribution of meaning to infant vocalizations was used to index MM during infancy at 20 months. Maternal MM when the child was age 3 was indexed by the one-question, describe-your-child interview. Child mentalising at age 5 was indexed by the "false belief and emotion task" (FBE; Harris, Johnson, Hutton, Andrews, & Cooke, 1989). Mothers with a tendency to attribute meaning to non-standard words/VBM speech during infancy were expected to use more mental attributes when describing their child at age 3, and have children scoring higher on the mentalising task at age 5 (Meins & Fernyhough, 1999). As predicted, continuity in MM was revealed from infancy to age 3, and performance on the FBE task at age 5 was related to maternal education and prior MM. Although maternal education proved the best predictor of FBE performance, MM at 3 years accounted for significant variance in FBE scores after controlling for maternal education. Researchers acknowledged that interpretation of their analyses was limited by the small sample size utilized in their longitudinal investigation (Meins et al., 1998; Meins & Fernyhough).

2.3.1 Assessing Mind-mindedness in Context

Meins (1999) has argued that efforts to replicate the seminal work of Ainsworth and colleagues reflect a failure to attend to a critical component of the original construct: the *appropriateness* of a mother's response to her child's cues. Meins and colleagues (Meins, Fernyhough, Fradley, & Tuckey, 2001) hypothesized that mind-related comments made by the mother during actual interactions with her infant reflected a representational aspect of the mother's view of her child. An assessment of mind-related comments, which proved appropriate to the immediate context, could provide an assessment of a caregiver's internal working model of herself with her child as evidenced by the language used during these interactions (Meins et al., 2001). Subsequent research efforts by Meins and colleagues involved the development of an assessment of maternal MM that was appropriate to age and interactional context (Meins et al.).

Development of a new MM assessment was described in a study examining the utility of maternal sensitivity and maternal MM in predicting security of attachment (Meins et al., 2001). The new measure is described as focusing specifically on a mother's understanding of her child's mental states, as opposed to sensitivity to her child's physical or emotional needs. A sample of $N = 71$ mother-infant pairs were assessed at 6 months for infant and maternal behaviors during a 20-minute free play interaction, and at 12 months for security and infant cognitive ability. Infant behaviors assessed were frequency of vocalizations, change in direction of gaze, and any object-directed action (Meins et al.). The Ainsworth et al. (1971) sensitivity scales were used to assess maternal care. Examination of data provided by 6 families was used to identify characteristics of mothers demonstrating a proclivity to treat their infant as a mental agent with the ability

to act with intention (families were chosen at random and their data was not included in the analysis, leaving $N = 65$). The resulting coding system placed maternal MM behaviors into 6 categories: responsiveness to change in direction of gaze, responsiveness to object-directed action, imitation, encouragement of autonomy, appropriate mind-related comments, and other (Meins et al.).

Responsiveness to change in direction of gaze and appropriate mind-related comments were the MM variables most strongly related to sensitivity, each accounting for 16% of the variance in sensitivity (Meins et al., 2001). The relation between sensitivity and security was as expected and consistent with prior research; mothers rated higher in sensitivity at 6 months were more likely to have securely attached children at 12 months. Significant differences in the expected direction were revealed between secure versus insecure groups for scores on responsiveness to change in infant gaze (medium effect) and appropriate mind-related comments (large effect); mothers of secure infants scored higher on these variables. Of the 5 MM variables (other category excluded), appropriate mind-related comments, calculated as a proportion of total comments, proved to be the only significant predictor of security. Sensitivity and mind-related comments each accounted for variance in security, with mind-related comments accounting for 12.7% of the variance in security after accounting for maternal sensitivity's 6.5% of the variance (Meins et al.).

Follow-up assessments of the children completing 3 theory of mind tasks were conducted at 45 and 48 months (Meins et al., 2002). Given prior research demonstrating security-related differences in the development of theory of mind understanding (Meins et al., 1998), Meins and colleagues hypothesized that the link between early security and

later theory of mind development could be explained by security-related differences in maternal MM (Meins et al., 2002). Child verbal intelligence and appropriate mind-related comments predicted theory of mind development; verbal intelligence proved to be the best predictor, accounting for 16% of the variance in theory of mind performance, with appropriate mind-related comments accounting for 11% (Meins et al.). In a follow-up of the children at age 55 months, appropriate mind-related comments assessed at 6 months proved to be a positive and independent predictor of maternal MM at 48 months, and of performance on advanced mentalising tasks at 45 to 55 months (Meins et al., 2003). Using path analysis, direct links were revealed between appropriate mind-related comments during infancy and later theory of mind understanding (Meins et al.).

Both theory of mind understanding and MM are believed to involve representational processes; MM serves as a representational reference for the child's current experience, and theory of mind development involves the child gaining a representation of the mental states of themselves and others (Meins et al.). Citing work by Harris (1996; Harris & Leavers, 2000), Meins et al. proposed a developmental pathway whereby maternal MM influences theory of mind understanding: appropriate mind-related comments during infancy may provide a scaffolding context within which children learn to connect maternal descriptions of mental states to their own experience (Meins et al., 2002). Subsequent research involved utilization of the new MM measure to examine the mediational role played by sensitivity in the relation between MM and security.

2.3.2 Mind-mindedness and the Mediation Role of Sensitivity

Citing research by Meins et al. (2001), Lundy (2003) reiterated the claim that sensitivity measures often failed to assess the appropriateness of mother's response to her infant's needs. Lundy hypothesized that an assessment of interactional synchrony could better capture appropriateness of caregiver behavior. Interactional synchrony in caregiver-child interactions was defined as "the extent to which an interaction appeared to be reciprocal and mutually rewarding" and is hypothesized to promote positive development of the infant's attachment to mother (Isabella, Belsky, & von Eye, 1989, p. 13). Frequency of interactional synchrony is assessed by examining dyadic patterns of interaction (both infant and caregiver behaviors are taken into account to determine if an interaction is synchronous) (Isabella et al., 1989).

Lundy (2003) examined mother and father mind-related comments during face-to-face interactions with their 6-month old infant ($N = 24$) and their association with interactional synchrony and security. Lundy found that for both parents, comments related to "general thought processes, knowledge or desires" were predictive of higher attachment security scores as assessed by a parent-completed Attachment Q-set (AQS; Waters, 1995). Mothers reporting more depressive symptoms and lower marital satisfaction tended to make fewer mind-related comments. For both parents, interactional synchrony mediated the relationship between mind-related comments and security of attachment (Lundy). Results indicating MM had indirect effects on attachment security in the Lundy study (2003) were inconsistent with prior research by the Meins team demonstrating direct effects of MM on attachment security (Meins et al., 2001).

Meins and colleagues hypothesized that differences in the assessment of attachment security in the Lundy study (parent completed q-sets), and use of laboratory settings to assess interactional synchrony (not sensitivity), could have led to an underestimation of nature and strength of association among MM, sensitivity, and attachment security (Laranjo, Bernier, & Meins, 2008). Use of a less rich assessment of sensitivity, in addition to a small sample size could also have impacted these results. In order to address these methodological constraints, Laranjo et al., (2008) conducted a study examining associations among these variables in a natural setting (the caregiver's home), utilizing observer-sorted q-sets for both sensitivity and security. Laranjo et al. hypothesized that maternal sensitivity, when assessed in a naturalistic setting, would mediate the relationship between MM and attachment security.

Two, 1.5 to 2 hour visits were made to caregiver homes ($N = 50$). Sensitivity and security were assessed during the entirety of the visits using observer completed q-sets, and MM was assessed during a 10 minute, free-play interaction on the first visit. Maternal comments during the play interaction were categorized and coded for appropriateness to context, and a frequency score was calculated for each category. The association between sensitivity and security was positive and significant as expected, and appropriate mind-related comments were found to be the only MM category positively associated with both sensitivity and security. The association between sensitivity and security was stronger than the relation between MM and security (Laranjo et al., 2008), which was inconsistent with an earlier study that assessed MM in a laboratory (Meins et al., 2001). Using Baron and Kenny's (1986) classic procedure to test the hypothesis that sensitivity mediates the relation between MM and security, Laranjo et al. confirmed that the requirements for

mediation had been met; once sensitivity had been accounted for, the relation between MM and security was no longer significant. These results provided support for one of Meins' earliest hypotheses; MM may be an antecedent to sensitivity, as it involves some degree of interpretation on the mother's part if she is to respond to infant signals appropriately (Meins, 1999). The discovery of an indirect effect of MM on security was attributed to the methodologies employed in earlier work by the Meins' team (2001), suggesting that longer observations may be critical to gaining an accurate assessment of maternal MM in naturalistic environments.

2.3.3 Mind-mindedness and Infant Socioemotional Functioning

Mind-mindedness in mothers of 6-month old infants has predicted the development of secure attachment at 12 months (Meins et al., 2001) and subsequent theory of mind understanding in preschool-age children (Meins et al., 2002, Meins et al., 2003). Maternal talk about mental states with infants at 15 months, particularly talk about what the child wants or desires, has been found to predict the child's own mental state language and performance on emotion identification tasks at 24 months (Taumoepeau & Ruffman, 2006). Maternal use of mental descriptors utilizing the one question, describe-your-child interview at 12 months was found to be significantly associated with early executive functioning from infancy to toddlerhood (Bernier, Carlson, & Whipple, 2010). Mind-mindedness, maternal sensitivity and support for autonomy during mother-child interactions were associated with better child performance in memory, impulse control, and set shifting tasks, suggesting that mind-mindedness may play a role in infant self-regulatory development (Bernier et al., 2010). While support for autonomy was revealed to be maternal behavior most related to age-specific measures of executive function, MM

appeared to account for changes in executive function during the same period, suggesting that MM in mothers builds on executive functioning attributed to maternal support for autonomy during the period from infancy to toddlerhood (Bernier, et al.).

2.4 Summary

Experts in the field of child development generally agree that “early environments matter and nurturing relationships are essential” in laying a foundation for healthy socioemotional development (Shonkoff & Phillips, 2000, p. 385). A key socioemotional competency that develops during infancy and early toddlerhood is the ability to form secure attachment relationships with primary caregivers (Rosenblum et al., 2009; Sroufe, 1996; Sroufe et al., 2005; Zeanah & Zeanah, 2009). Although psychosocial benefits associated with development of a secure attachment depend in part on continuity in the quality of care received during early and later childhood (Belsky & Pasco-Fearon, 2002), it is evident from the research reviewed that security in the attachment relationship between caregivers and their infants serves to promote healthy psychosocial outcomes in later childhood and adolescence (Belsky & Pasco-Fearon, 2002; DeKlyen & Greenberg, 2008; Sroufe, et al., 2005; Thompson, 2008). In order to develop intervention strategies that promote healthy socioemotional development and/or prevent development of behavioral and emotional disorders during childhood and adolescence, an understanding of caregiver behavior associated with development of secure attachments is key.

Two characteristics of maternal behavioral that precede the development of a secure attachments are sensitivity, as operationalized by Ainsworth et al. (1978), and mind-mindedness as operationalized by Meins (1999). The association between sensitivity and the organization of early infant behavior and subsequent attachment

security is well-documented (Grossman et al., 2006; Isabella, 1993; Isabella & Belsky, 1991; Pederson et al., 1990; Posada et al., 2004; Kaloustian, et al., 2007), with causal association confirmed by intervention research (Bakermans-Kranenburg et al., 2003). In addition to demonstrating that the presence of mind-minded caregiving is associated with security in a mother's relationship with her infant, Mein et al. (2001) have provided support for the hypothesis that a mentalising on the part of caregivers facilitates the development of this capacity in children (Sharp & Fonagy, 2008). Longitudinal examination of the association between early indexes of mind-mindedness and subsequent theory of mind understanding in preschool-age children has contributed to our understanding of the key role early relationships play in the development of social understanding (Meins et al., 2002, Meins et al., 2003).

Recent research has provided preliminary evidence that mind-minded caregiving is also linked to the development of self-regulatory skills in infants (Bernier et al., 2010), suggesting that mind-mindedness may impact other domains of socioemotional development that have not yet been explored as thoroughly. Prior research exploring independent contributions made by sensitivity and mind-mindedness in the prediction of attachment security could be expanded further by examining their association with other specific domains of socioemotional development, such as self-regulation. This would provide an opportunity to identify how sensitivity and mind-mindedness may work together or independently to influence specific socioemotional competencies during infancy in addition to security of attachment. The aim of the present study was to further examine the nature of the relationship between sensitivity, mind-mindedness, and an index of socioemotional development other than attachment security as this would

provide an opportunity to examine associations between maternal behavior and specific domains of socioemotional functioning such as self-regulation, autonomy, and social competence. An examination of these associations could help expand our understanding of how maternal behavior impacts different aspects of socioemotional functioning, as well as inform future intervention efforts designed to address delay in achieving specific socioemotional competencies such as attachment security and self-regulation.

2.4.1 Research Questions

I attempted to answer two research questions concerning associations between maternal sensitivity, maternal mind-mindedness, and infant socioemotional functioning:

1. What is the nature and strength of the relationship between maternal sensitivity, maternal mind-mindedness, and infant socioemotional functioning? It was hypothesized that sensitivity and mind-mindedness would be positively associated, and that both maternal variables would be positively associated with socioemotional functioning.

It was also hypothesized that both maternal variables would account for variance in infant socioemotional functioning. Prior research has demonstrated links between mind-mindedness and maternal education (Meins et al., 2001; Rosenblum, McDonough, Sameroff, & Muzik, 2008), and sensitivity and maternal education (Pederson et al., 1990). Maternal depression has been linked to sensitivity (Gelfand & Teti, 1990; Jameson, Geldfand, Kulscar, & Teti, 1997; Teti, Gelfand, Messinger, & Isabella, 1995), and mind-mindedness (Lundy, 2003). Relations between maternal depression and education and the two independent variables were examined to determine if they needed to be controlled for in the planned analyses. In order to account for the infant's contribution to the bidirectional nature of the mother-infant relationship, infant temperament as reported by

the caregiver, and defined as “constitutionally based individual differences in reactivity and self-regulation” (Rothbart, Chew, & Garstein, 2001, p. 190) was assessed in order to examine potential associations between temperament and the maternal variables.

2. Does sensitivity mediate the relationship between mind-mindedness and infant socioemotional functioning? It was hypothesized that the association between mind-mindedness and infant socioemotional functioning would be at least partially explained by maternal sensitivity.

CHAPTER 3. METHOD

3.1 Participants

Mothers age 18 and older with an infant between ages 11 to 14 months were recruited from the Greater Lafayette community. Recruitment flyers were posted on 2 college campuses and at public libraries, community/recreational centers, child care centers, social service agencies, and a community health clinic. Birth announcements posted in a local newspaper were used to identify potential participants with an infant of the approximate age. A snowballing technique was also used by asking participating mothers to discuss the study with mothers of their acquaintance. Fifty-three potential participants contacted the project for information about the study. Forty-one mothers agreed to participate in the study and 5 declined participation. Seven potential participants could not be reached. Data for one participant was not included in the analyses due to missing data, leaving a total of $N = 40$ mothers.

Mothers' mean age was 30.05 years ($SD = 5.14$, ranged from 18 to 42 years). Ninety percent (36) of mothers classified themselves as Caucasian, 7.5% were Asian, and 2.5% were Bi-racial. Mothers were well-educated: 50% had a bachelor's degree, 17% a master's degree, and 5% a doctoral degree. Of the remaining mothers, 20% had attended some college or technical school and 7.5% had earned at least a high school diploma. Thirty-five percent of mothers were employed, 55% were not employed, and 10% were

students. A majority of mothers were married to the father of their infant (92.5%), 2.5% were separated from the father, and 5% reported having no relationship or contact with the father. Mean age of fathers was 32.23 years ($SD = 5.54$, ranged from 24 to 50 years). Fathers were 82.5% Caucasian, 10% Asian, 5% Hispanic, and 2.5% African American. Information regarding paternal education was missing for one father, leaving educational data for a total of 39 fathers; 28.2% had a bachelor's degree, 30.8% a master's degree, 10.2% attended some college after earning a master's degree, and 12.8% a doctoral degree. Of the remaining fathers, 7.7% had attended some college or technical school, 5.1% had earned at least a high school diploma, and 5.2% had not earned a high school diploma. The majority of fathers were employed (90%) and providing financial support (92.5%).

Infants' mean age was 11.8 months ($SD = 1.22$, ranged from 9 to 15 months) and infants were equal in number by sex. Eighty percent of mothers reported being their infant's primary caregiver, and 20% reported sharing primary caregiving with the father. Fifty-seven percent of mothers were breastfeeding at the time of assessment. Mothers had been pregnant an average of 2.38 times ($SD = 1.28$, ranged from 1 to 6) and had carried an average of 1.9 pregnancies to term ($SD = 1.03$, ranged from 0 to 5). The mean number of family members living in the home was 4.00 ($SD = .99$, ranged from 3 to 7 members), and the mean number of children living in the home under age 18 was 1.98 ($SD = .97$, ranged from 1 to 5 children). Mean gross household income was \$48,763 ($SD = \$34,389$, ranged from \$8,376 to \$141,624). The median income of the sample (\$35,500) was used to replace missing income data for 2 of the households.

3.2 Procedures

All data were collected during a single, semi-structured home observation. Upon contact by a potential participant, the author telephoned the mother to describe the research project and schedule a 2 hour visit to the mother's home. Mothers were told that the main purpose of the visit was to observe mother-infant interactions in a home environment. Mothers were asked to schedule a time when their infant would usually be awake and active. It was left for the mother to decide if any of the infant's siblings would be present; one or two siblings were present for approximately 32.5% of the visits. Procedures for the home observation were designed to follow guidelines provided by Pederson and Moran (1995a) that suggest that the mother's attention be diverted from being completely focused on her child by having her complete a questionnaire or other task, as having to divide attention between her infant and other tasks would be a typical caregiving experience.

One to 2 observers conducted the home observations. Upon arrival at the participant's home, the author or lead observer described the project and consent issues in detail. Upon gaining consent, the mother completed a demographic form and 3 self-report questionnaires (described in the measures section). After completing the paper work, mothers were asked to respond to a brief, one-question interview that was audio-recorded: "Can you describe [infant's name] for me?" At the end of the mother's response, one prompt was given: "Anything else?" Next, mothers were told to behave as they usually would with their infant, choosing activities typical for the dyad to perform on any other day. After approximately 30 minutes, mothers were asked to complete 2, 10-minute interactions with their infant which were videotaped. The first interaction was a teaching

task. Mothers were given a zippered bag that contained 4 objects and were told, “In this bag are some toys that may be new to you and [infant’s name]. For the next 10 minutes, we want you to teach [infant’s name] how to use these toys. There is a book in the bag for you to use if you finish before the 10 minutes are over. At the end of 10 minutes, I’ll say ‘clean up’. Put the toys and book back in the bag and zip up the bag. I’ll tell you when to begin.” The objects contained in the zippered bag were: 1) a wooden toy barn with three doors that opened and closed with a different animal behind each door, 2) a wooden panda bear head with two hands that could open and close to play peek-a-boo, 3) a wooden turtle with head, arms, feet, and tail that could be folded underneath its shell, and 4) a book titled *Good Night, Gorilla* (Rathman, 1994).

Upon completion of the “clean up” portion of the teaching task, mothers were asked to complete a free-play interaction for 10 minutes. Instructions for the play task were, “Please play with [infant’s name] as you usually would for 10 minutes. At the end of 10 minutes, I’ll say ‘time’s up’ and you can get ready to do something else. If you want to continue playing, that is up to you. I’ll tell you when to begin.” Upon completion of the free-play interaction, it was left for the mother to decide what to do next, and the observation continued. At approximately 15 minutes before the visit ended, the author or lead observer asked the mother to complete a second brief, one-question interview that was audio-recorded: “As you think about what you and [infant’s name] did during this visit, what do you think went through [infant’s name] mind during this visit; what did she think and feel?” At the end of the mother’s response, one prompt was given: “Anything else?” The audiotaped, one-question interviews conducted at the beginning and end of the home visit were collected for use in another (future) study. Upon completion of the

interview, the mother was given \$20 to thank her for participating in the study. Mothers were then offered a free, blank copy of the infant socioemotional questionnaire to use for her own purposes and the visit ended. After leaving the mother's home, observers returned to a research lab to complete an assessment of maternal behavior observed during the visit.

3.3 Measures

3.3.1 Maternal Sensitivity

The Maternal Behavior Q-Set (MBQS; Pederson & Moran, 1995b) was used to assess maternal sensitivity in the home. The MBQS is a 90-item instrument used to provide a detailed description of maternal behaviors in the home. Q-sort items were designed to reflect Ainsworth's sensitivity construct (Ainsworth et al., 1971; Ainsworth et al., 1978) both theoretically and empirically (Pederson & Moran, 1995a). Q-sorts are made up of a series of descriptive items written on cards (one item per card) that an observer ranks according to how well each item reflects the subject being observed (Block, 1978). Observers begin the sort by placing the cards in 3 piles: "characteristic", "neither characteristic nor uncharacteristic", or "uncharacteristic". The observer then divides the 3 piles into 9 piles of 10 items each, with pile 1 representing descriptors "most uncharacteristic" of the mother, and pile 9 representing descriptors "most characteristic" of the mother. A global sensitivity score for each mother was comprised of the correlation between the observer's description of the mother and a prototypical description of a sensitive mother completed by experts in the field of attachment research. Global sensitivity scores range from -1.0 to 1.0, with higher positive scores reflecting more prototypically sensitivity caregiving. Validity and reliability information have been

provided elsewhere by Pederson and colleagues (Pederson, Gleason, Moran, & Bento, 1998; Pederson & Moran, 1995a, 1996; Pederson et al., 1990).

A team of 15 observers (13 females including the author) conducted the assessments of maternal sensitivity. Observers completed 15 to 20 hours of training on the maternal behavior q-sort. Training consisted of, a) a review of q-sorting procedures, b) group review of the definition and coding criteria for each of the 90 items, c) q-sort practice utilizing videotaped mother-child interactions, d) group discussion to achieve consensus on q-sort item disagreements, and e) a review of home observation protocol. Videotaped mother-child interactions were used to assess interrater reliability with an expert-completed sort. Each observer trainee was required to reach an $r = .70$ level of agreement on 3 different maternal sorts to participate in “live” home observations. Thirty-five of the home visits were conducted by the author and one other trained observer, 5 visits were conducted by the author alone, and the author was not present for 1 of the visits. Observer agreement for the MBSQ was assessed on 80% of the visits; mean agreement was $r = .84$ (ranged from $r = .66$ to $r = .92$).

3.3.2 Maternal Mind-mindedness

Verbatim transcripts of the videotaped interactions were coded for mind-mindedness based on criteria outlined in the *Mind-Mindedness Coding Manual, Version 2.0* (Meins & Fernyhough, 2010). Mind-mindedness is operationalized as a “caregiver’s tendency to comment appropriately or in a non-attuned manner on the infant’s putative internal states during on-line interactions.” (Meins & Fernyhough, p. 3). Being able to link a caregiver’s mind-related comment to her infant’s current state or behavior is key in determining if the comment is appropriate to context (attuned mind-mindedness) or not

appropriate to context (non-attuned mind-mindedness). Attuned mind-mindedness (attuned MM), calculated as a proportion of total maternal comments, was used as an index of mind-mindedness in the current study as suggested in the coding manual (Meins & Fernyhough) and as utilized in a prior study (Meins et al., 2001). Convergent and predictive validity of the MM construct was established by links to sensitivity, security, and child theory of mind understanding (Meins et al., 2003).

The first step in coding attuned MM is to identify mind-related comments in the video transcripts. Maternal comments were coded as mind-related if the comment fell under one of five categories: cognitive states and processes (e.g., “You think it goes on top.”), desires and preferences (e.g., “You want to read the book now?”), emotions (e.g., “You’re getting so excited!”), talking on behalf of the infant (e.g., “I can do it myself Mommy.”), and comments reflecting the infant’s attempt to influence other people’s thoughts (e.g., “You’re trying to trick me.”). Non-specific references to an infant’s current state (e.g., “What do you want?”) were not coded as being mind-related. Maternal comments not judged to be mind-related were coded one of six additional categories: reference to the senses (e.g., “You can hear the birds outside.”), physiological states (e.g., “You’re getting sleepy.”), vocalizations/noises conveying meaning but not in the form of actual words (e.g., Mother gasps in an exaggerated manner to gain infant’s attention; Mother teases infant with a toy saying, “Do-do-be-do!”), maternal comments made to someone other than the infant (e.g., talking to the infant’s sibling), inaudible comments, or other (e.g., comments not fitting any other category). Maternal comments directed at the observers were not coded.

The second step involved in coding attuned MM is to review the videotaped interaction with the transcript coded for mind-related comments to determine if each comment is appropriate to context. Each mind-related comment was coded dichotomously as being appropriate to context (attuned mind-mindedness; A-MM) or not appropriate to context (non-attuned mind-mindedness; N-MM) based on the coder's review of the videotaped interaction and its associated transcript. Criteria for coding a mind-related comment as attuned were: (a) the comment followed an infant behavior and the coder agreed with the mother's reading of the infant's current state, and (b) the comment tied the infant's current activity to similar events in the past or future.

It is important to note one key difference between the current coding scheme and that of the coding scheme developed by Meins & Fernyhough (2010). According to Meins & Fernyhough, a maternal comment using mind-related words (e.g., "You *want to* read a book?") which serves to suggest a new activity during a "lull" in the infant's engagement in any particular activity would qualify as being mind-related and attuned. Although a suggestion to begin a new activity may be appropriate if the infant is not engaged in any particular activity, it does not necessarily follow that the suggestion reflects the infant's current desires or preferences. In the current study, mind-related comments in the form of a suggestion during a lull in infant activity were not coded as attuned. Criteria for coding a mind-related comment as non-attuned were: (a) the coder did not agree with the mother's reading of the infant's current state, (b) the comment was not tied to the infant's current activity or interests, and (c) the coder could not determine or understand what the mother was referring to while viewing the videotaped interaction. Scores for attuned mind-mindedness used in the analyses were calculated as a proportion

of the total number of maternal comments made by the mother during the videotaped interactions (not including vocalizations conveying meaning but not in the form of actual words), with higher proportional scores indicating greater mind-mindedness.

A team of 6 graduate and 1 undergraduate students (all female) coded the video transcripts for mind-mindedness and were independent of observers conducting the home visits. Training in mind-mindedness coding was conducted by the author over the course of 3, 1.5 hour meetings. Training involved group review of a manual outlining coding procedures, code definitions, and examples, and some practice coding of transcripts. The author also met with coders individually or in pairs as needed to clarify coding criteria and to review video for coding mental state comments as attuned or non-attuned. Coders received approximately 5 to 8 transcripts to code per week. The author regularly reviewed coded transcripts for errors/missing data and was available to clarify coding questions for coders scheduled to code attunement for the videotaped data. Interrater reliability was assessed using the Cohen's Kappa statistic for each task (teach and play). Fleiss (1981) described Kappas of .40 to .60 as fair, .60 to .75 as good, and above .75 as excellent.

Fifteen (37.5%) of the teach task transcripts were rated by 2 coders. Interrater reliability for all 11 codes categorized was high, $\kappa = .94$ ($p < .001$), 95% CI (.92, .96). Interrater reliability for mental state comments alone was fair, $\kappa = .54$ ($p < .001$), 95% CI (.43, .65). Interrater reliability for coding of attuned versus non-attuned mental comments was fair but low, $\kappa = .42$ ($p < .001$), 95% CI (.32, .52). To further assess coder agreement, interrater reliability on the attuned versus non-attuned comments was assessed using only those events the 2 raters agreed had occurred. Resulting reliability was good, $\kappa = .63$ (p

<.001), 95% CI (.51, .75). Eighteen (45%) of the play task transcripts were rated by 2 coders. Interrater reliability for all 11 codes categorized was high, $\kappa = .95$ ($p < .001$), 95% CI (.93, .96). Interrater reliability for mental state comments alone was good, $\kappa = .64$ ($p < .001$), 95% CI (.52, .76). Interrater reliability for coding of attuned versus non-attuned mental comments was fair, $\kappa = .50$ ($p < .001$, 95% CI (.39, .60). Interrater reliability on attuned versus non-attuned events the 2 raters agreed had occurred was good, $\kappa = .63$, ($p < .001$), 95% CI (.51, .75).

3.3.3 Maternal Depression

The Center for Epidemiological Studies Depression Scale-Revised (CESD-R; Radloff, 1977) was used to assess caregiver depression. The CESD-R is a 20-item, Likert-type scale designed to assess depression in the general population. The scale assesses mood, somatic complaints, motor functioning, and interactions with others (Eaton, Smith, Ybarra, Muntaner, & Allen, 2004). Respondents rate on a 5-point scale (0-4) how often during the past week they have experienced each item, with answers ranging from “rarely or none of the time (less than 1 day)” to “most or all of the time (5-7 days)”. Scores can range from 0 to 80, with higher scores indicating more depressive symptoms. A score for each mother was calculated as a sum of ranked items. Scores ≥ 16 reflect significant impairment and are generally used as a cutoff score (Eaton et al., 2004). Seven (17.5%) of the mothers in the sample scored ≥ 16 , indicating significant impairment. The CESD-R has been utilized extensively in research, and has demonstrated internal consistency ranging from .80 to .90 in community samples (Eaton et al.). Cronbach’s alpha for the current study was .83.

3.3.4 Infant Socioemotional Functioning

The Ages & Stages Questionnaire: Social-Emotional was used to assess infant socioemotional functioning (ASQ-SE; Squires, Bricker, & Twombly, 2002). The ASQ-SE was designed to identify children needing further evaluation and/or intervention to address caregiver-reported concerns regarding their social or emotional development. The ASQ-SE is a self-report questionnaire for caregivers of children age 3 months to 66 months. Separate questionnaires were developed for children depending on age; the 12 month version (for children ages 9 through 14 months) was utilized in the present study. The 9 to 14 month version consists of 25-items. Three items provide an opportunity for the caregiver to note any particular concerns, and one item provides the opportunity for the caregiver to note what she enjoys most about her infant. The remaining 21 items assess 5 socioemotional domains: self-regulation (ability to self-soothe and/or adjust to physiological or environmental conditions); communication (responding and/or initiating verbal and nonverbal behavior to communicate feelings and/or affective and internal states); adaptive functioning (management of physiological needs such as sleeping, eating, elimination, and safety); affect (demonstration of feelings and empathy); and interaction with people (social responsiveness to caregivers, adults, and peers).

When used as a screening tool, caregivers rate their child's ability and/or willingness to engage in a list of specific behaviors "most of the time" (0 points), "sometimes" (5 points), or "rarely or never" (10 point), and can indicate if the particular item is a specific concern (an additional 5 points). A total score is calculated as a sum of the points associated with each checked item, with higher scores indicating poorer socioemotional development. Children scoring ≥ 48 are recommended for further

diagnostic evaluation (Squires et al., 2002). Three infants (7.5%) were rated ≥ 48 by their mother in the current study. Internal consistency for the ASQ-SE based on a sample of $N = 1,994$ children ranged from .67 for the 12 month version to .91 for the 48 and 60 month versions, with an overall alpha of .82 (Squires et al.). Test-retest reliability of the ASQ-SE was judged to be .94 based on caregiver completed questionnaires at 1 to 3 week intervals. Sensitivity of the instrument to identify children with social-emotional disability was judged to be 78%, and specificity of the instrument to correctly identify children without social-emotional delay was rated at 95% overall (Squires et al.).

The ASQ-SE scale was adjusted for the current study so that higher scores would be associated with healthier socioemotional functioning; “most of the time” was worth 3 points, “sometimes” was worth 2 points, or “rarely or never” was worth 1 point. Cronbach’s alpha for 20 out of 21 items was revealed to be .60; the 20 item version was utilized in the analyses. Very poor internal consistency was revealed for the affect ($\alpha = .118$) and communication ($\alpha = .111$) domains which consisted of 3 and 2 items respectively. The affect and communication domains were dropped from consideration in the analyses. The adaptive functioning domain consisted of 4 items ($\alpha = .58$) and was retained. The self-regulation domain consisted of 6 items ($\alpha = .49$) and the interaction with people domain consisted of 5 items ($\alpha = .26$). Reducing the number of items for the self-regulation domain from 6 to 4, and reducing the number of items for the interaction with people domain from 5 to 2 improved the alpha for both scales ($\alpha = .58$). Revised scales for self-regulation and interaction with people were retained for analyses purposes.

3.3.5 Infant Temperament

The Infant Behavior Questionnaire (IBQ; Rothbart, 1981) was used to assess infant temperament as operationalized by Rothbart (1981, 1989; Rothbart & Derryberry, 1981; Rothbart & Posner, 1985). The IBQ is a 94-item, Likert-type scale designed to assess reactive and regulatory capacities of infant temperament on 6 dimensions: activity level (gross motor including arm and leg movement, squirming, and locomotor activity); smiling and laughter; distress and latency to approach of sudden or novel stimuli (distress to sudden change in stimulation, distress and latency of movement toward novel, social, or physical object); distress to limitations (fussing, crying, or demonstrating distress when limits placed on behavior); soothability (response to soothing techniques by caregiver); duration of orienting (child's attention to a single object for extended period of time). Caregivers rate on a 7-point scale the frequency of specific infant reactions during concrete situations during the last week (feeding, sleeping, bathing and dressing, play and daily activities), and the infant's ability to be soothed in different contexts during the last 2 weeks. Caregiver responses are coded on a scale of 1 (never) to 7 (always), with an additional response of "X = does not apply" if a specific situation did not occur. A total score for each dimension was calculated as the sum of the items ranked for each dimension, with higher scores indicating higher behavioral frequency. The IBQ has demonstrated internal consistency with reliability coefficients for the 6 dimensions ranging from .72 (duration of orienting) to .84 (activity level) for 12-month old infants (Rothbart, 1981). Internal consistency for the IBQ in the current study ranged from .69 (activity level) to .88 (soothability).

CHAPTER 4. RESULTS

4.1 Descriptive Statistics

Descriptive statistics for variables of interest are presented in Table 1. Validity of statistical test assumptions was examined using standard methods (histograms, normal Q-Q plots, and box plots). Violation of the normality assumption was evident in distributions for sensitivity, depression, and maternal education. Standardized coefficients for skew were outside limits of normality for a small sample (± 1.96) for sensitivity, depression, and education, with sensitivity revealed to be the variable most significantly skewed in a negative direction. Significant kurtosis was evident in scores for maternal sensitivity and education (about half of the mothers had earned at least a bachelor's degree). Attuned MM scores for the teaching and play tasks were approximately normally distributed. A missing value found in one ASQ-SE questionnaire was replaced with the mean for that item. The distribution of total scores for infant socioemotional functioning and scores for the 3 socioemotional domains examined were significantly negatively skewed and kurtotic. The distribution of scores for each of the six infant temperament scales was normal. Non-parametric methods (Spearman's rho correlations; Mann Whitney tests) were deemed appropriate for conducting correlational analyses and most mean difference tests.

Table 1. Descriptive Statistics of Maternal and Infant Variables ($N = 40$)

	Min	Max	Mean	Mdn	SD	Skew	Kurtosis
<i>Maternal Variables</i>							
Sensitivity	-0.54	0.86	0.62	0.75	0.34	-2.60	6.32
Attuned MM							
Teaching	0.00	0.12	0.05	0.04	0.04	0.61	-0.74
Play	0.00	0.13	0.05	0.04	0.04	0.39	-0.87
Depression	0.00	27.00	8.25	5.00	7.75	1.17	0.30
Education	12.00	22.00	15.90	16.00	2.23	0.56	1.50
<i>Infant Variables</i>							
Socioemotional Total	45.69	60.00	56.07	57.00	3.23	-1.29	1.80
Self-regulation	7.00	12.00	11.05	11.00	1.22	-1.53	2.37
Communication	8.00	9.00	8.93	9.00	0.27	-3.35	9.74
Adaptive Function	8.00	12.00	11.10	11.00	1.15	-1.59	2.10
Affect	5.00	9.00	7.01	7.00	0.78	0.01	2.63
Interaction w/people	4.00	6.00	5.75	6.00	0.49	-1.85	2.82
Temperament							
Activity Level	2.88	5.86	4.30	4.30	0.68	0.21	-0.24
Distress Limits	2.10	5.30	3.64	3.65	0.76	0.07	-0.45
Distress Sudden-Novel	1.64	4.93	3.11	3.17	0.75	0.09	-0.43
Duration of Orienting	2.27	6.30	3.92	3.95	0.92	0.17	-0.20
Smiling & Laughter	4.27	6.73	5.53	5.67	0.65	-0.29	-0.84
Soothability	3.67	7.00	5.25	5.33	0.85	0.38	-0.30

4.2 Preliminary Analyses

4.2.1 Identification of Maternal Covariates

Spearman's rho correlations were conducted to examine maternal depression, education, and infant temperament as potential covariates for the maternal sensitivity and attuned MM variables. Because it was hypothesized that sensitivity and attuned MM would be significantly associated with depression and education, one-tailed tests of association were conducted. A significant negative association was revealed between

sensitivity and depression, $r_s = -.33, p = .02$, a medium effect. As sensitivity scores increased, depression levels tended to decrease. Sensitivity was not significantly associated with education, $r_s = .24, p > .05$. Attuned MM was not associated with education or depression regardless of task structure ($p > .05$); these results were consistent with parametric correlations conducted on square root transformed scores for these variables. The depression variable was retained as a covariate for sensitivity. The education was dropped from further consideration in the analyses. Potential association between the maternal variables (sensitivity, attuned MM, and depression) and the 6 infant temperament scales were examined next. Two-tailed tests of association were conducted as no directional hypotheses were made; $p < .008$ was required to reject the null hypothesis of no association for each set of comparisons as per Bonferroni adjustment. None of the temperament scales were significantly related to sensitivity, depression, or attuned MM regardless of task structure.

4.2.2 Infant Sex as a Potential Moderator

Mann-Whitney tests were conducted to examine potential differences in maternal sensitivity, depression, ASQ-SE total score, and the 3 SE domains as a function of infant gender (see Table 2). No significant differences were revealed as a function of infant gender ($p < .05$). Independent t -tests on scores for attuned MM and infant temperament were conducted to examine potential differences as a function of gender (see Table 3). Mothers of male versus female infants did not differ in attuned MM regardless of task structure, or in how they rated infant temperament for all 6 scales ($p < .05$). Infant gender was not evaluated further as a moderator.

Table 2. Maternal and Infant SE Variables as a Function of Gender

	Boy Mdn	Girl Mdn	<i>U</i>	<i>z</i>	<i>r</i>
<i>Maternal Variables</i>					
Sensitivity	0.74	0.75	199.50	-0.01	0.00
Depression	4.50	7.50	150.00	-1.36	-0.21
<i>Infant SE Functioning</i>					
Self-regulation	12.00	11.00	163.00	-1.05	-0.17
Adaptive Function	12.00	11.00	150.50	-1.74	-0.27
Interaction w/people	6.00	6.00	188.00	-0.04	-0.01
SE Total	58.00	57.00	156.50	-1.20	-0.22

Table 3. Attuned MM and Infant Temperament as a Function of Gender

	Boys		Girls		<i>t</i>	<i>r</i>
	Mean	SD	Mean	SD		
<i>Attuned MM</i>						
Teach	0.05	0.03	0.04	0.04	0.63	0.10
Play	0.05	0.04	0.05	0.04	0.25	0.04
<i>Temperament Scales</i>						
Activity Level	4.31	0.77	4.28	0.60	0.15	0.02
Distress Limits	3.51	0.87	3.76	0.63	-1.01	0.16
Distress Sudden-novel	3.14	0.85	3.08	0.66	0.24	0.04
Duration of Orienting	3.98	0.77	3.87	1.07	0.37	0.06
Smiling & Laughter	5.60	0.61	5.46	0.69	0.70	0.11
Soothability	5.25	0.90	5.25	0.82	0.02	0.00

4.3 Main Analyses

4.3.1 Association between Maternal Sensitivity and Attuned MM

The correlation matrix for retained maternal and infant variables is presented in Table 4. It was hypothesized that sensitivity and attuned MM for each task would be positively associated. The association between sensitivity and attuned MM for the teaching task was not significant, $r_s = .04, p > .05$. A significant positive association was revealed between sensitivity and attuned MM for the play task, $r_s = .40, p < .01$, a

medium effect. Higher sensitivity scores were associated with higher attuned MM scores for the play task. A first-order partial rank correlation was computed between sensitivity and attuned MM for the play task, controlling for depression. The partial r was significant, $r(37) = .47, p < .001$; a medium effect. After controlling for depression, the variance explained in the association between sensitivity and attuned MM for the play task increased from 16% to 22%.

Table 4. Spearman's Rho Correlation Matrix for Maternal and Infant Variables

	MS	TCH	PLY	DEP	SE
MS	1.00				
TCH	.04	1.00			
PLY	.40**	.37**	1.00		
DEP	-.33*	.09	.14	1.00	
SE	.20	.09	.08	-.34*	1.00

MS = maternal sensitivity; TCH = teach attuned MM; PLY = play attuned MM; DEP = maternal depression; SE = infant SE total.

* $p < .05$; ** $p < .01$.

4.3.2 Association between Maternal Sensitivity and Infant SE Functioning

It was hypothesized that sensitivity and infant SE would be positively associated. Results revealed that sensitivity was not significantly associated with infant SE, $r_s = .20, p > .05$, one-tailed. Potential associations between maternal sensitivity and the 3 infant SE domains (self-regulation, adaptive function, and interaction with people) were examined next; $p < .02$ was required to reject the null hypothesis for each comparison (see Table 5). None of the associations between sensitivity and the 3 SE domains were revealed to be significant ($p > .05$, one-tailed).

4.3.3 Association between Attuned MM and Infant SE Functioning

Spearman's rho correlations were conducted to test the hypothesis that attuned MM and total infant SE scores would be positively associated. Results revealed that attuned MM was not significantly associated with infant SE for the teaching task, $r = .09$, $p > .05$, or the play task, $r = .08$, $p > .05$. Means for attuned MM for teaching and play tasks were similar; a paired sample t -test confirmed that there was not a significant difference in attuned MM between the teaching ($M = .05$, $SE = .04$) and play tasks ($M = .05$, $SE = .04$), $t(39) = .07$, $p > .05$). A mean difference was revealed between the total number of maternal comments made during the teaching ($M = 171.73$, $SE = 55.36$) and play tasks ($M = 135.03$, $SE = 57.89$), $t(39) = 5.41$, $p < .001$. Mothers tended to talk more overall during the teaching task compared to the play task.

Spearman rho correlations were conducted to examine associations between attuned MM for both tasks and the 3 infant SE domains. A $p < .02$ level of significance was required to reject the null hypothesis of no association for each set of comparisons (see Table 5). None of the comparisons were significant regardless of type of task ($p > .05$, one-tailed). One non-significant trend was revealed between attuned MM for the teaching task and infant self-regulation, $r_s = .25$, $p = .06$; a small effect. Higher attuned MM scores during the teaching task tended to be associated with healthier infant self-regulation. A linear regression was conducted on square root transformed scores to examine whether attuned MM for the teaching task accounted for variance in the infant SE self-regulation domain. Assumptions required for bivariate regression were well met. Results revealed that attuned MM for the teaching task was not a significant predictor of infant self-regulation, $F(1,39) = 1.31$, $p > .05$; $R = .18$, $R^2 = .03$, adjusted $R^2 = .02$. This

was consistent with the t ratio for the slope of infant self-regulation, $t(39) = 1.14, p > .05$; $b = .08, \beta = .18$.

Table 5. Spearman's Rho Correlation Matrix for Maternal Variables and Infant SE Domains

	MS	TCH	PLY	DEP	AD	SR	IN
MS	1.00						
TCH	.04	1.00					
PLY	.40**	.37**	1.00				
DEP	-.33*	.09	.14	1.00			
AD	.05	.10	.08	-.31*	1.00		
SR	.03	.25	.02	-.16	.14	1.00	
IN	.11	-.15	.10	-.15	.08	-.15	1.00

MS = maternal sensitivity; TCH = teach attuned MM; PLY = play attuned MM; DEP = maternal depression; AD = adaptive functioning; SR = self-regulation; IN = interaction with people.

* $p < .05$; ** $p < .01$.

4.3.4 Analysis of Mediation

Examination of the hypothesis that sensitivity mediated the association between attuned MM and infant SE (total scores) could not be undertaken given that sensitivity and attuned MM were not significantly associated with total scores for infant SE, thus prohibiting calculation of an indirect effect.

4.3.5 Multiple Regression Analyses

Two multiple regression analyses were conducted to explore the degree of linear relationship between the criterion (ASQ-SE total scores) and 3 predictors as a group (sensitivity, depression, and attuned MM for both tasks). Square root transformation of scores for the ASQ-SE and depression were used in the analyses. A square root transformation was conducted on sensitivity scores after subtracting a constant equal to

the highest score plus 1. Although the sensitivity variable remained negatively skewed and kurtotic, the transformation served to reduce standardized coefficients it's for skew and kurtosis. Standard diagnostics (histograms and normal P-P plots of residuals) conducted on model 1 revealed assumptions for multiple regression were well met. Model 1 predicted ASQ-SE from sensitivity, depression and attuned MM for the teaching task (see Table 6). The overall regression was not statistically significant, $F(3, 36) = 2.47$, $p = .08$, which was consistent with non-significant t -ratios for the slopes of all 3 predictor variables $p > .05$. Model 2 predicted ASQ-SE from sensitivity, depression, and attuned MM for the play task (see Table 7). The overall regression was not statistically significant, $F(3, 36) = 2.51$, $p = .08$, which was consistent with the non-significant t -ratios for slopes of all 3 predictor variables $p > .05$.

Table 6. Model 1: Predicting Infant SE from Maternal Sensitivity, Attuned MM for the Teaching Task, and Depression

<i>Variables</i>	<i>ASQ</i>	<i>MS</i>	<i>TCH</i>	<i>DEP</i>	<i>b</i>	β	sr^2_{unique}
MS	-.36**				0.28	-0.27	0.06
TCH	-.02	-.02			0.94	-0.02	0.001
DEP	-.34*	.43**	.07		-0.04	-0.22	0.04
					Intercept = 8.07		
Means	7.48	1.11	0.15	2.54			
SD	0.22	0.14	0.04	1.35			
							$R^2 = .17$
							$R^2_{\text{adj}} = .10$
							$R = .41$

ASQ = infant SE total; MS = sensitivity; TCH = Teaching attuned MM; DEP = depression
 * $p < .05$; ** $p < .01$.

Table 7. Model 2: Predicting Infant SE Total Scores from Maternal Sensitivity, Attuned MM for the Play Task, and Depression

<i>Variables</i>	<i>ASQ</i>	<i>MS</i>	<i>PLY</i>	<i>DEP</i>	<i>b</i>	β	sr^2_{unique}
MS	-.36**				-0.39	-0.24	.04
PLY	.11	-.34*			0.33	0.06	.04
DEP	-.34*	.43**	.10		-.04	-0.24	.003
					Intercept = 7.80		
Means	7.48	1.11	0.05	2.54			
SD	0.22	0.14	0.04	1.35			
							$R^2 = .17$
							$R^2_{\text{adj}} = .10$
							$R = .42$

ASQ = infant SE total; MS = sensitivity; PLY = play attuned MM; DEP = depression

* $p < .05$; ** $p < .01$.

Two additional multiple regression analyses were conducted to explore the degree of linear relationship between self-regulation as the criterion, and sensitivity, depression, and attuned MM for both tasks as predictors. Square root transformed scores for self-regulation, sensitivity, and depression were used in the analyses. Assumptions for multiple regression were reasonably well met. Model 3 predicted self-regulation from sensitivity, depression, and attuned MM for the teaching task (see Table 8). The overall regression was not significant, $F(3, 36) = 1.72, p > .05$, which was consistent with non-significant t -ratios for the slopes of all 3 predictors ($p > .05$). Model 4 predicted self-regulation from sensitivity, depression, and attuned MM for the play task (see Table 9). The overall regression was not significant, $F(3, 36) = 1.73, p > .05$, which was consistent with the non-significant t -ratios for the slopes of the 3 predictors ($p > .05$). The t -ratio for the sensitivity slope approached significance, $t(36) = -1.81, p = .08$. The squared semipartial was $sr^2 = .079$, indicating that approximately 8% of the variance in self-regulation tended to be uniquely predicted by sensitivity when depression and attuned MM were statistically controlled.

Table 8. Model 3: Predicting Infant Self-regulation from Maternal Sensitivity, Attuned MM for the Teaching Task, and Depression

<i>Variables</i>	<i>SR</i>	<i>MS</i>	<i>TCH</i>	<i>DEP</i>	<i>b</i>	β	sr^2_{unique}
MS	-.33*				-0.39	0.25	.06
TCH	.12	-.09			0.57	0.11	.001
DEP	-.22	.43**	.07		-0.02	-0.11	.009
					Intercept = 3.76		
Means	3.32	1.11	0.05	2.54			
SD	0.19	0.14	0.04	1.35			
							$R^2 = .13$
							$R^2_{\text{adj}} = .05$
							$R = .35$

SR = self-regulation; MS = sensitivity; TCH = teach attuned MM; DEP = depression

* $p < .05$; ** $p < .01$.

Table 9. Model 4: Predicting Infant Self-regulation from Maternal Sensitivity, Attuned MM for the Play Task, and Depression

<i>Variables</i>	<i>SR</i>	<i>MS</i>	<i>PLY</i>	<i>DEP</i>	<i>b</i>	β	sr^2_{unique}
MS	-.33*				-0.49	-0.35	.08
PLY	-.01	-.39*			-0.62	-0.12	.01
DEP	-.22	.43**	.10		-0.01	-0.06	.002
					Intercept = 3.91		
Means	3.32	1.11	0.05	2.54			
SD	0.19	0.14	0.04	1.35			
							$R^2 = .13$
							$R^2_{\text{adj}} = .05$
							$R = .36$

SR = self-regulation; MS = sensitivity; PLY = play attuned MM; DEP = depression

* $p < .05$; ** $p < .01$.

CHAPTER 5. DISCUSSION

The primary aim of the current study was to further understanding of the nature and strength of the relationship between maternal sensitivity, maternal mind-mindedness (indexed as attuned MM), and infant socioemotional functioning. Results that were revealed in attempting to answer the first research question (*What is the nature and strength of the relationship between maternal sensitivity, maternal mind-mindedness, and infant socioemotional functioning?*), may serve to provide preliminary support for the argument that further examination of these associations are warranted in at least two areas, a) examination of association between maternal sensitivity and attuned MM in multiple contexts, and b) examination of the association between sensitivity, attuned MM, and self-regulation.

5.1 Maternal Sensitivity and Attuned MM

It was hypothesized that maternal sensitivity and attuned MM would be positively associated. Support for this hypothesis was revealed depending on the type of interaction task assessed. Sensitive caregiving and attuned MM were significantly associated in the expected direction when mothers were asked to play with their infants as they usually would when at home. Higher attuned MM scores during the play task were associated with higher sensitivity scores, representing a medium effect. The association became stronger after controlling for maternal depression, with variance explained in the

association between sensitivity and attuned MM for the play task increasing from 16% to 22%. The positive association between sensitivity and attuned MM during the play task is consistent with prior research utilizing free play interactions to assess attuned MM at home (Bordeleau, Bernier, & Carrier, 2012; Laranjo et al., 2008), and in the laboratory (Meins et al., 2001; Meins, Fernyhough, Arnott, Turner, & Leekam, 2011), even when different methods were used to assess caregiver sensitivity. Assessment of sensitivity via Ainsworth et al.'s (1971) sensitivity scales during a free play interaction in a laboratory (Meins et al., 2001; Meins et al., 2011), and assessment of sensitivity via the MBQS during lengthier home observations (Bordeleau et al., 2012; Laranjo et al.) revealed positive and significant associations between sensitive caregiving and attuned MM.

Although Meins and colleagues (2001) have called for the assessment of mind-mindedness in different contexts, assessment of attuned MM during free play interactions generally remains the standard for research in this area. This has been the case even when mother-infant dyads have been asked to participate in more challenging tasks in mind-mindedness studies (Bernier, Carlson, & Whipple, 2010; Bordeleau et al., 2012). In addition to the free play interaction utilized in the current study, mothers were asked to teach their infant how to play with a set of toys provided by the researchers. It was hypothesized that maternal sensitivity and attuned MM for the teaching task would be positively associated. This hypothesis was not supported by the data, suggesting that task requirements (situational context) may influence the strength and/or nature of relationship between attuned MM and sensitivity.

Prior research has demonstrated that maternal behavior is influenced by context. In a comparison of maternal behavior at home versus during a free play interaction in a

laboratory, mothers of 12-month old infants were observed attending, talking, and responding to their infants more often than when observed at home, as well as providing them with more stimulation (Belsky, 1980). In an examination of interactional attunement as defined by Isabella and colleagues (Isabella, Belsky, & von Eye, 1989), mother-infant dyads were assessed in multiple contexts for rates of attuned versus disharmonious interactions (Leyendecker, Lamb, & Scholmerich, 1997). Attuned interactions tended to occur more frequently during non-directed play interactions than during caretaking and feeding interactions (Leyendecker et al., 1997). In a comparison of free play with toys, face-to-face play without toys, and a caregiving interaction (diaper change), maternal animation and stimulation of her infant was highest during the free play, positive regard for her infant was highest during face-to-face play, and the caregiving interaction involved the least stimulation and positive regard (Maas, Vreeswijk, & van Bakel, 2013).

In the current study, the proportion of attuned MM for the teaching task was not significantly different from the proportion of attuned MM for the play task. A significant difference was revealed between the tasks in regard to the total number of verbal comments made by the mothers, indicating that mothers adjusted their verbal behavior to meet the goals of the current activity. The teaching task presented mother-infant dyads with a challenge in terms of how to organize their behavior based on the mother's interpretation of the goals of the task, and the dyad's prior experience with each other during interactions not necessarily involving free play as the sole focus of activity. Lack of association between sensitivity and attuned MM for the teaching task in the current study is consistent with research indicating that task requirements influence the extent to

which sensitive behavior is expressed (verbally and/or non-verbally) during mother-infant interactions in varied contexts (Isabella, 1998; Maas et al., 2013). For example, mother-infant interactions during high challenge (teaching) situations were revealed to be associated with lower levels of both maternal involvement and positive affect compared to low challenge (free play) situations (Miller, McDonough, Rosenblum, & Sameroff, 2002). Isabella (1998) asserts that it is the observation of mother-infant interactions in a combination of contexts that helps provide the most representative view of their relationship; “knowing...what we hope to observe might make it easier to devise situations mostly likely to allow us to observe it.” (p. 552). Continued examination of association between sensitivity and attuned MM in a variety of contexts could enhance our understanding of how they may function together or independently to predict socioemotional outcomes, including security of attachment.

5.2 Maternal Sensitivity, Attuned MM, and Infant SE Functioning

It was hypothesized that both sensitivity and attuned MM would be positively associated with infant SE (total score), and that each would account for variance in infant SE. SE scores were expected to increase as sensitivity and attuned MM scores increased. The hypothesis regarding a significant association between the maternal variables and infant SE was not supported by the data. The ASQ-SE measure may not have provided a thorough enough assessment of infant SE functioning for research purposes, as it was designed as a screening tool for identifying infants needing further evaluation and/or intervention in response to caregiver-reported concerns (Squires, Bricker, & Twombly, 2002). Internal consistency for the ASQ-SE as originally designed tends to increase as the age assessed increases; internal consistency for the instrument is lowest for the 2

youngest age groups ($\alpha = .69$ for the 6 months version; $\alpha = .67$ for the standard 12 month version). Alpha for the 20 item revised version used in the current study was .60; relatively low for research purposes. Poor internal consistency for 2 of the infant SE domains (affect and communication) resulted in these subscales being dropped from consideration in the analyses. Although internal consistency for the self-regulation and interaction with people domains was improved by deleting items from each subscale, the alpha for both scales was only .58. A more extensive assessment of infant SE functioning, such as the Infant Toddler Social Emotional Assessment for infants 12 to 36 months (ITSEA; Carter & Briggs-Gowan, 2006; Carter, Briggs-Gowan, Jones, & Little, 2003), and/or an assessment designed to be conducted by a trained professional, such as the Bayley Scales of Infant and Toddler Development, 3rd edition (Bayley, 2006) may have proved more fruitful in gaining a more comprehensive and accurate assessment of current infant SE functioning.

5.3 Attuned MM for the Teaching Task and Infant Self-regulation

A positive, non-significant trend was revealed in the association between attuned MM for the teaching task and infant self-regulation; representing a small effect. Self-regulation as assessed by the ASQ-SE is operationalized as an infant's ability or willingness to calm down or adjust to physiological and/or environmental conditions or stimulation (Squires et al., 2002). Mothers who tended to comment appropriately about their infant's mental state (were more attuned) during the teaching task tended to report having an infant with healthier self-regulation scores. Attuned mothers tended to report having an infant who did not cry, scream, or tantrum for long periods of time, was able to calm herself down when upset, and did not hurt others (other children, adults or animals).

Infant self-regulatory competence may have been more relevant in dyads during the teaching task compared to the play task.

To assess the predictive value of attuned MM on the infant self-regulation domain, a linear regression was conducted to examine whether attuned MM for the teaching task accounted for variance in the infant SE self-regulation domain. Although attuned MM for the teaching task was not a significant predictor of infant self-regulation, the trend revealed between the two variables is consistent with theory suggesting that the capacity to attribute mental states to others, and think about the self and others in terms of mental states is key to development of self and affect regulation (Fonagy & Target, 1997; Fonagy et al., 2008). Research conducted by Bernier et al. (2010) provides preliminary evidence that both sensitivity and attuned MM impact development of self-regulatory skills in infants and toddlers. Bernier and colleagues examined 3 maternal variables (sensitivity, attuned MM, and support for autonomy) as potential predictors of two types of executive function (EF) development; impulse control related to delay of gratification, and conflict assessed as set shifting, inhibitory control, and working memory. All three maternal variables were associated with EF, with autonomy support being the type of caregiving most strongly linked to future EF. Attuned MM at 12 months was linked to better infant working memory at 18 months, and a tendency to perform better in the impulse control and conflict domains at 26 months.

Meins and colleagues (2002) hypothesize that an infant's exposure to a caregiver's mental state language allows developing children to link behavior "to the mental states underlying that behavior" (p. 1724), providing a scaffolding context whereby a developing understanding of self as facilitated by a caregiver's use of mental

state language may lead to awareness of the mental states of others. Taumoepeau & Ruffman (2006; 2008) have used Vygotsky's (1978) zone of proximal development to explain how a transition from early maternal talk about infant desires, to later talk about the thoughts and knowledge of others serves to scaffold children's social understanding. Carlson (2003) has suggested that because caregiver language is likely to be vital to the development of EF, maternal mind-mindedness may serve as a kind of verbal tool that facilitates a child's transition from external regulation provided by a supportive caregiver, to more internal or self-regulation, reflecting the type of scaffolding suggested by Meins et al. (2002) and Taumoepeau & Ruffman (2006; 2008).

Bernier and colleagues (2010) theorize that mind-mindedness builds on the regulatory control attributed to maternal support for autonomy by providing the verbal skills (or tools) children need to further enhance developing regulatory skills. A mother's attuned understanding of her infant's current state as evidenced by the language she uses to describe what her infant may be thinking, feeling, or experiencing may also serve to enhance the mother's ability to adjust her behavior in order to balance remaining attuned to her child and attending to demands of a particular situation (such as the teaching task which may require more sustained attention than the play task). In addition, having an infant who is developing healthy self-regulatory skills may facilitate the ease in which the mother can interpret her infant's mental states, as well as influence how well mother-infant dyads respond to the demands of the immediate task.

5.4 Analysis of Mediation

Examination of a potential mediational model among the variables of interest (the second research question), proved overly ambitious given the strength of the associations

revealed and the sample size eventually recruited. Conditions necessary to establish mediation were not met for the model planned as both sensitivity and attuned MM were not significantly associated with infant SE total scores. Although a non-significant trend was revealed between attuned MM for the teaching task and self-regulation, sensitivity was not significantly associated with self-regulation, prohibiting examination of sensitivity as a mediator in the relationship between attuned MM for the teaching task and self-regulation.

5.5 Prediction of Infant SE by a Group of Maternal Variables

Multiple regression analyses conducted to explore linear relationships between 2 criterion variables (total infant SE scores and self-regulation) and 3 predictors (sensitivity, attuned MM, and depression) proved to be non-significant for all 4 models examined. Models 1 and 2 approached significance, which may be an indication that even a relatively moderate increase in sample size ($N = 50$) could have enhanced statistical power enough to reveal significant effects. Although the only trend revealed in the correlational analyses for the SE domains was between attuned MM for the teaching task and self-regulation, sensitivity appeared to be the only slope that approached significance in at least one multiple regression model; the prediction of self-regulation by sensitivity, attuned MM for the play task, and depression (model 4). The two trends revealed between self-regulation and the maternal variables are consistent with research suggesting that both sensitivity and attuned MM are important to the development self-regulation (Bernier et al., 2010).

5.6 Strengths and Limitations

Results revealed in the current study must be evaluated relative to the small sample size recruited which may have impacted the statistical power needed to accurately estimate the strength of association among the variables of interest. Small sample sizes tend to increase the level of Type II error and reduce reliability of effect size estimates. Two post hoc power analyses using G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) served to confirm a lack of statistical power in the current study. A post hoc power analysis of the association between sensitivity and infant SE total score ($r_s = .20, ns$) revealed power was only .35 to detect a small effect, indicating a 65% chance of retaining the null hypothesis when the alternative hypothesis was correct. A post hoc power analysis of the effect size for multiple regression models 1 and 2 which approached significance ($f^2 = .17$), revealed power was .63 for detecting a medium effect, indicating a 37% chance of retaining the null hypothesis incorrectly. Although the small sample size may limit generalization of the effects that were revealed, the data performed as expected given prior research examining the association between maternal sensitivity and attuned MM during free play interactions, and the association between sensitivity and maternal depression.

Results revealed in the current study must be evaluated relative to the sample as whole being a healthy one; the majority of mothers were sensitive caregivers who did not report depressive symptoms and rated their infants high in socioemotional functioning. Mothers were also highly educated, were in relationships with fathers of their infants, and were generally well off financially. The associations that were revealed in the current study may only reflect behavior of healthy mother-infant dyads that are not experiencing

stress associated with factors such as depression, lower income, and single-parent status. In a recent study, sensitivity and mind-mindedness were among the variables negatively associated with externalizing and internalizing behavior in young children, particularly for families of low socioeconomic status (Meins, Centifanti, Fernyhough, & Fishburn, 2013). Adult versus adolescent mothers have been found to use more mind-related comments overall, and their mind-related comments tend to be more positive and appropriate (Demers et al., 2010). Future research examining these variables with a larger and more varied sample could provide a clearer and more accurate picture of the nature and strength of association among these variables. This is particularly critical for the planning and development of interventions serving to enhance attachment relationships in families experiencing psychosocial and/or economic stress.

The infant SE measure chosen for the current study lacked adequate internal consistency overall. As a consequence, trends that were revealed between the infant SE and maternal variables need to be interpreted with caution as they may simply reflect particular characteristics of the sample recruited. Although the number of items in the ASQ-SE are not distributed equally across the domains in order to accommodate for changes in infant development over time (Squires et al., 2002), reliability of the measure for young infants could be enhanced by the identification and inclusion of more items reflecting behavior characteristic of young infants at risk for socioemotional delay. In addition, more attention may need to be paid to the examination of the questionnaire's underlying structure for the youngest age groups assessed, perhaps in the form of a factor analysis. The decision to use a socioemotional measure other than security of attachment was motivated by a desire to test the hypothesis that the association between mind-

mindfulness and infant SE was either mediated or partially mediated by sensitivity in a manner expected given prior research indicating sensitive caregiving mediates the relation between mind-mindfulness and security. Although the data prohibited examination of an indirect effect, it is important to note that the non-significant association between sensitivity and total SE scores ($r_s = .20$) was consistent with a meta-analysis by De Wolff and van IJzendoorn (1997) that found a medium effect between sensitivity when using Ainsworth's original sensitivity scale (1974) and attachment security ($r = .24$), and an overall combined effect across all studies between sensitivity and security ($r = .17$).

The assessment of concurrent associations only served as a limitation in terms of limiting our understanding about how infant socioemotional development is impacted by sensitivity and attuned MM over time. Research by Isabella (1998) and colleagues (Isabella et al., 1989) demonstrates that in addition to situational context, other variables such as the frequency of the observations made, the duration of the observations and/or required tasks, and the infant's age (stage of development) impact how mother-infant dyads organize their behavior both currently and across time. Different socioemotional competencies may be more salient during different developmental periods, perhaps because specific competencies build on each other over time. A longitudinal examination of the maternal variables examined in the current study could help explain how each impacts the developmental trajectories of different infant SE domains in the same way research by Ainsworth and colleagues (1978) has contributed to our understanding of how early maternal behavior influences later development of an attachment with her infant.

The medium effect revealed between sensitivity and attuned MM for play task could have been influenced by how the videotaped interactions tasks were organized; the teaching task was always followed by the play task. In future research, the order of tasks could be randomized to control for order effects. Because the author of the study participated in a majority of the home observations and conducted a majority of the sensitivity assessments, her participation may have introduced experimenter bias. The author had been participating in the assessment of sensitivity for other research projects for approximately 4 years with consistent reliability. Financial limitations influenced the extent to which the author could avoid actively participating in the data collection.

The presence of observers could also have impacted how the mother-infant dyads behaved during the home observation, although parents have generally reported enjoying participating in similar observational studies. Conducting assessments in the home enhanced the ecological validity of the study. One particular difference to note between the current study and prior studies is that the free play interaction in the current study involved mother and infant playing as they usually would at home, meaning they were free to choose activities and/or toys, as well as determine whether or not siblings were present and/or participated. Most prior research has involved free play interactions with toys provided by the researchers, with no other family members participating during the interaction (Demers, Bernier, Tarabulsky, & Provost, 2010; Laranjo et al., 2008; Lundy, 2003; Meins et al., 2001; Meins et al., 2002).

Two of the graduate students (not the author) who participated in the assessment of sensitivity also coded transcripts for attuned MM. Steps were taken to insure their coding of attuned MM was independent of their assessment of sensitivity (they did not

coded attuned MM data for the visits they participated in). In addition, coding of the transcripts for attuned MM took place after the majority of home observations had been completed, further limiting the possibility that one person could have inadvertently coded a transcript associated with a visit they participated in. Inter-rater reliability (agreement) for the attuned MM coding could have been improved by having coders meet to review coding disagreements and then come to an agreement about how to handle the discrepancies. Time constraints and varying academic schedules made it difficult to schedule such meetings. Inter-rater reliability was assessed on a weekly basis, and low overall reliability during one particular time period was addressed by having all transcripts associated with that time period recoded.

A coding decision made in the current study could have underestimated the frequency of attuned MM behavior. According to the coding manual written by Meins & Fernyhough (2010), maternal use of mind-related words serving to suggest a new activity during a “lull” in the infant’s engagement in any particular activity (e.g., “You *want* to read a book?”), are coded as being mind-minded and attuned. Mind-related comments in the form of a suggestion during a lull in infant activity were not coded as attuned in the current study unless the comment was tied to what the pause in activity might mean (e.g., “You’re *thinking* about what to do next?”; “You’re getting *bored*, huh?”), as opposed to a suggestion of a particular activity (“You *want* to read a book next?”). Although a suggestion to begin a new activity may have been appropriate, it did not necessarily follow that the suggestion reflected the infant’s current desires or preferences (e.g., during a lull in activity, mother asks if her infant wants to read a book, gives the book to her infant, but the infant pushes it away).

The accuracy of future estimates of attuned MM could be enhanced by differentiating between these two types of mind-related strategies: those specifically tied to the infant's current activity, and those that may serve to predict what would *most likely* interest the infant after a lull; if the infant actually engages in the suggested activity within a specified time frame the mother's comment could be coded as attuned. A related limitation of the mind-mindedness coding system is that non-specific references to an infant's current state (e.g., "What do you *want*?") are not coded as being mind-related. If these types of non-specific references to the infant's current state are not coded as mind-related, an analysis of their potential impact on, or association with, other variables of interest cannot be assessed. Overall, the proportion of attuned MM comments relative to the total number of maternal comments tends to be low. While this demonstrates that low frequencies of specific maternal behaviors can serve as significant predictors of SE outcomes (such as attachment security), it also means that the majority of maternal comments are not being evaluated as carefully as mental state comments in mind-mindedness studies. More attention to the content of all maternal comments may enhance our understanding of how maternal talk influences the development of socioemotional competence.

5.7 Implications for Clinical Intervention Research

An underlying goal motivating the undertaking of the current study was to gain a better understanding of caregiver behavior associated with the development of secure attachments given the level of empirical evidence demonstrating that security during infancy is associated with a variety of positive outcomes in later childhood and adolescence (Belsky & Pasco-Fearon, 2002; DeKlyen & Greenberg, 2008; Sroufe,

Egeland, Carlson, & Collins, 2005; Thompson, 2008). An understanding of caregiver behavior associated with security is critical to development of interventions serving to promote positive socioemotional development and prevent development of behavioral and emotional disorders. Interventions specifically targeting sensitivity appear to be most effective in enhancing caregiver sensitivity and in reorganizing security (Bakermans-Kranenburg et al., 2003). Evidence-based interventions such as *The Circle of Security* (Marvin, Cooper, Hoffman, & Powell, 2002) have demonstrated that clinical attention to a caregiver's internal working model of self and her child, as well as the mother's specific caregiving behavior (sensitivity to an infant's need for proximity and contact, and exploration), is effective in improving the security of attachment between a mother and her infant.

Research assessing mind-mindedness by asking a mother to describe her infant (Meins et al., 1998), or by assessing the appropriateness of mind-related comments made by mother during interactions with her child (Meins et al., 2001), suggest that enhancing a mother's capacity for mind-mindedness could prove beneficial to the development of secure mother-infant attachments. Preliminary evidence from a 5-year randomized control trial of the *Minding the Baby* intervention (Slade, Sadler, & Mayes, 2005), revealed that enhancing a mother's reflective functioning capacity with her infant made it less likely that the child's parents described their child as having behavioral difficulties at 3 to 5 years of age (Yale Child Study Center, 2013).

While results revealed in the current study may tentatively suggest that self-regulation is a socioemotional domain that is particularly influenced by sensitivity and attuned MM, it is important to remember the overall health represented by the sample in

the current study. Prior research examining sensitivity and mind-mindedness has demonstrated that factors such as socioeconomic status can influence the nature and strength of relationship between maternal behavior and child behavioral outcomes (Meins et al., 2013). In general, interventions seeking to enhance a caregiver's sensitivity and/or mind-mindedness need to pay particular attention to the impact maternal depression will have on both types of caregiving behavior. In a review of risk and protective factors associated with maternal depression, Goodman & Brand (2009) outlined a variety of risks to infants associated with having a depressed mother, among them were a decreased likelihood of forming a secure attachment with mother, deficits in emotional and behavioral regulatory development, increased expression of negative affective states, cognitive impairment, and neuroendocrine and physiological challenges (elevated stress hormone production).

The association between maternal depression and sensitivity in the current study was expected given that the link between depression and sensitivity has been well established (Gelfand & Teti, 1990; Jameson, Geldfand, Kulscar, & Teti, 1997; Teti, Gelfand, Messinger, & Isabella, 1995). The link between maternal depression and mind-mindedness needs further exploration as the association has rarely been examined in the mind-mindedness research (Lundy, 2003; Rosenblum et al., 2008). In a study examining maternal speech of depressed mothers versus healthy mothers, speech of depressed mothers was characterized by a reduced focus on the infant's experience, and an increased focus on the mother's experience and/or other topics not immediately relevant to the current activity (Murry, Kempton, Woolgar, & Hooper, 1993). When the discourse of depressed mothers was focused on their infant, it was less likely to reflect the mother's

understanding of her infant as an intentional agent, and was more likely to be critical or hostile (Murray et al., 1993). Although maternal depression was not associated with attuned MM in the current study, the emphasis placed on maternal language in the mind-mindedness construct indicates an attention to maternal depression in the planning of mind-mindedness research and interventions is called for.

5.8 Summary and Conclusions

In conclusion, results of the current study were consistent with prior research indicating attuned MM is a consistent correlate of maternal sensitivity during free play interactions. The current study's use of a teaching task in addition to a free play task suggests that task requirements may influence the nature and strength of association between these two key maternal variables. Although neither attuned MM or sensitivity were found to be associated with total scores for infant SE functioning, some evidence of association was revealed between attuned MM and self-regulation that is consistent with prior research (Bernier et al., 2010), as well as theory suggesting that the capacity to attribute mental states to others, and to think about the self and others in terms of mental states is important in the development of self and affect regulation (Fonagy & Target, 1997; Fonagy et al., 2008). Although the small sample size may limit how well results of the current study generalize to the larger population, associations that were revealed provide tentative evidence that continued examination of the associations between maternal sensitivity, maternal attuned MM, and specific domains of infant socioemotional development is warranted, particularly among families who are at risk either economically or psychosocially. Future research should be designed to examine these associations in different contexts, as well as longitudinally in order to provide a

more complete picture of how caregiver behavior influences socioemotional competence in young children. An attention to the impact factors such as maternal depression may have on caregiver behavior is essential to both future empirical research endeavors and in the planning and development of interventions seeking to enhance maternal sensitivity and mind-mindedness.

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