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Predictors of Maternal Sensitivity to Infant Distress

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SYNOPSIS

Objective—The present study was designed to examine the extent to which mothers' emotional (i.e., empathy, negative emotions) and cognitive (i.e., accurate detection of distress, goals about infant crying, and emotion efficacy) responses to infant distress are related to maternal sensitivity in tasks designed to elicit infant distress. Mothers' emotional and cognitive responses to distress were assessed both prenatally in response to unfamiliar infants and postnatally in response to own infant. The extent to which prenatal and postnatal measures correlated with one another and with sensitivity to distress was examined.

Design—One-hundred and one mothers were interviewed prenatally about their responses to videotapes of crying infants, then videotaped interacting with their own infants at 6-months postpartum in two emotionally arousing tasks during which maternal sensitivity and infant distress were rated, and participated in a video-recall interview about their thoughts and feelings during the emotionally arousing tasks.

Results—Mothers' prenatal and postnatal goals in relation to infant distress and emotional reactions to infant distress were the most consistent predictors of sensitivity, but prenatal accurate detection of infant distress also predicted sensitivity. Furthermore, mothers' goals, emotional reactions to crying, and accurate distress detection buffered maternal sensitivity from the negative effect of observed infant distress. That is, infant distress was less strongly negatively associated with sensitivity when mothers had more infant-oriented goals, reported fewer negative emotions in response to infant crying, or were skilled at detecting infant distress.

Conclusions—Assessing mothers' emotional and cognitive responses to infant distress provides insights into the origins of sensitivity to infant distress. Methodological issues relevant to assessing mothers' emotional and cognitive responses to infant distress are raised.

INTRODUCTION

Responding sensitively to infant distress can be a daunting task for new mothers. Crying is aversive and signals that the infant needs something, but determining what the infant needs is often difficult (Lester, 1985; Murray, 1985). Furthermore, as a society we judge mothers based on their ability to manage their infant's distress. However, we know very little about the processes by which mothers determine when and how to respond to infant distress. This information is critical because there is considerable evidence that infants develop healthy relationships, as evidenced by attachment security, and skills such as emotion regulation and social competence, as well as behavioral competence, as indexed by the absence of behavioral problems, in the context of early sensitive interactions with their mothers (Ainsworth, Blehar, Waters & Wall, 1978; Braungart-Rieker, Garwood, Powers, & Notaro, 1998; van den Boom, 1994). Sensitive responses to infant distress or needs for safety and protection may be of the

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greatest developmental significance in relation to children's social emotional functioning (Bowlby 1969; Goldberg, Grusec, & Jenkins, 1999; Thompson, 1997). When examined simultaneously, maternal sensitivity to distress was more predictive of infant-mother attachment security, social competence, behavioral adjustment, and affect regulation than was sensitivity to non-distress (Davidov & Grusec, 2006; Del Carmen, Pederson, Huffman & Bryan, 1993; Leerkes, Blankson, & O'Brien, 2009; McElwain & Booth-LaForce, 2005). Thus, the primary purpose of this paper is to identify predictors of maternal sensitivity to infant distress with a focus on mothers' emotional and cognitive responses to infant distress. Mothers' emotional and cognitive responses to distress were assessed during the prenatal period in response to videotapes of unfamiliar infants and at 6-months post-partum in response to videotapes of their own infants. Thus, a secondary goal was to determine the extent to which mothers' prenatal and postnatal emotional and cognitive responses to infant distress correlated with one another and the extent to which they each predicted maternal sensitivity to infant distress which was assessed when infants were 6-months old.

Decades ago, Ainsworth et al. (1978) suggested that to respond sensitively, mothers must notice and interpret infant cues, see their infant's point of view, and respond considerately in a manner that does not distort their infant's needs based on their own. However, these processes have received little empirical attention. Since then, Dix (1991) theorized that negative appraisals of child behavior relate to parental negative emotions, which increase the self-focus of parenting goals, thereby interfering with parents' ability to respond sensitively to children's needs. Finally, Gottman, Katz, and Hooven (1996, 1997) identified a group of parents categorized as emotion-coaching. These parents are confident in the realm of their own emotions, aware of low intensity negative emotions, view negative emotions as an opportunity for intimacy and learning, believe it is important to validate their children's emotions, help their children label their emotions, and problem solve with their children. Parents with this type of emotion philosophy engaged in more adaptive parenting behaviors than comparison parents with other emotion philosophies.

Each of the elements outlined by these three groups of scholars is apparent in the social information processing perspective (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). This model posits that social behavior is influenced by how one processes and interprets the cues of one's social partner implicating cue encoding and interpretation, emotional arousal, goal clarification, and response decisions which are based in part on self-efficacy evaluations as important precursors to specific social behaviors and interactive styles. Elements of the social information processing model have been usefully applied to the study of child abuse (Milner, 1993) and harsh discipline (Lorber & O'Leary, 2005). To date, no single study has applied a comprehensive model including all of these emotional and cognitive elements to the study of maternal sensitivity to infant distress cues. In the current study, mothers' emotional responses to distress (i.e., empathy and negative emotions) and cognitive responses to distress (i.e., distress cue detection, parenting goals in relation to infant crying, and efficacy beliefs about responding to infant distress) are examined simultaneously as potentially important factors that contribute to sensitive parenting. These factors are defined below and the processes by which they influence sensitivity to infant distress are elaborated.

Emotion detection refers to a mother's ability to perceive her infant's distress. Mothers who fail to detect infant distress may engage in behaviors that are poorly matched to the infant's state or may not respond at all. Consistent with this view, abusive mothers make more mistakes identifying specific emotions than non-abusive mothers (Kropp & Haynes, 1987), and mothers who were trained to identify their infants' signals, including distress, in a parenting intervention were more sensitive than control group mothers (van den Boom, 1994). Finally, maternal awareness of subtle differences in infant facial expressions correlated positively with maternal

sensitivity during toddlerhood even after controlling for prior maternal sensitivity (Donovan, Leavitt, Taylor, & Broder, 2007).

Mothers' emotional reactions to infant distress range from empathy to anxiety or anger, and specific emotional states motivate different types of response (Dix, 1991). *Empathic* or infant-focused emotional reactions increase the likelihood that a mother will intervene on her infant's behalf and do so sensitively because she genuinely feels for her infant, suggesting a prioritization of her infant's needs (Dix, Gershoff, Meunier, & Miller, 2004; Feshbach, 1987; Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002). In contrast, mothers who experience self-focused *negative emotions* (e.g., anger, anxiety) may withdraw or respond intrusively in an attempt to avoid or end the infant's display of negative affect because it is aversive (Cassidy, 1994; Lorber & O'Leary, 2005; Martin, Clements, & Crnic, 2002).

Parenting goals reflect what parents hope to achieve through their interaction with their children and are believed to guide parenting behavior (Sigel & McGillicuddy-De Lisi, 2002). Expanding on Dix's (1991, 1992) assertion that parents who prioritize child concerns are more sensitive, mothers with *infant-oriented goals* in relation to crying are more sensitive to infant distress because they value emotions, prioritize their infants' needs over their own and want to help their infants regulate distress. These mothers are likely to engage in soothing and supportive behaviors. In contrast, *mother-oriented goals* likely undermine sensitivity because they focus on mothers' needs such as getting the infant to conform to her schedule or getting away from the aversive sound of infant crying which may promote intrusive or withdrawal responses to infant distress. Consistent with this view, previous research in other parenting domains indicates that child-oriented goals are related to more adaptive parenting than parent-oriented goals (Hastings & Grusec, 1998; Hastings & Rubin, 1999; Kuczynski, 1984). In relation to responsiveness to crying, Zeifman (2003) found that adults with negative beliefs about crying (e.g., "you can spoil a baby by picking it up whenever it cries," p. 602) reported they would wait longer before intervening when an infant was crying.

Emotion efficacy refers to a mother's confidence in her ability to identify and respond effectively to infant distress. Highly efficacious people undertake more challenging tasks and persist longer in the face of challenge (Bandura, 1977). Thus, mothers who are confident in their ability to identify what their infants are feeling and why, and who feel capable of responding effectively, are more likely to intervene when their infants are distressed and to persist in responding when their infants cry often and intensely. Consistent with this view, maternal self-efficacy correlated positively with maternal sensitivity (Teti & Gelfland, 1991), and buffered mothers from the negative effect of difficult infant temperament on maternal sensitivity during emotionally arousing activities (Leerkes & Crockenberg, 2002). Alternatively, perceived parental powerlessness correlated with negative parenting (Bugental, Blue, & Cruzcosa, 1989).

In addition to maternal characteristics, infant behavior in the moment, the social cue mothers are responding to, should be related to maternal sensitivity. Since Bell (1968) first raised the issue of bi-directional effects and Thomas, Chess, Birch, Hertzig and Korn's (1963) seminal work on infant temperament, researchers and practitioners have assumed that infant "difficult temperament" or negative emotionality has a negative effect on parenting. They reasoned that infant crying is unpleasant and the pervasiveness of crying is stressful because it demands a response that interferes with mothers' ability to get other things done. This in turn, was believed to contribute to negative feelings toward the infant which would undermine maternal sensitivity (Crockenberg & Leerkes, 2003). However, meta-analysis suggests main effects of negative emotionality on maternal behavior are weak and likely depend on other parent characteristics (Paulussen-Hoogeboom, Stams, Hermanns, & Peetsma, 2007). In fact, Crockenberg (1986) has long argued that negative effects of temperament on parenting may be apparent only when

other stressors are present or buffers are absent. In the present study, the moderating role of mothers' emotional and cognitive responses to infant distress on the link between infant negative emotionality and maternal sensitivity to distress is examined. Infant negative emotionality may correlate negatively with maternal sensitivity to distress only if mothers' have negative emotional and cognitive responses to crying. In contrast, mothers who have positive emotional and cognitive responses to distress (i.e., accurate detection of distress, empathy, low anger and anxiety, infant-oriented goals, and high efficacy) are unlikely to respond insensitively to infant distress because they are unlikely to develop negative feelings toward their infants allowing these mothers to put their infants' needs first even if their infants cry intensely and for a long duration. In the present study, an observational measure of infant distress during the interactional context is utilized as the measure of negative emotionality because it provides a window into the type of social cue the mother is processing in the moment. Examining interactions between mothers' emotional and cognitive responses to infant distress and observed infant distress essentially tests the joint effect of mothers' interpretive tendencies and salient infant social cues on mothers' current behavior.

In addition to examining sensitivity to infant distress cues, sensitivity during emotionally arousing tasks was measured, even when the infant was not distressed. Importantly, some infants may not become distressed because their mothers are adept at anticipating and preventing their distress, important elements of sensitivity in distressing contexts. Consistent with this view, Holden (1983) identified two types of parenting behavior; those that are in response to child behavior and those that a pre-emptive or preventative in nature. In this classic study, the use of preventative techniques (primarily attentional in nature) was linked with less child misbehavior. Comparably, mothers who are skilled at directing infants' attention away from distressing events, have infants who display less distress (Crockenberg & Leerkes, 2004).

In sum, the purpose of this study was to identify specific emotional and cognitive processes that are related to how sensitively mothers respond to infant distress and non-distress cues in an emotionally arousing context. This is an advance over previous research which has tended to focus on singular antecedent processes rather than examining the influence of multiple affective and cognitive processes that likely influence parenting behavior simultaneously. By evaluating each of the emotional and cognitive responses to distress simultaneously, the factors that play the most significant role in predicting maternal behavior can be identified. In addition, mothers were interviewed about their emotional and cognitive responses to distress in response to unfamiliar infants during the prenatal period and their own infants at 6-months postpartum. This methodological feature allows for an examination of the extent to which responses to own infant and unfamiliar infants correlate with one another and examination of the predictive validity of each in relation to mothers' behavioral responses to their own infants. Finally, maternal depressive symptoms were assessed to determine if mothers' emotional and cognitive responses to distress predict unique variation in sensitivity to distress after accounting for an indicator of maternal well-being that frequently correlates with measures of sensitivity in infancy (NICHD ECCRN, 2005).

The following hypotheses were tested: (1) Maternal detection of infant distress, empathy, infant-oriented emotion goals, and emotion efficacy will correlate positively with maternal sensitivity, whereas negative maternal emotions will correlate negatively with maternal sensitivity. (2) Observed infant distress will interact with mothers' emotional and cognitive responses to infant distress to predict sensitivity during the arousing tasks. Specifically, infant distress will be negatively correlated with maternal sensitivity only if mothers have negative cognitive and emotional responses to infant distress (i.e., low emotion detection, empathy, infant-oriented goals, or efficacy; high negative emotions). It is anticipated that parallel dimensions of mothers' emotional and cognitive responses to unfamiliar infants assessed

prenatally and own infant assessed postnatally will correlate positively (e.g., prenatal empathy and postnatal empathy), and that the hypothesized associations with sensitivity will be comparable (i.e., in the same direction) across assessment periods (i.e., prenatal and postnatal). However, associations between postnatal emotional and cognitive responses to distress and sensitivity may be somewhat stronger because they may be more salient as they are based on an infant with whom the mother shares a close relationship and because they are based on mothers' descriptions of the event in which their sensitivity was actually observed.

METHOD

Participants

One-hundred and nineteen primiparous mothers completed the prenatal data collection. Of these, 18 mothers failed to complete the 6-month data collection, primarily because they moved out of the area. No significant differences emerged between the two groups based on demographics or any of the prenatal variables of interest. Thus, the final sample consisted of 101 mothers and infants. Mothers' ages ranged from 15 to 37 years (M = 27.79), education ranged from less than a high school diploma to a graduate degree (36% did not have a college degree), and annual income ranged from $6,000 to $190,000 (median = $65,000; 9 families were below the federal poverty level based on family size). Seventy-two percent of mothers were European American, 25% African American, 2% Asian American, and 1% Latin American. Eleven mothers were single mothers with no father involvement; the rest were married, living with, or dating their child's father. All infants were term and healthy; 56 were male.

Procedures

Expectant mothers were recruited at childbirth classes offered in the local hospital and public health department. Those who agreed to participate were mailed consent forms, a demographic questionnaire, and a measure of depressive symptoms. Mothers visited the campus research laboratory for an audiotaped interview 4 to 6 weeks prior to their due date. Mothers received a $15 gift certificate upon completing the prenatal assessments. An observation of mother-infant interaction and a second interview were scheduled within 1 week of the infant's 6-month birthday. Mothers were mailed the depression questionnaire to complete prior to this visit. Mothers received a $20 gift certificate and parenting book of their choice upon completing the 6-month interview.

Prenatal emotion interview—Four to 6 weeks prior to their due dates, mothers viewed 6 brief videoclips of two different 6-month-old infants, dressed in gender neutral clothing. One infant displayed low level fear during a 10-s clip, intense fear during another 10-s clip, and a range of fear intensities during a 1-min clip. The other infant displayed low level anger during a 10-s clip, intense anger during another 10-s clip, and a range of anger intensities during a 1-min clip. The fear clips were videotaped during a novelty task in which an unpredictable toy that moved and made noise was presented to the infant, and the anger clips were videotaped during a limitations task in which the infant's arms were restrained by an experimenter for 3 min (Leerkes & Crockenberg, 2003). After viewing the short clips, mothers rated the valence and intensity of the infant's distress and identified the infant's emotion(s). Following the full clip, they provided the same data, rated the extent to which they themselves felt various emotions while watching, described how they would respond and why, what their goal would be, and rated how efficacious they would feel responding. The audiotaped interviews lasted approximately 1 hour, were transcribed, and then coded as described below.

Six-month observation of infant temperament and maternal behavior—Within 1 week of the infant's 6-month birthday, mother and infant behavior were videotaped during a

laboratory assessment. During a 10-min warm-up period, mothers were instructed to change their infant into a gender neutral outfit we provided and to make themselves and their infants comfortable. Then, the experimenter returned to the room and asked the mother to place her infant in an infant seat. Mothers sat adjacent to the infant, situated so that with some effort infants could see them. This was followed by 2 emotion-eliciting tasks (novelty and limitations; counterbalanced), with a 5-min break in between to prevent carryover.

During the *novelty task*, the infant was tucked into a table with a short barrier wall near the infant that prevented the novel toy from touching the infant. A remote control operated dump truck with flashing lights, motion, and sound approached the infant from the opposite side of the table twice. While immobile in front of the infant, the truck's horn, ignition, and a voice sounded, and music played while the truck vibrated and its lights flashed. During this period the mother was instructed to remain neutral and uninvolved unless she wanted to end the activity. Then, the experimenter signaled the mother that she could interact with her infant as she pleased. The same sequence was repeated twice while the mother was involved. Then, the silent and still truck remained within the infant's reach for 1 min. The entire task lasted 3.5 min.

During the *limiting task*, the experimenter knelt in front of the infant seat and gently held the infant's forearms immobile for 4 min. The experimenter kept her head down and did not interact with the infant. During the first min the mother was instructed to remain neutral and uninvolved unless she wanted to end the activity. Then the experimenter signaled the mother that she could interact with her infant as she pleased for the remaining 3 min.

Six-month maternal emotion interview—Immediately after the observation, the mother and experimenter moved to an adjacent room for the audiotaped interview while another research assistant cared for the infant. After viewing the videotapes of each task, the experimenter asked the mother to describe her infant's emotional state, rate her own emotional responses, describe the goals of her behavior during the interaction, and rate how confident she felt responding.

Measures

Depressive symptoms—Depressive symptoms were assessed prenatally and postnatally using the 20-item Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977) which consists of a checklist of moods, feelings, and cognitions associated with depression (e.g., "I felt depressed," "I felt that people dislike me"). Respondents indicate how often they felt a particular way during the previous week on a 4-point scale ranging from *rarely/never* (1) to *most of the time* (4). Items from the CES-D were averaged to derive measures of mothers' prenatal and postnatal depressive symptoms with Cronbach's $\alpha = .85$ at both times.

Distress detection—During the prenatal interview, mothers rated the valence and intensity of infant distress after each clip on a scale ranging from 1 (*high positive*) to 7 (*high negative*) that included mid points (e.g., 3.5). Point 4 was labeled *neutral affect* meaning neither positive nor negative. Consistent with the approach used by Leerkes et al. (2004), mothers were coded as minimizing or underrating distress if they gave a rating that was .5 or more points lower than the ratings made by reliably trained raters. Thus, a rating of less than 4.5 for the mild fear and anger clips, less than 6 on the intense clips, and less than 5.5 for the long clips, which contained both mild and intense distress, were scored as minimizing. The number of times mothers minimized (out of 6) were summed to create a *minimization score*. Thirty-two percent of mothers did not minimize any clips, 29% minimized 1 clip, 17% minimized 2 clips, and 22% minimized 3 or more clips. For each clip, mothers were asked to identify the infants' dominant emotion from a list of 20 emotion terms (e.g., interested, happy, sad, angry) or other

self-generated emotion terms. The number of clips (out of 6) the mothers indicated that the infants' dominant emotion was a non-emotion word (e.g., tired, hungry, bored) or a positive emotion word (e.g., happy, interested) were summed to create a measure of *failure to detect negative emotions*. Twenty-two percent of mothers made no such detection errors, 40% made 1 error, 24% made 2 errors, and 14% made 3 or more errors. These scores correlated highly, $r(99) = .52$, $p < .01$, and were summed and then reversed so the score reflects more accurate *prenatal distress detection*.

A different approach was used to assess mothers' postnatal distress detection because there was insufficient time between the observation and interview to edit the videos to show only brief segments in which the infants were distressed. Mothers were asked to indicate all emotions the infant displayed during each task. The number of s that each infant was distressed (i.e., rated a 5, 6, or 7 by the trained coders as explained below) was recorded and compared to the emotions that mothers listed. The number of s an infant was distressed when the mother claimed the infant did not experience any negative emotions during the tasks was used to reflect the extent to which the mother failed to detect infant distress. This score was multiplied by −1 so high scores reflect accurate *postnatal distress detection*. Scores ranged from −41 to 0.

Mother emotions—After watching each 1-min clip during the prenatal interview and each task in the postnatal interview, mothers rated how strongly they felt 17 emotions (e.g., sad, irritated, concerned) on a 4-point scale ranging from *not at all* (1) to *very strongly* (4). Then, mothers were asked to elaborate on why they felt each emotion. Following Dix et al. (2004), each explanation was then coded as infant-oriented or mother-oriented. Infant-oriented explanations primarily involved concerns about the infant's welfare, a desire to help the infant, sympathy or empathy for the infant, or feeling pleasure or pride in the infant's behavior. Examples include: "I was angry that someone put the baby in that situation.", "I felt sad for the baby.", and "I was anxious because I wanted to do something for the baby." Mother-oriented explanations involved self-focused concerns, negative reactions about the infant, or responses that are of interest or importance to the mother but not the infant. Examples include: "I was irritated by the sound of the baby's cry." and "All that crying made feel nervous; like I am supposed to know what to do." Inter-coder reliability was calculated on 25 prenatal and 25 postnatal transcripts; kappa was calculated to assess agreement for orientation on each of the distinct emotions and ranged from .72 to 1.0. Two emotional reaction scores, relevant to the current conceptualization, were created by averaging mothers' intensity ratings for appropriate emotions at each time point: *empathy* (infant-oriented empathy, sympathy, sad, irritated, angry, annoyed, frustrated, concerned, worried, nervous, anxious; $\alpha = .83$ and .79) and *negative emotions* (mother-oriented irritated, angry, annoyed, frustrated, concerned, worried, nervous, anxious; $\alpha = .61$ and .73).

Infant-oriented emotion goals—Mothers' goals in relation to infant distress were coded when mothers were asked what they would do and why after watching each 1-min clip (prenatally) and task (postnatally) and at the end of the interviews when mothers were asked to think more generally about their goals in response to infant distress. Eighteen goal categories were created based both on a priori conceptualizations and inductive techniques during the interview process and while reviewing the transcripts. Each category was scored as present or absent for each mother. Inter-coder reliability was calculated based on 59 transcripts; kappa for each category ranged from .60 to 1.0 ($M = .83$). Based on a priori conceptualization, two broad dimension scores were created to reflect infant or mother orientation by summing appropriate goal categories. *Infant-oriented emotion goals* is the sum of 8 categories: wants to soothe infant, wants secure relationship/ attachment with infant, wants infant to be happy, wants child to understand and value emotions, views crying as a means of communication, and wants her response to contribute to infant social competence, to coping skills, or to other indices of positive adjustment [e.g., self-esteem]. Scores ranged from 1 to 7 prenatally and 0 to 7

postnatally. *Mother-oriented emotion goals* is the sum of 10 categories: wants to minimize crying, stop crying because it upsets her, stop crying because it bothers others, stop crying because it interferes with her productivity, wants infant to control emotions without her assistance, wants infant to conform/behave, wants to respond in a way that makes herself and others think she is a good parent, emphasis on physical needs over emotions, does not want to spoil infant, and emphasis on cognitive development over emotions. Importantly, some mothers may endorse these categories, particularly the last two, out of concern for their infants' future development. However, to the extent that they reflect stricter, more negative, and less valuing attitudes about children's negative emotions, which have been demonstrated to undermine children's emotional well-being (Gottman, et al., 1996), classifying them as infant-oriented seems inappropriate. Scores ranged from 0 to 7 prenatally and postnatally.

In previous research (Leerkes et al., 2004), the mother versus infant orientation of goals were rated as opposite ends of a continuum such that low scores indicated a high mother-orientation, moderate scores indicated a balance between the two, and high scores indicated a high infant-orientation. This score was associated with sensitivity to distress demonstrating the validity of creating a score based on the relative extent to which mothers endorsed each type of goal. Given the number of proposed predictors in the current study, creating a similar single goal score was desired and preliminary analyses were conducted to determine the appropriateness of doing so in this sample. In the current sample, mother-oriented and infant-oriented goals were unrelated, r (99) = −.18 and −.06., both *ns* for the prenatal and postnatal measures, respectively. However, each goal measure correlated with measures of sensitivity in the expected direction (i.e., infant-oriented goals correlated positively and mother-oriented goals correlated negatively with sensitivity), and when entered in simultaneous regressions predicting each measure of sensitivity, the association between mother-oriented goals and sensitivity often dropped to non-significance suggesting the two goal measures predicted somewhat overlapping variability in sensitivity. Furthermore, when, a single goal score was created by subtracting the mother-oriented categories from the sum of the infant-oriented categories such that high scores reflect more *infant-oriented goals*, this difference score correlated more highly with each measure of sensitivity than did either goal measure independently. Thus, the difference score was selected as the best single goal measure for hypothesis testing. Possible scores ranged from −10 to 8.

Efficacy—During the prenatal interview, after each 1-min clip, mothers were asked to rate how good they thought they would be at the following 4 items if their own infant were feeling like the infant in the video: knowing what baby wants or needs, understanding what baby is feeling, knowing how to comfort baby, and getting baby to calm down. The response scale ranged from *not good at all* (1) to *very good* (4). During the postnatal interview, they were asked to rate how good they were at each of these items after watching the video of each task. This questionnaire was modeled after Teti and Gelfand's (1991) Maternal Self-Efficacy Scale which has predicted sensitive maternal behavior in a number of studies (Hess, Teti, & Hussey-Gardner, 2004; Teti & Gelfand). Items were averaged across clips/tasks to create a measure of *prenatal efficacy* (α = .86) and *postnatal efficacy* (α = .84); high scores reflect higher efficacy.

Behavioral coding—Infant and maternal behaviors were continuously coded from digital media files using the Observer 5.0 (Noldus Information Technology, Wageningen, The Netherlands). Event-based coding was used. A code was entered at the onset of a specific behavior, then when the behavior changed, a new code was entered which signaled the offset of the previous behavior. Thus, every moment of infant and mother behavior was coded to .01 s. Different people coded infant and maternal behavior to ensure independence.

Infant affect was rated during the emotion eliciting tasks on a 7 point scale ranging from *high positive affect* (1) to *high negative affect* (7) adapted from Braungart-Rieker and Stifter

(1996) based on infants' vocalizations, facial expressions, and body tension. Inter-rater reliability was calculated based on 33 tapes; weighted κ = .79. The average rating of infant affect across the mother-involved portions of the tasks was used as an index of infant temperamental reactivity because it captures both intensity and duration of *observed distress*. Only 4 infants did not become distressed demonstrating the effectiveness of the tasks at eliciting distress, but the average duration of distress was fairly brief (*M* = 55.19, *SD* = 58.00 sec).

Maternal sensitivity—Maternal behavior during the mother involved portion of the emotion-eliciting tasks was continuously coded using 12 mutually exclusive categories; these are displayed in Table 1. The maternal behavior and infant affect code files were then merged, and the sensitivity of maternal behavior given the infant's affective state at that moment were rated on a 3-point scale (1 = *insensitive*, 2 = *moderately sensitive*; 3 = *sensitive*). For example, monitoring a neutral infant would be rated as sensitive because the infant is not signaling a need. Monitoring an infant who is displaying positive affect is moderately sensitive as the infant is not signaling a need for assistance but the mother is missing out on opportunities for positive engagement. Monitoring when an infant is distressed would be rated as insensitive because the infant is signaling a clear need to which the mother does not respond. Sensitivity ratings for discrete maternal behaviors during infant positive, neutral, and negative affect appear in Table 1. Sensitivity ratings derived from this continuous coding scheme correlate positively with single global ratings of sensitivity and predict subsequent child outcomes such as anxiety demonstrating the validity of this approach (Crockenberg & Leerkes, 2006). Inter-coder reliability for maternal behavior was calculated based on 18 tapes, κ = .79. Mothers' average rating of sensitivity during all periods of infant distress and during the entire task in responses to all types of infant affect were calculated to yield measures of *sensitivity to distress* and *total sensitivity*.

RESULTS

Preliminary Analyses

Descriptive statistics for all variables appear in Table 2. No significant univariate or multivariate outliers were identified. Maternal education, age, and minority status, family income, and infant gender were examined as potential covariates. None was significantly correlated with a predictor variable and the measures of sensitivity; therefore, they were considered no further. Correlations between depressive symptoms, mothers' emotional and cognitive responses to distress, and maternal sensitivity appear in Table 3. Prenatal depressive symptoms were unrelated to all relevant variables. In contrast, postpartum depressive symptoms correlated positively with postnatal negative emotions in response to crying and negatively with postnatal goals and total sensitivity during the emotion arousing tasks. Thus, postpartum depressive symptoms were entered as a covariate in the regressions predicting sensitivity from mothers' postnatal emotional and cognitive responses to crying.

Associations Among the Emotional and Cognitive Response to Crying

Correlations among mothers' emotional and cognitive responses to distress are presented in Table 3. Above the diagonal, 3 of 10 correlations among the prenatal emotional and cognitive responses were significant. Prenatal negative emotional reactions to crying correlated positively with empathy and negatively with goals and efficacy. Likewise, 2 of 10 correlations among postnatal emotional and cognitive responses, below the diagonal, were significant. Postnatal distress detection and efficacy correlated positively, and negative emotions and empathy correlated positively. Average correlations were small in size suggesting that the emotional and cognitive responses to distress are primarily distinct constructs, *M* = .13, *SD* = .10 and *M* = .15, *SD* = .17 for prenatal and postnatal emotional and cognitive responses, respectively. To examine the extent to which mothers' emotional and cognitive responses

assessed in relation to unfamiliar infants prenatally correlate with similar responses when assessed in relation to their own infants postnatally, associations between parallel prenatal and postnatal responses to distress were examined. These appear in Table 3 on the diagonal in bold. Emotion efficacy demonstrated concordance across assessments, and the remaining associations were positive but nonsignificant. The average correlation between parallel prenatal and postnatal responses to distress was in the small range, $M = .19$, $SD = .11$.

Predictors of Maternal Sensitivity

Zero-order correlations between the prenatal and postnatal emotional and cognitive responses to distress and indices of maternal sensitivity are also presented in Table 3. Consistent with prediction, of *the prenatal variables* (above the diagonal), distress detection correlated positively with sensitivity to distress, negative emotions correlated negatively with both measures of sensitivity, and goals correlated positively with both measures of sensitivity. Consistent with prediction, *of the postnatal variables* (below the diagonal), distress detection correlated positively with total sensitivity, empathy correlated positively with sensitivity to distress, and goals correlated positively with both measures of sensitivity. Contrary to prediction, postnatal negative emotions correlated positively with sensitivity to distress.

Next, multiple regressions were calculated to determine the independence of effects and to test proposed interaction effects. Four models were calculated; models predicting sensitivity to distress and total sensitivity from the prenatal predictors only, and models predicting both measures of sensitivity from the postnatal predictors only. Variables were centered prior to the construction of the interaction terms, and significant interactions were interpreted by calculating simple slopes between observed infant distress and sensitivity at the values of +/−1 *SD* of the moderator (Aiken & West, 1991). To maintain an appropriate participant-to-predictor ratio, preliminary analyses were conducted in which all main effects and one proposed interaction effect at a time were regressed on the sensitivity measures. Both prenatal and postnatal emotion efficacy were unrelated to both measures of sensitivity as main effects and in conjunction with observed infant distress and were considered no further. Thus, the final regression models included observed infant distress and, in the postnatal models, depressive symptoms in step 1, followed by the emotional and cognitive responses to distress in step 2, and finally interaction terms between these and observed infant distress in step 3. The total number of predictors in the prenatal predictors models was 9 and in the postnatal predictors models was 10 meeting the traditional rule of thumb of 10 participants per predictor. Statistical power is adequate to detect large and moderate effect sizes (> .70), but poor to detect small effect sizes (< .20) (Cohen, 1988).

Prenatal predictors—As displayed in Table 4, observed infant distress was unrelated to maternal sensitivity to distress. When entered simultaneously after observed infant distress, maternal distress detection and goals were positively associated, and maternal negative emotions was negatively associated, with maternal sensitivity to distress as predicted. Prenatal emotional and cognitive responses to distress accounted for 24% of the variability in sensitivity to distress (19% main effects, 5% interaction effects), a moderately large total effect size ($f^2 = .32$)

When total maternal sensitivity during the emotion eliciting tasks was the outcome, observed infant distress had a large negative effect, accounting for 31% of the variability ($f^2 = .45$). Of the emotional and cognitive responses to distress, mothers' goals was the only significant main effect predictor. Several prenatal emotional and cognitive responses to distress (distress detection, negative emotions, and goals) moderated the effect of observed infant temperament on total maternal sensitivity during the arousing tasks, and each of these effects was consistent with the hypotheses. Specifically, accurate distress detection reduced the negative association

between infant distress and maternal sensitivity. Infant distress was more strongly negatively associated with total sensitivity during the emotion-eliciting tasks if mothers were poor (−1 SD) at detecting distress prenatally, β = −.78, p < .01, than if they were good (+1 SD) at detecting distress prenatally, β = −.29, $p < .05$. As predicted, maternal negative emotions in response to infant crying increased the negative association between observed infant distress and maternal sensitivity, β = −.26, $p < .05$, when negative emotions were low versus β = −.66, $p < .01$ when negative emotions were high. This interaction is illustrated in Figure 1. Finally, as illustrated in Figure 2, the negative association between infant distress and sensitivity was larger when goals were more mother oriented (−1 *SD*; β = −.82, $p < .01$), than when goals were more infant-oriented (+1 *SD*; β = −.20, $p < .05$). The prenatal emotional predictors accounted for 23% of the variability in total sensitivity during the distress tasks (8% main effects, 15% interaction effects), a moderately large total effect size ($f^2 = .30$).

Postnatal predictors—As presented in Table 5, neither observed infant distress nor maternal postpartum depressive symptoms were related to sensitivity to distress. When entered simultaneously and after controlling for covariates, postnatal empathy and goals were positively associated with sensitivity to distress as predicted. None of the hypothesized interaction effects was significant. Postnatal emotional and cognitive responses to crying accounted for 24% of the variability in sensitivity to distress (22% main effects, 2% interaction effects), a moderately large total effect size ($f^2 = .32$).

When total maternal sensitivity during the emotion arousing tasks was the outcome, postpartum depressive symptoms were negatively associated with total sensitivity and accounted for an additional 8% of the variability beyond the portion accounted for by the negative effect of observed infant distress (a small to moderate effect size, $f^2 = .09$). No main effects of mothers' emotional and cognitive responses to distress were significant, although as a set the main effects predicted significant variation in total sensitivity. Maternal negative emotions and goals moderated the association between infant distress and total sensitivity as hypothesized. First, maternal negative emotions exacerbated the negative effect of infant distress on sensitivity, β =−.31, $p < .05$, and β= −.65, $p < .01$, when negative emotions were low versus high similar to the effect illustrated in Figure 1. And, mothers were buffered from the negative effect of infant distress on sensitivity if they had more infant-oriented than mother-oriented goals. That is, observed infant distress and maternal sensitivity were significantly negatively associated when goals were low, β = −.88, $p < .01$, but not when they were high, β = −.16, *ns*, consistent with the interaction illustrated in Figure 2. Postnatal emotional and cognitive responses to distress accounted for 24% of the variability in total sensitivity during the arousing tasks (8% main effects; 16% interactive effects), a moderately large total effect size ($f^2 = .32$).

DISCUSSION

Consistent with the hypotheses, mothers' emotional and cognitive responses to infant distress predicted significant variation in maternal sensitivity to distress independently of one another and in conjunction with observed infant distress. These effects were independent of maternal depressive symptoms and accounted for more variability in sensitivity than depressive symptoms did. That accurate distress cue detection, negative emotional arousal, and goals in relation to crying each predicted significant and independent variation in sensitivity demonstrates the utility of applying a comprehensive social information processing perspective (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). That mothers' goals were the most consistent predictors of sensitivity to distress followed by their emotional reactions to distress is consistent with Dix's proposed affective organization of parenting (1991) and emphasis on child-oriented motives as a guide for positive parenting (1992). The role of each emotional and cognitive response to crying is discussed below as is a series of measurement issues.

Emotion goals emerged as the most consistent predictor in that both prenatal and postnatal goal measures correlated with both measures of sensitivity, and continued to predict unique variability in sensitivity independent of other variables in all four regression models as either a main effect or in conjunction with infant distress. This supports the view that parenting behavior is guided by beliefs, values, and desires for one's children (Sigel & McGillicudy-DeLisi, 2002). This finding is consistent with evidence that mothers with more negative beliefs about crying reported they would wait longer to intervene (Zeifman, 2003), but is the first study to demonstrate the link between this type of goal and observed parenting. Furthermore, both prenatal and postnatal goals buffered mothers from the negative effect of observed infant distress on total maternal sensitivity during the arousing tasks. Having crying-related goals that are more infant than mother-oriented appears to be a particularly salient buffer of infant temperament likely because mothers who prioritize their infants' needs and value negative emotions are not particularly threatened by or emotionally drained from responding to infant crying.

That mothers' prenatal negative emotions in response to crying was related to sensitivity to distress cues as a main effect is consistent with Dix et al.'s (2004) findings that parent-oriented negative emotions negatively affect the degree of support parents provide for children. Mothers who find crying aversive are unlikely to respond sensitively because these negative emotions undermine their ability to focus on their infant's needs. Both prenatal and postnatal negative emotions moderated the link between observed infant distress and total sensitivity as predicted. That is, infant distress was more strongly negatively associated with total sensitivity among mothers who felt a high degree of negative emotions supporting the view that infant temperament only has a negative effect on sensitivity when other risk factors are present (Crockenberg, 1986), in this case a personal discomfort with crying. That the prenatal and postnatal measure of negative emotions operated similarly demonstrates convergence across both measurement techniques. It is noteworthy that postnatal negative emotions correlated positively with sensitivity to distress, but this association was not significant in the regressions. Given that negative emotions and empathy correlated positively, the portion of negative emotions that overlapped with empathy may have accounted for this effect. This pattern of findings is consistent with the view that empathy consists of both perspective taking and personal distress which are linked, but have differential effects on behavior (Davis, 1983; Eisenberg & Fabes, 1990). Consistent with the view that emotional arousal plays a key role in determining how cues are interpreted, goals are clarified, and response decisions are made (Dix, 1991; Lemerise & Arsenio, 2000), mothers' emotional reactions to crying correlated more frequently with the other emotional and cognitive responses to crying than did any other variables, accounting for 4 out of 5 significant correlations among emotional and cognitive responses to distress.

Postnatal empathy, but not prenatal empathy, was positively associated with sensitivity to distress. That empathy in response to one's own infant, but not in response to unfamiliar infants, was more relevant in predicting sensitivity is consistent with the finding that compassionate love for a specific person, a correlate of empathy, is more predictive of prosocial behavior toward that person than is a global measure of empathy (Sprecher & Feher, 2005). As empathy did not buffer mothers from the negative association between infant distress and maternal behavior, it seems mothers' self-oriented distress reactions, and not empathy, are particularly important in understanding the association between infant distress and maternal sensitivity.

Accurate detection of the unfamiliar infants' distress during the prenatal period was positively related to sensitivity to distress consistent with the view that the ability to read infant signals accurately contributes to contingent responding (van den Boom, 1994). Furthermore, prenatal distress detection reduced the negative association between observed infant distress and total sensitivity, once again supporting the view that the nature of the association between infant

distress and maternal sensitivity depends on maternal characteristics. Mothers' ability to detect their own infants' distress was positively correlated with total sensitivity, but this association was not significant in the regression models. Postnatal distress detection is likely a less sensitive measure because it focused only on whether mothers' perceived infant distress, and not on how accurately they perceived the intensity of distress. The difficulty of measuring this type of accuracy in vivo and the predictive validity of the prenatal measure underscores the utility of assessing mothers' reactions to a standard set of crying infants.

Efficacy was the only predictor that was unrelated to sensitivity as a main effect or in conjunction with infant temperament. Others have reported that efficacy is only positively associated with sensitivity when other parenting skills or knowledge are also high (Hess et al., 2004; Leerkes, Crockenberg, & Burrous, 2004). Testing interactions among emotional and cognitive responses to distress in this sample was deemed inappropriate given the already high ratio of predictors to participants; thus, this possibility remains untested in the current sample.

Several methodological considerations were made apparent by the current results. Mothers' comparable prenatal and postnatal emotional and cognitive responses to distress were not strongly related to one another. This may be interpreted in three ways: (1) responses to own infant and unfamiliar infants may vary due to greater investment in and knowledge of one's own child; (2) mothers' emotional and cognitive responses to distress may have changed as a result of actual parenting experience (Holden, 1988); and (3) features of the postnatal interviews may have undermined the ability to measure emotional and cognitive responses to mothers' own infants' distress. Specifically, because some participating infants displayed very little or no negative affect (i.e., 20% were distressed for less than 10 s), the opportunity to measure emotional and cognitive responses to distress postnatally may have been minimized in contrast to the standard set of prenatal video clips that showed clear and intense instances of infant distress. In addition, during the postnatal interviews, mothers watched the tasks in their entirety regardless of infant affect because there was no time to edit the tapes to focus only on instances of distress between the observation and interview. Viewing periods of distress and non-distress may have affected mothers' responses. For example, a mother may have felt anxious during the 5 s that her infant cried, but may not have reported that because it was so brief in the context of the entire clip. Additional research is needed to determine if the lack of correlation between prenatal and postnatal emotional and cognitive responses to crying is simply a function of methodological issues or a function of substantive differences in how mothers think and feel about infant crying with greater parenting experience or in response to their own versus an unfamiliar infant.

Despite the lack of convergence between mothers' prenatal and postnatal emotional and cognitive responses to distress, there was evidence to support the predictive validity of each. That is, both prenatal and postnatal responses to infant distress predicted significant variation in maternal sensitivity during distressing tasks, and all significant effects operated in the predicted direction. Contrary to expectation, mothers' postnatal responses to crying did not predict more variation in sensitivity than their prenatal responses. It seems likely that the methodological issues noted above counteracted any potential added benefit of having mothers respond to videos of their own infants. That the prenatal responses to distress predicted comparable variation in sensitivity to distress underscores the utility of the unfamiliar infant video clip method in an attempt to understand how mothers think, feel, and ultimately respond behaviorally in response to infant crying.

Some applied implications are apparent from these findings. First, expectant mothers' emotional and cognitive responses to infant crying could be screened to identify mothers at risk for insensitive parenting. Beginning intervention prenatally may have some advantage in that emotional and cognitive responses to infant crying could be altered before specific

response patterns have become habitual. Second, altering mothers' goals about infant crying may be particularly fruitful as this was the most consistent predictor of sensitivity over time and across outcome measures. This interview technique would be too time intensive for clinical purposes, but a questionnaire could be administered both to identify at risk mothers and to identify specific goals to target during prevention or intervention. Third, the role of maternal negative emotions in relation to sensitivity to distress cues suggests that cognitive behavioral therapy or desensitization may be fruitful avenues of intervention. Finally, the role of the ability to detect infant distress supports the continued use of interventions that focus on mothers' abilities to read infant cues via video feedback (Bakersman-Kranenburg, Juffer, & van IJzendoorn, 1998).

Several limitations of the current study must be noted. The majority of the sample were high functioning, non-minority adults, and all were first-time mothers. Efforts should be made to determine if this pattern of findings holds in more at risk groups (e.g., adolescent mothers, victims of child abuse), various ethnic groups, and multiparous mothers. The duration of infant distress was relatively brief, and some infants did not become distressed restricting the measurement of mothers' emotional and cognitive responses to their own infants' distress and contributing to brief observations of sensitivity to distress. In future, additional emotion eliciting tasks should be used and efforts should be made to assess sensitivity to distress in multiple contexts. Given the small sample size, efforts were made to reduce the number of predictors. As a result, infant-oriented and mother-oriented goals were combined even though they did not correlate significantly. It may be that the association between goals and sensitivity is more complex than reported here. For example, mother-oriented goals may only undermine sensitivity if infant-oriented goals are low. Such possibilities should be examined in future research.

In conclusion, mothers' emotional and cognitive responses to both their own and unfamiliar infants' distress predict moderate to large variability in maternal sensitivity during arousing contexts. Replication and extension is needed to determine which emotional and cognitive responses to distress are ultimately of greatest importance.

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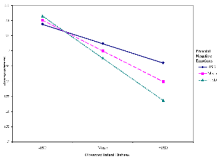

Figure 1.
Moderating effect of mothers' prenatal negative emotions on the association between observed infant distress and total sensitivity during the emotion-eliciting tasks.

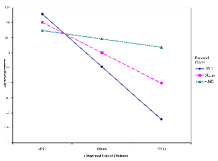

Figure 2.
Moderating effect of mothers' prenatal goals on the association between observed infant distress and total sensitivity during the emotion-eliciting tasks.

TABLE 1

Maternal Behavior Codes and Sensitivity Ratings Based on Concurrent Infant Affect

		Sensitivity Rating If: Infant Affect		
Maternal Behavior	**Description**	**Positive**	**Neutral**	**Negative**
Negative	directs negative affect toward the infant	1	1	1
Intrusive	forces own agenda on the infant	1	1	1
Mismatched affect	affect is incongruent with infant's	1	1	1
Withdraw	mother abruptly moves away or ends interaction with infant	1	2	1
Distracted	uninvolved or minimally involved with infant	1	2	1
Persistent ineffective	continues to respond to infant in same ineffective manner when alternative responses are available	2	2	2
Monitor	watches infant/situation without intervening	2	3	1
Task focused	engages with infant focusing on the arousing task	3	3	1
Calming	soothes infant physically or vocally	3	3	3
Supportive	maintains the infant's attention on the task while simultaneously calming infant	3	3	3
Non-task focused engagement	plays with or distracts the infant without using the arousing task	3	3	3
Routine care	engages in practices like wiping nose, straightening clothing	3	3	1

Note. Infant positive affect is a rating of 1, 2, or 3, neutral is 4, and negative is a rating of 5, 6, or 7. A detailed codebook is available on request.

TABLE 2

Descriptive Statistics

Responses to Video Clips	*M*	*SD*	Range
Prenatal- In Response to Standard Unfamiliar Infant Clips			
Depressive symptoms	1.57	.38	1.00–3.30
Distress detection	7.44	2.05	0.00–10.00
Empathy	1.91	.40	1.14–2.94
Negative emotions	1.13	.16	1.00–1.83
Infant-oriented goals	2.17	2.31	−3.00–7.00
Efficacy	3.18	.33	2.20–4.00
Postnatal-In Response to Own Infant Clips			
Depressive symptoms	1.42	.38	1.00–3.45
Distress detection	−1.56	3.86	−21.00–0.00
Empathy	1.39	.29	1.00–2.23
Negative emotions	1.15	.21	1.00–2.00
Infant-oriented goals	1.61	2.41	−5.00–6.00
Efficacy	3.47	.38	2.38–4.00
Observed Behaviors			
Infant distress	4.09	.28	3.39–5.16
Sensitivity to distress	2.34	.45	1.19–3.00
Sensitivity total task	2.84	.18	1.73–3.00

Note: $N = 101$ except for sensitivity to distress, $n = 97$

TABLE 3

Zero-Order Correlations Among Emotional And Cognitive Responses To Distress And Maternal Sensitivity

	1	2	3	4	5	6	7	8
1. Depressive symptoms	**.38****	−.03	.01	.14	−.09	−.15	.03	.00
2. Distress detection	.03	**.16**	.07	.10	.06	.09	.24*	.13
3. Empathy	.11	.15	**.13**	.36**	.02	.05	.03	−.03
4. Negative emotions	.40**	−.01	.59**	**.10**	−.22*	−.21*	−.22*	−.19
5. Infant-oriented goals	−.21*	.09	.01	−.14	**.18**	.16	.32**	.26**
6. Emotion efficacy	−.06	.23*	.03	−.13	.08	**.38****	.00	.04
7.Sensitivity to distress	−.11	.10	.34**	.23*	.28**	.03	--	--
8.Sensitivity total task	−.38**	.20*	−.05	−.13	.33**	.09	--	--

Note. Correlations among prenatal responses appear above the diagonal; correlations among postnatal responses are below the diagonal; correlation between parallel prenatal and postnatal responses appear on the diagonal and are in bold.

* $p < .05$;

** $p < .01$.

$N = 101$, $n = 97$ for sensitivity to distress

TABLE 4

Regressions Predicting Maternal Sensitivity From Prenatal Predictors

	Sensitivity to Distress				Sensitivity Total Task			
	B	**SE**	**β**	**R2Δ**	**B**	**SE**	**β**	**R2Δ**
1. Observed distress	−.02	.16	−.01		−.35	.05	−.56**	
2. Distress detection	.05	.02	.23*	.19**	.01	.01	.10	.08*
Empathy	.13	.12	.12		−.03	.04	−.06	
Negative emotions	−.62	.30	−.23*		−.15	.10	−.13	
Infant-oriented goals	.05	.02	.26**		.02	.01	.20*	
3. Distress X Detection	−.06	.08	−.07	.05	.07	.03	.23**	.15**
Distress X Empathy	−.47	.43	−.11		.10	.18	.07	
Distress X Negative emotions	−.03	.99	.00		−.81	.28	−.23**	
Distress X Goals	.14	.07	.18		.11	.02	.37**	
Total R^2				.24**				.54**
F for Model				2.74				10.44

Note: $N = 101$, $n = 97$ for sensitivity to distress.

* $p < .05$;

** $p < .01$

TABLE 5

Regressions Predicting Maternal Sensitivity From Postnatal Predictors

	Sensitivity to Distress				Sensitivity Total Task			
	B	**SE**	**β**	**R2Δ**	**B**	**SE**	**B**	**R2Δ**
1. Depressive symptoms	−.12	.12	−.10	.01	−.13	.04	−.28**	.39**
Observed distress	−.01	.16	−.01		−.32	.05	−.51**	
2. Distress Detection	.00	.01	.03	.22**	.01	.00	.14	.08**
Empathy	.43	.20	.28*		.11	.07	.18	
Negative emotions	.41	.27	.19		.03	.09	.03	
Infant-oriented goals	.05	.02	.25*		.01	.01	.13	
3. Distress X Detection	−.04	.04	−.14	.02	−.01	.01	−.12	.16**
Distress X Empathy	.39	.63	.33		.07	.17	.14	
Distress X Negative emotions	−1.09	.85	−.19		−.49	.19	−.22**	
Distress X Goals	−.01	.06	−.01		.09	.02	.45**	
Total R^2				.25**				.59**
F for Model				2.86				15.79

Note: $N = 101$, $n = 97$ for sensitivity to distress.

* $p < .05$;

** $p < .01$