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Mothers' Socialization of Emotion Regulation: The Moderating Role of Children's Negative Emotional Reactivity

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Abstract

During the toddler period, children begin to shift from being primarily dependent on parents to regulate their emotions to managing their emotions independently. The present study considers how children's propensity towards negative emotional arousal interacts with mothers' efforts to socialize emotion regulation. Fifty-five low income mothers and their 2-year-old children completed observational assessments measuring mothers' socialization of emotion regulation, children's reactivity propensity, and children's emotion regulation. Children's propensity towards negative reactivity significantly interacted with mothers' use of physical soothing. That is, mothers with less reactive children who used more soothing had children who were more likely to use interactive, distraction-based regulatory behaviors during a frustration situation. Theoretical and child care implications of the finding are discussed.

Keywords

Mothers; Socialization; Emotion regulation; Reactivity; Toddler-aged children

Introduction

Early childhood is noted for important advances in children's motor, language, and, critical to the present study, emotional development. Theoretically, children learn to regulate emotional arousal during early childhood through interactions with parents (Kopp 1989). Empirical evidence supports this theoretical expectation and suggests that mothers play a critical role in socializing children's emotion regulation by modeling and encouraging children to use specific regulatory strategies (e.g., Calkins et al. 1998; Calkins and Johnson 1998; Grolnick et al. 1999; for a review see Eisenberg et al. 1998). Mothers who respond to children's distress by shifting children's attention away from the source of the distress may enhance children's efforts to learn to autonomously regulate their emotions because attention-shifting strategies are expected to reduce children's emotional arousal and increase the likelihood that children will internalize mothers' socialization efforts (e.g., Scaramella and Leve 2004). In contrast, mothers

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who react to children's distress by intensifying their own negative emotion and using angry and punitive responses model poor emotion regulation, increase children's distress, and make it more difficult for children to reduce their emotional arousal (Scaramella and Leve 2004).

One challenge with studying the process by which children come to autonomously regulate emotions is that children's ability to regulate emotions is intrinsically linked to their propensity towards emotional arousal. That is, the purpose of emotion regulation is to modulate the experience and expression of emotional arousal. Children who tend to react with strong, negative emotions to environmental demands and changes may experience more difficulty learning to autonomously regulate emotions for two reasons. Strong negative emotions are likely difficult for children to control and may interfere with parents' socialization efforts (Scaramella and Leve 2004). In contrast, children less prone to intensely negative emotional reactions may experience fewer difficulties regulating their emotions because less intense emotions are easier for both parents and children to manage. Thus, as compared to less reactive children, highly reactive children may need more external support from mothers to reduce negative emotional arousal (Eisenberg et al. 1998; Scaramella and Leve 2004). Given the importance of various parenting characteristics to effective child care (e.g., Fischer et al. 2008; Korfmacher et al. 2008; Nicholson and Artz 2006), the present study considers how mothers socialization of emotion regulation interacts with children's propensity towards negative emotional arousal to influence children's ability to regulate emotions.

One limitation with much of the research examining the direct and interactive effects of children's reactivity propensities and mothers' socialization efforts on children's emotion regulation skill is that the vast majority of this work has relied on middle-class, Caucasian samples (e.g., Diener and Mangelsdorf 1999; Grolnick et al. 1999). The present study considers the role of children's propensity towards negative emotional reactivity in moderating the association between mothers' socialization of emotion regulation and children's observed emotion regulation among low-income, predominantly African–American mothers and their toddler-aged children. Consistent with previous empirical work, mothers were the focus of study (e.g., Calkins and Johnson 1998; Garner and Spears 2000; Grolnick et al. 1996; Stansbury and Sigman 2000). Restricting the focus to mothers increases the generalizability of these findings with existing studies. The following sections detail the developmental significance of the early childhood period for emerging emotion regulation and the influence of children's negative emotional reactivity on mothers' efforts to socialize emotion regulation. Finally, the hypotheses evaluated in the current study will be described.

Children's Emotion Regulation and its Development During the Toddler Period

The toddler period is marked by a number of developmental advances (e.g., cognitive, language) that coincide with increases in parental expectations for autonomous regulation of emotion and behavior (Kopp 1989). Emotion regulation is often defined as a process by which children use specific strategies to alter the experience or expression of emotional arousal (Eisenberg and Fabes 1999; Grolnick et al. 1999). As compared to infants who depend completely on others for regulatory assistance (Fox and Calkins 2003), toddler-aged children are increasingly able to understand the source of their emotional distress and are motivated to change or eliminate the cause of distress (Diener and Mangelsdorf 1999).

While emotion regulatory skill is expected to become more sophisticated over time, strategies toddler-aged children typically use to regulate their emotions can be clustered into two general groups based on whether they increase or decrease emotional distress. Attention-shifting strategies, like distraction, self-soothing, and comfort-seeking behaviors, re-direct children's focus away from the source of the distress and have been associated with less emotional distress

in children (Buss and Goldsmith 1998; Calkins et al. 1999; Grolnick et al. 1996). Emotion-intensifying behaviors, such as aggression and venting, maintain children's focus on the source of the distress and fail to reduce children's negative emotionality and distress (Eisenberg et al. 1994). Preschool-aged children who rely more heavily on attention-shifting strategies rather than emotion-intensifying strategies have been found to be more socially competent (Rubin et al. 1995); whereas children who use emotion-intensifying behaviors seem to have more externalizing problems (e.g., Cole et al. 1994; Rubin et al. 2003).

Some debate currently exists as to whether emotion intensifying strategies, like aggression or venting, actually represent emotional regulatory behaviors or whether such strategies represent failures to regulate emotion. Theoretical definitions of emotion regulation do not restrict emotion regulation to strategies that simply reduce the expression of emotion, but include responses that both intensify and modify the expression of emotion (e.g., Grolnick et al. 1996; Saarni et al. 2006). Importantly, variations in the use of children's strategies that down-regulate negative emotions as compared to those strategies that intensify emotional arousal may predict adjustment over time. That is, while venting and aggressive responses to frustration may accurately communicate a child's current feelings, an over-reliance on venting or aggressive responses may interfere with adjustment by promoting risk for psychopathology or interpersonal difficulties over time (Shipman et al. 2003).

Socialization of Emotion Regulation and Children's Regulatory Behaviors

Parents play an important role in guiding and assisting children's earliest efforts to regulate negative emotions. Socialization of emotion regulation includes mothers' responses to children's distress as well mothers' modeling and use of emotion regulation behaviors (e.g., Eisenberg et al. 1998). Like children's emotion regulation, mothers' socialization behaviors also can be grouped according to how mothers' behaviors affect children's distress. Theoretically, parents who respond to children's distress by shifting children's attention away from the source of the distress facilitate successful emotion regulation because such parenting behaviors help reduce children's emotional arousal to manageable levels (Calkins and Johnson 1998; Scaramella and Leve 2004). Angry or punitive strategies may impede children's regulatory development because such parental behaviors model poor emotion regulation and increase children's distress to levels that are too difficult for children to autonomously regulate (Scaramella and Leve 2004).

Empirical research is generally consistent with these theoretical expectations. Mothers who use attention shifting behaviors, like redirecting children's attention or providing comfort, have been found to have toddlers who use emotion regulation strategies that more effectively modulate emotional arousal (Calkins and Johnson 1998). In contrast, parents who respond to children's distress with negative emotion or angry and punitive behavior (i.e., emotion-intensifying behaviors) have been found to have children who have problems controlling their emotions during later developmental periods (Frick and Morris 2004 for an important review).

Although parents are significant socializing agents of emotion regulation, children's propensity towards negative emotional arousal may disrupt parents' socialization efforts (Putnam et al. 2002). Children who frequently react to novel situations with strong, negative emotions may be less responsive to parents' socialization attempts because their emotional arousal interferes with attentional processes (Hoffman 1983). Consistent with this idea, toddlers who became distressed during frustrating tasks and used emotion-intensifying regulation (i.e., venting or aggression) were found to attend to their mothers less, thereby missing many of their mothers' attempts to provide assistance coping with negative emotions (Calkins and Johnson 1998). Quite possibly, children who are less prone to react to frustration with quick, intense negative emotions not only provide mothers more opportunities to respond to their distress, such children

also may be more attentive and responsive to mothers' socialization efforts (Hoffman 1983). In contrast, highly reactive children may evoke more emotion-intensifying behaviors from mothers, maternal behavior that reinforces and escalates children's emotional negativity (e.g., Patterson 1982). Thus, children's propensity towards strong negative emotional reactivity is expected to interfere with or impede mothers' efforts to socialize competent emotion regulation.

Goals of the Current Study

The goal of the current study was to consider the extent to which children's negative emotional reactivity moderates the relationship between mothers' socialization of emotion regulation and children's use of specific emotion regulation strategies. Specifically, the following hypotheses were evaluated:

1. Mothers' use of attention-shifting behaviors (i.e., distraction and comforting) will be positively associated with children's use of attention-shifting regulatory behaviors and negatively associated with venting/aggressing regulatory behaviors.
2. Mothers' use of emotion-intensifying behaviors (i.e., angry/punitive behaviors) will be positively associated with children's use of emotion-intensifying regulation (i.e., venting/aggression) and negatively associated with children's use of attention-shifting regulation
3. Children's propensity towards negative emotional reactivity will be positively correlated with their use of emotion-intensifying regulation and negatively correlated with attention-shifting regulation.
4. Children's negative emotional reactivity will moderate the relationship between mothers' socialization behaviors and children's observed emotion regulation such that: (a) mothers' emotion-intensifying behaviors will be associated with children's use of emotion-intensifying regulation for more highly reactive children, and (b) mothers' use of attention-shifting regulatory behaviors will be associated with children's use of attention-shifting regulation among less reactive children.

Methods

Participants

Fifty-five mothers with a child enrolled in Head Start and a 2-year-old younger child were recruited; only mothers and their 2-year-old children participated. Mother–child dyads were recruited through collaboration with a local Head Start center that enrolled ~600 3- to 5-year-old children annually. Families were recruited through Head Start registrations, parent orientation meetings, and through phone calls and letters. Families were eligible to participate if they had at least one child enrolled in Head Start and a second child who would turn 2 years of age during the study period. Of the 337 families screened, 21% were eligible for participation (n = 77). Of the eligible, 97% of those families were interested in participating (n = 68) and 55 actually participated. Demographic information is summarized in Table 1. Of the participating families, 84% were African–American. As shown in Table 1, 47.3% of mothers were single and families averaged 4.9 members. Since having a child enrolled in Head Start was a requirement for participation, families were very low income, with an average annual income of $13,737 a year. The average per capita income was $3,166.

Procedures: Assessment

The majority of mothers and children (93%) completed an in-person assessment within 2 months of children's second birthday, four families completed interviews outside that

assessment window. One family completed their interview early (child age = 19.5 months) and three families completed the interview late (mean child age = 28 months). Interviews primarily occurred in the family's home, although a few took place at the Head Start center. Mothers received a $50 gift card to a local discount store for participating; children received a small toy. A cameraperson videotaped the entire assessment, which took about 1 h. Only the procedures related to the two activities used in the present study will be described.

First, mothers and children completed a variation of the gentle arm restraint task (e.g., Goldsmith et al. 1999) to measure children's negative affect. Children were presented with an attractive toy telephone with buttons and sounds. After children played with the toy for 30 s, mothers were instructed to hold children's arms gently but firmly to their sides so that children could not break free. After 30 s of restraint, mothers released children; and children resumed play with the toy for another 30 s. The restraint/release sequence occurred twice.

Second, a no-toy/waiting activity was used to measure mothers' socialization of emotion regulation behaviors and children's emotion regulation behaviors. Waiting activities have been used in other investigations to measure mothers' socialization during frustrating situations (e.g., Smith and Pederson 1988; Vondra et al. 1995). After mothers and children played together with a set of attractive toys, interviewers removed all the toys from the room. Mothers were given a questionnaire to complete and interviewers instructed mothers not to leave the room and to make sure that children stayed in the room while the interviewer was gone. Mothers were not given instructions regarding what children should do during the waiting period. Interviewers left the room for 5 min and then returned with supplies for the next activity.

Procedures: Observational Coding

Two teams of coders were used to rate children's emotional reactivity and mothers' and children's emotion regulation behaviors using computerized coding software (Observational Coding System; Triangle Research Corporation, Chapel Hill, NC 2003). The first team rated the duration and intensity of children's emotional reactivity observed during the gentle arm restraint task by marking the onset and termination of three mutually exclusive categories of distress vocalizations. Distress vocalizations included: (1) no distress/ ambiguous distress, defined as any vocalizations that were not clearly negative or positive, (2) mild distress, defined as children's clear whines or non-rhythmic cries, and (3) moderate/high distress, defined as clear sustained cries or screams. Distress vocalizations <3 s in duration were not coded. All reactivity coders received at least 10 h of training and had to pass a written exam and achieve a 0.80 reliability score as rated by Cohen's kappa before beginning to code. Inter-rater agreement was evaluated by double coding 25% of all gentle arm restraint tasks. Inter-rater reliability estimates indicated a strong degree of agreement across coders (mild distress: k = 0.86; moderate/high distress: k = 0.93).

A second team of coders rated mothers' socialization of emotion regulation and children's use of emotion regulation. Emotion regulation coders were blind to the emotional reactivity coding. Initially, a coding system was developed based on a review of existing coding systems and emotion socialization and regulation literature (e.g., Calkins et al. 1998; Denham et al. 1997; Eisenberg and Fabes 1994; Grolnick et al. 1996; Ramsden and Hubbard 2002; Stifter and Braungart 1995). A total of 12 unique mother codes and nine unique child behaviors were identified. Next, three codes that were inappropriate for the waiting task were eliminated (e.g., focusing on distress object, attempting to retrieve desired object). The remaining mother codes included: cognitive restructuring/game-like engagement, instruction (e.g., restating task rules), following the child's lead in play, emotion labeling/emotion coaching, verbal distraction, verbal soothing, physical soothing, avoid/ignore, negative emotional response, harsh physical intervention, and punish/minimize child's emotion. Children's codes included: cognitive restructuring, proximity/ support seeking, other-oriented verbal distraction, self-oriented

verbal distraction, physical distraction/other object engagement, self soothing, and venting/ aggression.

The first and second authors pilot-tested the behavioral codes using a random sample of collected assessments. Efforts to replicate existing coding systems and behavioral codes were largely unsuccessful because most of identified behaviors did not occur. For instance, mothers' and children's use of cognitive restructuring (e.g., making a game out of the waiting) or emotion labeling (e.g., "You're angry") were not observed during the pilot phase. Only four mother and child behaviors occurred with enough regularity to code, with many of these behaviors occurring infrequently. The final list of codeable mother and child behaviors was highly similar to the coding systems used by Calkins et al. (1998) and Grolnick et al. (1996) to code socialization and emotion regulation behaviors of mothers and 2-year-old children, respectively. Similar to Calkins et al. (1998) "negative guidance" and "positive guidance" codes, mother socialization behaviors coded in the present study included destructive coping, harsh physical behaviors, verbal distraction, and physical soothing. Consistent with codes use by Grolnick et al. (1996), child emotion regulation behaviors coded in the present study included venting/aggression, mother-oriented verbal distraction, self distraction, and proximity/support seeking. Prior to actual coding, observational coders received over 40 h of training, had to pass a written exam, and were required to achieve an average of 0.80 reliability across all codes using Cohen's kappa. To monitor inter-rater agreement, 25% of all waiting tasks were double coded.

Measures

Children's Negative Emotional Reactivity—Observational ratings of children's distress derived from the gentle arm restraint task were used to measure children's negative emotional reactivity. Negative emotional reactivity scores were based on the sum total of duration of time children were in mild or moderate/ high distress. Quite surprisingly, the composite score indicated very little child distress. As shown in Table 2, children's average duration of distress was 7.97%, indicating that on average children spent about 8% of the total length of the task in mild or moderate distress. The standard deviation of 10.59% indicated considerable variability around the mean. Children ranged from no distress to being distressed for 34% of the task.

Socialization of Emotion Regulation—Mothers' socialization of emotion regulation was conceptualized to include both strategies expected to shift children's attention away from the source of the distress (i.e., attention-shifting strategies) and strategies expected to intensify children's emotion through derogatory verbal or harsh physical interactions (i.e., emotion-intensifying strategies). Two separate codes were used to measure mothers' attention-shifting behaviors: verbal distraction and physical soothing. *Verbal distraction* included each instance of mothers' nontask related talking or asking questions to children. Only mothers' efforts to engage children in conversation unrelated to the activity of waiting were coded. *Physical soothing* included mothers' warm, physical, contact-oriented behaviors designed to comfort children. Frequency scores for each behavior were created by summing each occurrence of the code. As shown in Table 2, mothers used verbal distraction much more frequently than physical soothing. Not surprisingly, verbal distraction and physical soothing were statistically and significantly correlated ($r = 0.30$, $p < 0.05$). Coders demonstrated moderate reliability with the verbal distraction ($k = 0.62$) and physical soothing codes ($k = 0.73$).

Two codes were used to measure mothers' emotion-intensifying behaviors: destructive coping and harsh physical behaviors. *Destructive coping* was defined as verbalizations that antagonized, rejected, or threatened children and included mothers' verbal threats, teases, and derogation of their children. *Harsh physical behavior* was defined as mothers' angry and

aggressive behavior directed toward children and included any sharp, painful, or negative physical interaction initiated by mother. The destructive coping and harsh physical behaviors were highly statistically and significantly correlated ($r = 0.77$, $p < 0.01$). Consequently, an emotion-intensifying score was computed by summing the destructive coping and harsh physical scores (Table 2). Inter-rater reliability estimates indicated that coders achieved high reliability for destructive coping ($k = 0.94$) and harsh physical codes ($k = 0.89$).

Children's Attention-shifting Emotion Regulation—Children's attention-shifting regulation was defined as behaviors that directed children's attention away from the waiting activity and included three codes: child verbal distraction, self distraction, and proximity seeking behaviors. *Child verbal distraction* included all nontask oriented vocalizations to mothers, like asking questions and engaging mothers in conversation. *Self distraction* included all self entertainment efforts like undirected vocalizations, singing, and playing with objects, clothing, or their own body (e.g., feet, hair). *Proximity seeking* behaviors involved children's bids for physical attention from mothers and included all focused actions that reduced the distance between the child and mother (e.g., reaching to or walking to mothers). Individual scores were created by summing each occurrence of verbal distraction, self-distraction, and proximity seeking behaviors.

There was considerable variability in the rates of each of the attention-shifting behaviors. As shown in Table 2, children averaged about six self distractions and two verbal distractions per minute but only one proximity-seeking behavior during the entire 5-min activity. In other words, the 2-year-old participating children were more likely to rely on themselves to regulate than to solicit help from mothers. None of these scores were statistically significantly correlated with one another; thus analyses were computed separately for each code. Inter-rater reliability estimates indicated that coders achieved moderate reliability for verbal distraction ($k = 0.75$) and proximity seeking codes ($k = 0.72$) but were less reliable for self distraction ($k = 0.57$).

Children's Venting/Aggression Regulation—Children's use of emotion-intensifying behavior was measured using the *venting/aggression* code. The venting/aggression code included physical tantrums and angry verbal expressions of frustration or distress. As shown in Table 2, children used venting/ aggression strategies relatively infrequently. Inter-rater reliability estimates indicated that coders achieved moderate reliability for venting/aggression ($k = 0.67$).

Results

The first step in evaluating the study hypotheses was to correlate study constructs. To test for possible age-effects, child age was correlated with all other study variables. Child age was not significantly related to any other variable and was not included in any further analyses. The first three hypotheses were evaluated using correlational analyses and the final hypothesis was evaluated by computing a series of hierarchical regression equations. The results of the correlational analyses will be described first followed by a description of the regression analyses.

Hypothesis 1: Mothers' Attention-shifting Behaviors and Child Emotion Regulation

Mothers' use of attention-shifting behaviors, specifically verbal distraction and physical soothing behaviors were expected to be positively associated with children's use of attention-shifting regulation and negatively correlated with venting/aggression. Mothers' verbal distraction was statistically significantly and positively correlated with children's verbal distraction ($r = 0.63$, $p < 0.01$), but not with children's use of self distraction or proximity seeking (Table 3). Contrary to expectations, mothers' use of verbal distraction was statistically

significantly and positively correlated with children's use of venting/ aggression behaviors (Table 3), indicating that more verbal distraction was associated with more child venting/ aggression. Unexpectedly, mothers' physical soothing was statistically significantly and negatively correlated with children's use of self distraction (r = -0.31, $p < 0.05$), but was unrelated to children's proximity seeking, verbal distraction, or venting/ aggression (Table 3).

Hypothesis 2: Mothers' Emotion-intensifying Behavior and Child Emotion Regulation

Mother's emotion-intensifying behavior was expected to be positively correlated with children's use of venting/aggression and negatively correlated with children's use of attention-shifting regulation (i.e., verbal distraction, self distraction, and proximity seeking). Mothers' emotion-intensifying behavior was statistically significantly and positively correlated with children's venting/aggression (r = 0.49, $p < 0.01$), though mothers' emotion-intensifying behaviors were unrelated to children's use of self distraction and proximity seeking behaviors. Surprisingly, mothers' who used more emotion-intensifying behaviors had children who used more verbal distraction (Table 3).

Hypothesis 3: Children's Negative Emotional Reactivity and Emotion Regulation

Children's propensity towards negative emotional reactivity was expected to be positively correlated with emotion-intensifying regulation and negatively correlated with attention-shifting regulation. Contrary to expectations, children's negative emotional reactivity was unrelated to any of the child regulatory behaviors (Table 3). Taken together, the results of the correlational analyses suggest that mothers' verbal distraction and emotion-intensifying strategies were most strongly associated with children's use of verbal distraction and venting/ aggression. Since children's proximity seeking was unrelated to any mother behavior, proximity seeking was dropped from further analysis.

Hypothesis 4: Negative Emotional Reactivity as a Moderator of the Relationship Between Mothers' Socialization of Emotion Regulation and Children's Emotion Regulation

Preliminary Analyses—Since the scores used in the present analyses represent the actual frequency of observed behaviors or the duration of distress without predefined, Likert-type ranges, normality assumptions may not be valid or expected. Both the emotion regulation scores and the negative emotional reactivity scores were skewed. In order to reduce the effect of the skew in the regression equations, all scores were log-transformed before computing the regression equations (Cohen et al. 2003; Tabachnick and Fidell 2001). The log-transformation was successful in reducing the skew of the scores, as indicated by reductions in the skewness statistics to appropriate levels.

Data Analytic Plan—Children's negative emotional reactivity was expected to moderate the relationships between mothers' socialization behaviors and children's regulation strategies. To test the expected moderation effects, a series of multiple regression equations were computed. In the first step of each equation, the main effects of children's emotional reactivity and mothers' socialization of emotion regulation strategy were estimated. In the second step, an interaction term, computed by multiplying the log-transformed mothers' socialization strategy and log-transformed children's emotional reactivity, was entered. Nine regression equations were computed, one for each combination of the three child dependent variables and the three maternal socialization scores. Statistically significant interactional terms were expected. Table 4 summarizes the results of the nine regression equations.

Mothers' Use of Emotion-intensifying Strategies—Mothers' use of emotion-intensifying strategies were expected to interact with children's negative emotional reactivity

and to be associated with more child emotion-intensifying regulation and less child attention-shifting regulation for children rated as more emotionally reactive (Table 4, panel A).

Considering the model evaluating children's venting/aggression, results indicated that mothers' emotion-intensifying behaviors were positively associated with children's venting/aggression ($\beta = 0.49$, $p < 0.05$). The beta coefficients associated with the main effect of children's negative emotional reactivity and the interaction of mothers' emotion intensifying behavior by children's negative emotional reactivity were not statistically significant. The model accounted for 24% of the variance in children's venting/aggression regulation ($\Delta R^2 = 0.24$, $p < 0.01$). Considering children's use of verbal distraction, mothers' emotion-intensifying strategies were marginally statistically significantly associated with verbal distraction ($\beta = 0.43$, $p < 0.10$); but children's negative emotional reactivity and the mother emotion-intensifying by child negative emotional reactivity interaction term were not statistically significant (Table 4, panel A). Finally, regarding children's use of self-distraction, no statistically significant direct or interactive effects emerged (Table 4, panel A).

Mothers' Use of Verbal Distraction—Considering children's venting/aggression, only the main effect of mothers' verbal distraction was statistically significant ($\beta = 0.48$, $p < 0.05$; Table 4, panel B). Regarding children's use of verbal distraction, again mothers' use of verbal distraction was associated with higher levels of children's verbal distraction; but neither children's negative emotional reactivity nor the interaction of children's negative emotional reactivity by mothers' verbal distraction was associated with children's use of verbal distraction (Table 4, panel B). Finally, neither the direct nor interactive effects of mothers' verbal distraction nor children's negative emotional reactivity explained statistically significant portions of the variance associated with children's use of self distraction.

Mothers' Use of Physical Soothing—Lastly, the direct and interactive effects of mothers' use of physical soothing and children's negative emotional reactivity on observed children's emotion regulation was considered (Table 4, panel C). Of the three equations computed, only the regression equation estimating the direct and interactive effects of mothers' physical soothing and children's negative emotional reactivity on children's verbal distraction was statistically significant. That is, both mothers' physical soothing and children's negative emotional reactivity were statistically significantly and positively associated with children's use of verbal distraction. Moreover, the mother physical soothing by children's negative emotional reactivity interaction term was statistically significant ($\beta = -0.73$, $p < 0.01$; Table 4, panel C) and explained significant portions of the variance associated with verbal distraction ($\Delta R^2 = 0.15$, $p < 0.01$). The model was significant and accounted for 19% of the variance of children's verbal distraction strategy use (Table 4, panel C).

To interpret the interaction, the interaction term was decomposed using internet-based graphing software written by R Development Core Team (2004) and made available by Preacher et al. (2003). The graphing procedures were based on the work of Aiken and West (1991) and Cohen et al. (2003). Simple slopes were calculated to estimate the effect of mothers' physical soothing socialization on children's verbal distraction regulation at three different levels of children's negative emotional reactivity: low (mean − 1 SD), mean, and high (mean ? 1 SD; Fig. 1). Despite the depiction of three separate slopes in Fig. 1, the data were not separated into groups for this analysis; instead, the lines represent the predicted slopes at various levels of child negative emotional reactivity (Aiken and West 1991). As depicted in Fig. 1, at lower levels of negative emotional reactivity, mothers' physical soothing socialization is positively related to children's use of verbal distraction, while at higher levels of emotional reactivity, mothers' physical soothing was unrelated to children's use of verbal distraction.

Discussion

The goal of the present investigation was to examine the extent to which children's propensity towards negative emotional reactivity moderated the relationship between mothers' socialization of emotion regulation and children's use of specific emotion regulation strategies observed during the toddler period. Previous research indicates that the quality of parenting during early childhood impacts children's ability to control negative emotions within the context of childcare settings (e.g., Nicholson and Artz 2006). Thus, children's propensity towards negative emotional reactivity was expected to moderate the relationship between mothers' attempts to socialize emotion regulation and children's use of specific emotion regulatory strategies. The implications of the hypothesis testing, both in terms of the expected concordance of mothers' and children's behavior and the moderating effect of children's reactivity propensity, will be described first. Methodological issues associated with the measurement of mothers' socialization behaviors and children's observed reactivity and emotion regulation will be discussed next. Finally, strengths and limitations of the study as well as future research directions and clinical implications will be considered.

Concordance Between Mothers' Socialization of Emotion Regulation and Children's Use of Regulatory Behaviors

Previous theoretical and empirical work suggests that children learn to regulate their emotions largely through interactions with their mothers and are likely to adopt regulatory strategies similar to those demonstrated by their mothers (Calkins and Johnson 1998; Eisenberg et al. 1998; Fabes et al. 2001). Consequently, mothers' use of emotion-intensifying behaviors like harsh physical behavior or verbal taunts, teases, or criticisms was expected to correlate positively with children's use of emotion-intensifying regulation, (i.e., venting/aggression) and negatively with children's use of attention-shifting behaviors (i.e., verbal distraction, self distraction, and proximity seeking). Similarly, mothers' attention-shifting behaviors, like verbal distraction and physical soothing, were expected to be positively correlated with children's attention-shifting regulation and negatively correlated with children's emotion-intensifying regulation. Results provided mixed support for these expectations.

First, consistent with expectations and previous research on slightly older children (e.g., Fabes et al. 2001; Snyder et al. 2003; Spinrad et al. 2004), mothers' use of emotion-intensifying behaviors was positively associated with children's use of venting/aggression. Quite unexpectedly, mothers' emotion-intensifying behaviors also were associated with higher levels of child verbal distraction. Perhaps children were more likely to respond verbally to mothers' harsh and destructive behaviors. Alternatively, mothers may use harsh destructive behaviors in response to children's verbal bids for attention.

Second, mothers' verbal distraction was positively associated with children's use of verbal distraction and, surprisingly, venting/aggression, but mothers' verbal distraction was unrelated to children's use of self distraction or proximity seeking as hypothesized. While efforts to engage children in conversation and distract children's attention away from the source of the distress were expected to be related to more socially competent aspects of emotion regulation (e.g., distraction), these results suggest that the content of mothers' verbalizations was not always well received by children or that mothers frequently respond to children's venting/aggression with verbal distraction.

Although the association between mothers' verbal distraction and children's venting/aggression was unexpected, it is not without precedent. In their work with slightly older, low-income, ethnic minority children, Garner and Spears (2000) found that mothers' who responded to children's angry outbursts with neutral emotions were more likely to have children who vented angry emotions. Thus, some level of venting may occur even under optimal socialization

conditions (Garner and Spears 2000). Alternatively, mothers' attempts to use of verbal distraction may not be entirely adaptive and may communicate to children a lack of sensitivity or concern for children's feelings (Denham et al. 1997; Garner 2006). Consistent with this idea, mothers' use of distraction in response to children's negative affect has been linked to increases in children's overall distress (Grolnick et al. 1998). Additionally, age-based variations in the long-term adaptive benefit of mothers' use of distraction have been reported (Spinrad et al. 2004). The present correlational findings are consistent with the work of Grolnick et al. (1998) and Spinrad et al. (2004) and suggest that mothers' use of distraction is not universally adaptive and may even be counterproductive in both the short- and long-term. Perhaps considering the content of mothers conversations to their children during situations in which children must regulate their emotions would clarify the inconsistent relationship between mothers' distraction and children's emotional development.

Children's Emotional Reactivity as a Moderator of the Association Between Mothers' Socialization Strategies and Children's Emotion Regulation

Finally, mothers' ability to socialize competent emotion regulation was expected to vary by children's propensity towards negative emotional reactivity. Of the nine regression equations computed, the interaction term was statistically significant only in one equation. Specifically, mothers' use of physical soothing was positively associated with children's use of verbal distraction only for the least emotionally reactive children. In theory, mothers' use of soothing behaviors should promote more effective emotion regulation because such behaviors reduce children's arousal to more manageable levels (Hoffman 1983; Scaramella and Leve 2004). The results of the present investigation suggest that mothers' efforts to sooth children were associated with more verbal distraction only among the least reactive children. High levels of emotional reactivity may interfere with children's ability to respond to or even benefit from mothers' soothing attempts (e.g., Scaramella and Leve 2004). With this exception noted, children's reactivity propensity was not found to moderate associations between mothers' socialization of emotion regulation and children's observed emotion regulation. Concerning relations between mothers' and children's emotion-intensifying strategies, mothers' use of emotion-intensifying strategies may be overwhelming for all children such that even low-reactive children react to mothers' emotion-intensifying behaviors with venting/aggression.

Measurement issues may account for the lack of empirical support for the expected moderational effects. First, the arm restraint task produced very little negative emotional reactivity among the participating children. The arm restraint task is widely used to measure infants' and toddlers' angry affect and negative emotional reactivity (e.g., Bennett et al. 2005; Braungart-Reiker and Stifter 1996; Calkins et al. 2002; Scaramella and Conger 2003). In each of these studies, physical restraint resulted in variability in children's distress. With the exception of the Scaramella and Conger (2003) study, all of the children in these studies were younger than the children included in the present study. The arm restraint task may be less effective in generating emotional distress among toddler-aged children than among infants.

Second, the waiting task also may not have been emotionally frustrating for children. Children were expected to find the waiting task particularly challenging because mothers were occupied with a competing activity (i.e., completing the questionnaire) and less readily available to them. Although most children did not wait as directed, mothers and children largely ignored each other. Perhaps introducing a forbidden, attractive object may have proven to be more challenging for children and required more involvement from mothers (e.g., Carmichael-Olson et al. 1985; Dennis et al. 2002). Increasing the length of the waiting task beyond 5 min may have made the task more demanding for children and mothers.

Limitations, Strengths, and Childcare Implications

The present study is not without limitations. First, the sample size is small and replication using larger samples is clearly needed. Second, the duration of observational tasks used to measure mothers' socialization of emotion regulation, children's emotion regulation, and children's emotional reactivity was brief. That is, ratings of mother and child emotion regulation behaviors were based on 5 min of observations; and children's distress reactivity was measured from a task lasting just over 2 min. Third, one team of coders rated both mothers' emotion socialization and children's emotion regulation behaviors during the waiting task; although the coders were blind to study hypotheses, this limitation may have artificially inflated the observed relationships between mothers' and children's strategy use. Fourth, the use of microsocial coding procedures rather than global codes may have limited the variability of specific behaviors. Future studies may benefit from using a number of different, ecologically valid tasks in order to increase both the base rate and the variety of observed mother and child behaviors. Finally, as with most studies of emotion regulation during early childhood, evaluating children's reactivity propensity is difficult because the purpose of emotion regulation is to modulate the experience and expression of emotion (e.g., Thompson 1994). Understanding the extent to which the level of observed emotional reactivity is affected by children's internal regulatory processes was not possible in the present study. The use of physiological indicators of arousal (e.g., heart rate, vagal tone, skin conductance) may have helped to overcome these limitations associated with relying on observed emotional expression.

Despite these limitations, the present study builds upon existing research and theory in important ways and has a number of strengths. First, the current sample consisted of very low income, predominantly ethnic minority families whereas much of the previous research on mothers' socialization of emotion regulation and children's reactivity and emotion regulation has relied on middle- to upper-class, primarily Caucasian families. Investigating developmental processes across economically and culturally diverse groups of mothers and children is critical because socialization practices, regulatory strategies, and the relationships between such processes may not fully replicate across diverse socioeconomic circumstances (e.g., Devore and Schlesinger 1987; McAdoo 1993; Raver 2004). An additional strength of the study derives from the use of observational measures to assess children's regulatory behaviors. Observational coders are standardized raters, thereby limiting their biases. Mothers of more emotionally negative children may have rated their children more negatively, and such biases likely would have distorted the findings.

The results of this study also suggest a number of directions for future research, directions with clear childcare implications. First, consistent with the work of Nicholson and Artz (2006), mothers parenting behaviors, specifically their efforts to socialize emotion regulation, influenced children's ability to regulate frustration. That is, of the nine regression equations computed, statistically significant, or a trend towards significance, effects of mothers' socialization behaviors and children emotion regulation emerged, suggesting that children's emotion regulation abilities are socialized. However, studies rarely consider the impact child care providers' efforts to socialize children's emotion regulation. Quite possibly, consistency across childcare providers (e.g., mothers, child care teachers, and secondary caregivers) further enhances children's acquisition of emotion regulation skills. Future research examining the impact of multiple caregivers' efforts to socialize children's emotion regulation is clearly needed.

Second, the study highlights the need for understanding diversity in the processes by which children acquire emotion regulation skills. Efforts to replicate existing coding procedures designed for 2-year-old children and their mothers were largely successful, suggesting that the emotion-related behaviors used by mothers and children in the current sample are similar to those observed in frequently studied, more affluent, predominantly Caucasian samples.

However, the child care settings experienced by children vary considerably across socioeconomic groups. Clarifying how the various social contexts to which children are exposed influence their acquisition of emotion regulation is clearly needed. Such research will clarify the process by which mothers' behaviors, or child caregivers more generally, and children's propensities towards emotional reactivity affect children's emerging regulatory capacities.

Finally, the results of this study dovetail with those of Ahn (2005a, b), who found that teachers at childcare centers promoted children's emotional competence through supportive discussions of emotions and responses to children's emotional experiences. Consistent with the work of Ahn (2005a, b), the current findings suggest that children are likely to use maladaptive strategies like venting and aggression when similar strategies are modeled by a parent. Thus, interventions targeting both parents and childcare providers aimed at increasing their use of positive, supportive strategies and minimizing their use of destructive, emotion-intensifying strategies may be most efficacious in enhancing children's developing emotion regulatory competence (e.g., Nicholson and Artz 2006). Clearly, parents and childcare providers are powerful figures in children's emotional development; thus, expanding the focus of emotion socialization research to include secondary caregivers and daycare and school contexts will offer a wider view of children's emotional development and is likely to provide researchers and practitioners greater insight into how children learn to regulate emotions.

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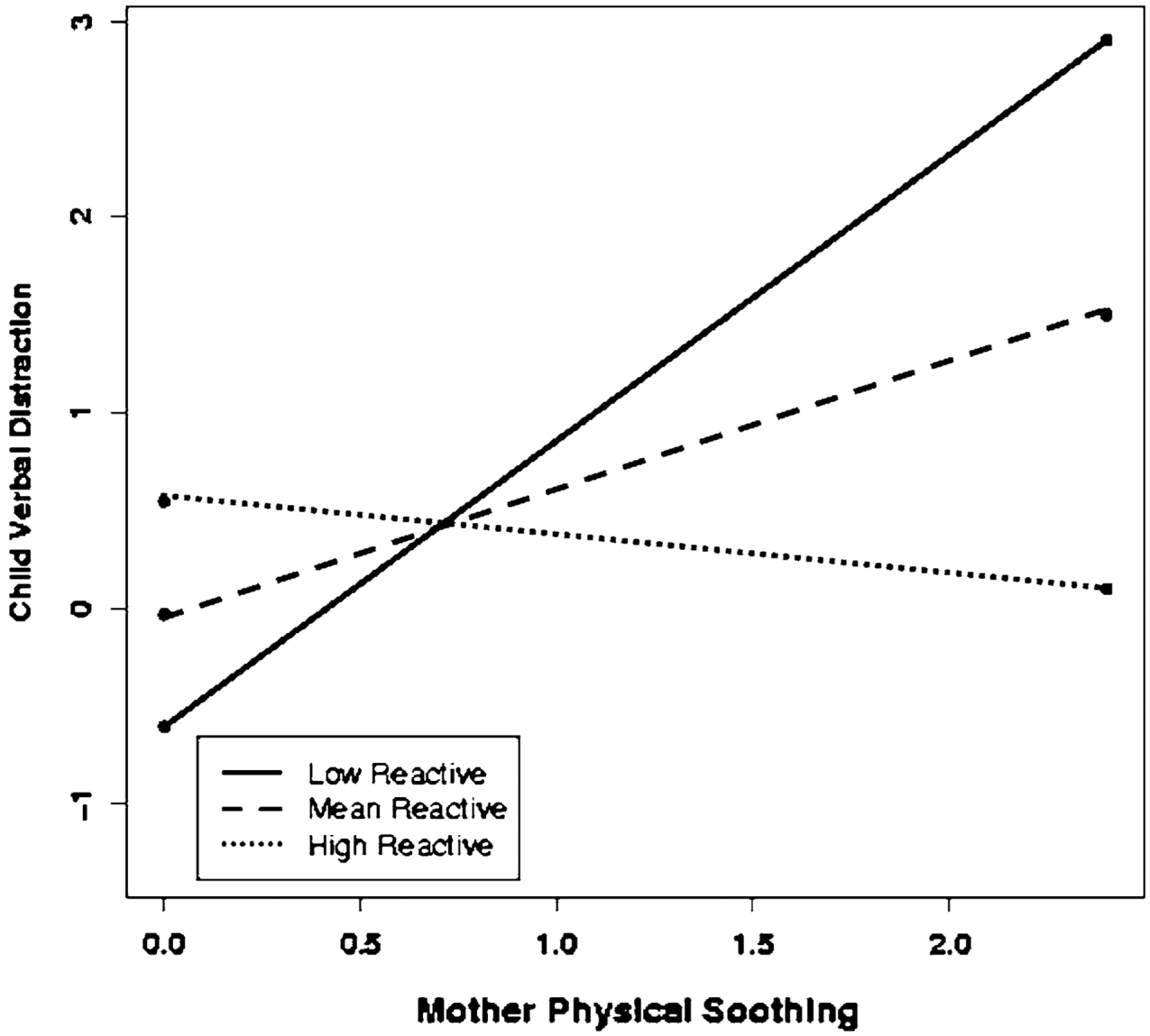

Fig. 1.

Interaction of physical soothing socialization of emotion regulation and children's negative emotional reactivity in relation to children's verbal distraction emotion regulation. Low reactive, 1 SD below the mean of children's negative emotional reactivity. Mean reactive, the mean of children's negative emotional reactivity. High reactive, 1 SD above the mean of children's negative emotional reactivity

Table 1

Demographic characteristics of the participating families

	Mean (SD)	Range
Mother age (years)	26.3 (5.1)	18–40
Child age (months)	24.4 (1.5)	19.5–29.4
Household size	4.9 (1.8)	1[a]–10
Income	$13,737 ($10,648)	$0–$46,966
Per capita income	$3,166 ($3,086)	$0–$15,655
Race/ethnicity (%)		
African American	84	
Caucasian	14	
Hispanic or Latina	4	
Indian/Middle Eastern	2	
Family composition (%)		
Single, never married	47.3	
Married	34.5	
Separated	12.7	
Widowed	3.6	
Divorced/unmarried	1.8	

[a]Mothers may not live in the same house as their children for four or more days per week

Table 2

Means, standard deviations, ranges, and reliability coefficients of the study constructs

	Mean (SD)	Range	Reliability (*k*)
Children's negative emotional reactivity	7.97 (10.59)	0.00–34.09	0.90
Mothers' distraction/comforting strategies			
Verbal distraction	8.49 (9.12)	0.00–37.00	0.62
Physical soothing	1.13 (1.90)	0.00–10.00	0.73
Mothers' emotion-intensifying strategies	1.28 (2.39)	0.00–11.00	
Destructive coping	0.87 (1.47)	0.00–6.00	0.94
Harsh physical	0.42 (1.06)	0.00–5.00	0.89
Children's distraction/comforting			
Verbal distraction code	11.21 (13.65)	0.00–58.00	0.75
Self distraction code	28.72 (14.01)	10.00–72.00	0.57
Proximity seeking code	1.60 (1.73)	0.00–8.00	0.72
Children's venting/aggression	1.23 (2.19)	0.00–10.00	0.67

Table 3

Correlations between mothers' socialization, children's regulation, and children's reactivity

	Child venting/aggression	Child verbal distraction	Child self distraction	Child proximity seeking	Child negative emotional reactivity
Mothers' emotion-intensifying behavior	0.49**	0.36**	0.00	–0.02	0.15
Mothers' verbal distraction	0.36**	0.63**	–0.02	0.18	0.29*
Mothers' physical soothing	0.21	0.19	–0.31*	0.17	0.19
Children's negative emotional reactivity	0.05	0.13	0.11	0.21	–

Note:

* $p < 0.05$

** $p < 0.01$ (2-tailed)

Table 4

Results of the hierarchical regression analysis evaluating the influence of mothers' socialization of emotion regulation and child negative emotional reactivity on children's use of specific emotion regulation strategies

	Child venting/aggression			**Child verbal distraction**			**Child self distraction**		
	ΔR^2	F_{ch}	β	ΔR^2	F_{ch}	β	ΔR^2	F_{ch}	β
Panel A: mother emotion-intensifying									
Step 1	0.24**	8.34**		0.13*	3.89*		0.01	0.33	
Negative emotional reactivity			–0.03			0.08			0.12
Mothers' emotion-intensifying behavior			0.49*			0.43+			0.01
Step 2: interaction term	0.00	0.00	0.01	0.00	0.20		0.00	0.01	
Overall R^2	0.24			0.13			0.01		
Panel B: mother verbal distraction									
Step 1	0.13*	3.89*		0.40**	17.20**		0.02	0.40	
Negative emotional reactivity			0.09			0.09			0.39
Mothers' verbal distraction			0.48*			0.79**			0.14
Step 2: interaction term	0.01	0.58		0.02	1.44	–0.29	0.04	1.89	–0.42
Overall R^2	0.14			0.42			0.05		
Panel C: mother physical soothing									
Step 1	0.05	1.24		0.04	1.08		0.13*	3.71*	
Negative emotional reactivity			0.09			0.37*			0.32
Mothers' physical soothing			0.34			0.66**			–0.12
Step 2: interaction	0.01	0.62		0.15**	9.75**	–0.73**	0.03	2.09	–0.35
Overall R^2	0.06			0.19			0.16		

Note:

+ $p < 0.10$

* $p < 0.05$

** $p < 0.01$ (2-tailed)