MATERNAL SENSITIVITY AND STRATEGIES TO REGULATE TODDLERS’ DISTRESS: RELATIONS TO TODDLERS’ EMOTION REGULATION

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ABSTRACT

Sixty-nine mothers and their 24-month-old toddlers were observed in two laboratory procedures designed to assess relations between maternal behavior in different contexts and child distress and regulatory strategies in a frustration task. Maternal sensitivity was examined in a semi-structured play activity and maternal regulatory strategies were examined in an emotionally challenging task. Emotion regulation was assessed in toddlers under two conditions of maternal involvement during an emotionally challenging (i.e., frustrating) task. Preliminary analyses indicated that children were more distressed in the mother-uninvolved condition than in the mother-involved condition of the frustration task, and children’s strategy use also varied across conditions. Toddlers’ interaction with mothers was positively related to child distress and child object orientation was negatively associated with distress during the mother-uninvolved condition. The maternal strategy of observation was positively related to children’s use of distraction and object orientation and negatively correlated with interaction with the mother. In predictive regression analyses, the strategy of child venting was positively related to child distress in the frustration task. Maternal observation was negatively related to children’s interaction with mothers. Interactions were found between maternal sensitivity and maternal observation as predictors of child distraction and object orientation. Findings indicated that maternal behavior in emotionally challenging and non-challenging contexts both affect children’s emotion regulatory capabilities.
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INTRODUCTION

Emotion regulation is a topic that has stimulated much recent research in the field of developmental psychology. However, there is disagreement in the field surrounding the definition of both emotion and emotion regulation. To fully understand emotion regulation it is first necessary to consider the definition of emotion. There is a general consensus among developmental researchers that emotions are biologically prepared capabilities that have evolved because of their survival value (Cole, Martin, & Dennis, 2004). Emotions enable individuals to appraise and evaluate situations and to engage in actions to deal with current conditions, also known as “action readiness”.

Some researchers espouse the position that emotion and emotion regulation can be considered separately, although they acknowledge that the interaction between the two processes is dynamic (Calkins & Hill, 2007; Cole et al., 2004). Other theorists argue that the processes of emotion and emotion regulation cannot be meaningfully separated (Campos, Frankel, & Camras, 2004). The current study utilized the first perspective and the definition of emotion regulation proposed by Calkins and Hill (2007), which shares considerable overlap with other researchers’ definitions. Calkins and Hill (2007) define emotion regulation as the “behaviors, skills, and strategies, whether conscious or unconscious, automatic or effortful, that serve to modulate, inhibit, and enhance emotional experiences and expressions.”

The development of individual differences in emotion regulation is important because such differences predict later adjustment, particularly social competence. Among the variety of factors that influence the development of these individual differences, caregiver behavior is widely acknowledged to be an important influence. However, few studies have examined how different aspects of maternal behavior may independently or interactively predict young
children's emotion regulation. More specifically, some research has examined general or more
global dimensions of maternal behavior such as sensitivity or intrusiveness and related these
dimensions to children's emotion regulation. Other research has examined the specific behavior
or strategies that mothers use when their children are facing an emotionally arousing situation
and related these maternal strategies to children's emotion regulation. However, research has not
considered how global qualities of maternal behavior and specific strategies may interact to
predict children's emotion regulation. The present study sought to examine how maternal
interactive style and specific emotion regulation strategies may jointly predict children's emotion
regulation. In order to provide a background for the current study, the following sections review
the normative development of emotion regulation, individual differences in emotion regulation
and their relation to later adjustment, and potential origins of individual differences with a focus
on socialization influences.

Normative Development of Emotion Regulation

The transition from reliance on caregivers to regulate for the infant to independent self-
regulation of emotion develops over the first several years of life. In outlining the sequence of
normative development of emotion regulation, Kopp (1989) explains that an individual’s
strategies to regulate emotion change over time. As early as the first few days of life, the infant
can regulate minor emotional discomfort via reflexive patterns of behavior. For example, the
infant may turn his/her head or engage in nonnutritive sucking. Early in infancy, discomfort is a
result of physiological stressors such as fatigue and hunger. In the second to third month, the
infant begins to exhibit signs of discomfort to psychological stressors such as the absence of a
caregiver. Also, during the third month the infant’s visual and attentional systems and motor
abilities mature and offer the infant a greater repertoire of behaviors to pacify distress. For
example, the infant acquires the ability to voluntarily shift attention. Therefore, in instances in which the infant is experiencing low levels of distress, the infant may begin to engage in self-distraction by directing focus toward or away from an object. The infant is still heavily reliant on the caregiver to help regulate the infant’s emotions. By 12 months of age the infant is capable of engaging in organized and flexible patterns of behavior such as reaching, redirecting attention, and self-soothing. With physical and cognitive maturation, toddlers are increasingly able to use regulatory strategies such as distraction when distressed. The development of language in toddlers also increases the ability of parents to help their children regulate emotions and gives toddlers a way to communicate and deal more effectively with intense emotions (Calkins & Hill, 2007).

Individual Difference in Emotion Regulation and Later Adjustment

Emotion regulation exhibits a pattern of normative development, but there are also individual differences at each stage of development (Calkins, 1994). For example, some toddlers have more difficulty dealing with a frustrating situation than do others. Thompson and Meyer (2007) note that individual differences in emotion regulation are predictors of future interpersonal relationships and socioemotional adjustment. Both over-regulated (e.g., inhibited/anxious) and under-regulated (e.g., aggressive) styles can cause problems. Overregulated styles may cause children to become socially withdrawn in future peer interactions, while under regulated styles may cause children to engage in aggressive or other forms of externalizing behavior, which may negatively influence their peer relations. Infants and children who do not develop appropriate emotion regulatory skills may have difficulties with peer relationships and success in the classroom (Calkins, 1994; Calkins & Hill, 2007).

Influences on Individual Differences in Emotion Regulation
It is generally accepted that there are multiple influences on the development of individual differences in emotion regulation, although researchers differ in their views of the relative importance of “intrinsic” or “extrinsic” influences. Some emphasize intrinsic influences such as temperament, while others give more weight to extrinsic influences such as socialization as a catalyst for emotion regulation. Calkins (1994) proposed a model of the development of individual differences in emotion regulation that reflects the bidirectional interaction between intrinsic and extrinsic components. The model begins with biological or neuroregulatory mechanisms that result in individual differences in CNS/ANS reactivity. These individual differences predispose the infant to respond to environmental events in particular ways. The caregiver reacts to this behavioral display of reactivity. As the infant develops, the caregiver begins to directly teach/train the child to behave in desired ways. In this model, infants’ behavioral traits and caregiver behaviors influence one another. The caregiver responds to the infant’s overt behaviors, and the infant in turn responds to the caregiver’s behaviors. Each has the potential to shape the other, although the model gives greater weight to the effect of the child’s behavioral displays on the caregiver. The caregiver can thus directly affect the child’s behavioral display of reactivity. In addition, however, both the child’s reactivity and caregiver behavior can directly affect the development of the child’s regulatory style. Finally, as the infant gets older, caregiver behavior is hypothesized to influence the development of regulatory style through a third pathway that is mediated by the child’s beliefs and cognitions.

Calkins (1994) outlines two hypothetical examples of infants with a particular type of reactivity whose caregivers respond differently, thus leading to different outcomes. An infant may be highly reactive to control and easily distressed when their exploration is limited or their goals are blocked; such a behavioral profile may be described as “easily frustrated”. The
caregiver responds to the infant’s behavioral displays, which are likely to include intense distress when the child’s goals are blocked (e.g., toy is taken away, child is restrained in car seat). The caregiver may respond with sensitivity and support or the caregiver may respond with intrusiveness and power-assertive discipline. How the caregiver responds to the infant affects the infant’s behavior in the immediate situation as well as directly influencing the development of the child’s regulatory style; over time, caregivers’ responses will also indirectly influence the child’s regulatory style by affecting the child’s beliefs about the world. For example, a caregiver who uses an unintrusive and supportive style of parenting will have an infant who comes to perceive the environment as friendly and who will develop a regulatory style that is independent and exploratory; this child will also tend to be outgoing and friendly with peers. Conversely, a highly reactive infant with an unsupportive and controlling caregiver will eventually develop the perception that the environment is hostile and will develop a regulatory style that is angry and coercive. This style will adversely affect future interactions with peers because the child is likely to behave hostilely and aggressively with others.

In Calkins’ (1994) model, infant reactivity and caregiver behavior are both hypothesized to influence regulatory style directly. She argues that highly reactive infants are likely to have more difficulty finding effective strategies for emotion regulation in part because the characteristic intensity of their distress is so high that it may interfere with regulatory attempts. In addition, caregivers’ responsiveness may be negatively affected by the frequency of the infant’s distress. Although reactivity is undoubtedly an important influence on emotion regulation, there is general agreement that “extrinsic” factors, most notably socialization, also influence individual differences in emotion regulation (e.g., Calkins, 1994; Calkins & Hill, 2007; Kopp, 1989; Thompson & Meyer, 2007).
There are multiple agents of socialization, but parents are typically the earliest influence on the management of distressing emotions. In general, parental sensitivity or responsiveness to an infant or toddler’s negative emotions is related to the strength of the distress and the length of time the child experiences distress, and is also likely to influence the child’s future expectations about whether strong emotions can be regulated and whether the caregiver can help in the process (Thompson & Meyer, 2007). Parents also model or teach specific strategies to help children decrease distress. For example, depending on the child’s age and the context, caregivers distract children from the source of distress, teach appropriate ways to deal with an upsetting situation, and help children to reinterpret an emotionally arousing event (Thompson & Meyer, 2007).

Approaches to Assessing Maternal Behavior

The empirical research on associations between maternal behavior and young children’s emotion regulation typically assesses maternal behavior in one of two contexts. In some studies, maternal behavior is coded during a mother-child interaction that is not designed to elicit negative emotions in children, such as a free play activity, and related to children’s emotion regulation in a separate task that is designed to elicit negative emotion. In other studies, maternal behavior is assessed during a task designed to elicit negative emotion (e.g., frustration/anger) in the child, and children’s behavior is assessed in the same or a separate, similar task. The context in which maternal behavior is assessed influences what aspects of behavior are coded. In non-arousing tasks, global qualities of maternal behavior such as sensitivity/responsiveness and intrusiveness are typically assessed. When maternal behavior is measured during emotionally arousing contexts, such as a frustration task, specific maternal strategies (e.g., distraction, soothing) are coded.
No study to date has assessed both maternal strategies in emotionally arousing contexts and maternal global qualities in non-arousing contexts. In the current study, maternal global qualities were measured in an emotionally non-arousing play interaction between mother and child. Also, maternal strategies were coded during a task designed to elicit frustration in the child. Toddler affect and strategies were measured during the frustration task to assess emotion regulation. This study evaluated the role of maternal behavior in different contexts and its relation to toddlers’ strategy use and affect during a frustrating task. In order to provide a framework for the current investigation, studies examining maternal global qualities in non-arousing tasks, research on maternal strategies in emotionally challenging situations, and the small number of studies examining global qualities in both contexts will be reviewed.
Assessing Global Qualities of Maternal Behavior

When maternal behavior is assessed in non-arousing contexts (e.g., mother-child play interactions), “global” qualities of maternal behavior, such as sensitivity/responsiveness or intrusiveness, are typically measured. For example, Calkins, Smith, Gill, and Johnson (1998) created composite measures of maternal behavior during three tasks. Sixty-five pairs of mothers and their 24-month-old children were observed in different contexts. Maternal behavior was assessed during three activities involving structured play, pretend play, and a teaching task. Composite measures of behavior across the three tasks were labeled *positive guidance* and *negative control*. Positive guidance included the frequency with which mothers engaged in several behaviors toward children, including positive verbal expressions, behaviors demonstrating an act for the child, physical affection, and verbal expressions of support and guidance. Maternal negative control included the frequencies of negative verbal expressions, physical control, and verbal control.

Toddlers’ emotion regulation was measured in two episodes designed to elicit frustration, one in which the child was prevented access to an attractive toy (barrier task), and a task in which the child was placed in a high chair without toys (high chair restraint task). Children were scored according to the amount of time spent orienting toward the object in the task (i.e., looking at or touching the focal object of the task), distraction (i.e., orienting to mother or any object other than the focal object of the task), and aggression/venting (i.e., banging, kicking, throwing, or hitting the object of frustration). In addition to coding these behavioral strategies, children's distress (reactivity) was also scored during these episodes by compositing children's latency to fuss (reversed) and duration of fussing.
Correlations between maternal interactive style and toddlers’ emotion regulation showed that maternal negative control was positively related to amount of time orienting to the focal object and negatively correlated with distraction in the barrier task. These differences in the strategies that children use to regulate their negative emotions are potentially important because research indicates that some strategies are more effective than others in decreasing distress. In general, behaviors which focus attention on the source of negative arousal are less effective in reducing distress than behaviors that focus attention away from the source of arousal (e.g., some form of distraction) (Grolnick, McMenamy, & Kurowski, 2006). In addition, there is evidence that the strategy of “venting” is positively related to child distress (Calkins, 2002).

Calkins and colleagues have used these global measures in additional studies examining maternal behavior and its relation to individual differences in young children's emotion regulation. Calkins and Johnson (1998) investigated maternal interactive style composited across four mother-child tasks and 18-month-olds’ regulatory strategies during separate frustration tasks. Although three of the mother-child tasks were non-arousing (free play, structured play, and teaching task), the fourth task was a compliance task in which the mother was instructed to have her child clean up a set of toys. In addition to coding maternal positive guidance and negative control during non-arousing tasks, "preemptive interference" was also coded. Preemptive interference was the frequency with which the mother barred the child from following through with an activity by doing it herself (e.g., placing shapes in a shape sorter during the teaching task).

Results showed that toddlers’ distress during the frustration tasks was positively correlated with preemptive interference but negatively correlated with maternal negative control. There was no correlation between toddlers' distress and maternal positive guidance. In analyses predicting toddlers’ use of specific regulatory strategies, there was an interaction between toddlers’
distress and preemptive interference in predicting the strategy of aggression/venting. As toddlers became more distressed, the positive association between preemptive interference and children’s aggression/venting became stronger. In addition, the child strategy of distraction was significantly predicted by maternal positive guidance.

In a follow-up of the same sample, Calkins (2002) examined associations between maternal behavior and children's emotion regulation concurrently and across time (from 18 to 24 months). Maternal negative control and positive guidance were again coded in non-arousing activities (structured play, pretend play, and teaching task) and toddlers’ levels of distress, venting, and noncompliance were scored in tasks designed to elicit frustration. A summary score of these three types of “aversive” child behavior was calculated to form a composite measure. An interaction was observed between maternal interactive style at 18 months and “aversive” behavior in toddlers at 24 months. Specifically, aversive child behavior at 18 months predicted venting at 24 months only when maternal positive guidance at 18 months was low. In addition, findings suggested that maternal negative control when children were 18 months old was predictive of maternal negative control when assessed again 6 months later.

In the studies reviewed above by Calkins and colleagues, maternal behavior was generally assessed in relatively non-arousing or non-stressful contexts and related to children’s behavior in arousing or stressful contexts (i.e., tasks designed to elicit child frustration/anger). These studies show relations between maternal interactive style and toddlers’ regulatory strategies in emotionally arousing contexts such as frustration tasks (Calkins, 2002; Calkins & Johnson, 1998; Calkins et al., 1998). In general, positive guidance is positively associated with distraction, a more effective regulatory strategy (Calkins et al., 1998; Calkins, 2002) and with lower levels of “venting”, a less effective regulatory strategy (Calkins, 2002). Negative control is related both to
lower levels of distraction and higher levels of object focus, a less effective regulatory strategy (Calkins et al., 1998). Finally, preemptive interference is associated with higher levels of venting (Calkins & Johnson, 1998).

Assessing Maternal Strategies for Regulating Children's Emotion

Another approach to assessing maternal behavior and its association with children's emotion regulation involves observing maternal behavior in “emotionally arousing” contexts (i.e., tasks designed to elicit frustration in the child). In these contexts, maternal “strategies” for helping the child cope with emotional arousal are typically coded (e.g., Grolnick et al., 1998). Strategies are defined as the behaviors that can be used by the mother to change the emotional response of the child (Grolnick, et al. 2006). For example, in a study by Grolnick, Kurowski, McMenamy, Rivkin, and Bridges (1998) maternal strategies were coded during frustration tasks in which children were required to wait for a desired object. One hundred forty toddlers ages 12, 18, 24, or 32 months and their mothers participated in this study. The mother-child dyads took part in two frustration procedures; the child had to wait to open a gift or wait to eat a snack. During one of the tasks, mothers were instructed to actively engage with their children as they normally would. In the other task, mothers were told to remain passive and not to interact with their children. The order of the active and passive engagement conditions was counterbalanced across the two tasks. Maternal strategies were coded in 5-second intervals and included active play or game-like engagement with the child, distraction, reassurance (reassuring the child that they would soon get the desired object), following (i.e., the mother commenting on the child’s distress with regard to the object of frustration), focus on desired object (e.g., "Look at that gift"), and physical comfort (i.e., hugging, kissing, or picking up the child). Also, a code of “passive” was given when the mother did not interact with her child throughout the interval. A code of
“other behavior” was given if the mother engaged in a behavior other than one of the strategies but was not passive. The child’s level of emotional distress was coded using a facial expression measure and a vocalization measure.

Controlling for children's level of distress in the parent-active condition and for children's age, results indicated that the maternal strategy of active engagement was related to higher levels of toddler distress in the parent-passive condition. Mothers who were more passive and used more non-strategy behavior had children who were less distressed in the parent-passive situation (Grolnick et al., 1998).

Putnam, Spritz, and Stifter (2002) also measured maternal strategies in emotionally arousing situations. Fifty-eight 30-month-old children and their mothers were observed during a delay task. During this activity the child was placed in a high chair and an attractive toy was placed within their reach. The experimenter told the child not to touch the toy while the researcher left the room. The mother was told to interact with her child as she normally would for 60 seconds. During the delay task, toddlers’ self-regulatory strategies, touching or not touching the toy, and maternal strategies were scored. Child strategies included orienting toward the toy (i.e., focusing verbal or visual attention on the object of frustration), orienting toward other (i.e., focusing on any other object in the room besides the toy or mother), orienting toward the mother, and self-comforting (e.g., thumb sucking or playing with hair). Mothers’ behavior was coded using five strategies: distraction, reasoning (i.e. explaining why the child cannot touch the toy), bargaining (e.g., telling the child they can play with the toy later), and commands (i.e., requesting or telling the child not to touch the toy). Results showed that relative to children who touched the toy, children who did not touch the toy engaged in higher levels of other and mother orientation and lower levels of object orientation. In addition, maternal use of distraction was
negatively related to children’s object orientation and positively related to other and mother orientation. Mothers of children who did not touch the toy were significantly less likely than mothers of children who did touch the toy to use reasoning or commands and more likely to use distraction.

Spinrad, Stifter, Donelan-McCall, and Turner (2004) investigated maternal regulatory strategies with toddlers and their relation to children’s emotion regulation at age 5. Mothers' strategies and child distress were assessed when children were 18 months and 30 months during emotionally arousing tasks. At 18 months, the emotionally arousing tasks were a clean-up task and a toy removal task; at 30 months the tasks were placement of electrodes for an ECG and a clean-up task. During these tasks, toddler affect, general maternal responses to toddler affect, and specific maternal regulatory strategies were coded. Maternal responses to specific occurrences of toddlers’ positive or negative affect were coded in one of four categories: mother did not use a regulatory strategy or affect label, mother used a strategy to regulate the toddler’s affective state, mother labeled the toddler’s emotion, or mother used a strategy to regulate the child’s affective state and labeled the child’s emotion. Maternal strategies included distraction, soothing and acceptance, granting wish (i.e., complying with the child’s request), questioning emotion (i.e., asking the child why he/she was upset), or explanation (i.e., the mother explained the emotion the child was feeling or explained the current situation).

At age 5, children’s emotion regulation was assessed using a disappointment task. Children were asked to hierarchically rank prizes in terms of their desirability and were then given one of the lower ranked prizes. The experimenter left the room after 30 seconds and the mother and child remained in the room for an additional minute. The child’s behavior was observed when the experimenter was present and when the experimenter left the room. The
ability to self-regulate disappointment would be demonstrated if the child maintained positive affect when the experimenter was present. The child’s emotion regulatory strategies were also coded during this activity. Children were scored as either engaging in no strategy, distraction, mental reevaluation of the situation (i.e., the child stated something positive about the prize), or causal discussion (i.e., the child discusses the causes or consequences of his/her emotional reactions; e.g., “She knew I hated this prize. Why did she give it to me?”).

Results showed that mothers’ general use of regulatory strategies at 18 months was not related to children’s facial expressions during the disappointment task at age five. At 30 months, mothers who more frequently used strategies had children who showed more positive facial expressions during the entire disappointment task and fewer negative facial expressions when the experimenter was present. With respect to specific maternal regulatory strategies, there was a positive correlation between wish-granting at 18 months when children displayed negative emotion and children’s negative affect in the disappointment task. The strategy of soothing and acceptance at 30 months was related to less positive facial expressions during the experimenter present condition at age five. Also, questioning the child’s emotions at 30 months was positively related to children’s negative emotions when the experimenter was absent during the disappointment task. Finally, associations between maternal regulatory strategies at 18 and 30 months and children’s self-regulatory strategies at 5 years were examined. Results showed that the use of soothing and acceptance by mothers at 18 months was positively related to children’s use of distraction and negatively related to children’s failure to use any strategy. Questioning the child’s emotions at 18 months was positively related to the use of no strategy in the disappointment task. The maternal strategy of distraction at 18 months was negatively correlated with children’s use of distraction at age 5.
In general, studies that have assessed maternal regulatory strategies in emotionally arousing contexts have found some common results (Grolnick et al., 1998; Putnam et al., 2002; Spinrad et al., 2004). In general, studies find correlations between the mother’s regulatory strategies and the child’s level of distress. Research also suggests correlations between maternal regulatory strategies used and the regulatory strategies used by the child. Findings across studies are not entirely consistent, and differences in methodology including design, sample ages, tasks used, and maternal and child strategies coded, make comparisons somewhat difficult. For example, Putnam et al. (2002) found that maternal distraction was related to 30-month-old children’s use of distraction during a delay task. However, Spinrad et al. (2004) found that maternal distraction at 18 months was negatively related to children’s use of that strategy at age 5 during a disappointment task. Moreover, although distraction was related to better delay ability in Putnam et al.’s study, Spinrad et al. did not report how child strategies were related to displays of positive and negative affect during a disappointment task. In addition, although Spinrad et al. (2004) found that mothers who used more strategies at 30 months (but not at 18 months) had children who showed better regulation during a disappointment task at age 5, Grolnick et al. (1998) found that mothers of 12-32 month olds who were more passive and engaged in more non-strategy behavior during a frustration task had children who showed less distress during a separate frustration task. Thus, there is a lack of clarity regarding how maternal strategy use is associated with child distress and regulatory behaviors.

Assessing Maternal Behavior in Different Contexts

Few studies have investigated maternal behavior and its relation to children's emotion regulation using both emotionally arousing contexts and non-arousing contexts to assess maternal behavior. However, in a sample of mothers and their 7-month-old infants, Miller et al. (2002)
coded maternal and infant behavior in both “high challenge” and “low challenge” situations. One high challenge task was a teaching task in which mothers were instructed to teach infants to place balls in a plastic bowl and to stack books, activities that were too difficult for them to complete. The other high challenge task involved re-engagement with the mother after a 2 minute period in which the mother failed to respond to the infant (“still-face” procedure). The low challenge tasks included free play and high chair play (mothers played with infants without toys while infants were in a high chair).

Mothers were rated on a variety of qualities, including level of involvement (attempting to engage the infant in play), sensitivity (follow the infant’s cues, speak in soft and soothing tones), intrusiveness (not following infant’s cues such as wiping infant’s mouth or surrounding with an excess of toys), and positive affect (positive emotional displays). Infants’ positive affect (positive emotional displays), negative affect (negative emotional displays), and arousal (degree of activity such as crawling or loud vocalizations) were also coded. Two dyadic ratings were made to capture mutual playful interaction and mothers’ ability to regulate infant distress.

Results indicated context-specific effects on maternal and child behavior. Relative to their behavior in low-challenge contexts, mothers were more involved but less positive, less sensitive and more intrusive in high-challenge contexts. Infants were more negative, less positive, and more aroused in high-challenge contexts than in low-challenge contexts. There was less positive mutual interaction and mothers had more difficulty regulating infant distress in high-challenge relative to low-challenge contexts.

An additional study has examined how maternal behavior in different contexts may differentially predict children’s emotion regulation. Rodriguez et al. (2005) examined maternal behavior with toddlers in both stressful and non-stressful contexts and related it to children’s
ability to delay gratification at age 5. They argued that maternal responsiveness in emotionally arousing contexts should be particularly relevant in predicting children’s abilities to independently regulate their emotions during emotionally arousing tasks. Thus, they hypothesized that maternal unresponsivity in stressful contexts would be more predictive of children’s later delay ability than maternal unresponsivity in non-stressful contexts. Similarly, they predicted that maternal unresponsivity to children’s negative affect would be more predictive of children’s later delay ability than maternal unresponsivity to other child behaviors.

Maternal responsivity was coded during a non-stressful play episode and during a stressful reunion episode that followed a brief mother-child separation. Global ratings were used that incorporated multiple dimensions of maternal behavior including facial expression, vocal expression, position and body contact, expression of affection, contingency of behavior, control of toddler behavior, and stimulation. Maternal behavior in response to toddlers’ negative affect was also coded separately in the reunion episode using a molecular measure of maternal disengagement. Codes included distress-contingent disengagement (i.e., frequency of maternal disengagement in response to toddlers’ negative affect) and non-distress contingent disengagement (i.e., frequency of maternal disengagement not following toddlers’ negative affect).

In the self-imposed delay of gratification task administered at age 5, children were given a choice between ringing a bell and eating a smaller amount of snack immediately or waiting until the experimenter returned to the room after 15 minutes and eating a larger amount of snack. Throughout this task, the amount of time children spent attending to the snack or bell and the amount of time they spent attending elsewhere was recorded. Also, the amount of time the child was able to delay gratification was measured in seconds. In other research, children who are able
to direct their attention away from the desired object wait longer in the delay of gratification task, while those who spend more time focusing on the desired object wait for shorter periods of time.

As predicted, maternal unresponsivity during the reunion episode but not the free play episode was related to the child’s later behavior during the delay task. Specifically, maternal unresponsivity was positively related to attentional focus directed to the snack or bell, a less effective regulatory strategy. Similarly, contingent maternal disengagement in response to toddler negative affect during the reunion episode predicted greater attentional focus to the snack or bell, but maternal disengagement that was contingent on non-distress behavior did not relate to delay ability.

Rationale and Hypotheses

There is considerable evidence that maternal behavior is related to young children’s emotion regulation. Maternal behavior has been assessed primarily through two approaches; one approach measures general interactive qualities such as sensitivity, while the other approach examines specific strategies that mothers use to manage children’s negative emotions. These approaches typically necessitate examining maternal behavior in different contexts (emotionally arousing or non-arousing). Few studies have examined maternal behavior in both contexts. However, there is limited evidence that maternal behavior differs in stressful versus non-stressful contexts (Miller et al., 2002). Moreover, maternal behavior in stressful contexts may be more predictive of children's emotion regulation than the same maternal behavior in non-stressful contexts (Rodriguez et al., 2005). However, research has not examined how global qualities of maternal behavior and specific maternal strategies may jointly predict children's emotion regulation. Thompson and Meyer (2007) make the point that maternal strategies used in stressful contexts are embedded in a larger relationship between parent and child. Analyzing the quality
of mother-child interactions in non-arousing contexts is important to fully understand the potential effects of maternal strategies on children's emotion regulation in emotionally arousing contexts (Thompson & Meyer, 2007).

It is conceivable, for example, that the effectiveness of certain maternal strategies may vary depending on more general qualities of maternal behavior, such as the parent’s sensitivity or intrusiveness. This possibility might help to explain some of the inconsistency in the literature concerning maternal strategies and children's emotion regulation. Alternatively, general qualities like sensitivity and specific maternal strategies may have additive, independent effects on children's emotion regulation. No studies to date have examined how global qualities of maternal behavior are related to specific maternal strategies in predicting children’s emotion regulation. The current study sought to test the following predictions:

1. It was hypothesized that global qualities of maternal behavior (i.e., sensitivity and intrusiveness) would be related to children's distress and emotion regulation strategies. Sensitivity would be negatively related to distress and positively related to more effective strategies (e.g., distraction), while intrusiveness would be positively related to distress and negatively related to more effective regulatory strategies.

2. Specific maternal strategies would be related to children's distress and regulatory strategies. Although past research in this area is somewhat inconsistent, it was hypothesized that maternal use of distraction would related to lower levels of child distress and more effective child regulatory strategies. Mothers' encouragement to focus on the arousing stimulus would be positively related to child distress and to less effective child regulatory strategies (e.g., object focus, venting). Finally, it was hypothesized that mothers who used active strategies for
regulating their children's distress rather than remaining passive (observing) would have children
who showed less distress and more effective regulatory strategies.

3. Although the lack of past research made hypotheses speculative, it was predicted that
maternal sensitivity or intrusiveness would interact with specific maternal strategies to predict
children's distress and regulatory strategies. In general, it was hypothesized that the relations
between specific maternal strategies and children's distress or regulatory strategies would likely
be moderated by maternal sensitivity or intrusiveness. For example, it was hypothesized that the
negative relationship between maternal distraction and children's distress would likely be
stronger when mothers were high rather than low in sensitivity. Given the number of potential
variables involved, analyses were constrained by theoretical and empirical considerations.

METHOD

Participants

Seventy-three typically developing 24-month-olds (range 22-26 months) and their
mothers (M age = 32.82 years; SD = 4.1) living in a small southeastern city in the United States
originally participated in this study, which was part of a larger longitudinal study on emotional
development in young children. There were 69 mother-child dyads included in the current study
(40 boys and 29 girls). The sample was comprised mainly of European-American families
(82.6%) with some African-American (4.3%) and other ethnic minority families (7.1%). The
majority of children (89.9%) were from two-parent households, with 4.3% of children living in
single-parent households. Maternal education levels were relatively high, with 14.5% of mothers
holding a graduate degree, 47.8% holding a 4-year college degree, 21.7% having some post-high
school education, 8.7% having earned a high school diploma or a GED, and 1.4% having less
than a high school degree. Percentages do not equal 100% because demographic information was missing for 4 of the participants. Three of the children were delivered prematurely (ranging from 2 to 12 weeks premature), but none of the participants had any diagnosed developmental delays at the time of assessment.

Participants were recruited through public birth records. Letters were sent to potential participants explaining the purpose and procedures involved in the study, and research assistants called families after receipt of the letter to further explain the procedures, answer any questions, and schedule assessments. Twenty dollars was given to each family after participation in the study.

Materials

The assessment took place in a laboratory playroom furnished with a child-sized table and chair, a chair and magazines for mothers, and a larger table on which to place materials. Filming equipment was set up in an adjacent room with a one-way mirror and the entire laboratory assessment was recorded. All data described below were coded from the video recordings.

Procedure

The non-emotionally arousing activity and the emotionally arousing activity were administered as part of a larger assessment battery. The non-emotionally arousing task directly preceded the emotionally arousing task.

Non-emotionally arousing activity. A 15 min semi-structured play activity between mother and child was used. This activity was adapted from the National Institute of Child Health and Human Development [NICHD] Study of Early Childcare and Youth Development (website address in reference list). In this activity, three clear Rubbermaid boxes numbered 1 to 3, each
containing a different toy, were placed on a table out of the child’s reach in the laboratory playroom. The toys were covered by colored towels so the contents were not visible. Once the boxes were placed on the table the experimenter gave verbal instructions to the mother. Mothers were told that the task would take 15 min and that children should spend some time playing with each of the toys in each of the three boxes. In addition, mothers were asked to ensure that children played with the toys in the order specified by the numbers on the boxes. Mothers were told that they could play with their children during this activity if they wished and that the 15 min could be divided between the boxes in whatever manner they chose. In the first box there was an age appropriate book, in the second box a toy kitchen set with a toaster, coffee pot, bread, and dishes, and in the third box a zoo toy with animals and other accessories.

Global ratings of maternal sensitivity and intrusiveness were used to assess maternal behavior during this activity. These codes were adapted from the NICHD study.

*Sensitivity/Responsiveness* was a code reflecting the extent to which a mother adapted her behavior to the child’s interests and was appropriately responsive to the child’s signals. *Intrusiveness* reflected the extent to which the mother followed her own agenda rather than adapting her behavior to the child’s interests or responding appropriately to the child’s signals. Sensitivity and intrusiveness were rated on 4-point scales based on the mother’s behavior during the middle 5 min of the 15 min interaction. A copy of the coding manual is provided in Appendix A.

Two “generations” of coders (4 coders total) were involved in coding sensitivity and intrusiveness. Due to time constraints, only 59 of the 63 participants with maternal strategy data were also coded for maternal sensitivity and intrusiveness; however, an additional participant was coded on sensitivity and intrusiveness but was missing maternal strategy data (see below for
explanation), bringing the total number of participants with maternal sensitivity and intrusiveness data to 60. Training for all coders consisted of watching pilot and participant data together, discussing and assigning ratings, and refining the coding manual as needed. Twenty-nine participants’ data were independently coded by the first generation of coders in an ongoing attempt to establish reliability. The second generation of coders coded the remaining data after establishing reliability with the first generation coders, using data from the 29 participants originally coded by those coders. Data from 7 participants (11.67% of 60) were coded by all 4 coders. Because the first generation of coders had independently coded 29 participants’ data, we had to decide whose ratings to use in the final data set (these cases were not all discussed between the two original coders to arrive at consensus codes). Examination of the reliability between these original coders and the two new coders indicated that reliability with the second generation coders was noticeably better with one of the original coders; therefore, this coder’s data were used. The remaining participants’ data were coded by one of the second generation coders after establishing initial reliability. Average kappas across the three possible pairs of coders for the 7 reliability tapes ranged from .50 to .73 for sensitivity, with an average kappa of .65. For intrusiveness, kappas ranged from .77 to 1.00, with an average kappa of .85.

Emotionally arousing task. The emotionally arousing task designed to elicit frustration was adapted from Diener and Mangelsdorf (1999). Materials included a transparent, childproof Tupperware container and approximately .5 oz of goldfish crackers. When families were scheduled for the assessment, mothers were asked if their children liked goldfish crackers; if not, they were asked to suggest another snack that could be used instead (e.g., animal crackers).

Mothers were provided with written instructions before the 6 min task began. During the first 3 min of the task the mother was instructed to read magazines, to refrain from initiating
interactions with her child, and to respond as briefly as possible to her child's initiations (e.g., “I’m busy right now.”). After 3 min the experimenter knocked on the one-way mirror to signal the mother that she could interact with her child as she normally would; however, mothers were also instructed not to open the container. Mothers were told that they were free to stop the activity at any point if they felt that their children were becoming too distressed. The experimenter cut short the activity after approximately 15 s of continuous, intense crying if the mother did not.

After the written instructions were provided to mothers and any questions were answered, the experimenter left the room and returned with the goldfish crackers secured in the childproof Tupperware container. The experimenter handed the child the container or placed the container on the floor near the child if he/she refused to take the container. The experimenter told the child, "There’s a treat in here for you. You can have it in a few minutes.” The experimenter left the room after giving these instructions to the child. After 3 min the experimenter knocked on the one-way mirror to signal the mother to interact with her child as she normally would without opening the container. After another 3 min, the experimenter returned to the room and opened the container for the child.
Data Coding: Maternal Strategies, Child Strategies, and Child Affect

The first 3 min of the goldfish activity was designated the *mother-uninvolved* condition and the last 3 min of the activity was designated the *mother-involved* condition. The experimenter knocked on the one-way mirror signaling the mother to interact normally (i.e., ending the mother-uninvolved condition and beginning the mother-involved condition) if the toddler displayed significant distress that lasted longer than 15 s. If the child remained distressed even after the mother was involved, the experimenter entered the laboratory playroom and ended the second part of the task (i.e., the mother-involved condition) early. The 2 min before the knock in the mother-uninvolved condition and the 2 min after the knock in the mother-involved condition were used to code maternal strategies, child strategies, and child affect (i.e., distress); each of these three sets of variables was coded by independent pairs of coders. Child affect and child strategies were coded during both conditions. Maternal strategies were coded only during the mother-involved condition. The coding systems for child affect, child strategies, and maternal strategies were adapted from previous coding systems.

As noted above, although 73 families originally participated in the study, the sample was reduced to 69 families. Two of the children received diagnoses of developmental disorders near the time of the assessment, one child opened the goldfish container at the start of the task, and there was one recording error that resulted in data loss for one mother-child dyad. Of the 69 mother-child dyads included, there were missing data for some variables. Data on child strategies, maternal strategies, and child affect in the mother-involved condition were missing for 6 dyads because 5 mothers misunderstood the instructions and opened the container shortly after the knock and one child opened the container with the mother’s help shortly after the knock. Child strategy data were also missing for an additional child in the mother-involved condition because the child
was off camera for the majority of the condition. Child strategy data were also missing for one child in the mother-uninvolved condition because the child was off camera for the majority of the condition. Child affect could be coded even when the child was off-camera because it was based on vocal distress. Thus, there were 63 dyads with all data for the mother-involved condition and 63 dyads with data on maternal strategies and child affect but not child strategies. For the mother-uninvolved condition, there were 68 dyads with data on child strategies and child affect, and 69 dyads with data on child affect. General information pertaining to the coding of maternal and child strategy data is provided below followed by more specific information about each set of codes (maternal strategy, child strategy, and child affect).

Child and maternal strategies were coded in 5 s intervals. Only one strategy was coded per interval. Thus, if the same strategy occurred multiple times within an interval, it was coded only once. In cases where different strategies occurred within the same interval, the first strategy was coded. The rationale for this rule was that the second strategy that occurred within an interval would typically continue into the next interval and be coded in that interval. Maternal and child strategy codes were operationally defined so that each code was mutually exclusive and no strategies could occur simultaneously. In addition, the strategy codes were exhaustive, meaning that a strategy was coded in every interval with the exception of an instance in which a child was distressed to such a level of intensity that visual attention could not be discerned. In this case, the interval was coded as no strategy for the child’s behavior (although in the mother-involved condition a maternal strategy was still coded). The no strategy code was only coded for a few participants \( n = 5 \). Due to the low frequency of this behavior, the data for no strategy were not used in subsequent analyses.
Child strategies. Child strategy codes, adapted from Diener and Mangelsdorf (1999) and Calkins and Johnson (1998), included interacting with mother, distraction, venting, and object orientation. Interacting with mother described the child’s attempts to engage the mother in interaction, to gain mother’s attention, or to establish close proximity to mother (i.e., within arm’s reach). Distraction was coded when the child focused his/her attention on something other than the goldfish container and/or the child engaged in self-manipulative behaviors such as thumb sucking, twirling hair, or rocking. Venting referred to aggressive behavior such as banging, kicking, throwing or hitting directed at a person or object. Object orientation was coded when the child held, touched, or manipulated the goldfish container and/or when their visual attention was focused on the container. The coding manual for child strategies is provided in Appendix B.

Interrater reliability was established between a pair of coders using data from study participants. Following a training period during which coders jointly watched and coded children’s behavior using pilot and study participants’ data, 18.8% of participants’ data were coded independently by both coders to establish initial reliability. Reliability checks were continued on an on-going basis during data coding. The total number of participants coded for reliability was 18, which represented 26% of the total sample (N = 69). Reliability was calculated using percent agreement. Reliability estimates for each category ranged from 78% to 92.7% (interacting with mother = 92.7%; distraction = 78%; venting = 82.2%; object orientation = 79%).

Maternal strategies. Maternal strategies were adapted from Grolnick et al. (1998) and Spinrad et al. (2004) and included drawing the child’s attention to the object of frustration, distraction, soothing and comforting, verbal explanation, bribery-future reward, bribery-future
punisher, observing child, and verbal command. Drawing the child’s attention to the object of frustration was coded when the mother verbally referenced the goldfish or pointed or gestured toward the goldfish or container (e.g., “Do you want to eat the goldfish?”). Distraction occurred when the mother engaged the child in a discussion or activity unrelated to the inability to obtain the goldfish; in some cases, the topic still involved the goldfish or container (e.g., asking the child to count the goldfish). A code of soothing and comforting was recorded when the mother provided physical affection and/or pleasant vocalizations directed toward the child (e.g., mother holding the child on her lap and explaining that everything will be ok). Verbal explanation was coded for any interval in which the mother referenced the child’s emotion and offered a justification for that emotion (e.g., “You are upset right now because you cannot have the goldfish”). Bribery-future reward was scored when the mother mentioned a future rewarding consequence (e.g., “You can have the goldfish in a few min.”). Bribery-future punisher was coded when the mother referenced a future punishing consequence (e.g., “If you don’t stop crying you will be in trouble”). Observing child occurred when the mother did not initiate interaction or respond verbally or behaviorally to the child. Verbal command referred to any verbal directive intended to regulate the child’s emotion or behavior (e.g., “Do not stand on the table”; “Come here”). Verbal explanation only occurred once and bribery-future punisher never occurred and therefore neither strategy was used in analyses.

As noted above, the first strategy that occurred in an interval was generally coded, but there were exceptions for the codes of maternal observation and soothing and comforting. If the mother engaged in observation and also another strategy at any point in the interval, then observation was not scored but the other strategy was coded. This rule was added so that maternal behavior would not be underestimated. A code of observation may have overestimated
maternal passivity if the mother engaged in another strategy at a different point in the interval. Also, if the mother engaged in object focus, distraction, bribery-future reward, or verbal command in conjunction with soothing and comforting, then soothing and comforting was not coded. Rather, the other strategy was coded for that interval. This rule was implemented because mothers often engaged in non-verbal soothing and comforting (e.g., stroking the child’s hair or holding the child on her lap) while simultaneously using a verbal statement that fell into a different category. More detailed information about these codes is provided in Appendix C.

Before data coding began, training sessions were conducted with two coders to establish interrater reliability. Pilot data and participant data were used in training sessions. During training, coders watched recorded data together and attempted to score maternal behavior separately. Discrepancies were then reviewed together and changes were made to the coding manual as needed. Following this training period, individuals coded independently. Interrater reliability was calculated using percent agreement and was initially obtained on 15.9% of the data. Reliability checks were taken throughout the coding process on a total of 20 participants, which corresponded to 28.9% of the data (N = 69). Reliability was calculated for each strategy and ranged from 56% to 87% (drawing the child’s attention to the object of frustration = 84%; distraction = 86%; soothing and comforting = 65%; bribery-future reward = 73%; observing child = 74%; and verbal command = 56%). Although the reliability for verbal command was too low for publication purposes, we chose to retain this variable for the analyses reported here because reliability was higher (65%) until the final reliability check.

Child affect. Child affect was assessed by calculating the duration (in s) of child whining, fussing, or crying. Because the child’s face was not always clearly visible, only vocalizations were included in this measure as noted above (see Appendix D for the coding manual for child
A pair of coders trained by watching pilot and participant data together; stopwatches were used to record the duration of negative vocalizations. Following training, reliability was assessed on a total of 13 pilot and actual participants coded independently (18.8% of the 69 participants coded). Pearson correlations were used to assess reliability between coders ($r = .99$, $p < .001$, uninvolved condition; $r = .93$, $p < .001$, involved condition).

RESULTS

Preliminary Analyses

For maternal and child strategy data from the goldfish task, the frequency of each strategy (i.e., the number of intervals in which it was coded) was calculated. For the child strategy data, these frequencies were calculated separately by condition. However, one or both conditions were curtailed for some dyads, usually due to child distress (and occasionally because either the child or the mother opened the container at some point during the task but not at the beginning of a condition). Thus, the frequency variables for maternal and child strategies were divided by the total number of coded intervals to yield proportion scores. The negative affect data were also transformed into proportion scores by dividing duration of distress by the total time coded in each condition (both in seconds). These proportion scores, rather than the raw frequency or duration data, were used in all analyses.

The global ratings of maternal sensitivity and intrusiveness coded from the semi-structured play activity were highly correlated ($r = -.91, p = .00$). Thus, a composite variable was created to represent greater maternal sensitivity and lower intrusiveness. Maternal intrusiveness ratings were reverse-scored so that higher scores indicated lower intrusiveness, and the sensitivity and (reversed) intrusiveness ratings were standardized and summed to create the
composite. High scores on this composite variable represented a greater degree of sensitivity and less intrusiveness, whereas lower scores represented lower sensitivity and higher levels of intrusiveness. This variable is referred to as sensitivity in the analyses reported below.

Descriptive statistics for the maternal strategy, child strategy, and child distress variables from the frustration task and for the sensitivity composite from the semi-structured play activity are provided in Table 1. A number of preliminary analyses were conducted to examine relations between variables within the frustration task both within and across conditions. In order to determine if children’s strategies or their distress differed significantly between the uninvolved and involved conditions, paired samples t-test were conducted. Other analyses involved zero-order or partial correlations. Partial correlations were used to control for other variables that seemed likely to affect the variables under study. Specifically, partial correlations were used to look at the stability of child strategies and child distress across the uninvolved and involved conditions. Maternal strategies and child strategies in both conditions were controlled when partial correlations were calculated for stability of child distress across conditions. When examining child strategies across conditions child distress in both conditions was controlled. Zero-order correlations were calculated to explore relations between child strategies and child distress in the mother-uninvolved condition. Partial correlations were used to examine the relationship between child strategies (involved condition) and proportion of distress (involved condition), partialling out maternal strategies. Partial correlations were also calculated to examine relations between child distress (involved condition) and maternal strategies, controlling for child strategies (involved condition). Finally, partial correlations were calculated between child strategies (involved condition) and maternal strategies, partialling child distress (involved condition). Because of the number of correlational analyses, a Bonferroni correction was
performed to prevent alpha inflation. With the desired alpha set at .05, the adjusted significance level was .001 and findings are reported using this significance level.

Partial correlations were also used to analyze relations between the maternal sensitivity composite and child distress, child strategies, and maternal strategies from the frustration task. Specifically, partial correlations were calculated between maternal sensitivity in the semi-structured play activity and the proportion of child distress in the mother-uninvolved condition, controlling for child strategies in the uninvolved condition. Similarly, partial correlations were calculated between maternal sensitivity and child distress in the mother-involved condition, partialling maternal strategies and child strategies in the mother-involved condition. To investigate the relationship between maternal sensitivity and child strategies, partial correlations were conducted for both conditions. For the mother-uninvolved condition, proportion of child distress in the uninvolved condition was controlled. For the mother-involved condition, maternal strategies and child distress in the mother-involved condition were controlled. Finally, the relationship between maternal strategies in the frustration task and maternal sensitivity in the semi-structured play activity was examined. In this analysis, child strategies in the mother-involved condition and child distress in the mother-involved condition were controlled. A Bonferroni correction was applied to these analyses using a desired alpha of .05; the adjusted significance level was .003 and findings are reported using this significance level.

Differences in children’s behavior across conditions. Paired samples t-tests were performed to assess group differences in children’s behavior across the mother-uninvolved and mother-involved conditions. A Bonferroni correction was not applied when conducting the following t-tests because the number of analyses was relatively small (N=5). With respect to child distress, children were more distressed in the mother-uninvolved condition (M = .29, SD =
.04) than in the mother-involved condition ($M = .17, SD = .20$), $t (62) = 3.93, p < .05$. With respect to child strategies, children used the strategy interacting with mom more in the involved condition ($M = .89, SD = .15$) than in the uninvolved condition ($M = .58, SD = .33$), $t (60) = -6.96, p < .05$. There was more use of distraction by children in the mother-uninvolved condition ($M = .13, SD = .21$) than in the involved condition ($M = .06, SD = .11$), $t (60) = 3.03, p < .05$).

Similarly, there was more venting in the uninvolved condition ($M = .05, SD = .09$) compared to the involved condition ($M = .01, SD = .04$), $t (60) = 3.06, p < .05$. Finally, there was more use of object orientation in the uninvolved condition ($M = .22, SD = .25$) than the involved condition ($M = .03, SD = .09$), $t (60) = 5.27, p < .05$.

Stability of children’s behavior across conditions. Stability of child distress and the stability of child strategies across conditions were examined using partial correlations. First, the relationship between child distress in the uninvolved condition and child distress in the involved condition was examined, controlling for maternal strategies in the involved condition and child strategies in both conditions. Findings revealed that the distress variables were positively correlated ($r = .57, p < .001$), indicating that children showed similar levels of distress across conditions. Partial correlations were also used to investigate relations between child strategies across condition, controlling for child distress in both conditions. Findings revealed that children’s use of the strategy of distraction in one condition was positively related to child distraction in the other condition ($r = .46, p < .001$). No significant relations were found between any other child strategies in the uninvolved condition and the involved condition: interacting with mom ($r = .19, p = .14$), venting ($r = .21, p = .12$), or object orientation ($r = .04, p = .75$).

Child distress and child strategies. Zero-order Pearson correlations were calculated to examine the relations between child distress and child strategies in the mother-uninvolved condition.
condition. Findings indicated that the child strategy of interacting with mother was positively related to child distress in the uninvolved condition \((r = .43, p < .001)\); thus, children who interacted with mom in the uninvolved condition were more likely to be distressed in the same condition, although it is not possible to infer direction of effects. Furthermore, object orientation was negatively related to child distress \((r = -.45, p < .001)\), indicating that children’s use of object orientation was related to less distress. Correlations between the child strategies of distraction and venting and child distress were not significant: distraction \((r = -.37, p = .002)\); and venting \((r = .21, p = .09)\).

Partial correlations were performed in order to investigate relations between child distress in the involved condition and child strategies in the involved condition. Maternal strategies were partialed in this analysis because the strategies that the mother employed in the involved condition might have influenced child strategies or child distress. There were no significant relations between child distress and child strategies in the involved condition: interacting with mom \((r = -.09, p = .52)\), distraction \((r = .02, p = .88)\), venting \((r = .35, p = .01)\), or object orientation \((r = -.07, p = .59)\).

Maternal strategies and child distress. Partial correlations were used to examine the relations between maternal strategies and child distress in the involved condition, controlling for child strategies in the involved condition. No significant relations were found between maternal strategies and child distress (see Table 2).

Maternal strategies and child strategies. The relations between maternal strategies in the involved condition and child strategies in the involved condition were examined using partial correlations in which child distress in the involved condition was controlled. In these analyses, there were several significant findings related to the maternal strategy of observing the child.
Specifically, maternal observation was negatively related to the child strategy of interacting with mom ($r = -0.68, p < .001$). That is, mothers who passively observed their children more frequently had children who less frequently used the strategy of interacting with mother, although it is not possible to infer direction of effects. Maternal observation was also positively related to child distraction ($r = 0.42, p < .001$), indicating that greater maternal observation was associated with children’s greater use of distraction in the frustration task. Another significant positive correlation was found between maternal observation and children’s use of object orientation, ($r = 0.45, p < .001$), indicating that mothers who observed their children more in the frustration task had children who spent more time focused on the frustrating object (i.e., the goldfish container). There were no other significant relations between maternal strategies and child strategies (see Table 3).

Relations between maternal sensitivity and child distress. Partial correlations were used to investigate the relationship between maternal sensitivity during the semi-structured play activity and child distress in the uninvolved and involved conditions of the frustration task. Controlling for child strategies in the uninvolved condition, there was not a significant relationship between maternal sensitivity in the semi-structured play activity and child distress in the uninvolved condition of the frustration task ($r = -0.13, p = .35$). A partial correlation was also used to examine the relationship between maternal sensitivity and child distress in the involved condition, controlling for maternal strategies and child strategies in the involved condition. There was not a significant relationship between maternal sensitivity and child distress in the mother-involved condition ($r = -0.11, p = .45$).

Relations between maternal sensitivity and child strategies. To explore the relationship between maternal sensitivity in the semi-structured play activity and child strategies in the mother-
uninvolved condition of the frustration task, partial correlations were calculated, controlling for child distress in the uninvolved condition. No significant correlations were found between maternal sensitivity and child strategies in the uninvolved condition: interacting with mom ($r = -.03, p = .86$); distraction ($r = -.08, p = .54$); venting ($r = .14, p = .30$); and object orientation ($r = -.04, p = .79$).

To examine the relationship between maternal sensitivity and child strategies in the involved condition, partial correlations controlling for child distress and maternal strategies in the involved condition were calculated. There were no significant relations between maternal sensitivity and child strategies in the mother-involved condition: interacting with mom ($r = .04, p = .76$); distraction ($r = -.30, p = .03$); venting ($r = .13, p = .36$); and object orientation ($r = .18, p = .22$).

Relations between maternal sensitivity and maternal strategies. Partial correlations were used to assess the degree of association between maternal sensitivity in the semi-structured play activity and maternal strategies in the frustration task. There were no significant relations between maternal sensitivity and maternal strategies (see Table 4).

Predictive Analyses

Hierarchical linear regression analyses were used to predict child distress and child strategies from maternal behavior. We were particularly interested in examining possible interaction effects between maternal sensitivity and specific maternal strategies in predicting children’s distress and strategy use during the frustration task. In order to constrain the number of analyses, several strategies were used. Because maternal behavior during the frustration task was only coded during the mother-involved condition the regression equations predicted child behavior only in the involved condition, although it is possible that maternal behavior may have
also predicted children’s behavior in the uninvolved condition. In addition, three maternal strategies were examined as predictors in the regression analyses: attention to the object, distraction, and observation. These three strategies were chosen because all of these strategies have been related to child distress and child strategy use in past research. The number of regression analyses was still large, however (N =15). Therefore, a Bonferroni correction was applied with alpha set at .05 to prevent inflating the Type 1 error rate. With the correction, the adjusted significance level was .003. We used this adjusted significance level in evaluating the overall significance of each model.

For all regressions, child distress or a child strategy was the criterion variable. Because child distress and child strategies were related, we entered child distress on the first step of the model when the criterion variable was a child strategy and the child strategy variables simultaneously on the first step when child distress was the criterion variable. The maternal sensitivity variable and a maternal strategy variable (attention, distraction, or observation) were entered simultaneously on the second step of each model. The third step of the model included the interaction of maternal sensitivity and the specific maternal strategy entered on the second step. Following recommendations by Aiken and West (1991), we centered the maternal variables and used these centered variables to create the interaction terms in order to avoid multicollinearity among the predictors. As noted above, a total of 15 regressions were conducted using five criterion variables (child distress and the four child strategy variables in the mother-involved condition). There were three regressions for each of the five criterion variables, one for each of the three maternal strategy variables.

For the three regressions predicting the child strategy of venting, the first model, which included only the control variable of child distress, was significant, but the models that included
the maternal variables (i.e., the sensitivity composite and the three maternal strategies) and their interactions were not significant. Inspection of the change statistics and the partial t-tests on the regression coefficients also indicated no significant relations between the maternal variables or their interactions and child venting. More specifically, in the regression that predicted child venting from the maternal sensitivity composite, the maternal strategy of drawing the child’s attention to the frustrating object, and their interaction, the model for step 1 reached significance, $F(1, 56) = 10.31, p = .002$. The partial t-test on the regression coefficient for child distress indicated that distress significantly predicted child venting. Inspection of the regression coefficient indicated that higher levels of child distress predicted greater use of venting (see Table 5). Similarly, in the regression that predicted child venting from the maternal sensitivity composite, the maternal strategy of distraction, and their interaction, the model for step 1 was significant, $F(1, 56) = 10.31, p = .002$. Finally, in the regression that predicted child venting from the sensitivity composite, maternal observation, and their interaction, the model for step 1 was also significant, $F(1, 56) = 10.31, p = .002$. In the latter two regressions, the partial t-tests on the regression coefficients indicated that as in the first regression, child distress was significantly and positively related to venting.

The regression predicting the child strategy of interacting with mother from maternal observation, the maternal sensitivity composite, and their interaction was significant with all predictors in the model, $F(4, 53) = 12.37, p = .000$. The partial t-test on the regression coefficient for the maternal strategy of observation indicated that observation significantly predicted the child strategy of interacting with mother. Inspection of the regression coefficient indicated that higher levels of maternal observation predicted less use of the child strategy interacting with mother (see Table 6). In addition to the main effect of maternal observation on the child strategy
of interacting with the mother, maternal observation was also related to the child strategies of
distraction and object orientation. Specifically, in the regression predicting child distraction from
maternal observation, maternal sensitivity, and their interaction, the model with all predictors in
the equation was significant, $F(4, 53) = 6.02, p = .000$. The partial t-test on the regression
coefficient for maternal observation indicated that maternal observation significantly predicted
child distraction. Inspection of the regression coefficient indicated that mothers who engaged in
more observation had children who used more distraction. The partial t-tests also indicated that
maternal sensitivity significantly predicted child distraction. Inspection of the regression
coefficient indicated that more sensitive mothers had children who used less distraction.
However, these main effects were qualified by a significant interaction between maternal
sensitivity and maternal observation. To investigate the nature of this interaction, we followed
procedures outlined by Aiken and West (1991). We elected to graph the interaction using
maternal observation as the moderator of the association between maternal sensitivity and child
distraction (see Figure 1). Figure 1 depicts the relationship between maternal sensitivity and
child distraction as a function of level of maternal observation. Inspection of the graph indicates
that the association between sensitivity and distraction depends on how much mothers engage in
observation. More specifically, under conditions of higher maternal sensitivity the positive
relationship between sensitivity and child distraction was strongest when mothers spent less time
engaging in the strategy of observation during the frustration task. When mothers observed more,
the relationship between sensitivity and distraction became weaker, although it remained
positive. However, when maternal sensitivity was low the positive relationship between maternal
sensitivity and child distraction was strongest when mothers engaged in higher levels of
observation and became weaker as mothers engaged in less observation.
The regression predicting child object orientation from maternal sensitivity, maternal observation, and their interaction was also significant with all predictors in the model, $F(4, 53) = 6.40, p = .000$. The partial t-test on the regression coefficient for maternal observation indicated that maternal observation significantly predicted child object orientation. An examination of the regression coefficient revealed a positive relationship between maternal observation and child object orientation. Thus, greater maternal use of observation predicted greater use of child object orientation. However, this main effect was also qualified by a significant interaction between maternal observation and maternal sensitivity in predicting child object orientation.

We elected to graph the interaction using maternal observation as the moderator of the relationship between maternal sensitivity and child object orientation. Figure 2 depicts the relationship between maternal sensitivity and child object orientation as a function of maternal observation. Under conditions of higher maternal sensitivity the graph shows a positive relationship between maternal sensitivity and object orientation when mothers were average or high in observation during the frustration task. When mothers were low in sensitivity the positive relationship between maternal sensitivity and child object orientation was strongest when mothers were average in observation and became weaker when mothers were high in observation. Under low levels of maternal observation, relations become more complicated. For mothers who were low to average in sensitivity, there was a positive association between maternal sensitivity and children’s use of object orientation. But the relationship changes directions as mothers became more sensitive. When mothers were in the average to high range of sensitivity, the relation between sensitivity and object orientation was negative; that is, as sensitivity increased within this range, children’s use of object orientation decreased. There
were no other significant findings in the remaining nine regressions predicting child distress and child strategies from maternal strategies and sensitivity.

DISCUSSION

The current study investigated the associations between global qualities of maternal behavior and specific maternal strategies in different contexts (emotionally arousing versus non-arousing) and their relations to the display of negative affect and regulatory strategies in toddlers. Maternal global qualities were assessed in an emotionally non-arousing play activity and maternal strategies, child strategies, and child distress were assessed during a task designed to elicit child frustration. The goals of this study were to examine how maternal strategies related to child strategies and child distress in a frustration task and also to explore how maternal global interactive style and maternal strategies may relate to children’s distress and emotion regulation.

Differences in Children’s Behavior Across Conditions (Uninvolved/Involved)

Calkins’ (1994) model proposes that maternal socialization is a key component influencing individual differences in toddlers’ emotion regulation. The finding that children’s distress was lower when mothers were instructed to interact with their children is generally consistent with Calkins’ model. Our findings our also consistent with points made by Thompson and Meyer (2007), who propose that parents are the earliest and most salient socialization influence on children’s emotion regulation. More specifically, they argue that caregivers both model and directly teach strategies to decrease children’s distress in emotionally challenging contexts.

Child Distress and Child Strategies
We found that children who more frequently used the strategy of interacting with mother were more distressed in the mother-uninvolved condition. Given the context, this finding is not surprising. In this condition, mothers were instructed not to interact with their children. Child bids for maternal attention or assistance were likely to be ignored or responded to very briefly (“I’m busy right now”). In addition to the frustration of being unable to open the goldfish container, maternal unresponsiveness likely added to the degree of negative affect expressed by children. Interestingly, our findings are inconsistent with those of Calkins and Johnson (1998), who found that toddlers who were more distressed were less likely to attend to their mother during frustration tasks.

It is important to note that we cannot determine the direction of effects for this finding. Thus, it is plausible that mothers may choose to interact more with children who are more distressed rather than children becoming distressed as a result of interacting with mothers. This possibility is perhaps less plausible given that mothers were instructed to limit their interaction in the uninvolved condition, but anecdotal observation indicates that it was more difficult for mothers to avoid interaction when children were distressed and persistent in making bids. Our findings also indicated that children who oriented to the object of frustration (i.e., the goldfish container) were less likely to be distressed in the uninvolved condition. Past research has suggested that orienting to the source of frustration is correlated with higher levels of distress (Grolnick et al., 2006). Putnam et al. (2002) found that strategies that diverted attention away from the object of frustration, including mother orientation, was associated with increased waiting time in a delay task. One potential explanation for these inconsistent findings may be the task demands. In a delay task, the child is instructed to wait but typically can choose whether or not to comply. In a frustration task, such as the one used in the current study, the desired
object is unattainable. Thus, object orientation may be a less effective strategy in delay contexts, when the criterion behavior is waiting time, but its association with children’s distress in a frustration task may not be as straightforward. Although it seems plausible that children who focus their attention on what they cannot have would be more likely to be distressed, it is also possible that children who are oriented toward the object are actively trying to open the container and the effort taken to solve the problem may be effective in reducing or preventing negative affect. The coding system used in our study makes this possibility more likely. In order to establish reliability on the child strategy codes, the operational definition of “interacting with mother” included all instances in which the child was within close proximity to mother, even if the child was also holding or looking at the goldfish container. Many children who interacted with the mother appeared to do so in an attempt to obtain the mother’s assistance in opening the container, although such help-seeking behavior was not distinguished from other forms of interaction. Thus, those children who were more distressed by their inability to open the container may have been more likely to be coded as interacting with mother. Those children who were coded as using object orientation in the current study may have been focused on trying to problem-solve or in some cases using the container to distract themselves (e.g., rolling it across the floor). The code for object orientation did not distinguish distraction using the container from other behavior involving the container because it proved too difficult to make this distinction reliably.

Relations between Maternal Strategies and Children’s Behavior During an Emotionally Arousing Task

Based on past research, it was hypothesized that the maternal strategy of distraction would be correlated with lower levels of child distress and more potentially effective child
strategies (i.e., distraction). However, we did not find any significant correlations between maternal distraction and children’s distress or regulatory strategies. These null findings are inconsistent with the significant findings of both Putnam et al. (2002) and Spinrad et al. (2004), although their findings were inconsistent. Putnam et al. found that maternal distraction was positively related to children’s use of distraction during a delay task when children were 30 months old. Conversely, Spinrad et al. found that maternal distraction was negatively related to child distraction. Thus, past research suggests that the association between maternal distraction and children’s use of distraction may be somewhat complicated. It is possible that in very young children maternal distraction relates to children’s distraction when it occurs in the same context in which children are experiencing distress, as was the case in Putnam et al.’s study as well as our study. However, when associations between maternal and child strategies are observed across different contexts or over time, relations become more complex.

It was hypothesized that maternal use of the strategy of drawing children’s attention to the frustrating object would be related to higher levels of child distress and potentially less effective regulatory strategies in children (i.e., venting, object orientation). This hypothesis was not supported by our research findings. There were no significant correlations between maternal object focus and any of the child strategies or child distress.

Furthermore, we hypothesized that in general more active maternal behavior would be more effective at reducing child distress and would be related to better regulatory strategies in young children than the passive maternal strategy of observation, although past findings on this topic are inconsistent. Grolnick et al. (1998) investigated the relationship between maternal regulatory strategies in an emotionally arousing task and children’s distress. Mother and toddler dyads participated in a delay procedure in which children had to wait to open a gift or wait to
receive a snack. Both the gift and the snack were visible to the children. Mothers were instructed either to interact with their children as they normally would, the parent-active condition, or not to interact with their children during the frustration task, the parent-passive condition. Grolnick et al. found that mothers who engaged in more passive behavior and more “non-strategy” behavior during the active condition had children who were less distressed when required to regulate independently. Our findings somewhat support those of Grolnick et al. (1998) in that more passive engagement by mothers (i.e., use of the strategy observation) was related to the potentially less effective regulatory strategy of object orientation. But our findings are inconsistent with Grolnick et al. (1998) in that the passive strategy of observation was related to more use of distraction in children, a potentially more effective regulatory strategy. We note, however, that in our study neither strategy was related to children’s distress in the mother-involved condition, and in the mother-uninvolved condition object orientation was negatively associated with child distress. Another study by Spinrad et al. (2004) found that more maternal strategy use at 30 months was related to better regulation in children.

More passive maternal behavior may increase children’s opportunities to regulate independently. Mothers who engage in more observation may have a history of engaging in similar behavior in a naturalistic environment. Grolnick et al. (1998) speculate that the opportunities for such “practice” may account for their findings. Therefore, more effective regulatory strategies such as distraction may be possible when children are given the chance to enact these strategies independently when faced with an emotionally arousing activity. However, it also seems plausible that children need to see models of strategy use in order to learn to implement these strategies independently, an argument consistent with Spinrad et al.’s (2004) findings. It is possible that the somewhat different ages observed in each study and the
difference in designs (longitudinal versus cross-sectional) may contribute to the inconsistency of the findings. More specifically, it is possible that children benefit from maternal modeling of strategies, but only once they have reached a certain developmental level. The children in Spinrad et al.’s study were older (30 months) than most of the children in Grolnick et al.’s study (12-30 months), and Spinrad et al. also predicted children’s regulation at a later age, while Grolnick et al.’s study was cross-sectional. Perhaps most importantly, the design of the current study and those of Spinrad et al. and Grolnick et al. are correlational, making it impossible to establish direction of effects. Thus, although it is possible that maternal observation or other passive maternal behavior leads to more effective strategy use or less distress in children, it is equally possible that children’s choice of particular strategies influences maternal behavior. We found that mothers observed less when children used the strategy of interacting with mother and observed more when children used either distraction or object orientation. When children selected strategies that did not involve the mother, mothers may have been more likely to let their children pursue such strategies; conversely, when children chose to interact with mothers, mothers may have been less inclined to engage in passive behavior. At this point, it seems premature to conclude that either more active or more passive maternal behavior is clearly related to more or less effective emotion regulation in children, particularly given the significant interactions we obtained between maternal observation and maternal sensitivity in predicting children’s strategy use, which suggest that these associations may be complex.

Maternal Sensitivity and Child Distress

We hypothesized that a greater degree of maternal sensitivity during a non-arousing semi-structured play activity would be negatively related to children’s distress during an emotionally arousing, frustrating activity. Conversely, we expected higher maternal
intrusiveness in the semi-structured play activity to be positively related to children’s distress in the frustration task. Contrary to our hypotheses, we did not find a relationship between the maternal sensitivity composite and child distress. Our findings are inconsistent with those of Calkins and Johnson (1998). Calkins and Johnson found that maternal preemptive interference was associated with a greater degree of toddler distress. Maternal preemptive interference is similar to our code of maternal intrusiveness, but preemptive interference is not as inclusive as our code of intrusiveness. Therefore, we may not have detected findings between maternal intrusiveness and toddler distress due to our operational definition of intrusiveness.

Maternal Sensitivity and Child Strategies

It was hypothesized that maternal sensitivity would be positively related to more potentially effective strategy use in children (i.e., distraction), whereas maternal intrusiveness would be positively related to less potentially effective strategy use (i.e., object orientation, venting). In contrast to our hypotheses, there were no relations between children’s strategy use and our maternal sensitivity measure. These findings are inconsistent with those of Calkins and Johnson (1998), who found that children’s use of distraction in a frustration context predicted maternal positive guidance in separate contexts. Our findings are also inconsistent with those of Calkins et al. (1998), who found that maternal negative control was related to lower use of distraction by children. Maternal negative control is comparable to maternal intrusiveness, but had a different operational definition. Therefore, the specific maternal behaviors that were coded were different in Calkins et al. (1998). Our code of maternal intrusiveness may not have detected the same maternal behaviors as maternal negative control.

Maternal Sensitivity and Maternal Strategies
There was no prior research examining the possible relationship between maternal sensitivity and maternal regulatory strategies. Our study adds to the literature in that the relationship between these two variables was explored, but no findings were obtained. It is possible that methodological limitations resulted in the null findings. With a different coding system for maternal strategies and maternal sensitivity and intrusiveness, perhaps significant findings would be detected. The codes for maternal sensitivity were limited in that mothers were given a score of 1-4. A more diverse measure may have detected a significant relationship between maternal behaviors in different contexts.

Prediction of Children’s Distress and Regulatory Strategies from Maternal Sensitivity and Maternal Regulatory Strategies

A major goal of the current study was to examine interactions between global qualities of maternal behavior (i.e., sensitivity) and specific maternal regulatory strategies in predicting children’s distress and regulatory strategies in a frustrating task. There were main effects for some variables in the regressions predicting children’s strategy use. These findings will be discussed first, followed by a discussion of the two regressions indicating significant interactions between maternal sensitivity and maternal strategy use (i.e., observation) in predicting children’s strategy use.

The regressions predicting the strategy of child venting indicated that the control variable, child distress, was significantly and positively related to venting. Preliminary correlational analyses probably did not show this relationship because partial correlations were used, controlling for maternal strategies. In the predictive analyses, child distress was the only variable entered on the first step of the regression models predicting venting. The finding that greater child distress predicted greater venting is consistent with the findings of Calkins (2002),
in which greater use of venting was related to more child distress. Due to the correlational design of both studies, the direction of effects cannot be determined. It is plausible that when children use the strategy of venting, they become more distressed and therefore venting may not be an effective strategy for decreasing distress. However, it is also possible that children who are initially more distressed are more likely to engage in venting.

Consistent with the preliminary correlational analyses, the predictive analyses indicated that the strategy of maternal observation predicted less interaction with the mother during the frustration task, one of the child strategies. To the best of our knowledge, no previous studies have examined relations between passive maternal behavior (i.e., observation) and children’s strategy use. Grolnick et al. (1998) examined child distress, but not child strategies, in relation to passive maternal behavior. The correlational nature of the data does not permit definitive conclusions about the direction of effects, but it is possible to speculate on the two different possibilities. The model of the development of individual differences in emotion regulation proposed by Calkins (1994) suggests that there is a bidirectional relationship between maternal and child behavior. Consistent with this hypothesis, mothers in our study may have been more likely to be passive when children were not actively attempting to engage them but were instead relying on other, less social strategies. Conversely, maternal observation may in fact discourage children from seeking interaction. In the first formulation, the finding suggests that children are regulating independently and mothers are not needed to help. The latter interpretation suggests that children are less likely to approach mothers when mothers do not take the initiative to interact with them. Given that children had just experienced a situation in which mothers were relatively unresponsive (the mother-uninvolved condition), this possibility may be more likely than might typically be expected.
There were two interactions between maternal sensitivity and the maternal strategy of observation in predicting children’s strategy use (i.e., distraction and object orientation). The interaction was graphed using maternal observation as the moderator. The nature of the interaction seemed clearer when maternal observation was treated as the moderator of the association between maternal sensitivity and children’s distraction or object orientation; thus, the discussion of the findings is framed this way. With respect to the prediction of child distraction, the association between sensitivity and distraction depended on how much mothers engaged in observation. More specifically, the positive relationship between sensitivity and child distraction was strongest when mothers spent less time engaging in the strategy of observation during the frustration task. When mothers observed more, the relationship between sensitivity and distraction became weaker, although it remained positive (see Figure 1).

The positive association between maternal sensitivity and child distraction across levels of maternal observation is consistent with the findings of Calkins et al. (1998), who found that maternal negative control was negatively associated with child distraction. Similarly, Calkins and Johnson (1998) found that greater child distraction was significantly predicted by higher levels of maternal positive guidance. In both studies, as in ours, “global” qualities of maternal behavior were measured in relatively non-stressful contexts and child behavior (i.e., strategies) was measured during emotionally arousing, frustrating activities. However, our study also examined maternal behavior (i.e., strategies) during the frustrating task, and the interaction between maternal sensitivity and the maternal strategy of observation indicates that the positive association between maternal sensitivity and child distraction was stronger when mothers engaged in low levels of observation. In the coding system for maternal strategies, all intervals received a strategy code. Therefore, mothers who spent less time observing their children must
have been using other strategies more frequently. It is plausible that mothers who are more sensitive are more likely to select strategies that encourage child distraction (potentially a more effective strategy, although not in the current study). In any case, however, these findings suggest that “global” qualities of maternal behavior that may be observed in non-stressful as well as stressful contexts, as well as specific maternal behaviors within emotionally challenging contexts, are both important in understanding children’s behavior in an emotionally challenging context. Although sensitivity was positively related to children’s distraction, this relationship was strongest when mothers also engaged in more active strategies during the frustration task rather than the passive strategy of maternal observation. Thus, our findings are more consistent with those of Spinrad et al. (2004), who found that greater maternal strategy use was related to better child regulation, than with those of Grolnick at al. (1998), who found that maternal passivity was related to better child emotion regulation.

With respect to the prediction of object orientation, there was a positive relationship between maternal sensitivity and object orientation when mothers were “average” or “high” in observation during the frustration task. Under conditions of “low” levels of maternal observation, relations became more complicated. For mothers who were low to average in sensitivity, there was a positive association between maternal sensitivity and children’s use of object orientation. But the relationship changed directions as mothers became more sensitive. When mothers were in the average to high range of sensitivity, the relation between sensitivity and object orientation was negative; that is, as sensitivity increased within this range, children’s use of object orientation decreased (see Figure 2).

These findings are open to multiple interpretations and given the correlational design of the study, definitive conclusions are impossible. However, we offer some speculations. With
respect to mothers who are average or high in observation during the frustration task, the positive relationship between sensitivity and children’s object orientation may mean that mothers who are more sensitive tend to use observation when their children are already focused on the object. Perhaps highly sensitive mothers are taking their cues from their children. When the child is oriented toward the object and is not distressed, then mothers are not interfering. Conversely, mothers who are lower in sensitivity may not be responding to the child’s behavioral cues. As noted above, the way in which object orientation was coded in the current study makes it plausible that object orientation could reflect a “problem-focused” or even a distracting regulatory strategy, which may be one reason it was not associated with child distress in the mother-involved condition and was associated with lower child distress in the uninvolved condition. Given the direction of effects issue, however, we acknowledge that maternal observation may lead to greater child object orientation, rather than the reverse.

Under conditions of low maternal observation, it is possible that mothers are choosing different strategies depending on their level of sensitivity, which in turn may influence children’s use of object orientation. More specifically, mothers who are low to average in sensitivity may be engaging in behaviors that tend to encourage object orientation; unlike mothers who are average or high in observation, who may be following their children’s focus on the object, mothers low in observation are by definition engaging in more active strategies that may have the effect of focusing the child’s attention on the frustrating object. Mothers in the average to high range of sensitivity who are low in observation are also engaging in more active strategies, but they may be selecting strategies that decrease children’s focus on the object. Of course, it is also possible that children may behave differently with mothers who vary in sensitivity, and children’s strategy choice may “drive” maternal behavior rather than the reverse. One of the
difficulties in interpreting this interaction is that the status of “object orientation” as an effective or ineffective strategy in reducing distress remains unclear. As noted earlier, some past research indicates that object orientation is related to greater child distress (Calkins et al. 1998; Grolnick et al., 2006). In our study, object orientation was unrelated to child distress in the mother-involved condition and negatively related to distress in the mother-uninvolved condition. Temporally sensitive designs are needed to better understand which child (and maternal) strategies actually decrease or increase child distress.

Although the interaction effects obtained in the present study are subject to multiple interpretations, in general our findings support the theoretical conceptualizations of Thompson and Meyer (2007), who make the point that the strategies mothers use in stressful situations are likely to be rooted in the larger mother-child relationship. Moreover, our findings suggest that understanding children’s behavior in emotionally challenging contexts requires examination of the overall quality of the mother-child relationship as well as the specific regulatory strategies mothers use in such contexts.

General Limitations and Future Directions

The current study had a number of limitations. Our relatively small sample size limited our power to detect significant effects. The composition of the sample was fairly homogeneous, which limits the external validity of the study and also may have constrained the variability observed in parenting behavior. The majority of participating families were European-American, well-educated, and lived in two-parent households; on average, these characteristics are associated with more positive parenting behaviors. In addition to sample characteristics, the study design also may have contributed to reduced variability in maternal and child behavior. Data were collected in a laboratory playroom, not in the natural environments typical for mother-
child dyads. As a result, mothers may not have interacted with their children as they normally would have because of their awareness of being observed. Moreover, the tasks used, although intended to be analogues of “real world” interactions, were artificial and the laboratory setting probably constrained both child and maternal behaviors. In addition, all data were gathered in one laboratory assessment, increasing the chances of observing unrepresentative behavior. For example, perhaps the child was tired or not feeling well on the date of assessment and this resulted in displays of atypical negative affect. For all of these reasons, we may not have achieved an accurate representation of mother-child interactions. In addition, the absence of longitudinal data made it impossible to establish the direction of effects in our analyses. There were also other more specific limitations related to the measures and coding systems used. For example, in the mother-uninvolved condition of the frustration task, the mother remained in the room. Therefore, many children tried to initiate interactions with mothers during the uninvolved condition. It was difficult for many mothers to remain uninvolved despite our instructions and some mothers responded to their children during this time. Thus, the difference between conditions with respect to maternal behavior was less pronounced than was intended. As noted above, due to difficulty in establishing interrater reliability when coding for child strategies, many of the original strategies had to be collapsed into larger categories. This increased interrater reliability, but it decreased the sensitivity of the codes. In addition, reliability for maternal sensitivity was relatively low. Finally, many factors are likely to affect individual differences in children’s emotion regulation. We did not measure child temperament, paternal behavior, family composition, or many other potentially relevant variables.

In the future, studies should examine potential interactions between global qualities of maternal behavior and more specific regulatory strategies using larger, more diverse samples and
longitudinal designs to address some of the issues discussed above. Future research also should investigate mother-child dyads in settings outside the lab and consider additional intrinsic and extrinsic factors that may affect individual differences in young children’s emotion regulation.
REFERENCES


Table 1

Descriptive Statistics for Proportions of Intervals: Child Strategies, Child Distress and Maternal Strategies by Condition and Sensitivity Composite

<table>
<thead>
<tr>
<th></th>
<th>Min</th>
<th>MAX</th>
<th>M</th>
<th>SD</th>
<th>N</th>
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<td><strong>Child (M Uninvolved)</strong></td>
<td></td>
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<tr>
<td>Interacting</td>
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<td>1.00</td>
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</tr>
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<td>1.00</td>
<td>.30</td>
<td>.30</td>
<td>69</td>
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</table>

| **Child (M Involved)** |     |      |     |     |    |
| Interacting            | .40 | 1.00 | .89 | .14 | 62 |
| Distraction            | .00 | .41  | .06 | .11 | 62 |
| Venting                | .00 | .19  | .01 | .04 | 62 |
| Object Oriented        | .00 | .57  | .03 | .09 | 62 |
| Duration of distress   | .00 | .84  | .17 | .20 | 63 |

| **Maternal** |     |     |     |     |    |
| Attention      | 0   | .96 | .28 | .26 | 63 |
| Distraction    | 0   | .96 | .38 | .28 | 63 |
| Soothing       | 0   | .48 | .10 | .13 | 63 |
| Observing      | 0   | .61 | .07 | .10 | 63 |
| Reward         | 0   | .52 | .11 | .15 | 63 |
| Command        | 0   | .64 | .05 | .11 | 63 |
| Sensitivity/Intrusiveness | -4.69 | 2.35 | .00 | 1.96 | 60 |

*Note.* Means and standard deviations for frustration task variables are based on proportion scores.
Table 2

*Partial Correlations for Child Distress and Maternal Strategies (Mother-Involved Condition) (N = 62)*

<table>
<thead>
<tr>
<th>Maternal Strategy</th>
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<td>Attention</td>
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<td>Distraction</td>
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<tr>
<td>Soothing</td>
<td>.39</td>
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<td>Reward</td>
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<td>Observing</td>
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<tr>
<td>Command</td>
<td>.00</td>
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</tbody>
</table>

*Note.* Child strategies in the mother-involved condition were controlled for in these analyses.
Table 3

Partial Correlations for Child Strategies and Maternal Strategies (Mother-Involved) 
(N = 62)

<table>
<thead>
<tr>
<th>Maternal Strategy</th>
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<th>Distraction</th>
<th>Venting</th>
<th>Object Oriented</th>
</tr>
</thead>
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<td>-.01</td>
<td>-.03</td>
<td>.05</td>
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<td>-.04</td>
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<td>Soothing</td>
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<td>-.12</td>
<td>.04</td>
<td>-.08</td>
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<td>Reward</td>
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<td>.16</td>
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<td>.21</td>
<td>-.09</td>
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</table>

Note. Child distress in the mother-involved condition was controlled for in these analyses. 
* $p < .05$.  *** $p < .001$. 


Table 4

*Partial Correlations for Maternal Sensitivity and Maternal Strategies (Mother-Involved Condition) (N = 58)*

<table>
<thead>
<tr>
<th>Maternal Strategy</th>
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<tbody>
<tr>
<td>Attention</td>
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<td>Reward</td>
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<td>Command</td>
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*Note.* Child strategies in the mother-involved condition and child distress in the mother-involved condition were controlled for in these analyses.
Table 5

Summary of Hierarchical Regression Analysis for Child Distress, Maternal Attention, and Sensitivity Composite Predicting Child Venting (N = 58)

<table>
<thead>
<tr>
<th>Variable</th>
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</table>

*Note. $R^2 = .156$, $p = .002$ for Step 1; $\Delta R^2 = .156$ for Step 1; $R^2 = .172$, $p = .583$ for Step 2; $\Delta R^2 = .017$ for Step 2; $R^2 = .174$, $p = .749$ for Step 3; $\Delta R^2 = .002$ for Step 3.***$p < .003.$
Table 6

Summary of Hierarchical Regression Analysis for Child Distress, Maternal Observation, and Sensitivity Composite Predicting Child Interaction (N = 58)

<table>
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</tr>
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</table>

Note. R² = .002, p = .715 for Step 1; ∆R² = .002 for Step 1; R² = .481, p = .000 for Step 2; ∆R² = .479; R² = 483, p = .671 for Step 3; ∆R² = .002 for Step 3.

***p < .003.
Table 7

Summary of Hierarchical Regression Analysis for Child Distress, Maternal Observation, and Sensitivity Composite Predicting Child Distraction (N = 58)

<table>
<thead>
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</table>

Note. R² = .000, p = .88 for Step 1; ΔR² = .000 for Step 1; R² = .226, p = .001 for Step 2; ΔR² = .226 for Step 2; R² = .313, p = .013 for Step 3; ΔR² = .087 for Step 3.
*p < .05. **p < .003.
Table 8

*Summary of Hierarchical Regression Analysis for Child Distress, Maternal Observation, and Sensitivity Composite Predicting Child Object Orientation (N = 58)*

<table>
<thead>
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<th>Variable</th>
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<th>β</th>
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<tr>
<td>Observation</td>
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</table>

*Note. R² = .007, p = .534 for Step 1; ΔR² = .007 for Step 1; R² = .243, p = .001 for Step 2; ΔR² = .236 for Step 2; R² = .326, p = .014 for Step 3; ΔR² = .083 for Step 3.*

*p < .05. **p < .01. ***p < .003.
Figure Caption

*Figure 1.* Prediction of child distraction from maternal sensitivity at varying levels of maternal observation.
Figure Caption

*Figure 2.* Prediction of child object orientation from maternal sensitivity at varying levels of maternal observation.
Appendix A: Parenting Behaviors Coding Manual (NICHD Study of Early Childcare and Youth Development)

Intrusiveness:

Intrusive and overcontrolling interaction is definitely adult centered rather than child centered. Prototypically, intrusive/overcontrolling others impose their agenda on the child despite signals that a different activity, level of play, or pace of interaction is needed. High arousal or a rapid pace are not, by themselves, indicative of intrusive overstimulation—if the child responds positively and does not engage in overt defensive behaviors (e.g., turning away, saying “no”, playing with other toys, or directly ignoring). Intrusiveness and overcontrol are apparent when the mother does not allow the child a “turn” or an opportunity to respond at his/her pace. Some intrusive/overcontrolling mothers overstructure their children’s play; they insist on their own agenda or play theme; they interrupt to redirect play; or they insist on particular uses for toys or props (e.g., “it’s an apron not a hat”; an oven cannot be a space shuttle), when such control is not necessary for the child’s safety or respect for others or their belongings. These mothers appear unable to relinquish control of the interaction in order to facilitate the child’s exploration or regulation of the activity. Another example of controlling, intrusive behavior is displayed by mothers overwhelming the child with a rapid succession of toys or suggestions, not allowing him/her time to react to one before another occurs. Extreme intrusiveness can be seen as overcontrol to a point where the child’s autonomy is at stake. It should be kept in mind that a mother can be involved in play with the child without being highly intrusive, if the mother follows the child’s
interest, pace, and signals. If a mother elaborates on a child’s agenda intrusively, it is seen as more low level than a complete redirect (e.g., go get this…, do this…).

Specific behaviors characterizing intrusive/overcontrolling interactions include (a) failing to modulate behavior that the child turns from, defends against, or expresses negative affect to; (b) offering a continuous barrage of stimulation, food, or toys; (c) not allowing the child to influence the pace or focus of play, interaction, or feeding; (d) taking away objects or food while the child still appears interested; (e) insisting that the child do something (play, eat, interact) in which he/she is not interested; (f) not allowing the child to make choices, and (g) by excessively or abruptly disciplining the child. Physical intrusiveness is seen to be more extreme than verbal intrusiveness. If the mother picks up the child to move him/her so that they are facing the one-way mirror, this should not count toward intrusiveness since the experimenter instructed her to do so; the only exceptions are if the mother repeatedly moves the child or does so in a harsh manner. The manner in which the mother negotiates the transitions from one box to another (particularly how she responds to the child’s cues with respect to cleaning up and moving on) should be taken into account in coding intrusiveness (as well as sensitivity). Generally, the most unintrusive way of negotiating the transition is if the mother brings down the next box or starts to clean up toys the child is not playing with without saying anything. If the mother suggests or tells the child it’s time to move on or clean up, the child’s focus of attention should be considered. For example, if the child is clearly engaged in an activity, a suggestion/direction from the mother is at least mildly intrusive. The level of intrusiveness is dependent on the mother’s persistence and the child’s resistance.
On the other hand, if the child is not engaged when the mother initiates a transition, her behavior would not be considered intrusive.

1 – *Not at all characteristic.* This rating should be given to caregivers who display one or two mild signs of intrusive behavior.

2 – *Minimally characteristic.* This rating should be given to caregivers who display minimal intrusiveness. There is some evidence of intrusiveness, but it is not typical. The mother may initiate interactions with and offer suggestions to the child which occasionally are not welcome or ill timed.

3 – *Moderately characteristic.* This rating should be given to mothers who are often intrusive. Mother intrusiveness occurs in some interactions at a fairly high level, but are often totally absent; or moderately intrusive behavior is evident more often; or for mothers who rarely interact, a substantial proportion of their interactions are intrusive.

4 – *Highly characteristic.* This mother’s interactions with the child are consistently and typically intrusive. During their interaction, the mother controls the interaction, allowing the child little self-direction in his/her activities. During the time that they are interacting, the mother allows the child little autonomy, and essentially negates the child’s experience.
Sensitivity/Responsiveness:

The sensitive mother demonstrates the ability to adapt his/her behavior to the child’s mood and level of development. The mother neither over- nor underestimates the child’s capacities. The mother knows when it is time to increase or reduce the amount of stimulation the child is experiencing. For example, the mother discontinues an activity that is beyond the child’s capacity for response or introduces a new activity when the child appears bored.

Markers of sensitivity include (a) acknowledging the child’s affect; (b) mother conversation that is responsive to the content of the child’s talk and or activity; (c) facilitating, but not over controlling the child’s play with objects or his/her motor activity; (d) evidence of good timing paced to the child’s interest, activities, and arousal level; (e) changing the pace when the child appears understimulated, overexcited, or tired; (f) picking up on the child’s interest in toys or games; (g) shared positive affect; (h) encouragement and praise of the child’s efforts; (i) providing an appropriate level of stimulation and appropriate range and variety of activities; (j) timely discipline that matches the nature of the violation under consideration and the child’s ability to understand and benefit from whatever reprimand is offered (nailbiting and telling the child not to put the toys in his/her mouth were considered appropriate discipline); and (k) general flexibility in handling compliance and autonomy issues, including not reacting to noncompliance and supporting autonomy while permitting dependence. If the mother picks up the child to move him/her so that they are facing the one-way mirror, this should not count against sensitivity since the experimenter instructed her to do so; the only exceptions are if the mother repeatedly moves the child or does so in a harsh manner.
The manner in which the mother negotiates the transitions from one box to another (particularly how she responds to the child’s cues with respect to cleaning up and moving on) should be taken into account in coding sensitivity. Generally, the most sensitive way of negotiating the transition is if the mother brings down the next box or starts to clean up toys the child is not playing with without saying anything. If the mother suggests or tells the child it’s time to move on or clean up, the child’s focus of attention should be considered.

If the mom corrects the child for mislabeling a toy or object, and does so positively, her sensitivity measure should not change. If the mother picks up the child to move him/her so that they are facing the one-way mirror, this should not count against them since the experimenter instructed her to do so; the only exceptions are if the mother repeatedly moves the child or does so in a harsh manner.

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

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

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

4 – Highly characteristic. This rating should be given to mothers who are exceptionally sensitive and responsive. Instances of insensitivity are rare and never striking. Interactions are characteristically well timed and appropriate.
Appendix B

CODING MANUAL FOR CHILD STRATEGIES

- The following information must be included for every coding sheet you fill out:
  1. Your name
  2. Date
  3. Indicate what you are coding for: training, reliability or final data
  4. Subject number
  5. Start time, knock time and end time

Also remember to fill out interval times before you begin to avoid confusion.

- PLEASE write clearly and do not write over your original codes. If you change your mind after watching an interval again and have to scribble a code out, please go back and make it clear what the code is (i.e., use white-out or scribble out your mistake entirely). If you are coding during training, a consensus coding sheet should be used to write down the decisions you and your partner make.

- Coders should code the first strategy or level of affect that occurs in an interval (see notes for clarification for exceptions to this rule).

CHILD STRATEGIES

2= Interacting with mother – the child is in close proximity to mother (they must be at least within the child’s arm length away to be considered within close proximity); the child is making verbalizations towards mother (e.g., “Look!” “Open”); is physically interacting (e.g., climbing on lap) with mother; and/or is looking at mother (i.e., their visual gaze is focused on mother).

3= Distraction - focusing attention on something other than getting the frustrating object (instances where focus is on the mother will not be coded as distraction). This may also include self-manipulative behaviors such as rocking or thumb sucking (i.e., self-soothing behaviors).

6= Venting - physical manifestations of distress that includes directing physical aggression toward the object of frustration, the mother or other objects in the room.

7= Object orientation
  A - Passive object orientation - holding, touching or manipulating the container with or without their visual attention. Looking at the container alone may be coded as passive object orientation, however ambiguous looks should be coded as distraction (i.e., glancing at the container from time to time should NOT count). Additionally, looking at the container must occur for at least 2 consecutive seconds to be coded as passive object orientation.
  B – Active object orientation - attempting to get into the object of frustration, and the child does so without involving the mother.

8= No strategy – instances where the child is crying with such intensity that visual attention is not able to be discerned.
Notes for clarification for child strategy codes:

- In an instance when the child is playing with something else (i.e., distraction) and the child is looking at mom from time to time (like she’s trying to talk or engage the child) then distraction should be coded and NOT interacting with mother. In other words, the child’s eye gaze must be fixated on mother to be considered interacting with mother (12-5-07).

- If the child goes out of frame, then the interval should be left blank (draw an X through the interval) (12-5-07). If the child is out of frame for the first half of the interval, do not code within that interval (code the next interval) (2-13-08).

- For code # 7 “involving mother” means that the child must actively pursue mom (i.e., it is a deliberate act by the child to involve mother) (1-26-08).

- When a child complies with a mother’s direct request, (e.g., “Just keep trying…”) you should code what the child’s behavior is and NOT interacting with mother (1-26-08).

- In an instance when the child is making vocalizations, you must assess 1) whether it is clear the child’s verbalizations are clearly directed towards the mother (e.g., asks mother a question, tells mother to look somewhere, directly addresses her name) and 2) whether or not the child’s eye gaze is towards the mother. In an instance when the child is making verbalizations and is looking at mom, code interacting with mother. If it remains unclear if the child is directly speaking to the mother and they are not looking at mom, code distraction, object orientation 7a or 7b, or venting (whichever is appropriate) (1-27-07).

- Exceptions to coding the first strategy in the interval: Code venting for an interval if these behaviors occur at any point during the interval (i.e., it doesn’t have to occur in the first half of the interval) (2-13-08).

- Code #2 clarifications:
  - Code interacting with mother regardless of whether the child is engaged with another object if they are talking to mom (2-13-08).
  - For the ‘mother involved’ condition, if mom picks the child up or places them in close proximity to her (or any physical interaction that mom initiates), code interacting with mother (2-13-08).
  - If the child is actively trying to open the container while meeting criteria for the proximity rule for interacting with mother (i.e., the child is within their arm’s reach to mom) code active object orientation and NOT interacting with mom. If the child is only looking at the container and is meeting criteria for interacting with mother (including the proximity rule) code interacting with mother (2-17-08).

- Changed definitions of venting, eliminated leave-taking and changed definitions of object orientation (2-22-08).
Appendix C

CODING MANUAL FOR MATERNAL STRATEGIES

- Write the date, name of coder, and indicate if you are coding for training, consensus, reliability, or for final data.
- Write all codes legibly and clearly mark out or erase all changed codes.
- Coders should code the first strategy that occurs in an interval, with the exception of code #6.
- All intervals are 5-seconds within the mother involved condition. Coding begins after the knock and ends 2-minutes after the knock.

Mother’s Strategies –
1 = Drawing the child’s attention to the object of frustration - verbal references to the object and/or pointing or gesturing toward the object.
2 = Distraction - engaging the child verbally in a topic other than the inability to obtain the object, or involving the child in an activity that is unrelated to the inability to obtain the object. If the mother uses the goldfish as a distraction (i.e. says “lets count the goldfish”) this should be marked as distraction.
3 = Soothing and comforting - pleasant physical affection such as a gentle touch and/or pleasant tone in vocalizations.
4 = Verbal explanation - a reference to the emotion of the child and an explanation (e.g., “You are upset because you can’t have that toy”).
5 = Bribery - reference to a future consequence the child will receive if they comply with the mother’s request
   A= future reward - such saying to the child “stop crying now and we can get ice cream on the way home”.
   B= future punisher – such as saying to the child “if you break it you’ll be in trouble”.
6 = Observing child - focusing attention on the child, and not ignoring the child, but not responding to the child verbally or behaviorally.
7 = Verbal command – direct child to regulate emotion or behavior

Notes for Clarification:
- Code #5 Bribery- Any time that mom references the future code #5. For example, if mom says “you will get the goldfish later” this should be coded as 5A, bribery of a future reward. (Updated 1-25-08)
- Code #6 Observing Child– other codes override code #6. Code #6 in intervals where mom does not respond to the child verbally or behaviorally for the entire 5-seconds. (Updated 2-9-08)
- Code #1 Object Focus- If the mom gives a says “You do it” or “You can do it” regarding opening the container then a code of object focus should be given for that interval. (Updated 2-9-08)
- If the mom engages in soothing, comforting, and pleasant physical affection and at the same time also engages in another strategy, then the other strategy should be coded. (Updated 5-1-08)
- Any physical affection (even the child sitting in the mom’s lap) should be coded as soothing and comforting (strategy #3). (Updated 5-1-08)
Appendix D

CODING MANUAL FOR NEGATIVE AFFECT

Goldfish Task: Start time is 3 min and duration is 2 min from knock time. If episode is curtailed early code latency to distress from the beginning of the task (when the door closes). Coding for duration of distress and intensity ratings start two minutes before the knock and continue for two minutes after the knock.

Latency to Distress: Number of seconds from start of task before child shows any negative affect (whine, fuss, cry, etc.)

Duration of Distress: Duration is coded in two different trials for both uninvolved and involved episodes. The time of those trials are rounded up if more than 50 mil-seconds. If there is more than 2 seconds difference between trial 1 & 2, a 3rd or even a 4th trial needs to be taken. Average all trials for final duration code.

Distress is coded based on the child’s vocalizations, but if facial expressions help to clarify an ambiguous vocalization they may also be used.

Note:
- If child says “no”, this should not automatically count as negative affect unless the child’s tone is whiny, fussy, etc.
- Sounds that reflect effort or are ambiguous should not be counted as negative affect.