Relationships among Maternal Emotion-related Socialization, Depressive Symptoms and Child Emotion Regulation: Child Emotionality as a Moderator

Thesis

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Abstract

This study tested a model of children’s emotionality as a moderator of the links between maternal emotion-related socialization and depressive symptoms and child emotion regulation. Participants were 129 mother-preschooler dyads. Child affect and emotion regulation were assessed observationally during a laboratory mood induction task, and were factorized into 3 categories: passive soothing, negative focus on distress, and positive engagement. Hierarchical linear regression models indicated that child positive emotionality moderated the links between maternal emotion-related socialization and depressive symptoms and child emotion regulation; whereas child negative emotionality moderated the links between maternal support and child emotion regulation. Findings suggest a transactional perspective to understand the effects of both child characteristics and familial influence on child emotion regulation.

Keywords: emotion regulation; maternal depression; maternal positive affect; maternal support; emotionality.
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CHAPTER 1: INTRODUCTION

Developing the ability to regulate emotions is crucial during early childhood. Emotion regulation (ER) is defined as “the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals” (Thompson, 1994, p.27-28). Adaptive ER is related to enhanced social competence, greater peer relationship (e.g. Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000) and better academic performance (e.g. Graziano, Reavis, Keane, & Calkins, 2007). Conversely, problems in emotion regulation in early childhood are likely to lead to emotional and behavioral problems and psychopathology (see Southam-Gerow & Kendall, 2002, for a review). Preschool age is one of the key developmental periods for emotion regulation; during this period, preschoolers learn to label their emotions (Stifter & Fox, 1987), develop proper emotion understanding (Waters et al., 2010), and gradually gain independence in the self-regulation of emotions (e.g. Kochanska, Philibert, & Barry, 2009), and more complex regulation strategies emerge at this time (Stansbury & Sigman, 2000). Numerous empirical studies have focused on the development and socialization of emotion regulation, especially in the family context.
(see Thompson & Meyer, 2007, for a review), and its association with both child emotionality and maternal characteristics.

Children’s ER capacity is embodied in specific ER strategies. Children’s use of different ER strategies is associated with various child outcomes, thus indicating differentiated levels of child emotion regulation capacities. Particularly, the use of ER strategies depends largely upon situational specificity and elicited emotions. From a functional perspective on emotional development (Barrett & Campos, 1987), each emotion serves as a different adaptive function: anger is related to obstacles in achieving personal goals and overcoming difficulties, while sadness is associated with giving up on personal goals and efforts. However, most previous research studies on ER have combined all the negative emotions together and treated them as a homogenous construct. Since different emotions function in diverse ways, given specific situations and emotions, different ER strategies may benefit different emotions (Cole, 2014). Most previous research also has failed to take into account specific functions of each negative emotion and the associated ER strategies accordingly. Additionally, few studies have examined up-regulating positive emotions, while most focus on down-regulating negative emotions. In most studies, positive emotions are either treated as “regulated” while negative emotions are “unregulated”, or positive emotions are simply ignored and excluded from analyses (Cole, 2014). Thus, to fill in the gap in current ER research, it is crucial to consider differentiated regulatory strategies according to specific negative emotions, and also for positive
emotions as well.

Grolnick and colleagues (1996) outlined a set of ER behaviors which are commonly used by toddlers and preschoolers (Grolnick et al., 1996; Silk, Shaw, Forbes, Lane, & Kovacs, 2006a). The first set of behaviors is related to redirection of attention, which can be a successful strategy to reduce anger for preschoolers, while maintaining or increasing attentional focus on sources of frustration can increase the level of anger/frustration (Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Stansbury & Sigman, 2000). The second category of strategies includes behaviors aimed at seeking comfort, which is consistently related to increased child sadness and distress (Grolnick et al., 1996; Stansbury & Sigman, 2000). Finally, a less researched aspect of emotion regulation strategies in children contains the up-regulation of positive affect and active engagement in activities (Silk et al., 2006a). Children’s regulation of positive emotions during a disappointing and sadness-eliciting situation includes (a) the ability to generate and uphold positive affect to substitute negative affect and (b) the utilization of active engagement as a strategy to experience positive emotions and change the emotional aspect of the frustrating situation. The experience of positive emotion facilitates the ability to regulate negative emotions and serves as a protective factor for individuals against depression (Silk et al., 2006a).

Research on child development of ER capabilities has emphasized temperamental and environmental factors, as they are closely related with one another (Rothbart & Sheese, 2007). This paper investigates the contribution of both child emotionality and
family environment to child ER skills. We examined child emotion regulation in a laboratory observation task which was aimed at eliciting child negative emotions. We attempted to differentiate children’s use of emotion strategies associated with different emotions. More importantly, we examined the interaction effects between child emotionality and maternal characteristics. This study calls attention to protective factors in children’s emotion regulation such as positive emotionality and up-regulation of positive emotions as a strategy. This study also provides a perspective of transaction between person and environment in understanding the development of emotion regulation.

**The Socialization of Emotion Regulation in the Family Context**

In the family context, the socialization of emotion regulation is complicated, involving both parent and child characteristics, and the interactional process between them. Child development is an active process moving from “other-regulation” to “self-regulation” (Sameroff, 2010; Sameroff & Fiese, 2000). From a cultural-historical view (Vygotsky, 1978), the assistance of “other-regulation” provides the child with the “scaffold” needed in normal development. The development of emotion regulation, therefore, is also a process from other-dependent to self-dependent. ER strategies are learned through the socialization process in families, particularly parental coaching and caregivers’ regulating behaviors (Thompson & Meyer, 2007; Morris, Silk, Steinberg, Myers & Robinson, 2007). Previous studies have shown that parental direct interventions to manage child
emotions are effective. At birth, parents start to soothe infants’ distress from hunger or other discomfort, and infants master self-soothing skills gradually since these behaviors can predictably eliminate distress. Later parents intervene diversely to manage children’s emotions, by distracting them, helping them solve problems, suggesting adaptive manners, and so on.

Morris and colleagues (2007) reviewed existing research and proposed a tripartite model on the development of emotion regulation in the family context. They proposed three ways in which the family influences emotion regulation: observation, parenting practices, and the emotional climate of the family. The first mechanism, observation, refers to children learning about emotions and regulation by observing and modeling parents’ emotional expressions and regulatory strategies. This also includes emotion contagion from the parents and social referencing to parental emotional cues. The second way in which parents teach children about emotions is through the socialization of emotion understanding, including emotion-related knowledge and regulatory skills. Specific examples include parental supportive reactions to child negative emotions, parent-child talks about emotion experiences, parental utilization of opportunities to coach children about dealing with negative emotions, parent problem-solving behaviors, and teaching children about varied ER strategies. The third aspect of family influence is the emotional climate of the family, which is presented in couple and parent-child relationship qualities and in the amount of positive and negative emotion that family members receive. Moreover, in this
conceptual model, parent and child characteristics are also taken into consideration. Parent characteristics (such as mental health, family history and personal beliefs) and child characteristics (such as gender and temperamental reactivity) interact rapidly in this dynamic process. Therefore, the family emotional system is considered as a holistic process in the socialization of child emotion regulation.

**The Relationship among Maternal Emotion-Related Socialization, Depressive Symptoms and Child Emotion Regulation**

Overall, previous findings suggest that mothers play a crucial role in children’s socialization of emotion expression and regulation (Shipman & Zeman, 2001). As the primary caregiver, mothers usually assume the most important responsibility of affective interactions with their children, and their emotional mental states are closely related to child affect and mood. In light of the conceptual model on the development of ER (Morris et al., 2007), the maternal influence on child development of ER largely comes in the form of emotion-related socialization. In the current study, maternal emotion-related socialization consists of maternal positive affect expressions and maternal support to child negative emotions. As Morris (2007) postulated, maternal positive affect expressions and support to child negative emotions are specific parenting practices associated with the socialization of emotion in the conceptual model, and are of crucial influence on the development of emotion and ER.

One important aspect of maternal parenting practices associated with emotion
socialization is the amount of positive emotions that the mother expresses to the child. Maternal expression of positive emotion has been found to impact child social competence and adjustment greatly, such that positive affect expressions towards children enhance regulative capacity (Eisenberg et al., 2001). The amount of positive emotions, expressed verbally and non-verbally, especially in mother-child dyad interactions, can provide children with joyful experiences, relational support, and confidence in dealing with negative emotions, thus promoting emotion understanding, prosocial behavior and enhanced parent–child relationship.

Another crucial aspect of emotion-related socialization is maternal support for child negative emotions in the process of child ER socialization. Warm, responsive and supportive parenting fosters emotional competence and regulation (e.g., Eisenberg et al., 2001, 2003). Gottman’s meta-emotion philosophy theory (Gottman, Katz, & Hooven, 1996) argued that parents who are responsive and warm typically have certain beliefs associated with emotion that affect children’s emotion regulation. These parents also display specific types of coaching behaviors, such as labeling emotions, comfort, and problem solving, that parents display in response to children’s emotional expressions. These coaching behaviors were found to be positively related to child regulation outcomes in middle childhood (Lunkenheimer, Shields, & Cortina, 2007). Because both maternal affect expressions and support to emotion regulation are so important for later child outcomes, it is crucial to understand the process of emotion development within mother-child dyads and related maternal characteristics.
and behaviors.

On the other hand, the emotional climate that children experience daily is also considered to have an important impact on overall emotional development and ER (Morris et al., 2007). One of the significant factors that influence the emotional climate in the family is maternal depression. In general, children of depressed mothers have been found to be at great risk for adverse outcomes, including poor social adjustment, academic difficulties, and affect and behavior problems (e.g., Downey & Coyne, 1990; Goodman, 2007). Underlying these problems in the offspring of depressed mothers are difficulties in regulating emotions (Hoffman, Crnic, & Baker, 2006). Specifically, children of depressed mothers tend to display less adaptive emotion expressions and utilize less effective regulation strategies (Silk, Shaw, Skuban, Oland, & Kovacs, 2006b). This is because offspring of depressed mothers are exposed to maternal sad and distressed mood, irritability, minimal positive affect expressions, acute and chronic stress in life, and potentially a high-conflict family environment. The overall emotional climate in families with depressed mothers can be negative, gloomy, hostile, insensitive, coercive, unpredictable, or emotionally insecure, with high conflict and low parental warmth. In this situation, children tend to develop less effective and adaptive ER capabilities (Morris et al., 2007). Besides, maternal depression also influences child ER in other indirect ways. In light of the tripartite model of the development of ER (Morris et al., 2007), children of depressed mothers are likely to have problems in regulating their emotions, in that depressed mothers are
less likely to provide proper ER modeling and training for their offspring, because of their own impaired ER and social skills (Silk et al., 2006b). Depressed mothers also exhibit less positive emotion in response to their young children’s positive expressions, and are less likely to respond to children’s expression of distress (Shaw et al., 2006). These findings highlight the importance of maternal depression, which can both influence the general emotion climate in the family and specific parenting practices utilized in the development of child emotion regulation (Morris et al., 2007).

**Child Emotionality and Emotion Regulation**

Child characteristics, including child gender, temperament, and developmental status can influence the socialization of child emotion regulation and later social competence (Morris et al., 2007). Among these factors, child temperamental emotionality has received special attention. Emotionality, also referred to as emotional reactivity, is conceptualized as stable individual differences of emotional responses to internal and external changes, including frequency, speed and intensity (Cole, Martin, & Dennis, 2004; Eisenberg, Fabes, Guthrie, & Reiser, 2000). Child temperamental disposition towards experiencing negative emotions, or negative emotionality, is highly related to poor ER capabilities, since children with high negative reactivity tend to experience more acute and intense levels of anger, frustration, sadness, fear, and distress comparing to their peers. High negative emotionality increases the difficulty for children to be regulated, both by themselves and when relying on external support (Thompson, 1994). Intense emotion and shortened latency of arousal
also make it difficult for children to reflect on, modulate or practice regulative strategies even if they are in a positive and supportive emotional climate (Denham, 2007). Consistent with theory, research studies have indicated that children high in negative emotionality are at risk for developing behavioral and emotional problems due to limited regulative capabilities (Eisenberg et al., 2000; Dougherty, Klein, Durbin, Hayden, & Olino, 2010).

However, less is researched about child positive emotionality, which is child propensity toward experiencing positive emotions, including positive affect, reward seeking behavior, sociability, and surgency. Theoretically, positive emotionality is generally viewed as orthogonal to negative emotionality, and therefore an individual can be high or low on one or the other, or both (Clark & Watson, 1999). Previous research indicates that low positive emotionality is a risk factor for child affective problems, especially depression, even when controlling for the influence of negative emotionality (Dougherty et al., 2010; Shankman et al., 2011). Low hedonic capacity and deficits in the surgency or initiation of pleasurable activities are primary potential etiological factors involved in the development of emotion dysregulation (Dougherty et al., 2010). Consistent with the aim of this study, which involves up-regulation of positive affect as a strategy against negative mood, positive emotionality should be taken into consideration as the ability to activate and maintain pleasure in a disappointing situation.

**Interactions between Child Emotionality and Maternal Emotion-Related**
Socialization and Depression

With both child and paternal characteristics taken into account, it is important to consider the interaction of both. Calkins (1994) noted that developing ER skills is an interactive process of both internal factors (e.g., child emotionality) and external factors (e.g., emotion-related parenting practices and maternal depression). Maternal parenting practices have been shown to be affected by child temperament, and the success of parenting is likely to depend on the fit between parenting and child characteristics (Calkins, 1994). Hence, it is believed that children low in positive emotionality and high in negative emotionality experience more frequent and intense levels of negative emotional arousal, and are in need of advanced ER skills to modulate their arousal. Thus, children with high negative emotionality are in most need of parenting practices related to improving coping with negative emotions and cultivating positive emotions, and they are susceptible to the influence of adverse environmental factors such as hostile and nonresponsive maternal reactions and maternal depression (Morris et al., 2007).

This claim is supported by growing evidence. For example, Feng et al. (2008) found that child behavior inhibition was positively associated with child passive regulation and sadness and negatively associated with active regulation and joy, but these relationships were found only for children with mothers with childhood-onset depression, not for the children whose mothers did not suffer from depression. Similarly, Kochanska and colleague (2007) found that child fearfulness significantly
moderated the impact of parenting in self-regulation outcomes: a mother-child positive relationship predicted future successful socialization outcomes more consistently for relatively fearless children than their fearful peers. Dennis (2006) also found that maternal approach and warmth are associated with better child emotional self-regulation, and this relationship is amplified if the child is high in temperamental approach. However, up until now, most research has focused on either the positive or negative aspect of parenting, without considering both the risk and protective aspects of parental socialization; and little research has examined both child positive emotionality and negative emotionality as potential moderators between parenting and child ER. To paint a complete picture of the cultivation of child ER, it remains to be further investigated to take both positive aspects (e.g., maternal support and positive affect) and negative aspects (e.g., maternal depression) of socialization, as well as both positive and negative child emotionality into account in investigations on child ER.

The Present Study

Though empirical studies have focused on the development of emotion regulation in the family context (see Morris et al., 2007 for a review), little research has carefully examined differential ER strategies according to specific elicited emotions, including sadness, anger and especially positive affect; and previous research has seldom included the roles that both positive and negative emotionality play in child ER, or their interactions with maternal emotion-related socialization and depressive
symptoms. To fill the gaps in the extant literature, this study will examine
differentiated child ER strategies in relation to various affect expressions in a
disappointing situation, and the contribution of both positive and negative
emotionality as well as maternal depressive symptoms, positive affect and support,
adopting a perspective of individual-environment interaction (see Figure 1 as the
conceptual model).

Specifically, this study is aimed at answering three questions. First of all, in a
disappointing situation, were differentiated regulation strategies associated with
specific emotions elicited (e.g., sadness, anger and positive affect)? Secondly, how
were child positive and negative emotionality associated with specific aspects of child
ER, and how were maternal depressive symptoms, positive affect and support related
to child ER outcomes? Finally, how did child positive and negative emotionality
interact with maternal depressive symptoms, positive affect and support in relation to
specific child performance in ER?

Based on previous findings, the following hypotheses were formulated: child
sadness would be associated with comfort seeking behaviors, child anger would be
associated with maintaining or increasing attentional focus on distress and less with
shifting attention from a distressing stimulus, and child positive affect would be
associated with positive engagement behaviors. Moreover, child positive emotionality
would be associated with positive affect and active engagement, while child negative
emotionality would be associated with negative affect and passive regulation;
maternal depressive symptoms would be associated with fewer positive affect and more negative affect expressions and less adaptive ER, whereas maternal positive affect and support would be associated with more positive affect and fewer negative affect expressions as well as adaptive ER. Finally, child positive and negative emotionality would interact with maternal emotion-related socialization and depressive symptoms in predicting ER outcomes. Specifically, maternal support and positive affect would be associated with adaptive child ER more strongly for preschoolers with high positive emotionality than with those with low positive emotionality, while elevated maternal depressive symptoms would be associated with maladaptive ER more strongly for preschoolers with low positive emotionality than with those with high positive emotionality. Conversely, enhanced maternal support and positive affect would be associated with adaptive ER more strongly for children with low negative emotionality than for those with high emotionality, whereas maternal depressive symptoms would have a stronger association with unsuccessful child ER for children with high negative emotionality compared to peers with low negative emotionality.
CHAPTER 2: METHOD

Participants

Data for this study were drawn from an ongoing longitudinal project concerning maternal depression and child emotional development. The participants were recruited from local families through advertisement on newspapers, parental magazines, community centers, and flyers sent to preschools/daycare centers, and clinics. One hundred and twenty-nine mother-child dyads participated in this study. The mothers were contacted first by phone, and went through a screening questionnaire on mothers’ depressive symptoms and child developmental delay, to confirm their eligibility for this study. The eligibility criteria were met if the mother was 21 years of age or older, either had a history of depressive disorders (with or without comorbid anxiety disorders) or had no history of psychiatric disorders, were the biological mother of the child, and the child did not have developmental disorders or delays.

In the current sample, the mean age of mothers was 31.19 years old (SD = 5.56). A majority of the mothers (65.1%) were Caucasian, 31.0% African-American, 2 mothers (1.6%) American Indian or Alaskan Native, and four mothers were (3.1%) of mixed race. Over half (51.2%) of the mothers had attained at least an undergraduate degree, with 22.5% having graduate or professional degrees; among the rest, 35.6%
had a college education or an associate degree, while only 13.2% had a high school education or less. Regarding the economic situation, 45.7% of the mothers had an annual household income at $50,000 or higher, above the local average household income ($48,246 in 2012; U.S. Department of Commerce, 2012), with a range from less than $10,000 to more than $150,000. Additionally, there were a total of 63 boys and 66 girls in this sample, all between 3 and 3.5 years old (M = 3.23, SD = 0.19).

**Procedures**

The mother and child attended a laboratory visit, which lasted for about 2 hours. The lab visits were videotaped and later coded. The mothers were also asked to complete a battery of questionnaires online concerning demographic information, their depressive symptoms, parenting stress, responses to child emotions, and child temperament.

The current study included three observational tasks from the laboratory visit. The first one was a 5-minute clean-up task, during which the mother asked the child to clean up the toys with which they had played together. This task was designed to elicit mild levels of distress and to observe children’s compliance. The second was mother-child joint play with a Tickle-Me-Elmo toy (Shaw et al., 2006); this task lasted for 5 minutes and was designed to elicit positive affect from the mother and child. In these two tasks, the affect expressions were coded for mothers. The third task was a disappointment task (Cole, Zahn-Waxler, & Smith, 1994), in which the child received his/her least favorite toy as a prize after a long vocabulary test. The
experimenter stayed in the room with the child for 60 seconds and then the child was left alone for 60 seconds before another experimenter came in to give the child his/her preferred prize. Children’s affect expressions and regulative behaviors were coded in this task.

**Measures**

*Mature depressive symptoms*. The Beck Depression Inventory-2nd Edition (BDI-II; Beck, Steer, & Brown, 1996) was used to measure maternal depressive symptoms. This instrument was included as part of the online survey that the mothers completed. The measure contains 21 questions rated on a 4-point scale that assess symptoms associated with depression experienced over the last 2 weeks. An overall score of depressive symptoms was generated from these questions (range 0-63). The scale displayed good reliability, with $\alpha = .95$.

*Mature positive affect* was coded from the clean-up and Elmo tasks. A coding system adapted from previous studies (Jabson, Dishion, Gardner, & Burton, 2002; Silk, 2004; Shaw et al., 2006) was used. Maternal positive affect was coded second-by-second based on facial cues (e.g. smiling), vocal indicators (e.g. laughing and raised tone), statements (e.g. “Great!”), and behaviors (e.g. hugging the child). The total duration of positive expressions were summed within each task and divided by the codeable task time to generate the percent of positive expression. Thirty percent of the observations were double-coded to assess inter-coder reliability (kappa = .75). The clean-up and Elmo tasks were coded independently and combined later,
with a score of overall percent of time, as an indicator of general positive affect that
the mother expressed to the child.

*Maternal support to child negative emotions* was measured by the Responses to
Child Emotions Questionnaire (RCE; Magai, 1997). The RCE was a parent-report
instrument that included four factors: magnification, support, dismissal and
punishment of children’s expression of negative emotions. Only the support subscale
was used in this study; this subscale includes 9 items rated on a 5-point scale (1 = not
at all frequently, 5 = very frequently), with higher scores indicating greater maternal
support for child sadness, anger and fear. Example questions includes “helped my
child deal with the issue” and “comforted my child” when the child was
sad/angry/scared. An overall score of maternal support was generated from these
questions (range 9-45). The reliability of the support subscale was demonstrated to be
good in the current study (α = .87).

*Child affect expressions* were coded from the disappointment task. A coding
system adapted from several previous studies (Jabson, Dishion, Gardner, & Burton,
2002; Silk, 2004; Shaw et al., 2006) was used to code the child affect expressions.
Three types of affects were coded: positive affect, anger and sadness. *Positive affect*
expressions included facial cues (e.g. smiling), vocal indicators (e.g. laughing and
raised tone), statements (e.g. “Interesting!”), and behaviors (e.g. clapping).
Expressions of *sadness* included facial cues (e.g. frowning, crying), vocal cues (e.g.
whining, dropping voice), and statements (e.g. “I don’t like this.”) as well as gestures
Examples of anger/frustration included facial cues (e.g. drawn brows, tight lips), vocal cues (e.g. yelling, harsh tone), statements (e.g. “No!”), and behaviors (e.g. throwing toys). All the affect expressions were coded second-by-second, and the final scores represented the percentage of the duration that each emotion was expressed (out of the total duration of the task). Approximately 30% of the observations were double-coded to assess inter-coder reliability; all three affect codes showed good reliability, with a kappa of .76 for positive affect, .69 for anger/frustration, and .77 for sadness.

Child emotion regulation strategies were also coded from the disappointment task. A coding system adapted from several previous studies (Stansbury & Sigman, 2000; Silk, 2004) was used. Five regulatory strategies were coded from the coding system: active playing (when the child plays with the toy engagingly), focusing on distress (when the child focuses on a negative aspect of the broken/unwanted toy), comfort seeking (when the child self-soothes or wants to go to the mother), passive waiting (when the child is engaging in any activity and not focusing on or looking at the broken/unwanted toy), and active distraction (the child redirects his/her attention away from the source of distress by engaging in other activities). Both the experimenter present and absent episodes were coded separately, and then combined later. The final scores for the ER strategy variables represented percentages of the duration of the strategies utilized over the total codable duration of the episode. A separate team of coders coded the ER strategies. To assess inter-coder reliability, 30%
of the observations were double-coded; the coding received adequate inter-coder reliability, for active playing (kappa = .74), focusing on distress (kappa = .66), comfort seeking (kappa = .67), passive waiting (kappa = .75), and active distraction (kappa = .63).

*Child emotionality* was measured by the Children’s Behavioral Questionnaire (CBQ; Rothbart, Ahadi, Hersey, & Fisher, 2001), reported by mothers. The CBQ is a parental report instrument assessing child temperamental inclinations, with 94 questions rated on a 7-point scale (1 = not at all frequently, 7 = very frequently). Subscales of Smiling and Laughter (6 items; e.g. “Sometimes smiles or giggles playing by her/himself”), Anger/Frustration (6 items; e.g. “Has temper tantrums when s/he doesn’t get what s/he wants”), and Sadness (7 items; e.g. “Cries sadly when a favorite toy gets lost or broken”) were used in the current study to assess child temperamental emotionality: *child positive emotionality* was the overall score of the Smiling and Laughter subscale, while *child negative emotionality* was a total score of both Anger/Frustration and Sadness subscales (the bivariate correlation \( r \) between the two subscales was .33, \( p < .01 \)). Each subscale presented good reliability in the current study: \( \alpha = .71 \) for Smiling and Laughter; \( \alpha = .71 \) for Anger/Frustration; and \( \alpha = .81 \) for Sadness.

*Family annual household income* was included as a control variable, which was reported by the mothers as an item in the demographic questionnaire. It was an ordinal variable, with 12 levels of family annual household income: 1 = “Less than
$10,000”, 2 = “$10,000 to $19,999”, 3 = “$20,000 to $29,999”, 4 = “$30,000 to 
$39,999”, 5 = “$40,000 to $49,999”, 6 = “$50,000 to $59,999”, 7 = “$60,000 to 
$69,999”, 8 = “$70,000 to $79,999”, 9 = “$80,000 to $89,999”, 10 = “$90,000 to 
$99,999”, 11 = “$100,000 to $149,999”, and 12 = “$150,000 or more”. It was used as 
a continuous variable in the data analysis.

Data Analysis

The data were analyzed using exploratory factor analysis and hierarchical linear 
regression analysis. To test the first hypothesis of the specific associations between 
ER strategies and elicited emotions, a principal component analysis was performed on 
all the child affect expressions and ER strategies coded from the disappointment task. 
Factor scores were created for each factor by summing up positively loaded items and 
reverse-coded negatively loaded items, with final scores indicating sums of 
percentages of the time length that the child displayed a certain affect and utilized a 
certain strategy (out of the total duration of the task). These factors were used as 
outcome variables in the subsequent analysis. Since these factors were not 
significantly correlated ($r = -.02$ to -.14, $ps > 0.10$), they were analyzed in separate 
regression models to test other hypotheses.

Next, to test the second hypothesis of the main effect of child emotionality and 
maternal emotion-related socialization and depressive symptoms, a series of 
hierarchical linear regression analyses were applied, with the factors revealing child 
affect expressions and ER strategies as the outcome variables in the models. The ER
factors reflecting passive soothing and positive engagement were positively skewed (Table 2), and were transformed (log 10 transformation). Preliminary analyses were conducted with original and transformed variables, and the results did not differ. Therefore, untransformed variables (passive soothing and positive engagement) were utilized in the final analyses. In the preliminary analyses, child gender was included as a covariate and was unrelated to any outcome variables. Thus, child gender was removed from the final regression models.

In the final hierarchical regression models, child emotionality, maternal depressive symptoms, support and positive affect, variables involved in calculating the interactions, were centered. Family income was entered into the model in the first step as the control variable, child positive and negative emotionality were entered in the second step, and maternal depressive symptoms, maternal support to child negative emotions and maternal positive affect were entered in the third step, in order to test the main effects of both child emotionality and maternal parenting practices and depressive symptoms. Finally, to test the third hypothesis of the interaction between child emotionality and maternal factors, the interaction terms between child emotionality and maternal factors were entered in the last step. After careful examination, nonsignificant interaction terms were removed from the model for the sake of parsimony. Thus, the final models consisted of main effects of child emotionality and maternal depressive symptoms, support and positive affect, as well as significant interactions between them.
CHAPTER 3: RESULTS

An exploratory factor analysis was performed on codes regarding child affect expressions and ER strategies, to investigate differential strategies related to different emotions. A principal component analysis revealed three factors with three kinds of affect expression falling into each category, and a Varimax rotation indicated specific ER strategies associated with three coded affect expressions. A total of 58.15% of the total variance was explained by the three factors. The first factor, passive soothing, consisted of sadness expressions and comfort seeking behaviors, both loaded positively. The second factor, negative focus on distress, was composed of anger, focusing on distress and active distraction (loaded negatively). The third factor, positive engagement, included positive affect, active playing and passive waiting (loaded negatively) (Table 1).

Means, standard deviations and bivariate correlations of study variables are presented in Table 2. In the bivariate correlations, maternal depressive symptoms were negatively related to family income ($r = -.20, p = .03$) and child positive emotionality ($r = -.21, p = .02$), while positively associated with child negative emotionality ($r = .18, p = .04$). Maternal support to child negative emotions was positively related to child positive emotionality ($r = .26, p < .01$) and negatively related to maternal
depressive symptoms ($r = -.24, p < .01$). Maternal positive affect was positively associated with family income ($r = .27, p = .01$) and negatively associated with child negative emotionality ($r = -.19, p = .04$). Observed child passive soothing behaviors were negatively related to reported child positive emotionality ($r = -.20, p = .03$) and maternal support ($r = -.23, p < .01$). Additionally, maternal depressive symptoms were negatively associated with child use of focusing on distress strategies ($r = -.18, p = .04$) and marginally positively related to child use of positive engagement strategies ($r = .17, p = .07$).

A series of hierarchical linear regression analyses was conducted to test the main effects of child emotionality, maternal depressive symptoms, maternal support, and positive affect, as well as interactions between child temperament and maternal factors on child ER outcomes. The first model was tested concerning the factor reflecting child passive soothing behaviors (Table 3). There was a marginally significant change in $R^2$ when maternal factors were entered into the model ($\Delta R^2 = .05, \Delta F = 2.25, p = .09$); maternal support to child negative emotions yielded a significant negative main effect ($\beta = -.20, p = .03$). The final model revealed a significant main effect of maternal support; maternal support of child negative emotions was negatively related to child passive soothing behaviors ($\beta = -.24, p = .02$). Additionally, three interaction effects were identified for the passive soothing behaviors: interaction between child positive emotionality and maternal depressive symptoms, between child positive emotionality and maternal positive affect, as well as
as between child negative emotionality and maternal support; these interaction effects were plotted in Figure 2a, 2b and 2c, respectively. As shown in the plot, for children low in positive emotionality, maternal depressive symptoms were marginally positively associated with passive soothing behaviors ($\beta = .24, p = .07$), while this association was not significant for preschoolers having a medium or high level of positive emotionality (Figure 2a). Moreover, although maternal positive affect was not significantly related to the passive soothing ER factor in any of the groups divided by different levels of positive emotionality, child passive soothing behaviors differed marginally given a low level of maternal positive affect ($\beta = -.24, p = .08$).

Additionally, for children with medium and low levels of negative emotionality, higher maternal support was significantly related to reduced levels of passive soothing ($\beta = -.21, p = .02$, and $\beta = -.42, p < .01$, respectively), whereas this link was not significant among children with high levels of negative emotionality (Figure 2b).

A hierarchical linear regression analyses was also conducted to test the main effects of and interactions between child emotionality and maternal depressive symptoms, maternal support and positive affect for the ER factor reflecting negative focus on distress behaviors. The overall model was marginally significant ($R^2 = .11$, $F(7, 114) = 2.02, p = .06$). After the child emotionality and maternal factors were entered into the model, the $R^2$ didn’t yield a significant change; however, when the interaction between child positive emotionality and maternal positive affect was entered into the model, the $R^2$ increased significantly ($\Delta R^2 = .03, \Delta F = 4.10, p = .05$).
The final model yielded a marginally significant main effect of maternal depressive symptoms \( (\beta = -0.19, p = .06) \), and a significant interaction effect between child positive emotionality and maternal positive affect (Table 4). The interaction is plotted in Figure 3; for preschoolers with a high level of positive emotionality, increased maternal positive affect was marginally significantly related to less negative focus on distress \( (\beta = -0.27, p = .06) \), while this relationship was not significant for children with medium or low levels of positive emotionality.

Finally, the model using hierarchical linear regression analysis tested the main effects and interactions between child emotionality and maternal depressive symptoms and positive affect for the ER factor reflecting positive engagement behaviors. After the child emotionality and maternal factors were entered into the model, the \( R^2 \) didn’t yield a significant change; however, when the interaction between child positive emotionality and maternal positive affect was entered into the model, the \( R^2 \) increased significantly \( (\Delta R^2 = .10, \Delta F = 12.53, p < .01) \). The final model yielded a marginally significant main effect of maternal depressive symptoms on child positive engagement \( (\beta = .16, p = .08) \), and a significant interaction effect between child negative emotionality and maternal positive affect (Table 5). The interaction is plotted in Figure 4. For preschoolers with a high level of negative emotionality, maternal positive affect was negatively associated with child positive engagement \( (\beta = -.50, p = .02) \); however for those low in negative emotionality, maternal positive affect as positively related to child positive engagement with the
task ($\beta = .47, p = .02$); this association was not significant for children with a medium level of negative emotionality.
CHAPTER 4: DISCUSSION

This study examined children’s differentiated ER strategies according to different aroused emotions in the context of a laboratory-based disappointment experience. It attempted to address questions about the socialization of ER in the family context in early childhood, from child emotionality, maternal emotion-related socialization and depressive symptoms, and interactions between them. As expected, it was found that different ER strategies were related to specific kinds of child emotions: children who displayed more sadness also utilized more comfort seeking strategies; children who were high in anger usually adopted more strategies related to focusing on the source of distress and less active distraction from the disappointing gift; and children who experienced more positive affect actively engaged in the task more often. Among all the maternal factors, maternal support to child negative emotions yielded a significant negative association with child passive soothing. Interaction between child emotionality and maternal factors were also found: child positive emotionality moderated the links between maternal socialization and depressive symptoms and child ER; whereas child negative emotionality moderated the links between maternal support and child ER.

During the early childhood years, adaptive ER strategies are required for social
functioning. Growing evidence suggests that differentiated regulatory strategies result in different outcomes in both affect and adjustment; for example, regulatory styles which are passive and focus on seeking physical and caregiver comfort are associated with heightened sadness and distress (Feng et al., 2008; Stansbury & Sigman, 2000); the inability to shift attention away from the source of distress, such as focusing on the disappointing gift, is correlated with increased subsequent anger beyond infancy (Diener, Mangelsdorf, McHale, & Frosch, 2002; Gilliom et al., 2002). On the other hand, strategies such as active engagement and positive anticipation have been associated with an increase in positive affect and a reduction of distress in challenging situations (Feng et al., 2008; Silk et al., 2006a). Our findings indicate that preschoolers are able to use differentiated ER strategies given different emotional contexts, and certain ER strategies are associated with specific affective experiences. This is consistent with the functional perspective on emotional development (Barrett & Campos, 1987). Sadness is related to giving up on personal goals and efforts, therefore passive regulatory strategies such as soothing would be applied to achieve comfort in this situation. Anger is related to obstacles in achieving personal goals and overcoming difficulties, so strategies such as distraction would be associated with reduced frustration, while continuing to focus on distress would increase levels of anger arousal. Finally, positive emotion is related to successful accomplishment of personal goals, so strategies such as engagement with the task would be associated with enhanced level of happiness and satisfaction.
Additionally, our results are also consistent with previous studies suggesting an association between maternal supportive responses to child negative emotions and child ER abilities (Eisenberg et al., 2001; Lunkenheimer et al., 2007). In a laboratory-based disappointment experience, sadness is the most common expressed affect (over anger and positive emotion), and thus is largely dependent on maternal supportive responses. According to the meta-emotion philosophy theory (Gottman, Katz, & Hooven, 1996), parents who hold beliefs that emphasize the importance of the child’s emotional experience and regulation are generally accepting, responsive, and supportive to child negative emotions. They provide guidance and scaffolding behaviors to help regulate child emotions, and these parenting practices can enhance child ability to regulate emotions (Lunkenheimer et al., 2007). In the current study, maternal support was related to reduced child sadness and comfort seeking behaviors even when the mother was absent, which indicates preschoolers have been able to move from “other-regulation” to “self-regulation” (Sameroff, 2010) and gain some independence in regulating emotions.

Surprisingly, however, in the current study, no main effects of child emotionality, maternal depressive symptoms and positive affect were found. This is consistent with the view that the development of ER is an accumulation of risk and protective factors (Calkins, 1994); not one simple personal or environmental factor could be deterministic for the development of ER. Several previous research findings coincided with this view and the results in the current study. For example, although
children of depressed mothers presented less active regulation and positive mood, not
direct associations between maternal depressive symptoms and child ER were found;
only those children who were temperamentally inhibited and had a mother with
childhood-onset depression displayed less active and more passive regulation (Feng et
al., 2008). Similarly, Dougherty and colleague (2010) found no direct link between
child negative emotionality and later depressive symptoms after controlling for
concurrent anxious/depressive symptoms, but a combination of low positive
emotionality and negative emotionality can predict a significant increase in depressive
symptoms. These findings, together with results from the current study, suggest that
the development of ER is a complex process, involving multiple temperamental and
environmental factors, and the interplay among these factors. Future research on ER
development should take all relevant internal and external issues into account, and
examine both risk and protective factors carefully.

More importantly, our findings support the proposition that individual
differences in ER skills reflect both internal and external factors and their interactions
(Calkins, 1994). Consistent with previous research (Eisenberg et al., 2000),
preschoolers who were low in negative emotionality tended to develop more adaptive
ER strategies (i.e. more positive engaging with the task and less focusing on the
distress without self-distraction), especially in a nurturing environment when mothers
displayed more positive affect and supportive responses. Surprisingly, however, it was
found that for preschoolers with a high level of negative emotionality, maternal
positive affect was negatively associated with child positive engagement. This might be due to a lack of emotional congruence in these dyads of highly positive mothers and highly negative children, which reflects potential deficits in maternal sensitivity among these mothers. Emotional congruence is an important aspect of mutual emotion regulation (Cole, Teti, & Zahn-Waxler, 2003), through which young children are socialized with regulatory skills. Mothers should be sensitive enough to read child emotional clues and respond accordingly. If mothers respond to the negative affect expressions of their children with exaggerated and inconsistent positive emotion, the regulation would be less successful. In sum, low negative emotionality is a protective factor in child development of ER.

Moreover, moving beyond our current knowledge about the role that negative emotionality plays in the development of ER (Eisenberg et al., 2000), child positive emotionality also yielded a significant interaction with caregiving environment on child ER outcomes in the current study. Consistent with findings that low positive emotionality place children at risk of dysregulation (Dougherty et al., 2010; Shankman et al., 2011), children with low levels of positive emotionality were more susceptible to the influence of maternal depression, and were more likely to display sadness and adopt passive regulatory behavior. On the other hand, from a mutual regulation perspective, when a child with a high level of positive emotionality coincided with a highly positive mother, the development of self-regulation of emotion tended to be more successful, even for regulating negative emotions such as...
sadness and anger. This goes back to the view that positive emotionality and negative emotionality are orthogonal constructs, rather than on the two opposite ends of one dimension (Clark & Watson, 1999), and positive emotionality can impact the regulation of negative emotions, just as negative emotionality can influence the regulation of positive emotion. Further research should untangle the relationship between these two constructs with regard to regulating both positive and negative emotions, and the interaction effect between them on child ER.

In sum, these findings suggest that there may be different ways of socialization of ER depending on both the child’s emotionality and the mother’s affective states and socialization. The findings also seem to suggest that children low in positive emotionality and/or high in negative emotionality may be more sensitive to risk factors in the family environment, and children high in positive emotionality and/or low in negative emotionality are more nurtured in a supportive environment, and more emotionally resilient in case of a high-risk environment. Broadly speaking, these moderation relationships support the transactional perspective of child development (Sameroff, 2010), particularly in understanding child ER development.

Limitations of the present study highlight directions of future work. Firstly, child emotionality, maternal characteristics and child ER were assessed at the same time, and thus causal relationships cannot be inferred. Longitudinal investigations are needed to discover the process in which children develop ER strategies over time, and how these strategies might be related to child characteristics and familial factors.
Secondly, the observations of child affect and ER strategies were conducted in a laboratory setting and for a brief time period. Although the disappointment task has been shown to be ecologically valid and consistently elicit negative emotions (Cole et al., 1994), multiple situations and contexts are needed to observe broader and more consistent ER behaviors without context limitations. Finally, maternal support to child emotions was only measured by maternal self-report, which is limited to the available options of the instrument and is threatened by respondents’ social desirability. Future research should use multiple methods and measures to catch a host of maternal parenting behaviors.

Despite these limitations, this study has several notable strengths. First of all, different emotions and related ER strategies were separated in the analysis, avoiding the overgeneralization in a model of one-factor negative emotions. Also, positive emotionality and regulation of positive affect were taken into account, which adds to the small amount of current literature addressing the importance of regulating positive emotions when considering ER capabilities. The maternal characteristics also included both positive aspects (e.g. positive affect and support) and negative aspects (e.g. depressive symptoms), which present as risk factors and protective factors in the family context. The assessments were from a multi-method, multi-informant design including parent self-report and report for their children, and laboratory observations for both mothers and children. And finally, this study highlights the interaction/transaction perspective between child temperament and environmental
factors, which presents a holistic picture of early child development and adjustment.

This study enhances our understanding of the role of child emotionality and family environment for the development of preschoolers’ ER competence. The results have implications for developing prevention and intervention programs of early child psychopathologies. First, our findings will inform early intervention programs focusing on adaptive emotion regulation strategies during early childhood, especially for those with temperamental inclinations towards high negative emotionality and low positive emotionality. Besides, our findings may suggest that the key leading to effective intervention is positive affect expressed to children, and supportive responses to child negative emotions in the processes of caregiving. For example, teaching children skills for actively engaging with the situation and enhancing or maintaining positive emotions may help prevent emotion dysregulation for temperamentally at-risk preschoolers.
References


Appendix: Tables and Figures
Table 1. Loadings of Exploratory Factor Analysis for Affect and ER Codes.

<table>
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<tr>
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<th>Passive Soothing</th>
<th>Negative Focus on Distress</th>
<th>Positive Engagement</th>
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*Note.* Loadings with an absolute value below .35 were suppressed for clarity.
Table 2. Descriptive statistics and bivariate correlations for study variables.

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<td>-0.20*</td>
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Note. + p < .10, * p < .05, ** p < .01.
Table 3. Hierarchical regression analyses for passive soothing ER factor

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<th>ΔR²</th>
<th>ΔF</th>
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R² = .22, F(9, 112) = 3.44**

*Note.* + p < .10, * p < .05, ** p < .01.
### Table 4. Hierarchical regression model for negative focus on distress ER factor

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<tr>
<th>Step</th>
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<th>t</th>
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R² = .11, F(7, 114) = 2.02+

*Note.* + p < .10, * p < .05, ** p < .01.
Table 5. Hierarchical regression analyses for positive engagement ER factor

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<th>β</th>
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R² = .13, F(6, 116) = 2.84*

Note. + p < .10, * p < .05, ** p < .01.
Child temperament
- Positive emotionality
- Negative emotionality

Maternal emotion-related socialization
- positive affect
- support

Maternal depressive symptoms
(Family emotional climate)

Child ER strategies
- Sadness
- Anger
- Positive affect

Figure 1. Conceptual model for the current study
(a) An interaction plot between positive emotionality and maternal depressive symptoms for passive soothing ER factor

(b) An interaction plot between negative emotionality and maternal support for passive soothing ER factor

Figure 2. Interaction plots for passive soothing ER factor
Figure 3. An interaction plot for negative focus on distress ER factor
Figure 4. An Interaction plot for positive engagement ER factor

\[ \beta = .47, p = .02 \]
\[ \beta = - .02, p = .86 \]
\[ \beta = - .50, p = .02 \]