

Identifying components of maternal sensitivity to infant distress: The role of maternal emotional competencies

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Abstract:

Objective. Emotional competencies that can facilitate maternal sensitivity to infant distress were examined. These included accurate identification of negative infant emotions, emotional responses to distress, emotion goals, and emotion-related efficacy. Design. Sixty-seven mothers and infants participated. Maternal sensitivity was observed in the laboratory when infants were 6 months. Mothers were interviewed about their emotional and cognitive responses to infant distress when their infants were 2½ years and subsequently completed daily diaries for 1 week to assess maternal sensitivity. Results. Emotional competencies interacted with one another to predict sensitivity to infant and toddler distress. Specifically, emotional competencies were positively related to sensitivity to distress when other competencies were also high, but unrelated or negatively related to sensitivity when other competencies were low. Conclusions. Maternal sensitivity to infant distress is dependent on a variety of skills, and specific combinations of the emotional competencies can either enhance or undermine maternal sensitivity.

Keywords: maternal sensitivity | infant distress | maternal emotional competencies

Article:

INTRODUCTION

There is considerable empirical support for the thesis that sensitive maternal behavior contributes to the development of adaptive child outcomes including infant attachment security, emotion regulation, and autonomy (Ainsworth, Blehar, Waters, & Wall, 1978; Braungart-Rieker, Garwood, Powers, & Notaro, 1998; Braungart-Rieker, Garwood, Powers, & Wang, 2001; van den Boom, 1994). Considering its significance, there is relatively little information on the emotional and cognitive processes underlying sensitive maternal behavior. The purpose of this study is to identify processes related to sensitive maternal behavior in response to infant distress.

We test whether mothers' sensitivity to infant distress is associated with their ability to identify emotions accurately, emotional reactions to infant distress, parenting goals in response to negative emotions, and feelings of efficacy in responding to distress.

These competencies were selected based on the work of several previous investigators. Ainsworth et al. (1978) proposed that to be sensitive, a mother must see her infant's point of view, notice and interpret cues, and respond in a manner that does not distort the infant's communications based on her own preoccupations, needs, and defenses implicating the importance of emotion identification and focusing on infant needs. Dix (1991) emphasized the role of parental emotions and parenting goals by theorizing that negative appraisals of child behavior relate to negative parental emotions, which increase the self-focus of parenting goals, thereby interfering with parents' ability to respond sensitively to children's needs. More recently, Gottman, Katz, and Hooven (1996, 1997) hypothesized, and demonstrated empirically, that emotion-coaching parents (i.e., those who are aware of low intensity negative emotions, view negative emotions as an opportunity for intimacy and learning, validate their children's emotions, help their children label their emotions, and problem solve with their children) are more confident in the world of emotions and engage in more adaptive parenting behaviors. Together, these views implicate the role of accurate emotion identification, emotion responses, goals, and emotion confidence in relation to parenting. We define the four selected emotional competencies in the following discussion and elaborate on the process by which they influence sensitivity to infant distress.

Accurate Identification of Emotion

Accurate identification of emotion refers to a mother's ability to perceive distress and to identify the specific emotion expressed. Mothers who do not perceive distress are unlikely to engage in comforting behaviors. For example, mothers who misread distress as interest may encourage a distressed infant to engage in activities when they are not in an emotional state conducive to such behavior. Similarly, mothers who recognize distress, but misidentify the underlying negative emotion are likely to engage in behaviors that are not well-matched to the infant's affective state. Consistent with the view that emotion identification is a critical aspect of sensitivity, Kropp and Haynes (1987) demonstrated that abusive mothers make more errors identifying specific emotions, and van den Boom (1994) reported that mothers who were trained to correctly identify their infants' signals were more sensitive than control group mothers.

Emotional Reactions

Mothers' emotional reactions to infant distress range from empathy to anxiety or anger, and specific emotional states motivate different types of response. Empathy increases the likelihood that a mother will intervene on her infant's behalf and do so sensitively because she genuinely understands the infant's point of view. In contrast, mothers who become angry or anxious are likely to focus on themselves, interfering with their ability to be sensitive to their infants' needs (Dix, 1991). They may withdraw or respond intrusively in an attempt to avoid or end the display of negative affect because it is aversive. Consistent with this view, parental empathy or insightfulness has been associated with positive parent – child interaction and with maternal sensitivity (Feshbach, 1987; Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002),

whereas negative parental emotions have been associated with less sensitivity (Martin, Clements, & Crnic, 2002). Furthermore, parental negative emotions were higher and empathy lower among abusive parents than nonabusive parents (Frodi & Lamb, 1980; Wiehe, 1985).

Emotion Goals

Parenting goals reflect what parents hope to achieve through their interaction with their children and are believed to organize and guide parenting behavior. Drawing on Dix's (1991, 1992) assertion that parents who prioritize child concerns are more sensitive, we propose that mothers whose goals are focused on their infants' emotions are more sensitive to infant distress because they prioritize their infants' needs over their own and want to help their infants regulate internal feelings of distress. These mothers may engage in soothing and supportive behaviors when infants are distressed. In contrast, mothers whose goals are self-focused are inclined to stop distress rapidly or minimize contact with the distressed infant because it is aversive or because they want to demonstrate to others that they are effective parents. These goals may prompt them to withdraw when infants are distressed, to respond intrusively, or to engage in responses that do not address the infants' emotions. Consistent with this view, parents are more likely to endorse adaptive parenting strategies if their goals are child-focused rather than parent-focused (Hastings & Grusec, 1998; Hastings & Rubin, 1999; Kuczynski, 1984).

Emotion Efficacy

Emotion efficacy is a mother's confidence in her ability to identify and respond effectively to infant distress. According to Bandura (1977), highly efficacious people undertake more challenging tasks and persist longer in the face of challenge than less efficacious people. However, if efficacy is illusory or unrealistic (i.e., based on success in tasks much easier than the task at hand), it could be unrelated or negatively related to behavior (Bandura, 1977; Donovan, Leavitt, & Walsh, 1990). Thus, mothers who are reasonably 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 longer when their infants cry frequently and intensely. Consistent with this view, maternal self-efficacy correlated positively with maternal sensitivity (Teti & Gelfand, 1991) and moderated the negative effect of infant temperament on maternal sensitivity during emotionally arousing activities (Leerkes & Crockenberg, 2002), whereas parental powerlessness, a form of low efficacy, correlated with abusive and coercive parenting (Bugental, Blue, & Cruzcosa, 1989).

Moderating Effects of the Emotional Competencies

That each identified emotional competency has been associated previously with maternal behavior, sensitivity, or child abuse suggests that specific competencies could contribute to maternal sensitivity to infant distress. However, it is also possible that reported effects of competencies could represent untested additive or multiplicative effects of multiple competencies on sensitive maternal behavior. This seems more likely than a simple effects model if the arguments presented thus far for the importance of each competency are compelling. On this basis, we examine the possibility that emotional competencies are related to sensitivity additively, and multiplicatively, such that any emotional competency is more likely to be

associated with maternal sensitivity when another competency is high, but could be unrelated to sensitivity when another competency is low. To illustrate, efficacy in the absence of accuracy is unlikely to be positively associated with sensitivity. Although highly efficacious mothers are likely to respond to infant distress given their confidence, their responses are unlikely to match the infant's need if they cannot identify the emotion expressed. Moreover, if they respond intrusively, the association between efficacy and sensitivity can be negative when accuracy is low.

In this study, we expand on previous research by testing associations between the emotional competencies and sensitivity to infant distress at two ages: 6 months and 2½ years. Furthermore, we assess mothers' emotional competencies in response to both fear and anger distress and in relation to both their own infants and standard "stranger" infants, allowing comparisons across emotion contexts and between own and stranger infants. We hypothesize that (1) mothers' ability to identify specific emotions, empathic emotional responses, infant/emotion focused goals, and emotion efficacy correlate positively with their sensitivity to infant distress; (2) emotional competencies are associated with maternal sensitivity in an additive fashion; and (3) emotional competencies interact to predict sensitivity such that any competency is more likely to be positively associated with maternal sensitivity when other competencies are high.

METHODS

Participants

Ninety-two primiparous mothers participating in a longitudinal study of infant emotional reactivity and regulation were invited to participate. Sixty-seven women completed this follow-up when their infants were 2½. On average, mothers were 31 years old, $SD = 4.52$, had 15 years of education, $SD = 1.85$, and had been married or living with a partner for 5 years, $SD = 2.38$. Family income ranged from \$20,000 to \$170,000, $M = \$69,400$. Sixty-four percent had or were expecting another child, and 5 mothers were separated or divorced from their partners. Thirty-eight toddlers were boys. Mothers who did not participate did not differ from participants on any demographic, maternal, or infant characteristic.

Procedures

Mothers were contacted initially in the prenatal period and completed a demographic questionnaire by phone at that time. Mothers and their 6-month-old infants participated in a laboratory assessment of infant reactivity and maternal sensitivity. Two years later, mothers who participated in the follow-up completed a global measure of empathy by mail and participated in a semi-structured interview, designed to assess maternal emotional competencies, conducted in our laboratory. Then, 47 mothers completed a diary for 1 week to assess maternal sensitivity. Twenty mothers did not participate in this part of the study due to the time demands or because they indicated that the target emotions did not occur in their presence that week. Mothers who declined were significantly younger, $M = 29.00$, $SD = 3.85$, than mothers who completed the diaries, $M = 31.98$, $SD = 4.53$, $t(65) = 2.98$, $p < .05$. There were no other differences in demographics or maternal and infant behaviors or characteristics.

6-Month Behavioral Observation

Mother behavior and infant affect were observed during a videotaped laboratory assessment of infant temperament similar to those used by others (Goldsmith & Rothbart, 1996). Following a 5-min warm up period, mothers placed their infants in an infant car seat, then sat 3 feet away, situated so that with some effort infants could see them. First, two novel and potentially fear-eliciting toys (a noisy, moving plastic ball and a fire truck) were introduced to assess distress to novelty, followed by a 5-min break to reduce carryover effects. Then two potentially frustrating situations (arm restraint and toy retraction) were used to assess distress to limitations. Mothers were asked to remain neutral during the first task in each emotion context so we could observe the infant's independent response. During the second task, within each emotion mothers were instructed to interact with their infants in any way they liked, but not to intervene in the activity or remove their child from the seat unless they wished to end the activity. Four mothers ended a task prior to its completion. Novelty and limitations tasks were counterbalanced to control for task effects on mother and infant behavior.

Infant distress was rated and maternal behavior was coded from videotapes during the mother-involved tasks using computer-operated, eventbased continuous coding. Trained students coded in pairs to maintain accuracy while watching the videotape, operating the VCR, and entering codes. Pairings varied to prevent pair-linked coder drift. Coders were blind to other data with the exception that one coded both reactivity and maternal behavior 4 months apart, although never families she recognized. The authors coded 25 tapes, at the beginning and midway through the process, to assess reliability and to prevent coder drift for each type of coding. A 1-sec window for agreement was used to compute reliability.

Infant distress. Infant distress was rated continuously on a 7-point scale, adapted from Braungart-Rieker and Stifter (1996). Scores range from 1 (*high positive affect*) to 7 (*high negative affect*), based on the infant's facial expressions, body tension, and vocalizations. Kappa for each level of affect ranged from .68 to .98, average $\kappa = .83$ (Leerkes & Crockenberg, 2003).

Maternal behavior/sensitivity. Twelve codes were created after reviewing existing coding schemes (Farran, Kasari, Comfort, & Jay, 1986; Tronick & Weinberg, 1990; van den Boom, 1994) and several videotapes from this study. The appropriateness and quality of maternal behaviors given infant distress were assigned sensitivity ratings on a 3-point scale (1 = *insensitive*, 2 = *moderately sensitive*; 3 = *sensitive*) a priori. Ratings were applied by the Video Coding System (Long, 1999) based on the co-occurrence of infant distress with specific maternal behaviors.

The mutually exclusive codes and their sensitivity ratings during infant distress were *negative* (directs negative affect toward the infant; 1), *intrusive* (forces own agenda on the infant; 1), *mismatched affect* (affect is incongruent with infant's; 1), *distracted from infant* (uninvolved or minimally involved with infant; 1), *persistent ineffective* (continues to respond to infant in same ineffective manner when alternative responses are available; 2), *monitor* (watches infant/situation; 1), *task focused* (engages with infant focusing on the arousing task; 1), *calming* (soothes infant physically or vocally; 3), *supportive* (provides soothing support for engagement with the task; 3), *nontask focused engagement* (plays with or distracts the infant without using

the arousing task; 3), *empathy* (empathizes with or mirrors the infant's positive or negative affect; 3), and *uncodable* (infant or mother cannot be seen). Kappas for specific behaviors ranged from .65 to .85, mean $\kappa = .75$. The subsequent sensitivity ratings are as reliable as the initial infant and maternal codes because they are based on the co-occurrence of discrete maternal behaviors and specific infant affective states, which were coded reliably.

Mothers' sensitivity during infant distress was computed by multiplying the duration of time a mother engaged in each behavior while her infant was distressed by its sensitivity rating, summing the weighted values, then dividing by the time the infant was distressed. This yielded two variables, *sensitivity to infant fear distress* and *sensitivity to infant anger distress*, for 50 and 55 mothers, respectively, because some infants did not get distressed. These correlated, $r(45) = .42$, $p < .01$, and therefore were combined to create a single measure of *sensitivity to infant distress* ($N = 60$) that correlated positively, $r_s = .48$ to $.67$, with global sensitivity ratings adapted from Farran, Kasari, Comfort, and Jay (1986).

Global Measure of Empathy

When infants were 2½, mothers completed the Interpersonal Reactivity Scale (Davis, 1983), indicating how well each statement described them on a 5-point scale. The 7-item empathic concern scale assesses sympathy and concern for others (e.g., "I often have tender, concerned feelings for others who are less fortunate than me.") and was used to assess the validity of emotional reactions variables derived from the emotion interview. This subscale has good internal and test-retest reliability, and correlates positively with other empathy scales (Davis, 1983). Items were averaged to yield a measure of *global empathy*, $\alpha = .69$.

Maternal Emotion Interview

When infants were 2½, mothers participated in a semi-structured interview adapted from Gottman et al. (1996, 1997) meta-emotion interview. Mothers viewed video clips of 6-month-old stranger infants and their own infants from the 6-month temperament assessment. They viewed both types for three reasons: (1) mothers' reactions to their own infants can be more informative because they are emotionally invested in their own children; (2) displaying standard clips ensures that each mother has the opportunity to convey her reactions to negative affect even if her own infant never reacted that way; and (3) using standard clips ensures that differences in mothers' responses are a function of mothers' rather than infant characteristics.

The stranger infant clips included (1) two 10-sec clips of an infant displaying mild fear and intense fear, followed by a 1-min clip including a range of fear intensities, and (2) two 10-sec clips of a different baby displaying mild anger and intense anger, followed by a 1-min clip including a range of anger intensities. Clips were selected because infants' specific emotions were clear. Presentation of clips was counterbalanced to correct for order effects of emotion context and intensity. After viewing the short clips, in response to questions, mothers rated the intensity of the infant's distress and identified the infant's emotion and their own emotional reactions to the distress. Following the full clip, they provided the same data and indicated what they thought the baby wanted or needed, how they would respond and why, what their goal would be, and how efficacious they would feel responding.

Then mothers viewed clips of their own infants, with the number of clips viewed varying from zero to six because not all infants displayed distress in each context. Twenty-three mothers viewed own fear clips only, 23 mothers viewed own anger clips only, 14 viewed both own fear and own anger, and 7 viewed no clips of their own infant because their infants did not become distressed during the 6-month observation. Mothers answered the same questions about their own infants as they did about the stranger infants. The interview concluded with general questions about mothers' emotion goals for their children (i.e., what did you typically want to have happen when your baby was distressed, what was your goal, why do you think this goal is important). Variables derived from these data are described in the following.

Accuracy. Mothers rated the intensity of infant affect during each clip on the 7-point scale used by our coders in rating infant distress, and the scores from the reliably trained coders were used as the standard for determining the accuracy of mothers' ratings. If mothers' ratings were more than .5 below the standard rating, they were coded as minimizing, representing an inability to accurately rate distress. We selected .5 as the cutoff for two reasons: (1) mothers rated affect using intervals of .5 so we needed to use a cutoff that was a product of .5; and (2) any interval larger than .5 tended to result in one large group of mothers who were within range and just a few mothers who minimized. Thus, a cutoff of .5 created the most useful distribution of scores. The number of fear and anger clips minimized was summed to yield measures of standard and own *minimize fear* and *anger* (range 0 to 3).

Then, the accuracy of mothers' identification of specific emotions was measured. The standard set of stranger fear and anger clips was initially selected because the authors verified that the dominant emotions were fear and anger, respectively, after considering the infants' facial and vocal expressions and body tension. The facial expressions of the identified infants were consistent with fear and anger facial configurations identified by Izard (1983). That the majority of mothers in the study listed the correct emotion (90% for fear, 93% for anger) and identified the correct dominant emotion (70% for fear, 78% for anger) supports our contention that the standard tapes reflect fear and anger. Fear, anxiety, wariness, and nervousness were considered accurate fear words; anger, frustration, irritation, and annoyance were considered accurate anger words. Mothers received a score of 1 if they named the correct emotion in the entire group of emotions they listed, a score of 2 if they also identified it as the dominant emotion, and a score of zero if they did neither for each of the standard clips. The three fear scores (i.e., mild, intense, and full minute clips) and the three anger scores were summed to yield measures of *accurate identification of fear* and *accurate identification of anger* (range 0 to 6).

Modified procedures were used to code mothers' responses to their own infants' clips. The emotion-eliciting context was used as a guide. We assumed that if an infant became distressed during the novelty task, fear would be one of the negative emotions present, and likewise for limits/anger. Mothers received a score of 1 if they named the correct context emotion in the emotions they listed, and zero if they did not. The dominant emotion was not scored because some infants displayed fear and anger in the same clip. *Accurate identification of own infant's fear* and *accurate identification of own infant's anger* were computed by summing the number correct across the three clips (range 0 to 3).

Minimizing the intensity rating and accurate identification of emotions correlated negatively, $r(65) = -.24$, $r(65) = -.47$, $r(35) = -.45$; $r(35) = -.60$, all $ps < .05$, for standard fear, standard anger, own fear, and own anger, respectively. Thus, these variables were standardized and combined with minimizing the intensity rating reverse scored to create four variables: *standard fear accuracy*, *standard anger accuracy*, *own fear accuracy*, *own anger accuracy*.

Emotional responses. Mothers' emotional responses to each infant clip were categorized as *empathy*, *urgency (desire to act)*, *concern for infant*, *negative feelings toward the situation*, *objective interest*, *self-focused anxiety*, *dislike cry*, *positive feelings toward the infant*, *negative feelings toward the infant*, *amusement*, and *neutral*. Mothers rated the intensity of each emotional response on a 3-point scale (1 = *mild*, 2 = *moderate*, 3 = *very*). Neutral was always scored as mild. Interrater reliability for each category ranged from .67 to .88, overall $\kappa = .79$, and for the intensity ratings, $\kappa = .77$, weighted $\kappa = .80$.

Emotional responses were aggregated across each set of clips within an emotion (e.g., anxiety in response to the standard fear clips was the average anxiety response to mild fear clip, intense fear clip, and full-minute fear clip). Then, theoretical and statistical considerations were used to combine related emotions in an effort to reduce the number of variables and to construct variables with appropriate statistical properties.¹ Two variables were created to reflect mothers' emotional responses for the fear and anger contexts for standard and own clips. *Empathic emotions* was the weighted average of empathy (3), concern (2), and urgency (1), with higher weightings reflecting greater emotional attunement with the infant. *Negative emotions* was the weighted average of negative feelings toward infant (3), amusement at infant's distress (2), and self-focused anxiety (1), with higher weightings reflecting more egregious negative feelings toward the infant. Mothers' empathic emotional responses correlated positively with Interpersonal Reactivity Scale (Davis, 1983) empathic concern, $rs = .29$ to $.45$, all $ps < .05$, for standard and own fear and anger, demonstrating their validity. In contrast, mothers' negative emotions correlated with neither measure of empathy, rs ranged from $-.08$ to $.23$, ns , demonstrating the discriminant validity of the two types of emotional response.

Emotion goals. In contrast to the other competencies, goals were not rated separately for standard and own clips and fear and anger contexts. Although mothers were asked how they would respond and what the goal of that response would be in response to each clip, the most detailed information about emotion goals came from the end of the interview when mothers were asked to describe what they would typically want to have happen or what their goals were in general when their infants were distressed. Probes were used to clarify the meaning of mothers' goals (e.g., "Can you tell me why you wanted baby to stop crying?"; "Why was it important to you that baby feel better, less afraid, etc.?"). Mothers' emotion goals from the entire transcript were rated on two dimensions: the extent to which the goals focused on the infant versus the mother and the extent to which the goals were focused on the infants' emotions on 9-point scales. Higher scores

¹ The a priori plan to combine emotion variables was as follows: empathic emotions = empathy, concern, urgency, negative situation; negative emotions = anxiety, dislike cry, negative baby, amused at distress; and neutral emotions = interest, neutral. Neutral and interest were dropped because of low frequency. Anger toward the situation was not included in empathic emotions because it correlated positively with negative feelings toward the baby, $r(67) = .35$, $p < .01$. Dislike cry was not included in negative emotions because it correlated positively with empathy, $r(67) = .29$, $p < .05$, and concern, $r(67) = .28$, $p < .05$.

reflect goals that are highly infant and emotion focused. Two coders rated each transcript along these dimensions and disagreements were resolved by consensus coding. This yielded two scores: *infant-focused goals* and *emotion-focused goals*, weighted $\kappa = .77$ and $.75$, respectively. The two correlated highly, $r(65) = .75$, $p < .001$, and were combined into a new variable labeled *emotion goals* for which high scores reflect goals that are focused on infant emotions.

Emotion efficacy. Following the full-minute clips, mothers rated on a 5-point scale how efficacious they would feel knowing what the baby wanted or needed, knowing how to comfort the baby, getting the baby to calm, helping the baby soothe himself or herself, and getting the baby to play. Responses were averaged to yield measures of *fear efficacy* and *anger efficacy* for own and stranger infants, $\alpha s = .86, .89, .85$, and $.72$, respectively, that correlated positively with global maternal self-efficacy assessed at 6 months, $r s = .50$ to $.59$, all $p s < .001$.

Maternal Daily Diaries

At the end of the emotion interview, mothers were given a series of diaries (adapted by Burrous, 2004, from the Parent Attachment Diaries; Stovall & Dozier, 2000) to complete every day for a week to assess maternal sensitivity. Using the original diary, Dozier and Stovall demonstrated that parents of secure infants tended to be responsive, whereas parents of insecure infants tended to engage in rejecting behavior, demonstrating the validity of the attachment diary method. In addition, Zahn-Waxler, Radke-Yarrow, and King (1979) reported that maternal behavior codes based on mothers' diary reports correlated with trained coders' ratings of caregiving and predicted differences in children's altruistic behavior, demonstrating the validity of sensitivity data derived from maternal diary reports of behavior.

In the adapted diary, mothers report on four incidents that typically occur in any given day: when the child is physically hurt, frightened, frustrated, or angry and separated/reunited with the parent. Mothers write a narrative describing each incident and then complete three sets of checkboxes. First, mothers describe their child's initial help-seeking behavior drawing from 21 choices (e.g., asked to be picked up). Second, mothers report their immediate responses to the child drawing from 23 choices (e.g., said something like "Don't be upset."). Finally, mothers report the child's reaction to their behaviors using 25 choices (e.g., was soon calmed). Mothers were instructed to check all behaviors that applied. Only data from the frightened and frustrated contexts were included in these analyses, consistent with the 6-month observation contexts.

Maternal sensitivity for each context each day was rated by the authors on a 5-point scale based on the match between the mother's responses, the situation, and the toddler's level of distress. Insensitive responses included clear negative responses (e.g., spanking, laughing at distress) and ignoring or minimizing distress (e.g., saying "There's no reason to be afraid."). Sensitive responses included soothing the child, acknowledging the child's feelings, altering the distressing situation, and for frustrated/angry situations, the combination of an affective component with a limit when appropriate (e.g., "You cannot hit your baby sister because it hurts her.") or attempts to assist the child in achieving a blocked goal (e.g., coaching child to complete a hard part of a puzzle). Inter-rater reliability was high, weighted $\kappa s = .81$ and $.72$ for maternal sensitivity during frightened and frustrated/angry situations, respectively. The average sensitivity rating for each context over the course of the week was calculated resulting in two variables:

maternal sensitivity to toddler fear distress and maternal sensitivity to toddler anger distress, which were unrelated, $r(43) = .01$, *ns*, and, therefore, were not combined.

Data Reduction

Two strategies were used to reduce the number of competencies under consideration in an effort to maintain an adequate subject-to-predictor ratio in subsequent analyses. First, correlations were calculated between standard competencies assessed in relation to the fear and the anger clips to determine if they could be combined. Similar correlations could not be calculated between own fear and own anger competencies because only 14 mothers responded to both. Parallel standard fear and anger emotional competencies correlated significantly, $r(65) = .66$, $r(65) = .38$, $r(65) = .59$, and $r(65) = .84$, all $ps < .01$, for accuracy, empathic emotions, negative emotions, and efficacy, respectively. Thus, fear and anger standard competencies were standardized and aggregated yielding four standard competency variables: *accuracy*, *empathic emotions*, *negative emotions*, and *efficacy*. Based on the correlations between standard fear and anger competencies, we standardized and combined own fear and anger competencies as well.

Second, correlations between standard and own emotional competencies were examined to determine if they could be combined. Three of the four emotional competencies correlated significantly across standard and own clips, $r(58) = .30$, $p < .05$; $r(58) = .42$, $p < .01$, $r(58) = .08$, *ns*, and $r(58) = .81$, $p < .001$ for accuracy, empathic emotions, negative emotions, and efficacy, respectively. Thus, we aggregated across standard and own competencies yielding five emotional competencies used in subsequent analyses: *accuracy*, *empathic emotions*, *negative emotions*, *efficacy*, and *emotion goals*. Descriptive statistics for these competency variables and other primary variables are displayed in Table 1.

Table 1. Descriptive Statistics: Composite Variables

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Combined emotion competencies				
Accuracy	67	0.00	0.88	-2.81-1.65
Empathic emotions	67	0.00	0.67	-1.06-2.05
Negative emotions	67	0.00	0.60	-0.65-1.95
Emotion goals	67	6.68	1.84	1.50-9.00
Efficacy	67	4.15	0.55	2.75-5.00
Maternal sensitivity				
Sensitivity to infant distress	60	2.16	0.60	1.00-3.00
Sensitivity to toddler fear distress	43	4.39	0.81	2.00-5.00
Sensitivity to toddler anger distress	47	3.96	0.67	2.50-5.00

RESULTS

Distributions were examined to identify skew, kurtosis, and outliers. All variables were normally distributed, and there were no outliers.

Identifying Potential Covariates

Simple correlations were calculated between the primary variables and maternal age, education, income, and number of own infant clips viewed. None was significant. *T* tests were computed with child gender and order of videoclips (i.e., fear or anger clips first) as the grouping variables and all of the primary variables as the outcome. There were no significant differences.

Main and Additive Effects of the Emotional Competencies

As presented in Table 2, and contrary to prediction, none of the emotional competencies correlated significantly with maternal sensitivity to infant or toddler distress. Multiple regressions were used to test for possible additive effects of the emotional competencies. First, *sensitivity to infant distress* was regressed on the five emotional competencies simultaneously. The model was nonsignificant, $F(5, 54) = 1.86$. Then, *sensitivity to toddler fear* and *sensitivity to toddler anger* were each regressed on the five competency variables simultaneously. Neither of these models was significant, $F(5, 37) = .56$ and $F(5, 41) = 1.97$ for fear and anger, respectively. Thus, the emotional competencies were not related to sensitivity to distress additively.

Table 2. Correlations Between Combined Emotional Competencies, Temperament, and Maternal Sensitivity

	1	2	3	4	5	6	7	8
Combined competencies								
1. Accuracy	—	.10	-.29*	.16	-.13	-.04	.23	-.13
2. Empathic emotions		—	-.08	.01	.14	-.10	.07	.11
3. Negative emotions			—	-.25*	-.09	.00	-.10	-.26
4. Emotion goals				—	.12	.07	-.01	.21
5. Emotion efficacy					—	-.22†	.12	.17
Maternal sensitivity to								
6. Infant distress						—	-.03	-.22
7. Toddler fear distress							—	.01
8. Toddler anger distress								—

Note. $n = 67$ for associations between competencies, 60 for those involving sensitivity to infant distress, 43 for those involving sensitivity to toddler fear distress, and 47 for those involving sensitivity to toddler anger distress.

* $p < .05$.

† $p < .10$.

Interactive Effects of the Emotional Competencies

Proposed interactions between emotional competencies in relation to maternal sensitivity were tested with hierarchical multiple regression using procedures recommended by Aiken and West (1991). For *sensitivity to infant distress*, the five emotional competencies were entered in Step 1. In the second step, one of the 10 competency \times competency interactions was entered (i.e., accuracy \times empathic emotions, accuracy \times negative emotions, accuracy \times efficacy, accuracy \times emotion goals, empathic emotions \times negative emotions, empathic emotions \times efficacy, empathic emotions \times emotion goals, negative emotions \times emotion goals, negative emotions \times efficacy, and emotion goals \times efficacy). Thus, the significance of each interaction effect was evaluated after entry of all main effects, but not other interactive effects. Six predictors were entered in each regression meeting criteria that N (in this case, = 60) should equal 40 or 50 plus the number of predictors (Harris, 1985; Howell, 1997).

A different approach was used for analyses involving *sensitivity to toddler fear* and *sensitivity to anger distress* because of the reduced sample sizes ($n = 43$, $n = 47$, respectively). Rather than including all main effects in each model, each regression included two main effects in the first step, followed by their interaction term in the second step (e.g., efficacy and accuracy, then efficacy \times accuracy). This prevents saturated models, but does not determine if interaction effects are independent of all main effects or of one another. Including three predictors in each of these regressions meets the criteria than N equal 40 plus the number of predictors (Howell, 1997).

Table 3. Summary of Interaction Effects on Sensitivity to Distress

Competency Interactions	Maternal Sensitivity to Distress					
	Infant Distress $n = 60$		Toddler Fear $n = 43$		Toddler Anger $n = 47$	
	β	ΔR^2	β	ΔR^2	β	ΔR^2
Accuracy \times empathic emotions	.32*	.08	<i>ns</i>		<i>ns</i>	
Accuracy \times negative emotions	<i>ns</i>		<i>ns</i>		<i>ns</i>	
Accuracy \times emotion goals	<i>ns</i>		.33*	.07	<i>ns</i>	
Efficacy \times accuracy	.40*	.13	<i>ns</i>		<i>ns</i>	
Efficacy \times empathic emotions	<i>ns</i>		<i>ns</i>		.40*	.09
Efficacy \times negative emotions	<i>ns</i>		<i>ns</i>		<i>ns</i>	
Efficacy \times emotion goals	<i>ns</i>		<i>ns</i>		<i>ns</i>	
Empathic \times negative emotions	<i>ns</i>		<i>ns</i>		<i>ns</i>	
Empathic emotions \times goals	<i>ns</i>		<i>ns</i>		<i>ns</i>	
Negative emotions \times emotion goals	<i>ns</i>		-.30*	.06	<i>ns</i>	

Note: β is standardized beta at entry.
 * $p < .05$. *ns* = not significant.

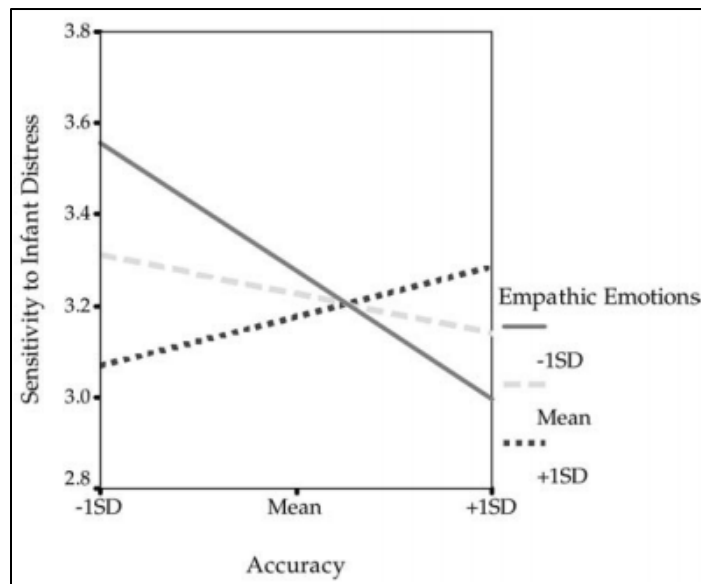


Figure 1. Moderating Effect of Empathic Emotions on the Association Between Accuracy and Maternal Sensitivity to Infant Distress.

A total of 30 regressions were computed to test each competency \times competency interaction in relation to each measure of sensitivity: 10 interactive terms in relation to three measures of sensitivity. A summary of the interaction effects is included in Table 3.

Five of 30 interactions were consistent with the hypothesis that positive associations between any competency and maternal sensitivity are more likely when another competency is high rather than low. Accuracy interacted with empathic emotions in relation to maternal sensitivity to infant distress. As illustrated in Figure 1, accuracy was positively associated with sensitivity when empathic emotions were high, $\beta = .22$, *ns*, but was negatively associated with sensitivity when empathic emotions were low, $\beta = -.38$, $p < .05$. Similarly, accuracy was positively associated with sensitivity to toddler fear distress when emotion goals were high, $\beta = .38$, $p < .05$, but was negatively associated when emotion goals were low, $\beta = -.23$, *ns*. Efficacy interacted with accuracy in relation to sensitivity to infant distress. As illustrated in Figure 2, efficacy was positively associated with sensitivity when accuracy was high, $\beta = .15$, *ns*, but was negatively associated with sensitivity when accuracy was low, $\beta = -.80$, $p < .001$. Efficacy interacted also with empathic emotions in relation to sensitivity to toddler anger distress. Efficacy was positively associated with sensitivity to toddler anger distress when empathic emotions were high, $\beta = .31$, $p < .10$, but was unrelated to sensitivity when empathic emotions were low, $\beta = -.06$, *ns*. Finally, emotion goals and negative emotions interacted to predict maternal sensitivity to toddler fear distress, as illustrated in Figure 3. Emotion goals were positively associated with sensitivity when mothers did not experience negative emotions in response to distress, $\beta = .26$, *ns*, but when negative emotions were high, the association between goals and sensitivity was negative, $\beta = -.27$, *ns*.

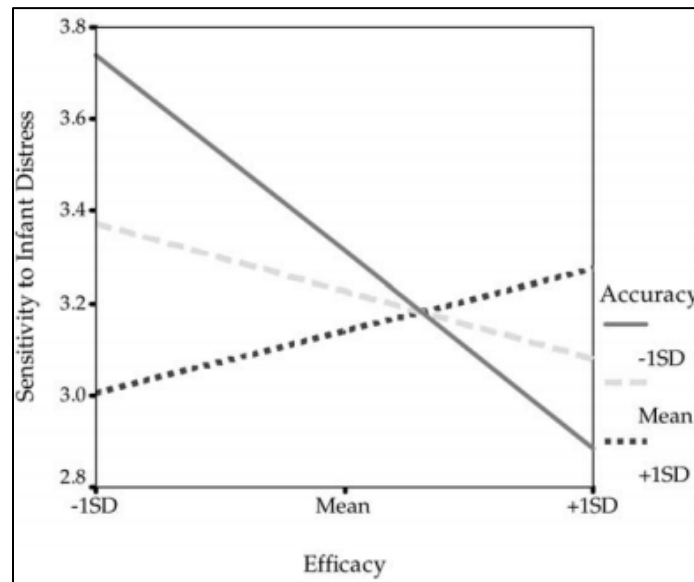


Figure 2. Moderating Effect of Accuracy on the Association Between Efficacy and Maternal Sensitivity to Infant Distress.

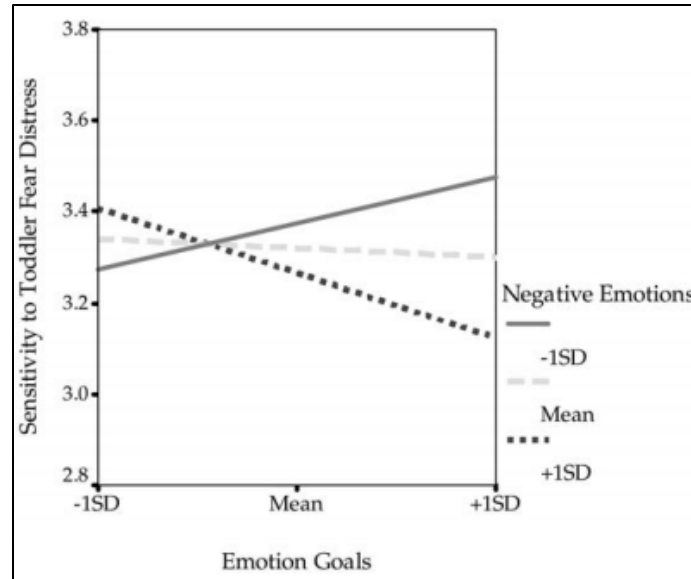


Figure 3. Moderating Effect of Negative Emotions on the Association Between Emotion Goals and Maternal Sensitivity to Toddler Fear Distress.

DISCUSSION

As hypothesized, any emotional competency was more likely to be positively associated with maternal sensitivity when another competency was also high. None of the simple associations between individual competencies and sensitivity were significant, contrary to the hypothesis, but underscoring that sensitive maternal behavior depends on a variety of competencies. Nor did emotional competencies combine additively to predict sensitivity. Rather, a combination of specific competencies appeared to enhance or undermine maternal sensitivity

Specifically, accurate identification of emotions was positively related to sensitivity to distress when empathic emotions or emotion goals were high, but negatively related when either competency was low. Presumably, identifying negative emotions accurately contributes to a sensitive behavioral response only if a mother believes distress warrants such a response and is emotionally capable of mounting one. A mother who knows her infant is afraid is most likely to intervene on her infant's behalf if she empathizes with her infant's fear and has goals that focus on helping her infant feel better. That accuracy was positively associated with sensitivity when empathic emotions were high is consistent with evidence that empathic emotions enhance sensitivity (Feshbach, 1987; Koren-Karie et al., 2002). That infant and emotion focused goals increased the positive association between accuracy and sensitivity is consistent with evidence that goals that are child centered and focused on positive outcomes are associated with sensitive parenting (Hastings & Grusec, 1998; Hastings & Rubin, 1999; Kuczynski, 1984). Mothers who are accurate at discerning negative emotions, but low on empathy or emotion goals may be less motivated to intervene on their infant's behalf because they do not sympathize with their infant's state, prioritize their infant's needs over their own, or believe that reducing their infant's distress is an important goal. As a result, they may be less responsive toward their distressed infants. This would explain the negative association between accuracy and sensitivity when empathy is low or reducing infant distress is not an important goal for mothers.

Similarly, efficacy was positively associated with sensitivity when accuracy or empathic emotions were high. That mothers who felt highly efficacious, but were low on accuracy or empathy, were less sensitive is consistent with theory and evidence that unrealistic or illusory feelings of efficacy are maladaptive (Bandura, 1977; Donovan et al., 1990; Leerkes & Crockenberg, 2002). In this case, efficacy is illusory because mothers are not skilled at recognizing or understanding negative emotions. Mothers with high efficacy and low accuracy may respond when their infants are distressed, but are more likely to select a response that is incongruent with their infants' cues. They may persist in using one ineffective strategy, rather than moving on to alternatives, because their confidence in their skills is unrealistic, or they may withdraw when their initial attempts to soothe their infants are ineffective because this failure violates their efficacy expectations. Less empathic mothers may be less likely to intervene on their infants' behalf in spite of their confidence because they do not recognize distress as an unpleasant state warranting intervention.

That mother's negative emotions moderated the association between emotion goals and sensitivity is consistent with Dix's (1991) emotion process model of parenting. That is, even if mothers espouse goals that are focused on infants' emotions, they are unlikely to act on those goals in a positive manner if they are personally distressed. The negative association between emotion goals and sensitivity when negative emotions are high may be the result of increased anxiety and self-blame when mothers discover their behavior is in fact incongruent with their underlying goal, which could contribute to helpless responses like withdrawal.

These interactive effects implicate emotional (i.e., emotional reactions) and cognitive processes (i.e., appraisals of infant affect and of ones' own abilities) as components of sensitive maternal behavior. Although both sets of processes have been considered previously in relation to parenting (e.g., empathy, anxiety vs. appraisals, attributions, parenting goals), rarely have researchers considered their joint influence, despite conceptualizations of parenting that incorporate emotions and cognitions (e.g., Dix, 1991). Research that considers both cognitive and emotional processes will likely yield more sophisticated models and better prediction of parenting behavior.

In contrast to the view that individuals possess a superordinate construct of emotional competence (Saarni, 1999), only 2 of 10 possible correlations between the emotional competencies were significant: Negative emotions correlated negatively with both accuracy and emotion goals. Perhaps emotional competencies in the parenting domain consolidate over time as mothers become more experienced in responding to distress, just as children's emotional competence evolves with increased and varied social experience (Denham, 1998). Alternatively, the lack of association between the emotional competencies could be an artifact of sample characteristics or measurement error. In either case, emotional competence related to parenting warrants further investigation.

Several limitations of the study should be noted. First, the small sample precluded testing the independent contribution of specific interactions. Second, the number of interactions tested increased the odds of Type I error; however, more interaction effects than expected by chance alone supported the moderating hypotheses. Nevertheless, very few of the total number of tested interactions between competencies were significant. The combination of competencies identified

by the significant interactions may be specific to low-risk mothers; different combinations could predict sensitivity in at-risk samples. Furthermore, different competencies could be important at different times and could evolve with the demands particular developmental periods place on parents, as evidenced by the lack of stability in maternal sensitivity over time. Replication of findings is needed with larger, more diverse samples and at various points during infancy. Finally, the direction of effects between emotional competencies and maternal sensitivity at 6 months is uncertain. Sensitivity at 6 months may have been a function of the emotional competencies mothers possessed, but which were not measured at that time. Thus, associations between emotional competencies and 6-month sensitivity could reflect that portion of the competencies that remained stable from 6 months to 2½ years. However, the possibility that emotional competencies develop in the process of caring sensitively for an infant was not ruled out. A cross-lagged design in which sensitivity and competencies are both assessed at multiple times would provide a stronger test of the model.

Despite these limitations, the results of this study identify complex emotional and cognitive processes involved in maternal sensitivity and point to specific combinations of skills that either support or undermine maternal sensitivity to infant distress. This information can be useful in developing intervention strategies tailored to the strengths and weaknesses of individual mothers.

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