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EMOTION LANGUAGE IN EARLY CHILDHOOD: RELATIONS WITH CHILDREN'S EMOTION REGULATION STRATEGY UNDERSTANDING AND EMOTIONAL SELF-REGULATION

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Laura Marie Armstrong

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The dissertation of Laura Marie Armstrong was reviewed and approved* by the following:

Pamela M. Cole
Professor of Psychology
Dissertation Advisor
Chair of Committee

Karen L. Bierman
Distinguished Professor of Psychology

Ginger A. Moore
Associate Professor of Psychology

Carol A. Miller
Associate Professor of Communication Sciences and Disorders

Melvin M. Mark
Professor of Psychology
Head of the Department of Psychology

*Signatures are on file in the Graduate School.

ABSTRACT

Emotion language appears to be an important component of developing socio-emotional competence. However, most emotion language research has focused on children from middle class, educated, advantaged homes. The aims of the current study were to: (1) describe the developmental change in mother and child emotion language from 18 months to 5 years of age as a function of selected child and parent characteristics, in a sample of 99 economically-strained children, who are known to receive less language input and to have less well developed language skills than children from middle- and upper-income families, and (2) examine the relations among emotion language, emotion regulation strategy understanding, and emotion regulation from toddlerhood to age 5. Emotion language data were drawn from a 5-minute wordless book task during lab visits when children were 18-, 24-, 36-, 48-months and 5-years old. Children's emotion regulation strategy understanding was drawn from a puppet task during lab visits when children were 36-, 48-months, and 5-years old, and children's skill in emotion regulation was drawn from two challenging lab tasks at the same age points. The results of latent growth curve modeling indicated that mothers' emotion talk evidenced quadratic change, whereas children's emotion talk evidenced linear growth over time. Child gender and temperament, as well as mother emotion language and sensitivity predicted the initial level and growth in children's emotion talk over time. Structural equation modeling indicated a mediation model, whereby mother emotion talk predicted child emotion talk, which in turn predicted children's strategy understanding, which predicted children's anger expression during a challenging task. However, the results varied by task. Findings are discussed in terms of future directions for this type of work.

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Chapter 1. INTRODUCTION

Emotion regulation, defined as the ability to monitor, evaluate, and modify emotional experience, expression, and related behavior (Thompson, 1994), begins to develop in early childhood and is crucial for healthy, competent development (Shonkoff & Phillips, 2000). Young children with poor emotion regulation skills often have symptoms that interfere with their school and family relationships (Calkins, Gill, Johnson, & Smith, 1999; Eisenberg et al., 2001; Keane & Calkins, 2004; Keenan, 2000; Rubin, Coplan, Fox, & Calkins, 1995). Parents and other important adults are thought to play a key role in fostering the development of emotion regulation in early childhood (Denham, 1997; Denham & Grout, 1993; Eisenberg, Cumberland & Spinrad, 1998; Gottman, Katz, & Hooven, 1997), although the precise manner in which they do so remains to be detailed.

One view is that parents may harness young children's emerging language and cognitive skills in the service of emotion regulation by helping children develop an understanding that emotions can be regulated and that certain strategies may be more or less effective in regulating emotion (Kopp, 1989). Talk about emotions and other internal states may be one way that parents promote the integration of language and emotion regulation in early childhood, as this type of language has been linked to children's emotion understanding and emotional competence (Denham, 1998; Dunn, Brown, & Beardsall, 1991). Internal state language (ISL), more broadly, is embedded in parent-child discourse as children experience distress. It involves the labeling of internal states that are not observable, including desires, cognitions, perceptions as well as emotions (Bretherton, Fritz, Zahn-Waxler, & Ridgeway, 1986). In early childhood, such discourse allows parents to capitalize on young children's developing language skills and link them to effective and appropriate emotion regulation (Cole, Armstrong, & Pemberton, 2010).

Although talking about emotions is typically regarded as a predictor of children's emotional competencies, including emotion regulation, few studies examine whether children's use of emotion language predicts their regulatory behavior during actual emotional situations or their understanding of regulatory strategies. Parent-child emotion language should help children understand how emotions can be changed through the use of regulatory strategies and, therefore enhance their ability to recognize, generate, and use them in frustrating situations. Although parents may refer to young children's emotions during toddlerhood, a period of heightened negativity, it may not be until the preschool years and beyond when children can coordinate their knowledge of regulatory strategies so that they contribute to the strategic deployment of regulatory behaviors during challenging situations (Kopp, 1982).

Most of the research on emotion language has examined it in laboratory-based parent-child conversations with preschool age or older children, yielding evidence of concurrent relations between this language and various correlates. With older children, discourse between parents and children about emotions and other internal states is associated with children's own talk about emotions (Cervantes & Callanan, 1998; Dunn, Bretherton, & Munn, 1987), emotion understanding (Denham, Zoller, & Couchoud, 1994; Dunn et al., 1987; Laible, 2004a), and emotion perspective-taking (Dunn et al., 1991; Garner, Jones, Gaddy, & Rennie, 1997), as well as autobiographical memory (Harley & Reese, 1999), theory of mind (Bretherton & Beeghly, 1982; de Rosnay, Pons, Harris, & Morrell, 2004; Ruffman, Slade, & Crowe, 2002), and conscience development (Laible & Thompson, 2000). Therefore, parental discourse with young children about feeling states is believed to foster children's own use of this language, as well as socio-emotional competence. This is because talking about feelings promotes children's self-awareness (Welch-Ross, Fasig, & Farrar, 1999), and it is generally expected that talking about

feelings, rather than acting on them, enhances the ability to engage in emotional control. As yet, this assumption has not been tested. Therefore, the goal of the present study is to test the longitudinal relations between mother and child emotion language, child emotion regulation strategy understanding, and child emotion regulation, during early childhood.

In a developmental period when language develops rapidly, parental language about emotions and other internal states scaffolds children's use of terms that help them understand and communicate their needs (Taumoepeau & Ruffman, 2006, 2008). Indeed, between 18 and 20 months, children begin to use emotion language (Bretherton & Beeghly, 1982). Therefore, this period of rapid language development provides an opportunity to investigate whether parent and child emotion language contributes to later emerging emotion regulation skills. The influences of parent and/or child emotion talk on the development of emotion regulation are implied in the literature but they are not documented. Although parent emotion language predicts children's socio-emotional competence, children's own use of this language is assumed to be an important link in the developmental pathway. Their ability to use emotion terms would seem to aid their developing awareness of their own emotions, and emotion awareness is thought to contribute to the ability to regulate emotions (Cole et al., 2010). As children enter the preschool age years, they are increasingly able to verbalize their feelings, and their experience with this skill should equip them to reflect on and manage emotions. This skill should appear in the form of knowledge of regulatory strategies as well as their use of regulatory strategies in emotionally challenging situations.

Thus, the goal of the current study was to examine if and when emotion language relates to emotion regulation strategy understanding and emotion regulation. As a first step, differences in mean levels of internal state language categories (including emotion language) were examined

across time. Then, developmental models of mother and child emotion language were investigated to describe how this talk changes between 18 months and 5 years of age, as well as to understand how selected child and parent characteristics influence developmental changes in this talk. It appears that there has been only one published study of children's emotion language development during early childhood (see Taumoepeau & Ruffman, 2008). However, the generalizability of the published findings is uncertain, given the developmental, cultural, and economic differences between the New Zealand sample used in the published study and the American sample used for the current investigation. The current study examined developmental change in emotion language in a sample of economically-strained families living in rural and semi-rural communities in Pennsylvania.

The information gained from the first set of models was used to inform a second set of models. Specifically, two structural equation models were tested (one for each challenging task) in a longitudinal design, examining the relations among mother and child emotion language, emotion regulation strategy understanding, and emotion regulation.

Developmental Change in Emotion Talk

Talking about emotions is one way that parents socialize their children to be emotionally competent individuals (Bretherton et al., 1986; Denham, 1998; Dunn et al., 1987; Eisenberg et al., 1998; Gottman et al., 1997). Parent and child emotion talk is related to children's concurrent and later emotion knowledge and perspective taking (Laible & Song, 2006; Martin & Green, 2005; Mcquaid, Bigelow, McLaughlin, & MacLean, 2008). Parents' use of emotion language is expected to help children develop this language and in turn be able to reflect on their own experience and recall information that will help them manage challenging situations in the future, as parent elaboration also enhances children's autobiographical memory (Haden, Haine, &

Fivush, 1997; Harley & Reese, 1999). However, the way in which emotion language develops across early childhood is unknown. The few cross-sectional and two-time-point studies examining parent-child emotion language, as well as ISL more broadly, may give clues about the nature of children's growth in this talk over time.

Changes in ISL. Between 18 and 48 months of age children's talk about internal states, including emotion terms, increases (Dunn et al., 1987; Jenkins, Turrell, Kogushi, Lollis, & Ross, 2003; Taumoepeau & Ruffman, 2008). Child use of inner state terms parallels growth in language production (Bretherton et al., 1986). At 18 months of age, some children are acquiring their first words and others have entered the vocabulary spurt. What is particularly notable is that during this same period, the late toddler and early preschool years, there is heightened emotional expressivity (Adamson & Bakeman, 1985; Bretherton et al., 1986). Thus, at a time when children are emotionally expressive, their emerging language skills offer a vehicle for understanding their experiences and moving toward more effective ways of dealing with them. Emerging linguistic abilities also allow caregivers to label children's inner states and give verbal commands and feedback about the appropriateness of these states as children develop a vocabulary to describe their experience and to think about it. As children's ability to talk develops, parents have new opportunities to communicate with children about internal states and their labels.

By the time children reach their second birthday, their ability to talk about emotions and other internal states is quickly developing, and about 30% of children talk about inner states appropriately (Bretherton et al., 1981). Children's talk about internal states significantly increases between 18 and 24 months of age and between 25 and 32 months of age (Dunn et al., 1987). Between children's second and third birthday, there is a rapid spurt in ISL. During this

time, children's vocabulary for talking about desires and physiological states (e.g., hunger, pain) is more extensive and highly elaborated than their vocabulary for emotion terms, and their vocabulary for cognition terms is the least developed (Bretherton & Beeghly, 1982). Children's talk about desires and emotions increases between 15 and 24 months of age and talk about desires, emotions, and cognitions increases between 24 and 33 months of age (Taumoepeau & Ruffman, 2006, 2008). In addition, children's use of internal state language between ages 3 and 4 years is correlated (Ruffman et al., 2002), although it is not significantly correlated between ages 2 and 4 years (Jenkins et al., 2003). These differences in association may be evidence of developmental change or it may be due to differences in methodology (i.e., picture task versus naturalistic home observation).

The frequency of maternal references to inner states is correlated between child ages 12 and 24 months and between 30 and 44 months, but there are changes in the categories of internal state references that mothers use with their children (Degotardi & Torr, 2007; Dunn et al., 1987; Kuersten-Hogan & McHale, 2000). Specifically, between child ages 15 and 24 months, mothers' talk about desires decreases and their talk about cognitions increases, and between child ages 24 and 33 months, mothers again increase their talk about cognitions, but do not change in their use of desire or emotion language (Taumoepeau & Ruffman, 2006, 2008). Also, there is considerable evidence that mothers' internal state language predicts young children's use of ISL (e.g., Mcquaid et al., 2008; Taumoepeau & Ruffman, 2006, 2008). For example, maternal use of desire terms at child age 15 months predicted child ISL at 24 months, and maternal use of cognition terms at child age 24 months old predicted child ISL at 33 months (Taumoepeau & Ruffman, 2008). Taken together, these findings suggest that mothers likely scaffold their children's

understanding and communication about internal states by staying a step beyond children's skill level at each time point.

Development of emotion talk. The onset of children's emotion language is reported to be between 18 and 20 months of age (Bretherton et al., 1986). By 28 months, children can discuss actions and events that led to a particular emotion and the motivation to behave in certain ways as a consequence of the emotion. Children who talk about their own past and future states are more likely to be able to refer to the emotional states of others (Bretherton & Beeghly, 1982). Causal utterances about emotion are more frequent than those concerning other internal states even though the use of emotion terms is less common overall. This suggests that children's understanding of the causes and consequences of emotions appear earlier in development or is more salient than that of other internal states. Therefore, children understand the function of emotions as appraisal and motivating states, and they view overt behaviors as related to emotion.

Between ages 3 and 5 years, two developmental trends in verbal communication about emotion become apparent. First, children's ability to reflect on the antecedents, consequences, and behavioral correlates of emotion becomes more accurate, clear, and complex. Second, children begin to express awareness that emotional experience can be regulated (Bretherton et al., 1986). By 5 years old, children are able to make longer and more complex causal inferences about interpersonal events, and children can generate plausible antecedents and consequences for a variety of emotions in hypothetical situations (Stein & Trabasso, 1989). However, emotion labels that require a more complex understanding of interpersonal situations (e.g., guilt and pride) are not used appropriately until later. Children from 4-11 years old tend to agree on the types of events that lead to particular emotions (Barden, Zelko, Duncan, & Masters, 1980). Furthermore, there is an increasing awareness that moods can linger and as a result, influence

behavior in situations that are not directly related to the event that came immediately before the emotion (Lagattuta & Wellman, 2001). Children also come to realize that the same antecedent may not necessarily be evaluated in the same way by different people (Gove & Keating, 1979).

Parents who talk about emotions with their children have the ability to encourage certain patterns of expression and facilitate awareness and understanding of emotions by: (1) increasing the child's motivation to attend to internal experience, (2) creating and/or strengthening the association in the child's mind between the expression of an emotion, the label for that emotion, and the situations that elicit those emotions, and (3) increasing the salience of the event so that the situations that elicit particular emotions are able to be recalled and talked about in the future. Emotion language is thought to allow parents to be specific in teaching children how to feel, what to say, and what to do (Denham, 1998). In addition, referencing emotions gives parents the opportunity to link present or recent events with past and future events, encouraging forethought and planning (see Adamson & Bakeman, 2006).

The development of emotion language is likely influenced by characteristics of both conversation partners and the family context, as children react to parents based on qualities of the parent and their relationship history and a sensitive parent is adjusting his or her language based on characteristics of the child (Dunn, 2006; Harris, 2006). First, temperamental qualities of the child, including negative emotionality, surgency, and effortful control are known to influence mother-child emotional conversations at a single point in time (Laible, 2004b). Children rated higher in negative emotionality and children rated lower in surgency engaged in conversation with their mothers that included more references to negative emotions. Also, mothers used more elaboration in conversations with children rated higher in effortful control. Second, child language ability influences parent and child talk about emotions because children with more

advanced linguistic abilities are better communication partners and should draw greater benefits from emotion language (Lee & Rescorla, 2008). However, most studies treat child language ability as a control variable rather than examine how child language abilities *influence* parental behavior. The young child with better vocabulary or grammar should elicit more talk about emotions compared to a child with less advanced language abilities. Third, child gender is known to influence emotion talk, with parents of girls using more emotion talk than parents of boys, and by 6 years old girls are using more emotion terms than boys (Adams et al., 1995).

Parental characteristics, including parent education, sensitivity, and use of emotion language are known to be related to parent-child communication about emotions. Mothers (Fivush et al., 2000; Leaper, Anderson, & Sanders, 1998), particularly those who are more educated (Degotardi & Torr, 2007; Jenkins et al., 2003) or more knowledgeable about child development (Garrett-Peters et al., 2008) use more emotion talk with their children than those who do not have those characteristics. Sensitive parenting is also likely to advantage child emotional competence, and changes in maternal conversations about emotions are likely a sensitive response to children's increasing linguistic, cognitive, and socio-emotional abilities. In addition, family characteristics, including lower income and larger family size (i.e., child birth order) are known to negatively influence language development more generally (Hart & Risley, 1995; Hoff-Ginsberg, 1991) and likely influence emotion talk, as well.

Relations between emotion talk and emotional competence. Although emotion language has been studied using a variety of methods and outcome measures, one of the most common procedures used to elicit conversation about emotions is the use of wordless picture books, and emotion talk during this task is often associated with children's emotion understanding using the Denham Puppet Procedure (Denham, 1986). Studies on the relations

between emotion language and emotional competence during early childhood fall into three general categories. The first type of study focuses only on maternal emotion references or a composite of mother and child emotion discourse during parent-child interaction (e.g., Laible, 2004b; Taumoepeau & Ruffman, 2006, 2008). Although this work has been important in establishing that mother and child emotion references are related to children's emotional competence, it makes it difficult to disentangle whether it is parent emotion language or child emotion language that is a stronger predictor of children's later emotion understanding.

The second type of investigation focuses on correlations among maternal emotion terms, child emotion terms, and emotional competence; however these have yielded mixed results. In some studies only maternal references to emotion, not child references, are related to children's emotion understanding (Martin & Green, 2005) and conscience development (Laible & Thompson, 2000). However, other work has shown that maternal emotion talk and child emotion talk are correlated with emotion labeling, role-taking, and situation knowledge (Denham, Cook, & Zoller, 1992; Dunn et al., 1991; Ensor & Hughes, 2008; Mcquaid et al., 2007; Ruffman et al., 2002). These differences in findings are likely due to different outcome measures (i.e., conscience development versus emotion understanding), as well as differences in methodology for assessing emotion talk (i.e., reminiscing task, wordless book task, naturalistic home observation, and mother-report of children's emotion references).

The third type of study examines both maternal emotion language and child emotion language in regression analyses to determine which explains unique variance in emotion understanding. Again, the findings vary across studies, which make it difficult to draw firm conclusions. In some work, mother and child emotion talk explain unique variance in emotion understanding (Garner, 2003; Garner et al., 1997) and in other research only child talk explains

unique variance in children's emotion and false-belief understanding (Ensor & Hughes, 2008). Again, these differences may be attributed to the outcome measures used. Specifically, Garner and colleagues (1997, 2003) used an empathy task to measure emotion understanding, whereas Ensor and Hughes (2008) used a composite of social understanding which included deception, false-belief, and emotion understanding. Perhaps child emotion talk is more important than maternal emotion talk for assessments of how well children understand the emotions of others.

Taken together, there is reason to believe that age-appropriate conversations about emotions may serve the goal of helping children understand and therefore regulate emotional experiences. Given the number of studies exploring the relations between emotion language and emotion understanding, the lack of empirical work investigating the links between emotion language and strategy understanding or the links between emotion language and emotion regulation is surprising. Although knowledge about effective emotion regulation strategies is another way of assessing children's understanding of emotions, children's strategy understanding would seem to be a more proximal predictor of regulatory ability and behavioral outcomes than measures that tap emotion identification and situation knowledge. Indeed, 3- and 4-year-olds' recognition of effective emotion regulation strategies predicted their ability to engage in appropriate emotional self-regulation during a frustrating task (Cole, Dennis, Smith-Simon, & Cohen, 2009).

In sum, emotion language helps children develop the tools to think about their emotions and to become aware that others have emotions that are similar to and different from their own. Children can use this language to label and discuss emotions and, arguably, to guide their behavior. It is likely through emotion talk that children learn about the causes and consequences

of emotions, develop the ability to reflect and talk about these emotional states themselves, and understand that emotions can be modified through the use of regulatory strategies.

Emotion Regulation Strategy Understanding

The development of emotion regulation strategy understanding is considered to be a component of emotional competence, yet it is less often studied compared to other aspects of emotional competence, such as emotion identification, perspective-taking, and situation knowledge. The paucity of research in the area may be due to methodological issues related to having young children report on their knowledge in reference to hypothetical and real-life situations. Furthermore, there is little work on whether the strategies children report they would use have any bearing on real-life challenging situations. In addition, the verbal nature of these tasks require that children's language skills, especially expressive language, are advanced enough to permit children to understand the tasks and respond verbally. Given that children's emotional, cognitive, and linguistic skills are going through a process of rapid development and integration during the toddler and preschool years, tasks that require the coordinated use of these domains can prove to be quite effortful for young children. Young children's verbal knowledge about emotion regulation emerges between ages 3 and 5 years (Denham, 1998; Lemerise & Arsenio, 2000), and continues to develop throughout childhood. Research on the development of children's understanding that the expression and the experience of emotion can be regulated is generally drawn from two separate literatures, display rule knowledge and coping.

Display rule knowledge. Children's understanding of when and how to regulate the outward expression of emotion for cultural, prosocial, and self-protective reasons falls under the category of display rule knowledge. Children's display rule knowledge increases with age (Taylor & Harris, 1984). Even though children as young as 3 years old are able to mask their

emotions during a disappointment task (Cole, 1986), this does not necessarily mean that children are consciously aware of social display rules. Parents have likely taught their children how to behave during events that have the potential to be unpleasant or disappointing for them. This behavioral rehearsal may lead to children's dissemblance (i.e., expressing an emotion that differs from what is felt), but not necessarily the knowledge that displaying contentment, through speech or verbal expressions, in the midst of a disappointment is culturally appropriate and protects the feelings of others. Therefore, children's internalization of social rules likely precedes their ability to verbally communicate these rules. Perhaps it is not until children are adept at using display rules and have developed the language skill to reflect on their own and others' emotions and behavior, that they can articulate display rule knowledge.

Consistent with this reasoning, 4- and 5-year-old children are able to accurately say how another appears to feel based on facial expressions, whereas 5-year-olds are more accurate than 4-year-olds in their understanding that there may be discrepancies between how another appears to feel based on outer appearance and how they really feel internally (Gross & Harris, 1988). However, when the language and memory demands are reduced, children as young as 3 years old appear to understand the difference between internal experience and the outward expression of emotion (Banerjee, 1997). By first grade most children are able to communicate their knowledge of display rules in complex ways, describing the causes and consequences of masking emotion (Gnepp & Hess, 1986). Perhaps advances in language, emotional competence, and metacognition foster the developing awareness of these rules.

Although this knowledge continues to develop over time, it appears that even by 10th grade, children have a well-developed understanding that verbal displays of emotion can be controlled, but less understanding that facial expressions can be controlled, as well. Perhaps with

increases in executive functioning during adolescence and into adulthood, there are increases in self-monitoring and a growing awareness that a dominant response (e.g., a disappointed facial expression) during a disappointing situation, can be inhibited and replaced with a sub-dominant one (e.g., a content or happy facial expression). Display rule knowledge is related to social competence among school-age children, especially for children who understand when to mask positive and negative emotions and for those who are able to articulate prosocial reasons for masking emotions (McDowell & Parke, 2009).

Knowledge of Coping Strategies. The literature on coping strategies has been greatly influenced by the work of Lazarus and Folkman (1987). They argue that coping strategies fall into two general categories, problem-focused and emotion-focused. In problem-focused coping, the individual manages the stress of the situation through external means, and in emotion-focused coping there is an attempt to improve the negative emotional state through internal means (e.g., cognitive distraction and reappraisal).

For school-age children (5-12 years old), the use of particular coping strategies varies as a function of age and the controllability of the situation (Altshuler & Ruble, 1989; Band & Weisz 1988). School-age children tend to suggest situational modifications or problem-focused coping to deal with challenging situations, but those who are closer to adolescence also mention cognitive strategies (Harris, Olthof, & Terwogt, 1981). In addition, based on self-report, children are more likely to use problem-focused coping in situations perceived as controllable (e.g., peer problems, school failure) and more likely to use emotion-focused coping in less controllable, and possibly less familiar situations (e.g., medical emergencies, physical accidents). Although some research has shown that younger children do not use the features of the situation to determine which type of coping strategy to use, it is possible that the cognitive demands on the children

during these tasks limits their ability to verbally articulate their knowledge (Band & Weisz, 1988).

During early childhood, children have an understanding of the relations between goals and outcome (e.g., inability to obtain the desired snack will lead to negative emotional states) and between behaviors and emotions (Stegge & Terwogt, 2007). When younger children are asked how to cope with challenging situations, they are more likely to suggest behavioral strategies that modify the situation, rather than changes to an internal state (Flavell, Flavell, & Green, 2001). Behavioral distraction is the most common strategy suggested by 5-, 7-, and 10-year-old children for managing stressful situations (Altshuler & Ruble, 1989).

Although less work has been done with preschoolers' strategy knowledge, 3-year-olds do have an explicit awareness of effective and ineffective strategies (Dennis & Kelemen, 2009). Specifically, preschoolers understand that cognitive and behavioral distraction, as well as problem-focused repairs of the situation are more effective ways of decreasing negative emotions than rumination, venting, and telling mother. In addition, preschoolers are beginning to develop a functional understanding of emotions, and therefore suggest problem-focused solutions to alleviate anger and behavioral distraction to reduce sadness (Dennis & Kelemen, 2009).
In addition, children are motivated to intervene to help other's manage their emotions, especially in cases of sadness and anger (Carlson, Felleman, & Masters, 1983), possibly demonstrating a sense of efficacy in their ability to change inner states. Older children (8- and 12-year-olds) suggest more social and verbal interventions than younger children (5-year-olds) to alleviate another's negative emotion, whereas younger children suggest more material interventions, like sharing toys (McCoy & Masters, 1985). Even young children are aware that nurturance elicits happiness in others and aggression elicits anger and/or sadness.

Taken together, emotion-focused coping may be slower to develop because these processes are internal, and therefore more difficult to observe in parents and other important adults. Language may be a mechanism through which children come to understand that negative emotions can be changed through internal processes. In fact, child and parent characteristics, including child age and language ability and maternal support relate to preschoolers' understanding of anger regulation strategies (Cole et al., 2009). It is possible that young children's knowledge of regulatory strategies is more experientially than conceptually based, and that such a base of knowledge leads more readily to behavioral than to internal forms of regulation. Given that young children develop the ability to recognize and reflect on their own and others' emotions, have common ideas about the antecedents and consequences of emotions, and are often motivated to modify their emotions, it is reasonable to expect that at some point during development, children's knowledge of regulatory strategies contributes to their emotion regulation abilities. In fact, preschoolers' recognition of effective strategies for managing anger and sadness is related to their use of self-initiated regulatory strategies in a frustrating situation (Cole et al., 2009).

Emotion Regulation

It has been well-established that the ability to regulate emotions is an essential developmental task, with implications for later socio-emotional development and mental health (Calkins et al., 1999; DelCarmen-Wiggins, 2008; Eisenberg et al., 2001; Keane & Calkins, 2004; Keenan, 2000; Rubin et al., 1995; Saarni, 1999). For example, poor regulation in infancy predicts noncompliance and externalizing behavior in toddlers (Stifter, Spinrad, & Braungart-Rieker, 1999). In contrast, children who appear emotionally well-regulated are more socially skilled and better accepted by their peers (Eisenberg et al., 2001).

Definitional issues. Although definitions of emotion regulation (ER) differ, Thompson has conceptualized emotion regulation 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). As illustrated by Thompson's conceptualization, most definitions of emotion regulation include systematic changes of an emotional response, and the appropriateness of those changes in the situational context (Cole, Michel, & Teti 1984; Thompson, 1994). However, few studies assess the temporal and intensive features of emotion when studying emotion regulation, rather emotion regulation is often studied in terms of amount of anger, even though the amount of anger expressed says little about how it is being regulated (Cole, Martin, & Dennis, 2004).

Anger regulation. Anger regulation is often studied because of the association with aggression and other externalizing problems in childhood (Shaw, Bell, & Gilliom, 2000). From a functional perspective of emotions, anger occurs when one's goals are blocked, and as a result, anger prepares individuals to act in a way that removes the obstacles to achieving one's goals (Barrett & Campos, 1987). Although displays of negative emotion are common in toddlerhood, this behavior normally declines by preschool (Tremblay & Nagin, 2005), presumably due to the development of more effective and strategic regulatory strategies. However, simply because there is a normative decline in anger across early childhood, this does not mean that the expression of any anger will have negative consequences. In fact, preschoolers' anger expressions are associated with appropriate efforts to deal with blocked goals and persist at challenging tasks (Dennis, Cole, Wiggins, Cohen, & Zalewski, 2009). Thus, anger has the potential to enhance behavior if it is well-regulated. However, little is known about whether mother and child emotion language is related to anger regulation.

Socialization of ER. When parents help their children regulate emotional arousal or instruct them on how to do so independently, children are protected from experiencing overarousal and dysregulation. These situations provide a model for future situations where emotion regulation will be required. In addition, parental displays of emotion can be important for the socialization of children's coping ability. Some parents might teach their children to suppress their emotions, whereas others might emphasize coping techniques, such as problem solving or seeking social support (Eisenberg & Fabes, 1992). A third way that parents socialize emotion regulation is through reactions to their children's emotion. For example, sensitive parents likely help their children to cope with their emotions when distressed, and these children are less likely to become overaroused. In contrast, negative and over-bearing parents tend to react to children's distress in ways that exacerbate child negativity and exemplify punitive socialization (Fabes, Eisenberg, & Miller, 1990).

A fourth way that parents socialize emotion regulation is by talking explicitly about emotions, in terms of where and why they occur, as well as how they should be expressed. Thompson (1990) suggests several ways that parents' verbal discourse can contribute to emotion regulation. Specifically, parents can: (a) give direct commands or instructions about emotions, (b) state the rules of emotional expressiveness and suggest clear means of performing emotion regulation, (c) discuss their own emotions and thereby shape children's conceptions of emotion regulation in general and of adults' emotion regulation strategies, in particular, and (d) manage the information given to their child about potentially emotional events.

Development of ER. The capacity for the self-regulation of emotions begins during infancy, but this is still a period of relative dependence on adult regulation (Kopp, 1982). During toddlerhood, there is a qualitative shift in emotion regulation such that children learn to actively

regulate emotions on their own. The increasing differentiation and complexity in motor, cognitive, and visual systems is thought to allow for the understanding of links between children's own actions, behavior of caregivers, and changes in emotional states. In conjunction with these cognitive and motor advances, brain development likely results in more successful and diverse ways of managing and expressing emotions, such that emotion regulation becomes increasingly flexible, adaptive, and effective. Children also begin to intentionally solicit social interchanges as a means of maintaining positive affect, develop specific plans for obtaining assistance and support from caregivers, and distract themselves from stressful events.

Children are thought to intentionally use regulatory strategies between ages 30 and 36 months of age (Kopp, 1982). By preschool age, children appear to actively initiate strategies that regulate anger (e.g., Calkins, 2007; Grolnick, McMenamy, & Kurowski, 2006; Kopp, 1989). Empirical work has shown that there is a developmental change in children's anger regulation between 24 and 36 months (Cole et al., 2011). Specifically, during this time period children begin to use more advanced and deliberate regulatory strategies, including support-seeking and distraction. By the time children are 36 months old, they are slower to get angry and able to initiate distractions, although those distractions appear to influence latency to anger only by 48 months of age. This work further highlights the importance of examining temporal variables when seeking to understand anger expression and regulatory behaviors.

Perhaps earlier ability to use emotion language and understand that emotions can be modulated provides a foundation for successfully managing later frustrating experiences. Emotion language may help children communicate their feelings and to think through rules and strategies for changing emotions (Cole et al., 2010; Kopp, 1989). These advances should be

demonstrated over time as emotion language, emotion regulation strategy understanding, and emotion regulation are integrated during early childhood.

Relations among Emotion Language, Strategy Understanding, and Emotion Regulation

The relation between emotion language and emotion regulation has been implicated in theoretical and empirical work, but the mechanisms underlying this relation are as yet unknown. Therefore, an aim of this study was to examine the longitudinal relations among emotion language, strategy understanding, and emotion regulation using methodology that can handle a repeated measures design. Talking about emotions likely promotes the integration of language and emotion regulation. In addition, emotion language might be considered a regulatory behavior in and of itself. Participation in recurrent conversations about emotions should lead children to verbalize their emotions in real life situations and, furthermore, support their skill at generating verbally mediated strategies to manage emotions. In fact, language has been considered a tool for organizing experience directly through self-directed verbalizations meant to guide behavior and indirectly through shaping one's thoughts, feelings, and behavior about situations (Vygotsky, 1962). Conscious reflection on internal experience, its causes, and potentials for action likely contribute to children's ability to interrupt emotional action tendencies and flexibly choose an appropriate response (Stegge & Terwogt, 2007). Parent and child communication about emotions is believed to be particularly important for children in emotional situations because language can provide a 'pause' of sorts that allows children to think about, instead of act on, their environment in ways that could potentially be disruptive and maladaptive.

As mentioned earlier, although research has shown that emotion language is associated with children's understanding of themselves, others, and of emotions generally, less is known about how emotion language influences children's *behavior* in frustrating situations. Laible and

colleagues have found that the quality of mother-child internal state language predicts concurrent and later behavior in a resistance-to-temptation task designed to measure children's conscience development (Laible, 2004a, 2004b; Laible & Thompson, 2000). In a similar vein, positive associations have been found between emotion conversations and child positive affect in school (Denham et al., 1992), empathic behavior (Garner, 2003), and likability (Fabes, Eisenberg, Hanish, & Spinrad, 2001). However, the mechanisms by which talking about emotions facilitates developmentally and socially appropriate behavior are largely unknown, and yet it is these mechanisms that hold promise for intervening on behalf of children and families to foster prosocial and well-regulated behavior.

If children can verbalize their needs and problems, they may be more likely to reflect on their behavioral options and to behave appropriately. However, evidence to this effect is slim. In addition, in early prevention programs, for example, children are taught to label and talk about the causes and consequences of their feelings, as well as verbally explore ways of handling frustrating situations and problematic social interactions (Bierman et al., 2008; Havighurst, Harley, & Prior, 2004; Izard et al., 2008). Although it is clear that basic comprehension and production skills are required for understanding and using strategies, we do not know how emotion language and strategy understanding influence self-regulation in emotional situations. Because interventions often consist of a number of interrelated components, the unique effect of using emotion talk is uncertain. Similarly, cognitive therapies help clients identify and alter negative self-talk, producing therapeutic change (Kendall & Treadwell, 2007). However, it is unclear how children generalize lessons about emotion and strategy understanding to managing anger during frustrating situations.

Mother emotion talk as a predictor of child emotion talk. There is considerable evidence that maternal emotion language predicts young children's use of emotion language (e.g., Cervantes & Callanan, 1998; Denham et al., 1992; Garner et al., 1997). This work is consistent with Vygotsky's (1962) assertion that conversations between children and adults are necessary for the development of self-regulation; these dialogues support the mastery of acts that a child cannot yet achieve independently. Emotion language enables children to transform implicit emotional processes into objects of thought that can be discussed, explored, shaped, and changed (Bartsch & Wellman, 1995; Taumoepeau & Ruffman, 2006). Emotion language, therefore, may be one means by which parents help children develop the tools to think about feelings and to coordinate their needs with those of others and social constraints (Kopp, 1989; Thompson, 2006).

Children's emotion talk as a predictor of strategy understanding. Although there are no published studies that examine whether emotion language predicts later emotion regulation strategy understanding, the literature on the relations between emotion references and socio-emotional understanding (e.g., Ensor & Hughes, 2008; Laible & Song, 2006; Martin & Green, 2005; Mcquaid et al., 2008; Ruffman et al., 2002; Taumoepeau & Ruffman, 2006, 2008) suggests that children's emotion language may be predictive of later strategy understanding. As children becoming increasingly proficient in understanding and using emotion language, they likely develop a conceptual framework for understanding their own and others' emotional experience. Along with information about emotional identification, situation-knowledge, and perspective-taking, this framework should also include an awareness that emotions are continually changing and that there are behaviors that serve to modulate emotions so that one's

goals can be fulfilled. Children's emotion language may explicitly and concretely draw attention to emotional experience and the strategies that can be used to change these experiences.

Relations between strategy understanding and regulatory behavior. The developmental associations between strategy understanding and emotion regulation are unclear. A strength of this study was the ability to examine the direction of effects between strategy understanding and emotion regulation. Two pathways are implicated: (1) strategy understanding predicts regulatory behavior, and (2) regulatory behavior predicts strategy understanding.

Children's strategy understanding as a predictor of regulatory behavior. Over time, children increasingly understand the possibility that emotions can be purposefully changed (Terwogt, & Olthof, 1991). Although knowledge of regulatory strategies may not automatically translate into effective implementation without parental guidance, it would seem that preschoolers who can recognize which strategies will be more or less effective in regulating negative emotions are at an advantage when situations arise that require the regulation of distress.

Regulatory behavior as a predictor of strategy understanding. Alternatively, it may be the case in early childhood that behavior leads to awareness. Perhaps children come to reflect on emotions only after they have some experience modulating them. Thus, with increasing abilities in talking about emotions and regulating them, children eventually develop the self-awareness that they are using strategies that change their emotions.

Regulatory behavior as a predictor of anger expression. Children manage anger in a number of ways depending on the features of the situation (Dennis et al., 2009). During potentially frustrating situations when children have to wait for a desired item in the presence of their mother, the use of support-seeking and distraction has the potential to modulate anger

expression by forestalling anger (longer latency to anger) or minimizing the extent of an angry reaction (shorter duration, less intensity). One way young children deal with frustration is to seek the aid of an adult about the problem they face (Eisenberg & Fabes, 1992; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Grolnick, Bridges, & Connell, 1996; Rothbart, Ziaie, & O'Boyle, 1992). Support-seeking is thought to be an important stepping stone toward self-reliance and has been observed in children as young as age 12 months (Grolnick et al., 1996; Rothbart et al, 1992). However, a more self-reliant behavior that is frequently associated with less anger is distraction or shifting attention away from an emotion-eliciting source (e.g., a desired but restricted object). A child's use of distraction is associated with less anger even in toddlers (e.g., Calkins & Johnson, 1998) although its effectiveness appears to be temporary (Buss & Goldsmith, 1998). It is also linked to reduced anger in preschool and school age children (e.g., Gilliom et al., 2002; Reijntjes et al., 2006), and it is in the preschool years that distraction clearly contributes to increased latency to anger (Cole et al., 2011). On the other hand, when children's goals are blocked and they must handle this frustration in the absence of mother, persistence in trying to overcome the obstacle, later referred to as "attempting to fix" the situation, is thought to be the developmentally appropriate behavior (e.g., Compas, Connor-Smith, Saltzman, Thomsen, &Wadsworth, 2001). Between ages 2 and 3 years, there is a notable change in children's behavior when frustrated; 2-year-olds tend to become aggressive and disruptive when frustrated, whereas 3-year-olds engage in goal-directed actions that are context appropriate even when frustrated (Cole et al., 2009).

Current Study

As a preliminary analysis, mother and child use of internal state language was examined to gain a basic understanding of how this talk differs as a function of internal state category (i.e.,

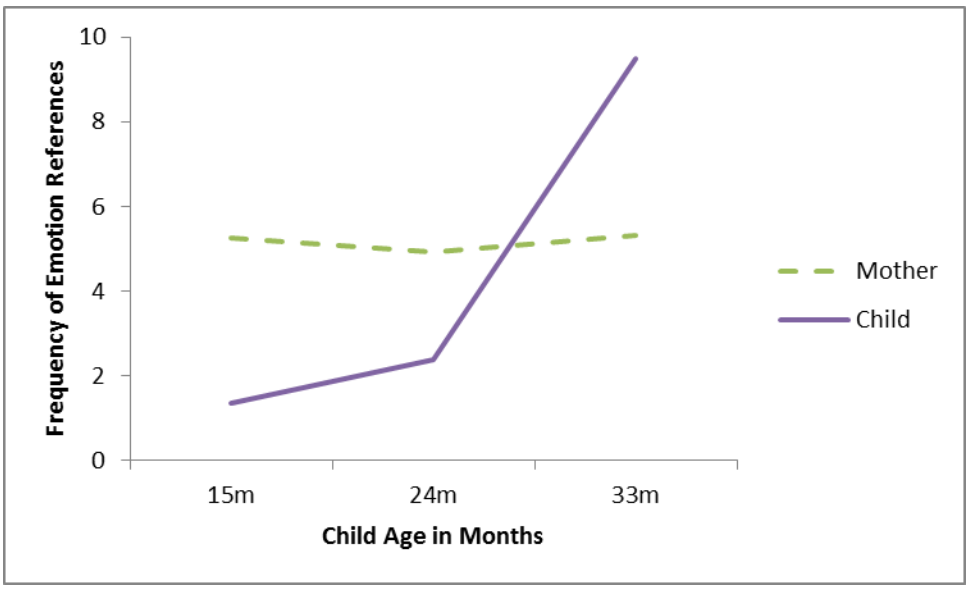
desire, perception, cognition, and emotion terms) and child age. The major aims of the current study were to: (1) describe the developmental change in mother and child emotion language from 18 months to 5 years of age as a function of selected child and parent characteristics, in a sample of economically strained American children, who are known to receive less language input and to have less well developed language skills than children from middle- and upper-income families (Hart & Risley, 1995), and (2) examine the relations among emotion language, emotion regulation strategy understanding, and emotion regulation from toddlerhood to age 5.

In terms of developmental change in mother and child emotion language, it was expected that mothers would increase their use of emotion terms until children began acquiring this language themselves, at which time, mothers' amount of emotion references would decrease. It was also expected that children in the current study would use little to no emotion language at 18 months, but between 24 and 36 months, there was expected to be rapid growth in children's emotion language, which would then plateau between 48 months and 5 years of age (see Figure 1). It is hypothesized that mothers' emotion talk during toddlerhood would predict the amount and growth of children's own emotion talk. In addition, selected child characteristics were hypothesized to influence the amount of emotion talk in the following ways: (a) with respect to temperamental characteristics, children rated higher in negative emotionality, those rated higher in surgency, and those rated lower in effortful control would use less emotion language, but their mothers would use more emotion language; (b) in terms of child gender, girls were expected to use more emotion language and have mothers who used more emotion language with them, compared to boys; and (c) child language ability during toddlerhood was expected to be positively related to both mother and child emotion talk. The selected parent and family factors were hypothesized to influence the amount of emotion talk in the following ways: (a) maternal

sensitivity was expected to be positively related to both child and mother emotion references; (b) maternal education was expected to be positively associated with child and mother emotion references; (c) family income was expected to be positively related to emotion talk; and (d) birth order was expected to be negatively related to emotion talk. Because there is minimal literature to guide hypotheses about how the selected child and parent factors influence *growth* in emotion talk, the selected factors would be expected to predict growth in ways that are consistent with the hypotheses made for amount of emotion talk.

In order to understand the relations among emotion language, emotion regulation strategy understanding, and emotion regulation, two models were tested (one for each challenging task). There was no reason to expect the relations among factors would vary by task, so the hypotheses were the same across tasks. Based on information gained from Aim 1 about the appropriate age-points to use, a hypothesized mediation model for Aim 2 was tested, such that mothers' emotion talk predicted children's emotion talk, which in turn predicted children's strategy understanding and children's self-initiated regulatory attempts, which then predicted children's anger expression during a frustrating task. In addition the direction of effects between strategy understanding and regulatory behavior were examined (see Figure 2).

A. New Zealand Sample



B. Pennsylvania Sample

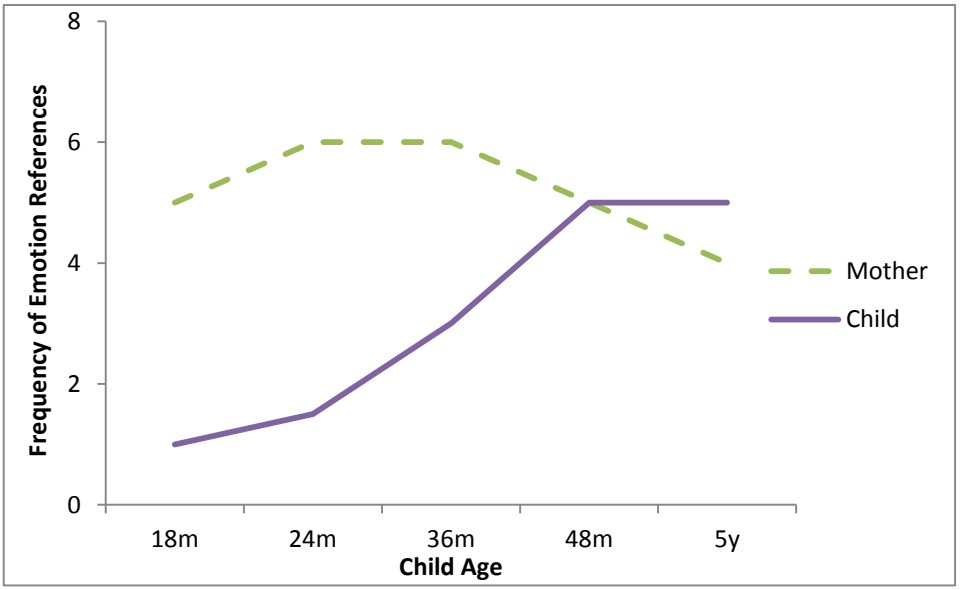


Figure 1. The development of mother and child emotion talk across two cultures.
(A.) New Zealand; Mixed SES sample (Taumoepeau & Ruffman, 2006, 2008).
(B.) Hypothesized Growth Curve for United States (Central Pennsylvania); Economically-strained sample (Current Investigation)

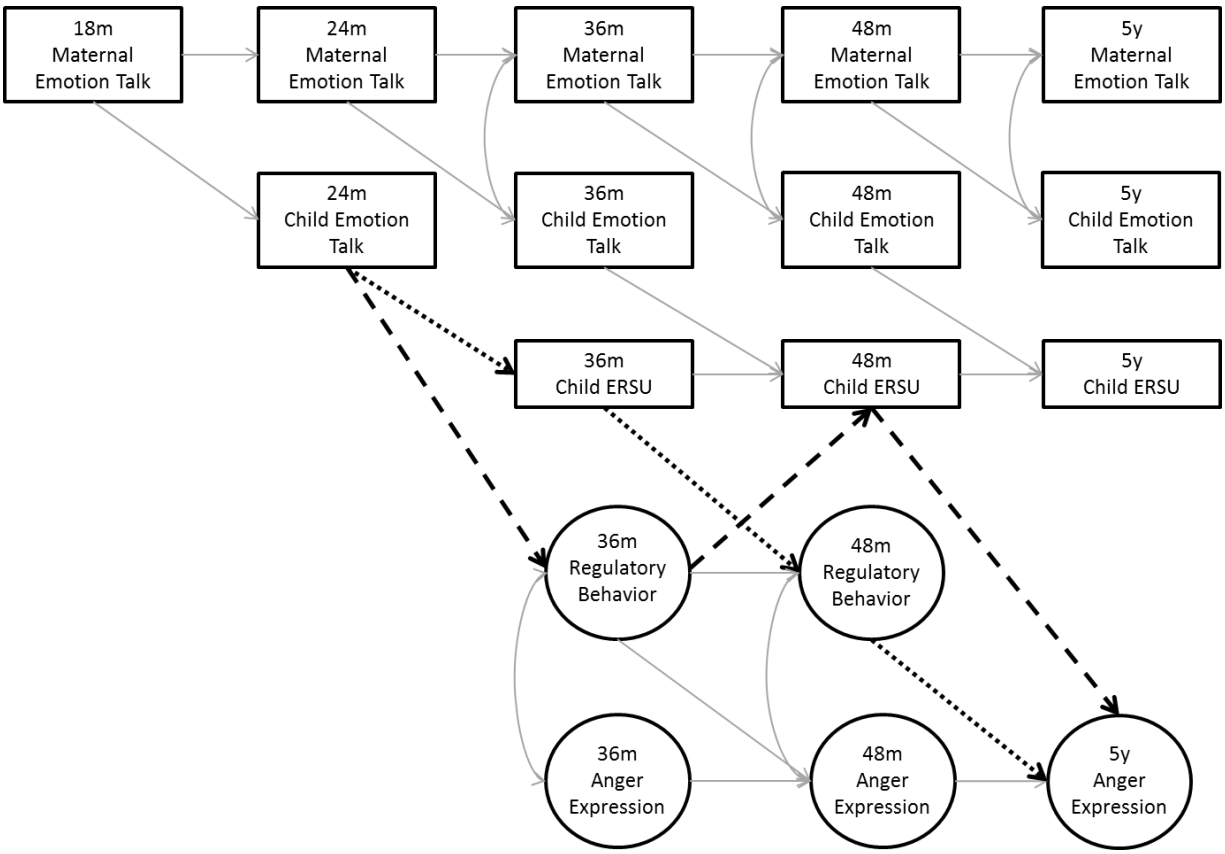


Figure 2. Hypothesized relations among emotion talk, emotion regulation strategy understanding (ERSU), regulatory behavior, and anger expression across time.
Note. The light gray paths represent the baseline model. The paths indicated by dotted lines represent the ERSU to regulatory behavior pathway (path 1), whereas the paths indicated by dashed lines represent the regulatory behavior to ERSU pathway (path 2).

Chapter 2. METHOD

Design Overview

Data were drawn from Pamela Cole's Development of Toddlers Study (DOTS; Cole, Crnic, Nelson, & Blair, 2000). Families were assessed every six months through a combination of naturalistic home observation (at child ages 18-, 30-, 36-, 42-months) and structured laboratory visits (at child ages 18-, 24-, 36-, 48-months, and 5 years). Only tasks and measures relevant to the present study are described.

Recruitment Procedures

Families with a young child (younger than 18 months) and who lived in specific regions of a semi-rural city in the Northeast, known to have large numbers of young families with incomes at or below the national median income, were recruited to participate in the Development of Toddlers Study (D.O.T.S.), a longitudinal project investigating the development of emotion regulation between child ages 18 months and 5 years (Cole et al., 2000). The study further focused on sampling families with a range of income that was just above the U.S. government's definition of poverty but below or near the community median income. To recruit families of 18-month olds whose income placed them above the U.S. government's definition of poverty but below the community median income, several strategies were used: (1) Community Leader Contacts (e.g., Clergy, daycare providers and preschool administrators, medical practices, and local officials were contacted to discuss the study and solicit their support for distributing and posting flyers), (2) Community Events - project staff attended and distributed flyers at community events, such as health fairs, town festivals, and Head Start fairs, (3) Letter Campaign - From birth announcements published in local newspapers, families were contacted by letter and then called to see if they were interested in the project, and (4) Word-of-Mouth of Enrolled

Participants - Enrolled families recommended friends and family members with an 18-month old by supplying names, addresses, and phone numbers. Project staff then proceeded to contact potential participants through methods specified in the letter campaign.

After families expressed interest in the project, they participated in a two-step phone interview, conducted by research assistants. Advanced undergraduate and clinical graduate students, who were blind to the objectives of the study served as research assistants. The first step was designed to assess whether the family met eligibility criteria. Once it was determined that the family met study requirements, research assistants conducted an enrollment interview during which family and demographic information was collected.

During the first phone interview, families were asked a series of questions to determine (a) whether they met eligibility requirements for household income, maternal education, child age, and legal guardianship, and (b) whether there were any exclusionary criteria (e.g., family planned to move from the area, child had handicaps that would interfere with procedure administration, child had serious medical or psychological disorder that with interfere with administration, child did not live with current guardian since 3 months of age).

Enrollment Procedures

After determining family eligibility, families were asked several questions regarding family and demographic status. Specifically, families were asked questions about family composition, family racial/ethnic status, child care history, highest level of parental education achieved, religious affiliation, parental employment, and salary information. Because of the longitudinal nature of the study, the names, addresses, and numbers of two individuals who would know how to get in contact with the enrolled family were also gathered. Recruitment led to the enrollment of 128 families. Of this initial group, three families did not meet financial

criteria, and one family withdrew before completing 18-month data. Therefore, 120 families remained enrolled in the study through the 48-month lab visit. However, 21 families decided not to participate after the completion of the 48-month visit, as the 5-year visit was an additional time point beyond what the families had agreed to initially.

Participants

The present study sample included 99 families who remained enrolled in the study through the 5-year lab visit. The 54 boys and 45 girls were seen within two weeks of their half or full birthday from the 18-month visit through the 48-month visit, and when they were 5.15 years old on average (SD=.36). Mean income to needs ratio at T1 (i.e., child age 18 months) was 2.33, indicating that families were above the poverty threshold (ITNR=1) but nonetheless below the national averages. These economically strained families were studied because they represent the families that are served by our rural community mental health center and to whom we offer prevention and intervention services that draw heavily on the use of language to promote child emotional competence. This population is known to have unmet mental health needs and yet is much less studied than families who are advantaged or living in poverty. Understanding how these children come to use language in the service of emotion regulation is particularly important given that families with lower socioeconomic status are known to talk less and the language that they do use is typically less complex.

In terms of racial identity, 93% of children were identified as White by their mothers, and 7% were biracial, which is consistent with the demographics of the area. At the start of the study, mothers were 30.86 years old on average (SD=5.63) and fathers were 32.57 years old on average (SD=6.20). Mother and father educational status at child age 18 months was as follows: 19.2% of mothers and 30.8% of fathers completed high school, 14.2% of mothers and 9.2% of fathers

participated in vocational school, and 64.2% of mothers and 54.2% of fathers had taken at least some college courses. In addition, 29.2% of mothers were unemployed or stay-at-home mothers, 30.8% worked part-time, and 40% worked full time. On the other hand, 90% of fathers worked full-time. In terms of birth order, 43.5% of these children were first-born, 39.5% were second-born, 12.1% were third-born, and 4.8% were the fourth- or later- born. The average household annual income (all sources) at 18 months was $40,500 (SD=14,480.73), whereas the average household per capita income at 18 months was $10,881 (SD=4,279.15).

Procedures and Measures

For each lab visit, mothers and children came to the lab in the Child Study Center for approximately 3 hours. During the laboratory visits mothers and children participated in a variety of tasks designed to assess children‘s emotional and cognitive functioning, and the quality of mother-child interactions. All lab visits were video-taped.

The home visits were scheduled by the project coordinator during a time in which most family members could be present and when the target child was alert. Families were told that the object of this home visit was to observe the target child in the natural setting of the family's home, paying special attention to toddler's emotion and language use. Additionally, the coordinator explained that the family should engage in activities as they would normally. Upon arrival at the home, the research assistant answered any questions about the visit or the project and then obtained written parental consent. The research assistant then observed and coded the child and the child's mother and father using the Parent-Child Interaction Rating System (Belsky, Crnic, & Woodworth, 1995). At the end of the home visit, parents were financially compensated and given packets of questionnaires on family, marriage, and child functioning

(including the Toddler Behavior Assessment Questionnaire-Revised used in the present study) to complete.

Internal state language (18mo, 24mo, 36mo, 48mo, 5 years). Transcripts were made from the video recordings of all the lab visits (MacWhinney, 2000). Only transcripts from a 5-minute reading task were used to code internal state language. In this task, the mother and child are asked to tell the stories implied in wordless picture books about a frog's adventures (Mayer & Mayer, 1975). These stories were chosen because they tend to elicit conversations about internal states, but talk about feelings is not necessary for the completion of the task. Mothers were simply told that they had 5 minutes to read with their child. This reading procedure is often used to prompt spontaneous mother-child conversations about emotion (Greenberg & Crnic, 1988).

Internal state language was coded using an adaptation of Dunn and Hughes' (2005), Inner State Coding Manual. All instances of explicit internal state references were identified and assigned to the following categories: (a) desire, (b) emotion, (c) perception, and (d) cognition. Next references were coded in terms of who made the reference (i.e., speaker), who was addressed (i.e., addressee), and to whom the inner state term referred (i.e., referent). In addition, the type of inner state references was coded, such that each internal state reference was assigned to one of the following categories: (a) statement about a genuine mental state, (b) question about a genuine mental state, (c) conversational filler, (d) directing interaction, (e) contrastive, (f) explanation, (g) prediction, (h) suggestion/question about desired activity, and (i) other.

Undergraduate research assistants who were naive to the study objectives coded internal state language. The coding team was trained to 90% accuracy with the author of this study, under the supervision of the principal investigator (Dr. Pamela Cole) and in consultation with one of

the developers of the coding system (Dr. Judy Dunn). Once trained, coders were randomly assigned transcripts to code for internal state language. Inter-rater reliability among internal state coders was calculated on 20% of the transcripts. The average kappa across ages for category was $\kappa = .97$ (range .94 - .99), for referent was $\kappa = .93$ (range .91 - .96), and for type was $\kappa = .73$ (range .70 - .78). The average interclass correlation across ages for the frequency of internal state references was ICC = .98 (range .96 - .99). For the present study, the frequency of internal state references per category was examined, with a specific focus on the frequency of emotion references said by the mother and child.

Child emotion regulation strategy understanding (36mo, 48mo, 5 years). A puppet procedure was conducted during the lab visit to assess children's understanding of emotion regulatory strategies. The procedure began with a warm-up period, where children were encouraged to interact with the puppets. Three cloth puppets (Red, Brownie, and Mom) were used to enact sad and angry vignettes. The reasons for the puppets' emotions and for needing to 'stop' feeling so angry or sad were enacted for the child. This language was used based on work by Denham (1997) showing that it is effective in facilitating understanding of emotion regulation in young children.

One research assistant was the puppeteer and a second assistant sat next to the child, helping the child understand the story and the instructions. Each vignette ended with the puppets turning to the child and directly asking, '[Child's name], what can we do to stop feeling so [target emotion]?' The child then had the opportunity to make suggestions to the puppets; from these spontaneous suggestions, strategy generation was coded. Puppet Generation coders were undergraduate research assistants who were blind to the objectives of the study. All coders were trained by an advanced graduate student, under the supervision of the principal investigator (Dr.

Pamela Cole). Training included demonstrations by the first author and use of the Emotion Regulation Strategy Understanding Manual. Once trained, coders were semi-randomly assigned to puppet procedures, ensuring that no coder sequentially watched or coded tapes of the same subject from two adjacent time points. Inter-rater reliability among strategy generation coders was calculated on 20% of the transcripts. The average kappa across ages for the effectiveness of the strategies generated was $\kappa = 0.88$.

After the child had the opportunity to spontaneously generate regulatory strategies for the puppets, each puppet verbalized a strategy, one effective and appropriate strategy derived from the literature on emotion regulation and one parallel strategy that is regarded under ordinary circumstances as socially undesirable or less effective. Pictorial representations were used to illustrate mental strategies and the puppets enacted behavioral strategies. The order of the strategy pairs began with an effective strategy for half the children and an ineffective one for the other half. For each pair of strategies, the child was asked to tell the puppets which strategy was the best. The child could respond by speaking or pointing to a puppet or picture. Children's choices for the "best" thing to do of the pairs generated by the puppets were recorded by the assistant during administration. The child's selection of the better strategy was scored as recognition of an effective, appropriate strategy.

The number of effective strategies that the child generated and recognized for each vignette were used for the current investigation.

Child use of purportedly effective regulatory behaviors (36mo, 48mo). These were coded from videotapes of the Locked (transparent) Box procedure from the laboratory temperament assessment battery (LabTab; Goldsmith & Rothbart, 1996) and a boring Wait Task, during the lab visit.

Locked box. This task is designed to elicit anger-related emotions in young children. The box was a large, clear, acrylic box, with a metal lock. The child was shown two figurines and allowed to select one. This figurine was then placed in the box and the box was locked. The child was then shown how to open the lock with a set of two keys. The child was allowed to practice opening the lock and the box. The assistant then told the child that she needed to do something in another room and would be back shortly. The child is told, 'I'm going to find your mom. I will let you work on that for a while. When you open the box, you can play with the toy inside.' To elicit frustration, the task then requires the assistant to hand the *wrong* set of keys to the child, without the child realizing a switch was made. The child is left to try to open the locked box for 3 minutes. Upon her return, the assistant asked the child whether the box was opened and asked why the child could not open the box (to check whether the child realized that the wrong keys were given).

For the 5-year lab visit, the procedure was modified slightly to minimize the likelihood that children would remember the task. Therefore, in the 5-year visit, children were given a knotted sack to open. Children were shown a knotted sack and told that there was a prize in the sack for them. The research assistant demonstrated how to untie the sack, but the sack was empty. The child was then given a tightly knotted sack with the prize inside and told that he/she should untie the sack to get the prize. The child is left to try to open the sack for 3 minutes. Upon her return, the assistant asked the child whether the sack was opened and asked why the child could not open the sack.

The coding was done through an independent, time-linked assessment of several behaviors, including regulatory behaviors. In the same 1-second epochs, an independent team coded 10 child behaviors typically studied in emotion regulation studies. For the present study,

the following behaviors were used: (1) attempt to fix (i.e., behaviors where the child is persisting at trying to open the box with the keys) and (2) attempt to fix-alternative (i.e., behaviors where the child is trying to open the box with some alternative, non-disruptive method).

The coding team was trained to 80% accuracy with master coders; once trained, 15% of cases were checked for reliability at random times. For the current investigation, only non-disruptive, self-initiated behaviors were examined. The average kappa across ages was $\kappa = .83$ (range = .70 - .96). Bout frequency (number of discrete sets of continuous epochs of given behavior), latency to first bout, and average bout duration for each behavior were obtained.

Wait task. Children were observed during a boring 8-minute wait, often used to observe child self-regulation (e.g., Dennis, 2006; Kochanska, Murray, Jacques, Koenig, & Vandegeest, 1996). Each mother was instructed to tell her child that the child must wait to open a gift until she finished her work (adapted from Vaughn, Kopp, & Krakow, 1984). Waiting is frustrating for typical children in the ages studied (e.g., Cole et al., 2011; Cole, Teti, & Zahn-Waxler, 2003). The task was administered in the following manner at each age point. First, mothers were briefed in advance to avoid mothers laughing and in that way inadvertently inserting humor into a frustration situation for the child. Then, the RA gave the mother "work" (questionnaires) and the child a boring toy: a small toy car with missing wheels (36 months) and a toy horse with missing legs (48 months). After that, the RA placed a shiny gift-wrapped bag, tied tightly with a ribbon, on the child's table, saying "This is a surprise for you." As the RA left, the mother told the child to wait until she finished her work to open the gift. After 8 minutes, the RA returned and the mother let the child open the gift.

The coding was done through an independent, time-linked assessment of several behaviors, including regulatory behaviors. In the same 1-second epochs, an independent team

coded 10 child behaviors typically studied in emotion regulation studies. For the present study, two were used: (1) distraction, which was further distinguished as either (a) focused, i.e. child became absorbed in alternative activity or (b) unfocused, i.e. child diverted attention from focus on challenge but did not become absorbed in an alternative activity, and (2) bids to mother about the challenge also referred to as support-seeking (e.g., "Mom, are you almost done?" or "I wonder what's in it"). It should be noted that unfocused distraction was not used in this study. Each behavior was classified as either initiated by the child, compliant with mother's directive, or disruptive. For the present study, only non-disruptive, self-initiated behaviors were examined. The average kappa across ages was $\kappa = .82$ (range = .73 - .91.). Bout frequency, latency to first bout, and average bout duration were obtained for each behavior.

Child anger expression (36mo, 48 mo, 5 years). Anger expression was coded during the Locked Box/Knotted Sack and Wait Task (as described above) through a system that involved an independent, time-sensitive assessment of emotion expressions. To determine the total amount of anger displayed and its temporal qualities, emotion expressions in 1-second epochs were coded. Although anger was the focus of this study, sad, anxious, and calm emotional expressions were coded as well. Each emotion was coded in terms of its presence and intensity (except neutral) in each 1-second epoch. Emotion expressions were inferred from facial (brow and mouth movements), vocal, and select postural/gestural cues (Cole, Zahn-Waxler, & Smith, 1994).

The average κ for emotion = .88 (range = .81 - .94). For analyses, the following variables for anger were created: bout frequency (number of discrete sets of continuous epochs of given emotion), latency to first bout, average bout duration, and average bout intensity.

Child temperament (18mo, 30mo). Child temperament was assessed using the Toddler Behavior Assessment Questionnaire-Revised (TBAQ-R; Goldsmith, 1996) when the child was

18 and 30 months old. The TBAQ-R is a 105-item questionnaire designed to assess temperament-related behavior in children 16-36 months of age by asking the parent to report on the child's reactions to a number of situations. The TBAQ-R was administered to the primary caregiver, who was asked to indicate how often she observed the toddler engage in each behavior, rating the frequency on a 7-point scale, ranging from never to always. This measure has the following subscales: activity level, anger, attentional focusing, attentional shifting, high pleasure, impulsivity, inhibitory control, low pleasure, perceptual sensitivity, pleasure, positive anticipation, sadness, social fearfulness, and soothability. These scales are combined to derive three factors: Negative affectivity (i.e., anger, sadness, social fearfulness, and soothability-reversed), Effortful control (i.e., attentional focusing, attentional shifting, inhibitory control, low pleasure, perceptual sensitivity), and Extraversion/Surgency (i.e., activity level, high pleasure, impulsivity, positive anticipation, and social fearfulness-reversed). Internal consistency reliability estimates (alphas) for the three factors range from .77 to .81. For the analyses that follow, each child's mean score on the Negative affectivity, Effortful Control, and Extraversion/Surgency factors was used.

Child language status (18mo, 36mo). In order to assess child language status at 18 months, mothers completed the MacArthur Communicative Development Inventory – Words and Gestures (CDI; Fenson et al., 1993) during the laboratory visit. The CDI is an 889- item form on which mothers indicate how many gestures, words, and phrases the child understands and uses. Although the children were 18 months of age, the Words and Gesture form, which is normed up to 16 months of age, was used. The reason for using this form was that the CDI was normed on children from advantaged households; however, the children in this sample are from homes in which geographic isolation and economic strain are prominent features of their

environment. Because the CDI – Words and Gestures was not normed for 18 month olds, only raw scores are used in the analysis. For the analyses, the vocabulary comprehension and production scores, which have alphas of .95 and .96, respectively, were used.

To assess child language status at 36 months, the Clinical Evaluation of Language Fundamentals 3 (CELF-3, Semel et al., 1995) was administered at the 36-month lab visit. The Grammatical Understanding standard score was used.

Parent education. Maternal education was assessed through self-report during the initial enrollment interview, which was conducted by the project coordinator. Each parent was asked to report the highest level of education received. Education level was rank-ordered on a scale from 1-7, such that "some high school" received the lowest ranking and "earned an advanced degree" received the highest ranking.

Sensitive parenting (18mo, 30mo). Maternal sensitivity was assessed during the 18- and 30-month home visit using a coding system, developed by Belsky and colleagues (1995), called the Parent-Child Interaction Rating System. In this procedure, the observer watches the family for 10 minutes and then makes ratings during the following 5 minutes. These rating periods characterize the quality of parenting as seen during the previous 10 minutes on a 5-point scale. Each parent who was present was rated on the degree of: (a) sensitivity and (b) positive affect that they exhibited. This pattern was repeated six times at each home visit yielding 60 minutes of rated observations. The home visitors were advanced undergraduate and graduate research assistants who received approximately three months of training, which included instruction, demonstrations, use of videotapes from other studies, and practice during live observations. The initial home observers were trained by Keith Crnic (co-author of the coding system) and subsequent home observers were trained by master coders from the initial group. All observers

were unaware of the study aims. Due to logistical constraints, the observers were not randomly assigned to home visits. Reliability criteria for training were defined as a minimum of 70% exact agreement and 95% agreement within one scale point (against a master coder) on the 5-point rating scales. To ensure cross-rater reliability and to avoid observer drift, consensus ratings were regularly conducted on videotaped home observations. Reliability was calculated from 7% of the home visits: 70% of ratings were an exact match and 98% were within one-point. In order to reduce variables for the analyses, a mean sensitivity score was created for the mother at each time point representing the average ratings across all six epochs.

Chapter 3. RESULTS

Overview of Analyses

Before testing predictions, all variables were examined for outliers and for skew and kurtosis in the distributions that might compromise assumptions of parametric statistics. For skewed distributions, transformations were conducted to improve distributions. In order to ensure that effects were not masked by the constraints of the larger models (i.e., LGCM and SEM), zero-order correlations are presented before each model.

Latent growth curve and structural equation models were tested using Lisrel 8.8 (Joreskog & Sorbom, 2008) and executed with covariance matrices of observed variables, using THEIL (Molenaar, 1996), a FORTRAN program for robust covariance matrix estimation. It improves the condition of a covariance matrix while leaving its underlying structure intact. The fit for each model was assessed using chi-square statistics and two common indices of practical fit: RMSEA (Browne & Cudeck, 1993) and CFI (Bentler, 1990). Path coefficients (beta-weights) were used to evaluate the strength of association for each path and direction of effects. To test for mediation, the joint significance test was used instead of the Sobel test, which tends to be overly conservative (Shrout & Bolger, 2002). The joint significance test states that if the effect of the predictor on the mediator is significant and the effect of the mediator on the outcome is significant after controlling for predictors, criteria for mediation are met (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002).

Preliminary Analyses

In addition to inspecting potential outliers and the suitability of distributions for parametric statistics, the selected child and parent factors hypothesized to influence mother and child emotion language were examined. The means and standard deviations for the child factors,

including child birth order, child language ability at 18m and 36m, child surgency at 18m and 30m, child negative emotionality at 18m and 30m, and child effortful control at 18m and 30m, are shown in Table 1, separated by child gender. In addition, the means and standard deviations for the maternal factors, including education and sensitivity at 18m and 30m are shown in Table 2, separately for child gender. Finally, the Pearson product-moment (two-tailed) correlations among the child and parent factors are presented in Table 3.

Table 1
Child Birth Order, Language Ability, Surgency, Negative Emotionality, and Effortful Control by Child Gender

	Boys			Girls				Total		
	M	SD	N	M	SD	N	*p* <	M	SD	N
Birth Order Range (1-5)	1.74	0.80	65	1.87	0.94	55	*ns*	1.80	0.87	120
Language 18m Range (15-717)	300.47	132.77	62	334.80	149.82	55	*ns*	316.61	141.47	117
Language 36m Range (0-20)	11.43	4.65	63	12.04	4.67	53	*ns*	11.71	4.65	116
Surgency 18m Range (1-7)	4.61	0.54	64	4.53	0.61	54	*ns*	4.57	0.57	118
Surgency 30m	4.74	0.57	61	4.54	0.60	53	.10	4.65	0.59	114
Negative Emotionality 18m	3.43	0.54	64	3.47	0.57	54	*ns*	3.45	0.55	118
Negative Emotionality 30m	3.49	0.55	61	3.65	0.53	53	*ns*	3.57	0.54	114
Effortful Control 18m	4.44	0.59	64	4.60	0.52	54	*ns*	4.51	0.56	118
Effortful Control 30m	4.67	0.58	61	4.88	0.56	53	.10	4.77	0.58	114

Table 2
Maternal Education and Sensitivity by Child Gender

	Boys			Girls				Total		
	M	SD	N	M	SD	N	*p* <	M	SD	N
Maternal Education Range (0-6)	3.58	1.68	65	3.67	1.73	55	*ns*	3.63	1.70	120
Maternal Sensitivity 18m Range (1-5)	3.40	0.83	65	3.22	0.76	55	*ns*	3.32	0.80	120
Maternal Sensitivity 30m	2.83	0.84	64	3.18	0.82	55	.05	3.00	0.85	119

The average household income (M=40,459.70, SD=14,170.93) yielded a mean income-to-needs ratio (INR) of 2.32. This indicates that the families were above the national poverty threshold (INR = 1) but below middle class (INR = 3). Because language input varies by socioeconomic status (Hart & Risely, 1995; Hoff-Ginsberg, 1991), this sample permitted examination of language related effects without the additional correlates, associated with poverty and economic advantage that may confound or overwhelm language effects. That is, potentially nuanced developmental processes can be studied without being overwhelmed by the deleterious factors related to living in poverty or the advantageous factors that come with middle or higher income status. In addition to variability in child language use (see Table 1), the constraint of family income yielded a distributed range of maternal educational achievement. Specifically, maternal education ranged from approximately 3% of mothers who did not complete high school, 19% earned a high school diploma or GED, 4% attended a trade or vocational school, 10% completed trade/vocational school, 22% attended college, 37% earned a college degree, to 6% earned an advanced degree.

In regard to child gender, mothers exhibited similar levels of sensitivity toward sons and daughters at 18 months, but by 30 months, mothers were less sensitive with boys, $t(117) = 2.24$, $p < .05$. Also, two non-significant trends were noted for child temperament ratings. Mothers of boys rated them as having more surgency, $t(117) = -1.75$, $p < .10$, and less effortful control, $t(112) = 1.93$, $p < .10$, at 30 months. A partial correlation demonstrated that even after controlling for 30m surgency and effortful control, mothers of boys still appeared less sensitive at 30m ($r = -.20$, $p < .05$). Taken together, these results suggest that gender differences in parenting quality and reported temperament emerged by the time children reached 30 months of age.

Pearson product-moment correlations (two-tailed) were conducted to test relations among selected child, parent, and family factors (see Table 3). As expected, family income was positively related to maternal educational attainment, maternal sensitivity, and child language ability at 18m,

whereas family size (child birth order) was related to lower household income, less sensitive parenting, and more difficult child temperament (more negative emotionality, less surgency, and less effortful control) at 18m. In addition, better educated mothers were more sensitive parents and their toddlers had higher language skills. In terms of parenting quality, maternal sensitivity was relatively stable between 18m and 30m. More sensitive mothers described their children as having less negative emotionality and more effortful control; their children also had higher language skills.

Child language skills were stable between 18m and 36m. Early language skills were positively related to child surgency at 18m and effortful control at 18 and 30 months, and inversely related to child negative emotionality at 18m. Child temperament was relatively stable between 18 and 30 months; child negative emotionality was also inversely related to effortful control at both ages and to surgency at 18m, whereas effortful control was positively related to child surgency at 18m only.

Table 3
Relations among Parent and Child Factors

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Income	--													
2. Gender	.08	--												
3. Education	.31**	-.03	--											
4. Sensitivity 18m	.24**	.11	.43**	--										
5. Sensitivity 30m	.03	-.20**	.22*	.43**	--									
6. Birth Order	-.35**	-.08	-.04	-.27**	-.20*	--								
7. Language 18m	.18†	-.13	.23*	.28**	.27**	-.14	--							
8. Language 36m	.09	-.07	.22*	.24*	.20*	-.08	.33**	--						
9. Surgency 18m	.06	.07	-.12	.03	.11	-.16†	.31**	-.03	--					
10. Surgency 30m	.06	.16†	-.14	.01	.03	-.13	.01	.04	.46**	--				
11. Negative Emotionality 18m	-.13	-.03	.02	-.21*	-.18*	.18*	-.20*	-.04	-.22*	-.08	--			
12. Negative Emotionality 30m	-.14	-.14	.02	-.19*	-.21*	.16†	-.14	-.03	-.08	-.12	.69**	--		
13. Effortful Control 18m	.05	-.15	.05	.14	.27**	-.25**	.49**	.16†	.32**	-.01	-.39**	-.28**	--	
14. Effortful Control 30m	.09	-.18†	.05	.16	.28**	-.20*	.32**	.14	.28**	.10	-.33**	-.39**	.74**	--

† p< .10, * p < .05, ** p < .01 (two-tailed)

Mean Levels of Internal State Language over Time

As a first step, repeated measures analysis of variance (MANOVA) was used to assess changes in mother and child internal state language (ISL) categories. The means, standard deviations, and ranges for the frequency of maternal ISL over time are shown in Table 4a. There were significant effects of category, $F(3, 83) = 128.83$, $p < .001$, time, $F(4,82) = 4.09$, $p < .01$, and the interaction of category and time, $F(12,74) = 17.93$, $p < .001$. Specifically, at all ages, mothers used perception terms more than all other ISL terms, likely due to the task demands of book reading, e.g., saying "look at that" and "see it?" In addition, at child age 18 months, mothers used fewer cognition terms than all other categories of ISL, although at 24 months, mothers used more cognition than emotion terms. By 36m, 48m, and 5 years, mothers used fewer desire terms than all other ISL categories, and by 48m and 5 years, mothers used significantly more cognition than emotion terms.

Notable differences also emerged for mothers' use of each category over time. Compared to 18m, mothers used significantly fewer desire terms at 24m and at 5years. However, mothers' use of desire terms did not change significantly between ages 24 months and 5 years. Mothers' use of emotion terms varied across time, such that mothers used significantly fewer emotion terms at 24m compared to 18m, yet used more emotion terms at 36m, 48m, and 5 years than at 24m. With respect to perception, mothers used more perception terms at 18m than at 5 years and used more perception terms at 24m than at 48m or 5years. In addition, mothers used more perception terms at 36m and 48m than at 5 years. Finally, mothers used more cognitive terms at 36m and 48m than at 18m and 24m.

Taken together, these findings suggest that although mothers' use of perception terms was higher than all other categories of ISL over time, by 36m desire terms were used the least,

and by 48m mothers used cognitive terms more than both desire and emotion terms. It appears that 24m marked a turning point; after this age the relative levels of ISL categories shifted toward more sophisticated talk about emotions and cognitions (see Figure 3a).

Means, standard deviations, and ranges for the frequency of child ISL over time are shown in Table 4b. A repeated measures analysis of variance (MANOVA) yielded significant effects of category, $F(3, 87) = 4.72$, $p < .01$, time, $F(4,86) = 72.78$, $p < .001$, and the interaction of category and time, $F(12,78) = 5.08$, $p < .001$. For child ISL categories, significant differences emerged at 24m and at 5 years. Specifically, children used significantly fewer emotion terms than desire and perception terms at 24m; however, at 5 years of age, children used fewer desire terms than all other terms. As expected, across all categories, children used fewer ISL terms at 18m and 24m compared to later ages. Consistent with the literature on ISL, child emotion, perception, and cognition terms significantly increased between 36m and 5 years but desire terms declined (see Figure 3b). Taken together, these findings suggest that when their language skills are rapidly developing between 18m and 24m, children use desire terms most often in the wordless book task, perhaps because they are already using them to communicate their own wants and needs in everyday life. However, as their language skills become more advanced, they become more adept at referring to complex internal states like emotions and cognitions. As children get older, mothers may also use this task as a means of encouraging children's knowledge of internal states, bringing emotions and cognitions to the forefront of the task while reading the books.

Table 4a
Descriptive Statistics for Mothers' ISL by Category over Time

	Mean	SD	Min	Max	N
18m					
Mom Desire	3.90	3.00	0	15	115
Mom Emotion	3.88	3.97	0	18	115
Positive	0.91	1.35	0	6	115
Negative	2.92	3.33	0	17	115
Mom Perception	17.95	8.35	3	49	115
Mom Cognition	2.46	2.73	0	16	115
Mom Total	28.19	10.64	8	57	115
24m					
Mom Desire	2.82	2.43	0	14	119
Mom Emotion	2.37	2.94	0	18	119
Positive	0.79	1.42	0	11	119
Negative	1.55	2.20	0	10	119
Mom Perception	18.18	9.07	4	49	119
Mom Cognition	3.22	3.07	0	15	119
Mom Total	26.60	11.49	6	76	119
36m					
Mom Desire	3.07	2.89	0	18	117
Mom Emotion	5.62	5.18	0	29	117
Positive	1.47	1.66	0	9	117
Negative	3.85	3.90	0	20	117
Mom Perception	16.16	8.94	1	46	117
Mom Cognition	6.21	4.66	0	21	117
Mom Total	31.05	14.32	2	74	117
48m					
Mom Desire	2.99	2.78	0	14	115
Mom Emotion	5.61	5.47	0	32	115
Positive	1.70	2.20	0	14	115
Negative	3.70	3.71	0	18	115
Mom Perception	14.41	7.99	1	36	115
Mom Cognition	7.95	5.08	0	23	115
Mom Total	30.96	14.41	6	74	115
5 year					
Mom Desire	2.50	1.95	0	9	92
Mom Emotion	4.68	4.93	0	23	92
Positive	1.45	2.00	0	12	92
Negative	3.03	3.33	0	15	92
Mom Perception	11.24	7.06	0	37	92
Mom Cognition	7.68	5.25	0	25	92
Mom Total	26.11	13.01	1	63	92

Table 4b
Descriptive Statistics for Children's ISL by Category over Time

	Mean	SD	Min	Max	N
18m					
Child Desire	0.07	0.29	0	2	117
Child Emotion	0.05	0.26	0	2	117
Positive	0.04	0.24	0	2	117
Negative	0.01	0.09	0	1	117
Child Perception	0.05	0.22	0	1	117
Child Cognition	0.05	0.22	0	1	117
Child Total	0.22	0.51	0	3	117
24m					
Child Desire	0.42	1.57	0	15	120
Child Emotion	0.13	0.71	0	7	120
Positive	0.03	0.18	0	1	120
Negative	0.09	0.67	0	7	120
Child Perception	0.47	1.48	0	11	120
Child Cognition	0.16	0.80	0	8	120
Child Total	1.17	3.22	0	28	120
36m					
Child Desire	1.47	3.39	0	29	117
Child Emotion	0.68	1.42	0	8	117
Positive	0.24	0.77	0	5	117
Negative	0.44	1.01	0	5	117
Child Perception	0.97	1.60	0	9	117
Child Cognition	0.84	1.44	0	7	117
Child Total	3.96	4.27	0	29	117
48m					
Child Desire	1.18	1.95	0	12	116
Child Emotion	1.27	2.07	0	14	116
Positive	0.30	0.77	0	5	116
Negative	0.96	1.55	0	9	116
Child Perception	1.74	2.56	0	12	116
Child Cognition	1.20	1.58	0	8	116
Child Total	5.39	4.32	0	18	116
5 year					
Child Desire	0.67	0.90	0	4	92
Child Emotion	1.84	2.97	0	19	92
Positive	0.43	1.02	0	6	92
Negative	1.38	2.34	0	14	92
Child Perception	2.24	2.85	0	15	92
Child Cognition	1.49	1.78	0	8	92
Child Total	6.24	5.24	0	27	92

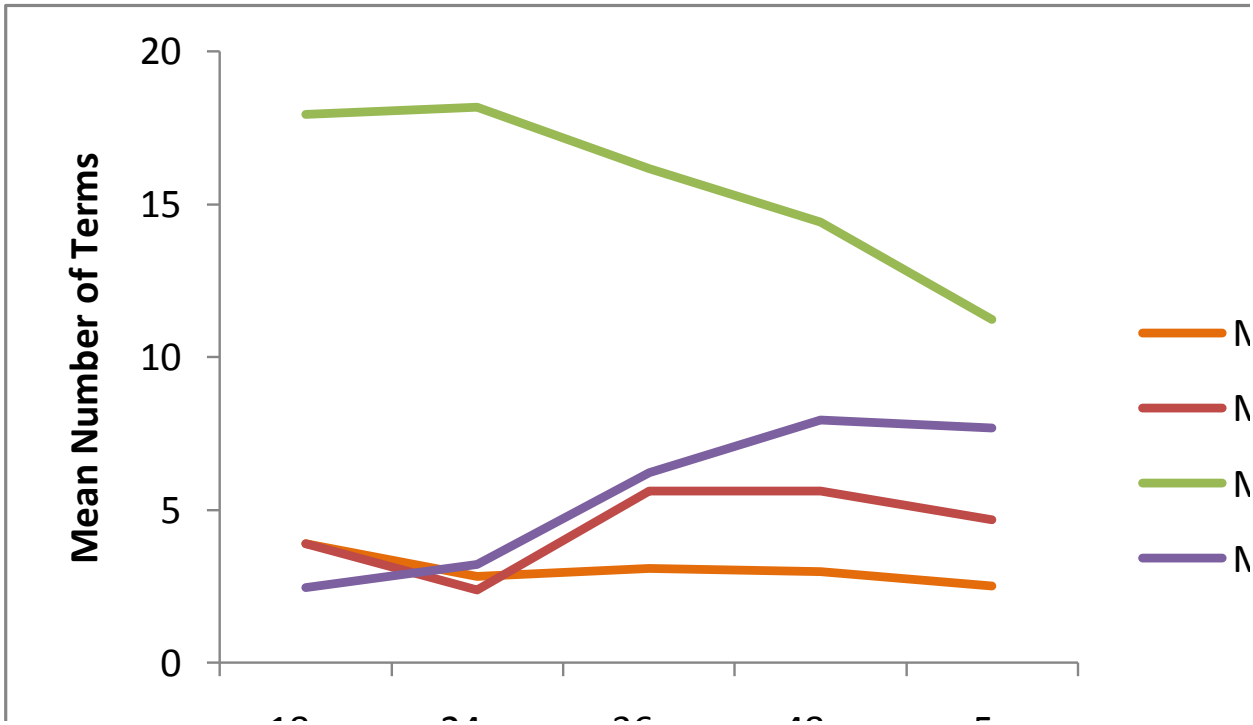


Figure 3a. Mothers' use of internal state language categories over time.

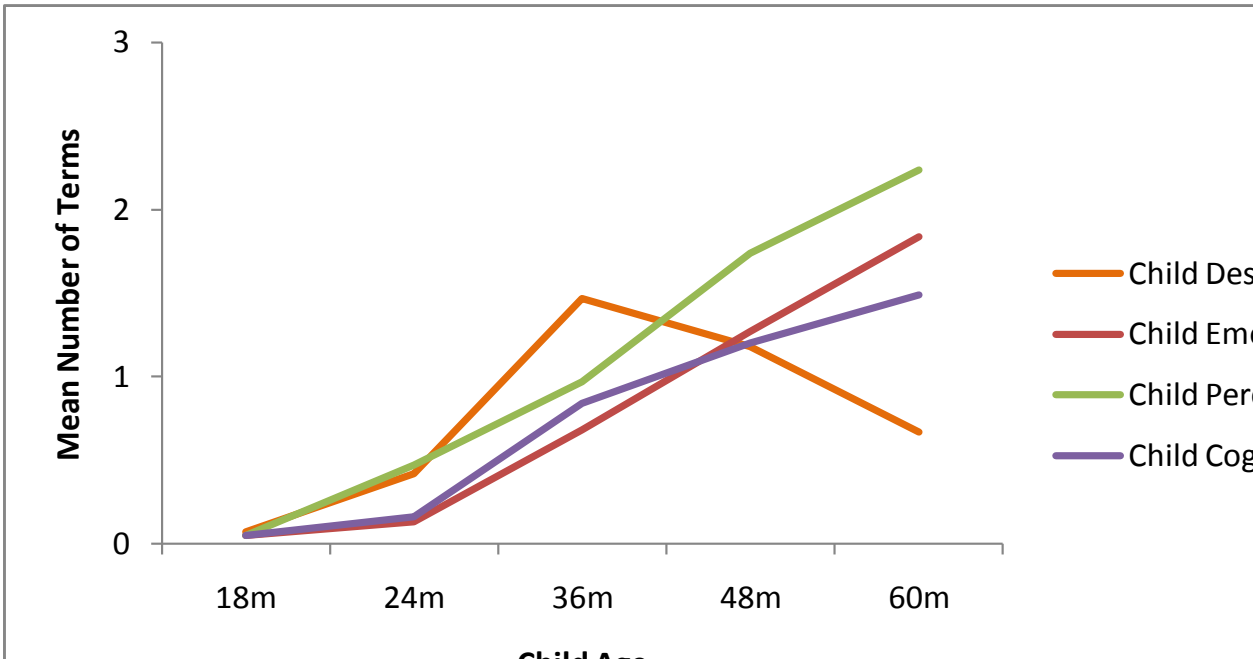


Figure 3b. Children's use of internal state language categories over time.

Results of the repeated measures MANOVAs indicated that the pattern of mean-level change differed by category; therefore combining all ISL categories into a single variable would obfuscate the understanding of change over time. Given the outcomes of interest involved aspects of emotional competence, including emotion regulation strategy understanding, self-regulatory behaviors during frustrating tasks, and anger expression, only mother and child emotion talk was analyzed further.

Relations among Emotion Talk and Child and Parent Factors

Pearson product-moment correlations (two-tailed) were conducted to test relations between mother and child emotion talk (see Table 5). As expected, maternal emotion talk was relatively stable over time and relations were stronger at age points that were closer in time. Also as expected, child emotion talk was not stable across time due to the previously described marked changes in emotion talk over time. In terms of concurrent associations, mother and child emotion talk was positively related at 18m, 36m, 48m (a non-significant trend) and 5y but not at 24m. In regard to prospective associations, only mothers' emotion talk at 24m significantly predicted child emotion talk at 36m. However, the relation between maternal emotion talk at 18m and child emotion talk at 36m and 5 years was in the expected direction.

Table 5

Correlations between Mother and Child Emotion Talk

		1	2	3	4	5	6	7	8	9	10
1.	M. Emotion Talk 18m	--									
2.	M. Emotion Talk 24m	.36**	--								
3.	M. Emotion Talk 36m	.22*	.31**	--							
4.	M. Emotion Talk 48m	.15	.27**	.39**	--						
5.	M. Emotion Talk 5y	.13	.19†	.25*	.29**	--					
6.	Ch. Emotion Talk 18m	.29**	.11	-.10	.07	-.09	--				
7.	Ch. Emotion Talk 24m	.11	.13	-.06	.07	.21*	-.05	--			
8.	Ch. Emotion Talk 36m	.16†	.27**	.37**	.28**	-.00	-.01	.07	--		
9.	Ch. Emotion Talk 48m	.04	.08	-.06	.16†	.04	.14	.10	.03	--	
10.	Ch. Emotion Talk 5y	.19†	.16	.01	.16	.21*	.10	.09	.03	.16	--

† p< .10, * p < .05, ** p < .01 (two-tailed)

Pearson product-moment correlations (two-tailed) were conducted to test relations between mother and child emotion talk and selected parent and child factors, shown in Tables 6a and 6b. As expected, maternal sensitivity predicted mothers' emotion talk (i.e., 18m - 36m) and child emotion talk at 36m. Unexpectedly, mothers of sons used more emotion talk than mothers of daughters at 48m and 5 years. At 48m, boys used more emotion terms than girls. As expected, 18m language skill predicted children's early emotion talk (18m and 24m) but language skill was not related to their later emotion talk. Verbal ability may become a less important factor in emotion references as children age. As expected, there was a trend indicating that children rated lower in effortful control at 18m had mothers that use more emotion terms at 5 years. Finally, children rated as more surgent by their mothers at 18m used less emotion talk at 36m. Although correlations are useful in understanding relations among levels of emotion talk and other factors,

they cannot explain how these parent and child factors influence the *growth* in use of emotion references over time.

Table 6a
Correlations among Mother Emotion Talk and Parent and Child Factors

	Mothers' Use of Emotion Terms				
Child Age	18m	24m	36m	48m	5y
Parent and Child Factors					
Income	-.12	.01	.10	-.02	-.17
Birth Order	.05	.00	-.06	-.02	.05
M. Education	.11	.15	.09	.09	.10
M. Sensitivity 18m	.20*	.23*	.20*	.05	.06
M. Sensitivity 30m	.22*	.00	.02	.01	-.16
Ch. Gender	-.05	-.00	-.01	.23*	.26*
Ch. Language 18m	.08	.14	-.03	-.01	-.11
Ch. Language 36m	.16†	.20*	.11	.05	.05
Ch. Surgency 18m	-.10	-.14	-.04	-.10	-.05
Ch. Surgency 30m	-.16	.01	.05	-.01	-.05
Ch. Negative Emotionality 18m	-.04	-.10	.02	-.12	.14
Ch. Negative Emotionality 30m	.06	-.00	.07	-.06	.12
Ch. Effortful Control 18m	.10	-.11	-.10	-.13	-.18†
Ch. Effortful Control 30m	.05	.05	.03	-.04	-.17

† p< .10, * p < .05, ** p < .01 (two-tailed)

Table 6b
Correlations among Child Emotion Talk and Parent and Child Factors

	Children's Use of Emotion Terms				
Child Age	18m	24m	36m	48m	5y
Parent and Child Factors					
Income	.04	-.06	.15	.02	-.17
Birth Order	.05	-.07	.01	- .00	.05
M. Education	.19*	.06	.09	-.03	.03
M. Sensitivity 18m	-.01	.08	.13	.05	-.07
M. Sensitivity 30m	.08	.09	.24**	-.04	-.01
Ch. Gender	-.03	-.11	-.05	.26**	.05
Ch. Language 18m	.19*	.23*	-.01	.03	-.08
Ch. Language 36m	.09	.13	.11	.09	-.03
Ch. Surgency 18m	.10	-.00	-.20*	.06	-.15
Ch. Surgency 30m	-.04	.08	-.01	.15	-.12
Ch. Negative Emotionality 18m	-.07	-.03	-.10	-.06	.09
Ch. Negative Emotionality 30m	.12	-.13	-.13	-.05	.04
Ch. Effortful Control 18m	.15	.09	-.09	-.02	-.11
Ch. Effortful Control 30m	-.02	.10	.09	-.11	-.07

† p< .10, * p < .05, ** p < .01 (two-tailed)

Growth in Emotion Talk over Time

To understand the developmental changes in mother and child emotion language from ages 18 months to 5 years **(Aim 1)** latent growth curve modeling (LGCM) was performed using Lisrel 8.8 (Joreskog & Sorbom, 2008). LGCM takes into account the repeated measure design in a single model. However, separate models were analyzed for mothers and children. The frequency of emotion references at each time point were loaded onto latent factors - i.e., intercept and growth functions (e.g., linear, quadratic). Based on the results of these models, age points were selected for the mediation models addressing Aim 2.

To arrive at final models, the data were analyzed in steps. First, two unconditional growth models -- one for mother and one for child emotion talk -- were estimated (i.e. growth models with no predictors). The maternal emotion talk model did not converge when all time points (18m – 5 years) were included, but removing the 18m time point improved the model stability. Inspection of Figure 3a shows that maternal emotion talk sharply declined between 18 and 24 months and then followed a quadratic trend between 24m and 5 years. An unconditional quadratic model, centered at 24m, provided a good fit to the data, X^2 (1) = 1.66, $p > .05$, RMSEA = .08, CFI = .99. The quadratic model was a significant improvement over the linear model (ΔX^2 (4) = 40.71, $p < .001$). Results of the quadratic model revealed that the mean intercept, linear, and quadratic change in mothers' emotion talk were significantly different from zero. The mean linear change indicated a significant increase in maternal emotion talk from 24m to 5 years, whereas the mean quadratic change was negative, implying that maternal emotion talk initially increased and then declined after 36m, as expected. The intercept, linear, and quadratic change factors were not significantly correlated with one another.

For the unconditional model of child emotion talk, the starting time point was set at 36m because most children used no emotion talk at 18m and 24m. In fact, a model starting at 24m converged but did not yield reliable fit statistics. Removing the 24m time point and centering the model at 36m improved the stability of the model and provided an excellent fit to the data, X^2 (1) = 0.05, $p > .05$, CFI = 1.00, RMSEA = 0.00. The only option for modeling change in children's emotion talk was linear growth due to the limited degrees of freedom when using only three time points. Therefore, quadratic change was not modeled. When plotted (see Figure 3b), linear growth appeared to accurately depict change in child emotion talk from 36m to 5 years. Results of the linear model revealed that the mean intercept and slope for child emotion terms were significantly different from zero. The mean linear change confirmed a significant increase in emotion terms from 36m to 5 years. The intercept and slope were not significantly correlated.

Next, the central analyses were addressed by estimating separate conditional growth curve models for mother and child emotion talk. Developmental change in mother and child emotion talk was not estimated in a single model because the unconditional models indicated different start points and patterns of change over time. However, the strategy for the conditional growth curves was similar for mother and child models. Specifically, each of the selected child and parent factors, including emotion talk, was entered as a covariate and paths were estimated to determine whether any factors predicted significant variance in level or change in emotion talk. Non-significant paths were removed systematically. Only significant findings are presented in Figures 4 and 5.

For maternal emotion talk, the conditional growth curve model indicated that as expected, maternal sensitivity ($\beta = .28$, $p < .05$) and child effortful control ($\beta = -.25$, $p < .05$) were significant predictors of mothers' level of emotion talk at 24m (see Figure 4). Mothers who were

more sensitive (during a home visit at 18m) used more emotion talk (in a lab task) at 24m, and mothers used more emotion talk at 24m with children whom they rated as lower in effortful control at 18m. However, maternal sensitivity and child effortful control did not influence change in maternal emotion talk. In fact, child gender was the only significant predictor of change in maternal emotion talk (β = .34, p <.01), such that maternal emotion talk increased more quickly for boys than girls. The model containing these three factors provided a good fit to the data, X^2 (16) = 17.18, p > .10, CFI = 0.97, RMSEA = 0.03.

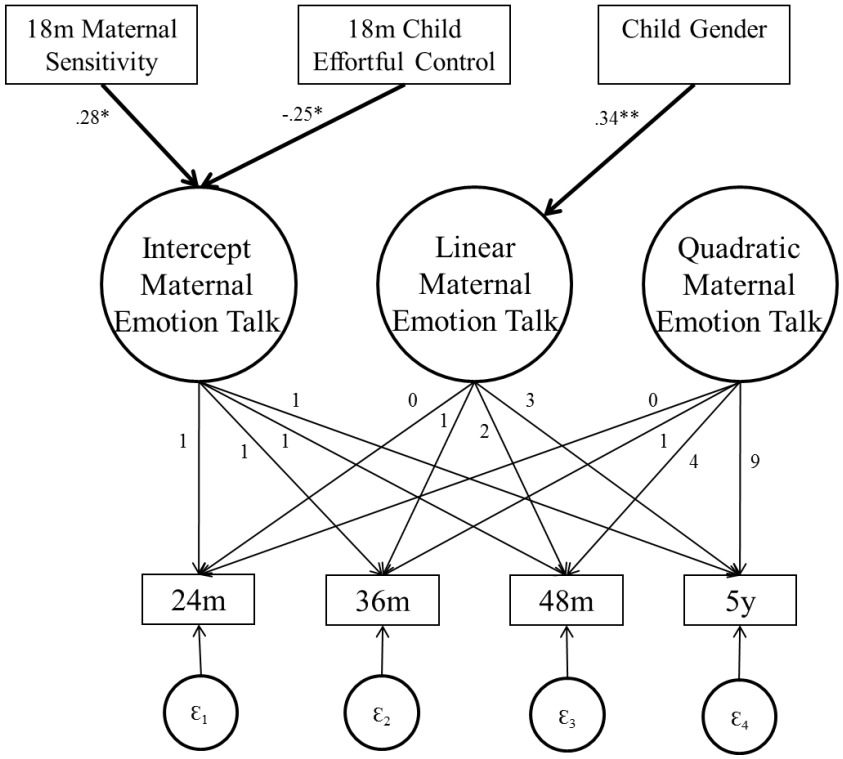


Figure 4. Results of conditional latent growth curve modeling for maternal emotion talk from child ages 24m to 5y.

For child emotion talk, the conditional growth curve model indicated that maternal emotion talk at 24m (β = .42, p < .01) and 36m (β = .65, p < .01) significantly predicted child

level of emotion talk at 36m (see Figure 5). However, the more emotion terms mothers used at 36m, the slower the growth in child emotion talk between 36m and 5y (β = -.53, $p < .01$). In addition, child gender predicted growth in child emotion talk (β = .33, $p < .05$), indicating boys had more rapid growth in emotion talk compared to girls, between 36m and 5 years.

Maternal sensitivity at 30m (β = .35, $p < .05$) and child surgency at 18m (β = -.30, $p < .05$) also predicted child level of emotion talk at 36m, but in different directions. As expected, more sensitive mothers at 30m had children who used more emotion talk at 36m, whereas more surgent children at 18m used *less* emotion talk at 36m. This conditional growth model provided an adequate fit to the data, X^2 (19) = 23.46, $p > .10$, CFI = .88, RMSEA = 0.04.

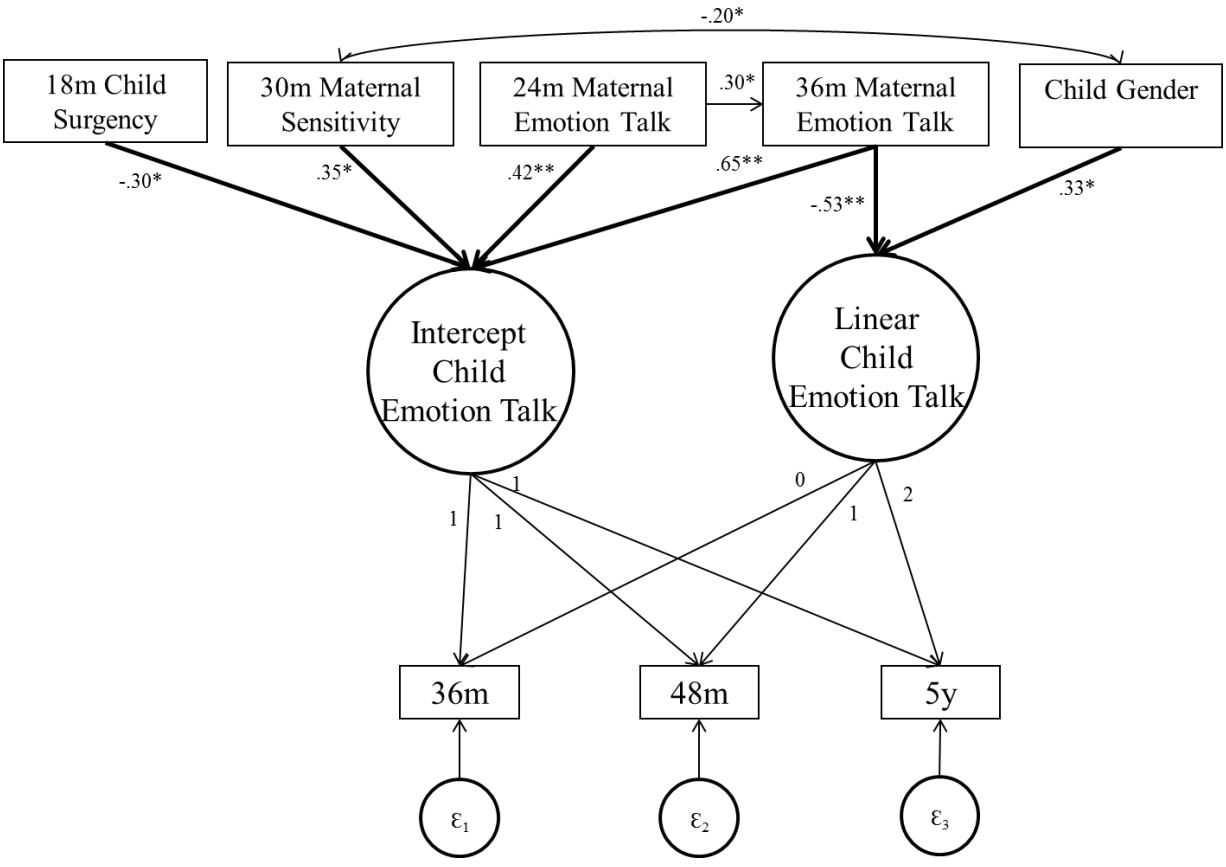


Figure 5. Results of conditional latent growth curve modeling for children's emotion talk from 36m through 5 years.

As expected, maternal sensitivity predicted the amount of emotion references used by mothers and children. Unexpectedly, child gender differences emerged such that boys and mothers of boys evidenced more rapid growth in emotion talk, compared to girls. Taken together, it appears that mothers are eliciting children's emotion talk and they are taking into account the characteristics of the child.

Relations among Emotion Talk and Children's ER Strategy Understanding

Because children used so little emotion talk at 18m and 24m and language skill was a significant predictor of emotion talk at these ages, the results presented below focus on child emotion talk from 36 months to 5 years, in keeping with the results of the growth curve modeling of child emotion talk. As shown in Table 7, strategy recognition and generation were relatively stable over this period of time. Notably, recognition and generation were not related at any time point, although they approached significance by 5 years.

In terms of relations between emotion talk and children's strategy understanding, maternal emotion talk at 36m was marginally predictive of strategy recognition at 48m, but child emotion talk appeared to be a better predictor of strategy understanding. As predicted, child emotion talk at 36m predicted strategy recognition and generation at 48m. Furthermore, child emotion talk at 48m was marginally predictive of strategy generation at 48m and at 5 years. Overall, these results suggest that toddlers who used more emotion terms were more likely to recognize and generate effective regulatory strategies by preschool age.

Table 7
Correlations between Children's ER Strategy Understanding and Emotion Talk

	36m		48m		5y		Mean(SD)	Range
	Recognition	Generation	Recognition	Generation	Recognition	Generation		
Recognition 36m	--						3.43(1.61)	0-6
Generation 36m	.15	--					0.79(1.55)	0-9
Recognition 48m	.29**	.15	--				5.03(1.20)	0-6
Generation 48m	.13	.24*	.14	--			2.03(2.48)	0-10
Recognition 5y	.17	.11	.47**	-.05	--		5.64(0.70)	2-6
Generation 5y	.08	.22*	.06	.29**	.19†	--	2.53(1.74)	0-8
Mother Emotion Talk								
18m	.07	.16	.01	.16	-.06	.06		
24m	.09	.01	.10	-.06	-.05	.01		
36m	.08	-.07	.18†	.11	.07	.03		
48m	.10	.07	.11	.01	.03	.15		
5y	.10	.04	.12	.09	-.07	-.03		
Child Emotion Talk								
36m	.02	.06	.19*	.21*	.10	.01		
48m	-.01	.14	.09	.18†	-.02	.19†		
5y	.02	-.02	.05	.25*	-.14	.12		

† p< .10, * p < .05, ** p < .01 (two-tailed)

Relations among Emotion Talk, Children's ER Strategy Understanding and Emotion Regulation

Before running a larger structural equation model, an Exploratory Factor Analysis (EFA), with varimax rotation, was used to inform the creation of emotion regulation factors. The results indicated that the anger expression variables (i.e., frequency of bouts, average bout duration, latency to first bout (reversed), and average bout intensity) loaded onto distinct factors based on task and age point. The one exception was the 5-year Wait Task, for which average anger bout duration did not load onto the anger expression factor. For the regulatory behaviors, the Locked Box Task variables cohered (with the exception of average bout duration for Attempt to Fix) and appeared to do so better than the Wait Task variables. This suggested that the regulatory behaviors in the Locked Box Task (i.e., Attempt to Fix and Attempt to Fix-Alternative) represented a unitary construct, whereas those for the Wait Task (i.e., Focused Self-Distraction and Support-Seeking) represented distinct constructs. Because the Focused Self-Distraction variables appeared to hang together better across time than the Support-Seeking variables, only the Focused Self-Distraction variables were used in the model. This strategy has been considered more self-reliant and not as influenced by mothers' responsiveness as support-seeking might be.

Before loading the emotion regulation temporal variables onto latent constructs using structural equation modeling, composites were created based on the exploratory factor analyses in order to conduct zero-order correlations. Specifically, separate anger expression composites were created for the Locked Box and Wait Task temporal variables across age points. The anger expression composites were similar across tasks and age points, and included the following variables: bout frequency, average bout duration, latency to first bout (reversed), and average bout intensity of anger expression. The regulatory behavior composites across age points, for the

Locked Box included: bout frequency and latency (reversed) to first bout of attempt to fix, as well as the bout frequency, bout duration, and latency (reversed) to first bout of attempt to fix-alternative. The regulatory behavior composites for the Wait Task varied by age. For 36m, the Wait Task regulatory behavior composite included: bout frequency and latency (reversed) to first bout of focused self-distraction. At 48m the Wait Task regulatory behavior composite included: bout duration and latency (reversed) to first bout of focused self-distraction. Pearson product-moment correlations were calculated in order to determine the relations among the composited emotion regulation variables before including them in larger structural equation models (see Table 8).

Table 8
Correlations between Regulatory Behavior and Anger Expression

	1	2	3	4	5	6	7	8	9	10
1. Regulatory Behavior LB 36m	--									
2. Regulatory Behavior WT 36m	-.04	--								
3. Regulatory Behavior LB 48m	.09	-.03	--							
4. Regulatory Behavior WT 48m	.18†	.05	-.04	--						
5. Anger LB 36m	.04	-.02	-.07	-.18†	--					
6. Anger WT 36m	.21*	-.35**	.09	-.18†	.08	--				
7. Anger LB 48m	-.05	-.03	.32**	.04	.05	-.08	--			
8. Anger WT 48	-.06	-.24**	-.07	-.17†	.09	.20*	-.03	--		
9. Anger KS 5y	.09	.03	.11	-.03	.00	.14	.01	-.04	--	
10. Anger WT 5y	.01	-.21*	.19†	-.05	-.03	.20†	-.02	.09	-.01	--

† p <.10, * p < .05, **p < .01.

Pearson product-moment correlations (two-tailed) were also calculated to examine the zero-order relations between emotion talk, strategy understanding, and regulatory behavior before including them in the larger model. The results are shown in Table 9. Because transformations did not improve the distributions for strategy generation at 36m (floor effects) or strategy recognition at 5 years (ceiling effects), these two variables were excluded from analyses. As expected, mothers' emotion talk at 36m was positively related to children's regulatory behavior in the Wait Task. However, contrary to expectations, maternal emotion talk at 18 and 36m was negatively related to children's later regulatory behavior in the Locked Box Task. In a similar vein, children's emotion talk at 36m was concurrently related (a non-significant trend) to regulatory behavior in the Wait Task (positive relation) and in the Locked Box (negative relation), but in opposite directions. Unexpectedly, children's strategy understanding was only related to regulatory behavior in one of the challenging tasks, i.e., the Wait Task.

Pearson product-moment correlations (two-tailed) were also calculated to examine the zero-order relations between emotion talk, strategy understanding, and anger expression. The results of which are shown in Table 10. Mothers' emotion talk at 18m was positively related to anger expression in the Locked Box, but as expected, mother's emotion talk at 36m and 48m was negatively related to anger expression in the Wait Task at 5y. Child emotion talk at 36m was negatively related to anger expression in the Locked Box and Wait Task at 48m and 5y, respectively. In terms of children's strategy understanding, 36m recognition and 48m generation were negatively related to anger expression in the Wait Task. Unexpectedly, concurrent strategy generation and anger expression in the Wait Task was positively related at 5y.

Table 9
Correlations among Emotion Talk, Children's ER Strategy Understanding, and Regulatory Behavior

	36m		48m	
	Locked Box	Wait Task	Locked Box	Wait Task
Mother Emotion Talk				
18m	-.21*	.02	.14	.03
24m	.02	.02	.07	.06
36m	.00	.26**	-.18†	.09
48m	-.03	.16†	.10	.12
5 yr	-.14	.10	.02	.01
Child Emotion Talk				
36m	-.17†	.17†	-.07	.08
48m	-.19†	-.05	-.05	-.04
5yr	-.10	.02	.10	-.11
Child Strategy Recognition				
36m	.03	.24*	.00	-.13
48m	.09	.23*	-.12	.10
Child Strategy Generation				
48m	-.07	.12	.02	-.04
5yr	.12	.23*	.15	.02

† p <.10, * p < .05, **p < .01.

Table 10
Correlations among Emotion Talk and Children's ER Strategy Understanding and Anger Expression

	36m		48m		5yr	
	LockedBox	WaitTask	LockedBox	Wait Task	KnottedSack	WaitTask
Mother Emotion Talk						
18m	.21*	-.08	.03	-.15	-.14	-.14
24m	.15	.15	-.01	.03	.02	-.10
36m	.11	-.14	-.06	-.04	.02	-.32**
48m	.18†	.03	-.07	-.01	.12	-.20*
5yr	.02	-.09	.11	-.09	-.01	-.09
Child Emotion Talk						
36m	.03	-.15	-.20*	.07	.02	-.31**
48m	.12	-.09	.09	-.01	.02	.02
5yr	-.01	.09	-.02	-.10	.04	-.13
Child Strategy Recognition						
36m	.19†	-.12	-.01	.04	.14	-.21*
48m	.16†	-.10	-.11	-.06	.16	-.19†
Child Strategy Generation						
48m	.11	-.24**	.06	.00	-.02	-.23*
5yr	.09	-.01	.05	.08	.02	.24*

† p <.10, * p < .05, **p < .01.

As shown in Table 11, anger expression is related to some of the selected parent and child factors (i.e., family income, child gender, maternal education and sensitivity, child language, surgency, and negative emotionality); therefore these were included as covariates in the structural equation models.

Table 11
Correlations among Anger Expression and Parent and Child Factors

	36m		48m		5yr	
	LockedBox	WaitTask	LockedBox	WaitTask	KnottedSack	WaitTask
Child Gender	.20*	.08	.14	.17†	.29**	.12
Birth Order	-.09	.09	.04	.16†	-.04	-.15
Maternal Education	.10	-.02	-.06	.08	.11	-.26**
Income	.19*	-.19*	-.12	-.01	.09	-.09
Maternal Sensitivity 18m	.22*	-.17†	-.14	.06	.07	-.10
Maternal Sensitivity 30m	.01	-.07	-.17†	.07	.10	-.18†
Child Language 18m	.07	-.04	.00	-.08	-.11	-.01
Child Language 36m	.14	-.13	-.06	-.06	.07	-.24*
Child Surgency 18m	.21*	.14	.13	.00	.03	.08
Child Surgency 30m	.17†	.13	.16†	.09	.06	.02
Negativity Emotionality 18m	-.25**	-.14	.15	.04	-.08	-.13
Negative Emotionality 30m	-.13	-.00	.12	-.04	-.08	-.08
Effortful Control 18m	.05	.14	.14	-.03	-.06	.08
Effortful Control 30m	.07	.14	.05	.10	.01	.06

† p <.10, * p < .05, **p < .01.

To examine relations among mother and child emotion talk, emotion regulation strategy understanding, and emotion regulation **(Aim 2)** structural equation modeling (SEM) was performed using Lisrel 8.8. Autoregressive path analyses of three observed constructs: mother emotion language, child emotion language, and children's strategy understanding (recognition and generation), and two latent constructs: *Anger Expression* and *Regulatory Behavior* were modeled across time. Based on findings from the EFA and as specified in Aim 2, the Locked Box and Wait Task data were analyzed in two separate models.

Locked box. The *Anger Expression* latent factor was created using the mean frequency, duration, latency (reversed), and intensity of anger bouts in the Locked Box Task. These variables had significant factor loadings on the *Anger Expression* latent construct at all age points (range of standardized factor loadings: .54 – 1.01). The *Regulatory Behavior* latent factor for the Locked Box Task at 36m and 48m was initially composed of bout frequency, duration, and latency (reversed) of the attempt to fix and attempt to fix – alternative variables. Because the duration of attempt to fix did not load significantly onto the latent factor, it was removed. This was consistent with the information gained from the exploratory factor analysis. The remaining variables had significant factor loadings (range of standardized factor loadings: .51 - .91) on the *Regulatory Behavior* latent construct at both age points. These latent factors are shown as circles in Figure 6. The emotion talk and strategy understanding variables are represented as squares in Figure 6 because they were observed variables, not latent factors. In a larger model, a number of covariates were included due to significant zero-order correlations between these parent and child factors (i.e., gender, income, maternal sensitivity, child surgency, and negative emotionality) and anger expression in the Locked Box. However, as non-significant paths were trimmed systematically, all the covariates except child gender were removed. In addition, the

mother and child emotion talk and children's strategy understanding variables that were not related to each other or to *Anger Expression* or *Regulatory Behavior* were removed from the model. The final model, as shown in Figure 6, provided a good fit to the data, $X^2(393) = 436.80$, $p > .05$, RMSEA = .03, CFI = .92.

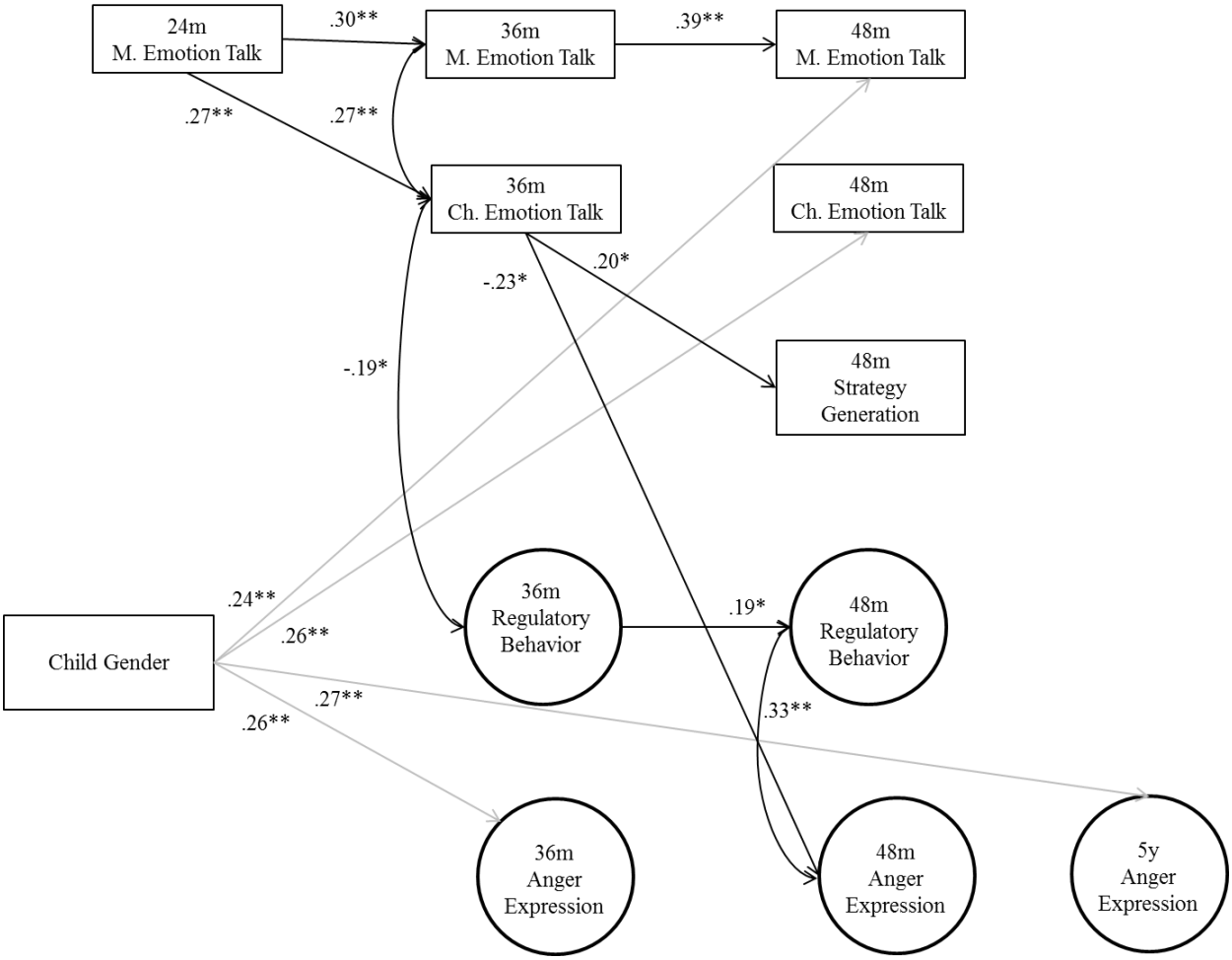


Figure 6. Structural equation model illustrating the relations among emotion talk, strategy understanding, and emotion regulation over time for the Locked Box task.

Maternal emotion talk predicting child emotion talk. The model demonstrated that maternal emotion talk was stable over time (βs = .30 - .39, $p < .01$) but child emotion talk was not. In addition, maternal emotion talk at 24m predicted child emotion talk at 36m (β = .27, $p < .01$), and mother and child emotion talk were concurrently related at 36m (β = .27, $p < .01$). Child gender predicted mother and child emotion talk at 48m, such that boys (β = .26, $p < .01$) and their mothers (β = .24, $p < .01$) used more emotion terms than girls and their mothers.

Emotion talk predicting children's ER strategy understanding. As expected, child emotion talk at 36m predicted strategy understanding at 48m, such that children who used more emotion talk later generated (β = .20, $p < .05$) more regulatory strategies.

Emotion talk predicting emotion regulation. With respect to the latent constructs capturing emotion regulation, children's *Regulatory Behavior* (β = .19, $p < .05$) in the Locked Box Task was stable over time *but Anger Expression* was not. Unexpectedly, *Regulatory Behavior* and *Anger Expression* were not related at 36m and were positively related at 48m (β = .33, $p < .01$), indicating that attempting to fix the locked box was associated with more anger. Contrary to hypotheses, children's strategy understanding was not significantly related to *Regulatory Behavior* or *Anger Expression* in the Locked Box Task, and therefore a mediation model was not supported. However, child emotion talk was related concurrently and predictively to children's emotion regulation in the Locked Box. Surprisingly, the more children talked about emotion with their mothers, the less they engaged in *Regulatory Behavior* (β = -.19, $p < .05$) during the Locked Box Task at 36m. As expected, children's emotion talk at 36m negatively predicted *Anger Expression* at 48m (β = -.23, $p < .05$). In addition, child gender was a significant predictor of *Anger Expression*. Compared to girls, boys expressed more anger during the Locked Box Task at 36m and 5y (βs = .26, .27, $p < .01$, respectively). Of note, the path from

36m *Anger Expression* to 48m Maternal Emotion Talk was not significant, indicating that children's anger in the Locked Box Task did not predict mothers' use of emotion terms subsequently.

Wait task. For the Wait Task, the *Anger Expression* factor was composed of the mean frequency, duration, latency (reversed), and intensity of anger bouts in the Wait Task, as these variables were loaded onto the latent factor at each time point. These variables had significant factor loadings on the *Anger Expression* latent construct (range of standardized factor loadings: .39 – .93). The *Regulatory Behavior* latent factor was initially composed of the mean frequency, duration, and latency (latency) to focused self-distraction bouts, which were loaded onto the *Regulatory Behavior* factor at each time point. However, as the EFA showed, the average self-distraction bout duration at 36m and the average self-distraction bout frequency at 48m did not load significantly onto the *Regulatory Behavior* factors. Therefore, these two variables were removed. The remaining variables had significant factor loadings (range of standardized factor loadings: .56 - 1.00) on the *Regulatory Behavior* latent factor. This change in regulatory behavior over time may be understood in the context of developmental changes in children's use of distraction; with age, children engage in self-distraction for longer durations of time and therefore the frequency necessarily decreases.

In the larger model, a number of covariates were included due to significant correlations between these parent and child factors (i.e., gender, income, maternal sensitivity, birth order, maternal education, and children's language at 30m) and *Anger Expression* in the Wait Task. However, as the model was trimmed, variables and covariates with non-significant paths were systematically removed. The final model, as shown in Figure 7, provided a good fit to the data, $X^2(534) = 586.12$, $p > .05$, RMSEA = .03, CFI = .89.

Maternal emotion talk predicting child emotion talk. As expected, the relations between mother and child emotion discourse for the Wait Task were similar to those found in the Locked Box model. Specifically, for the Wait Task model, maternal emotion talk was stable over time (βs = .27 - .38, $p < .01$).

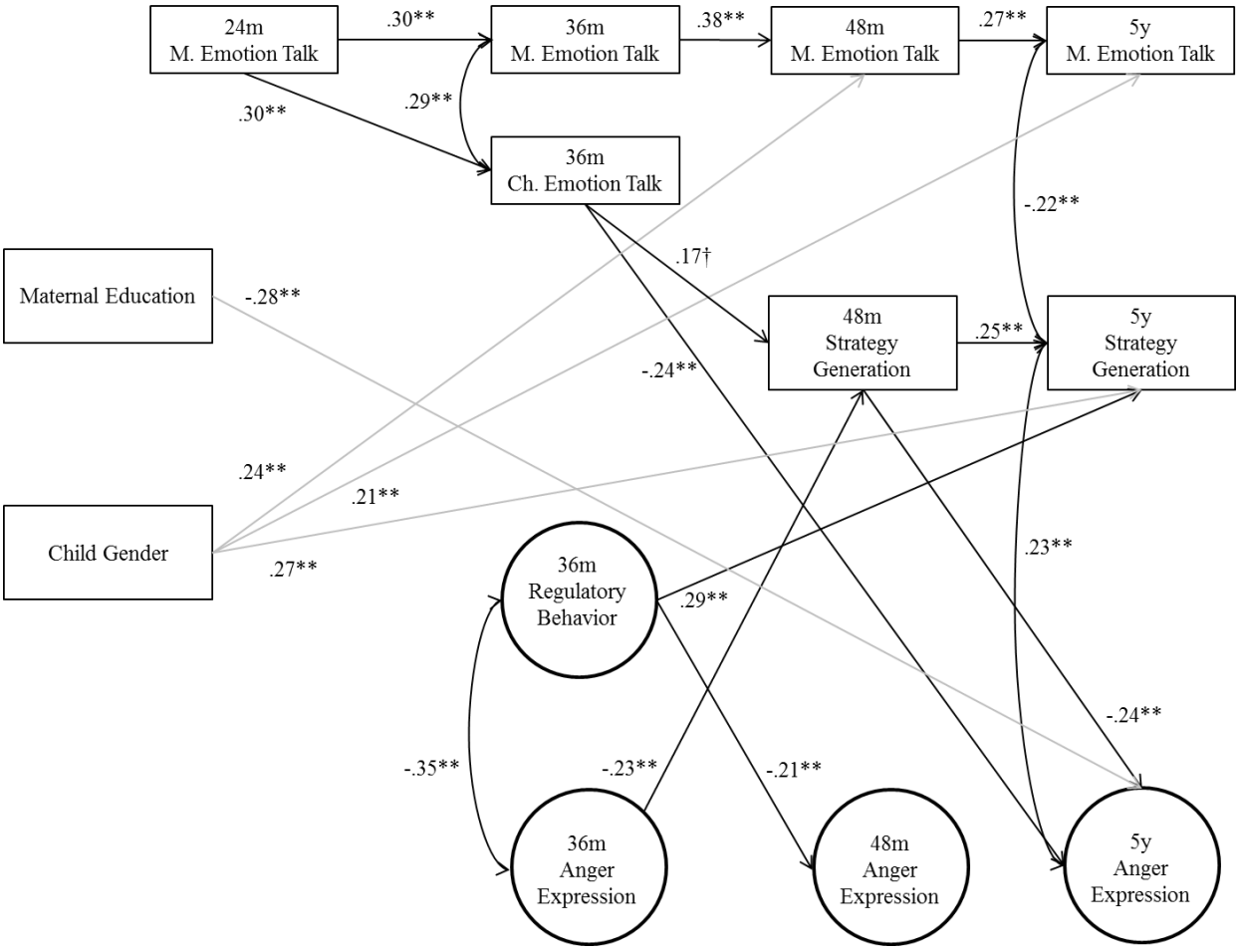


Figure 7. Structural equation model illustrating the relations among emotion talk, strategy understanding, and emotion regulation over time for the Wait Task.

Only 36m child emotion talk was included in this model as it was the only time point with significant associations with children's strategy understanding, *Regulatory Behavior* and *Anger*

Expression in the Wait Task. Therefore, the stability of child emotion talk over time could not be assessed for this model. In terms of predictive and concurrent relations between mother and child emotion talk, maternal emotion talk at 24m predicted child emotion talk at 36m ($\beta = .30$, $p < .01$), and mother and child emotion talk were concurrently related at 36m ($\beta = .29$, $p < .01$). In addition, child gender was a significant predictor of mother emotion talk at 48m and 5y (βs = .24, .21, $p < .01$, respectively), such that mothers of boys talked more about emotions than mothers of girls.

Emotion talk predicting children's strategy understanding. As expected, children's ER strategy generation was stable between 48m and 5y ($\beta = .25$, $p < .01$). Similar to the Locked Box model, in the Wait Task model children's emotion talk at 36m marginally predicted strategy generation at 48m ($\beta = .17$, $p < .10$). Unexpectedly, the more mothers talked about emotion at 5 years, the fewer strategies children generated at the same time point ($\beta = -.22$, $p < .01$). In addition, boys generated more regulatory strategies than girls at 5 years ($\beta = .27$, $p < .01$).

Relations among emotion talk, strategy understanding, and emotion regulation. For the Wait Task model, children's *Regulatory Behavior* at 48m was removed because it was not significantly related to the other variables in the model. Therefore, the stability of children's *Regulatory Behavior* over time could not be assessed for this model.

As in the Locked Box model, *Anger Expression* in the Wait Task was not stable over time. At 36m, there was a significant negative relation between *Regulatory Behavior* and *Anger Expression* ($\beta = -.35$, $p < .01$), indicating that as children more quickly and more often used focused self-distraction, they displayed less anger in the Wait Task. Likewise, *Regulatory Behavior* at 36m negatively predicted *Anger Expression* at 48m ($\beta = -.21$, $p < .01$). As expected,

child emotion talk at 36m and child strategy generation at 48m both significantly predicted children's later *Anger Expression* at 5 years (βs = -.24, $p < .01$). However, contrary to hypotheses, child strategy generation at 5 years was positively related to *Anger Expression* at the same time point (β = .23, $p < .01$). Of interest, 36m *Regulatory Behavior* and *Anger Expression* significantly predicted later strategy generation, suggesting that the *Regulatory Behavior* to strategy understanding pathway was supported. Specifically, *Regulatory Behavior* at 36m positively predicted strategy generation at 5 years (β = .29, $p < .01$), and *Anger Expression* at 36m negatively predicted strategy generation at 48m (β = -.23, $p < .01$). Finally, maternal education was the only covariate that significantly predicted *Anger Expression* after the variables of interest were included in the model. As would be expected, mothers with more education were likely to have children who expressed less anger during the Wait Task (β = -.28, $p < .01$). Taken together, results of the Wait Task model indicated that a mediation model was supported but not with the exact paths that were hypothesized. Instead, there was a pathway that emerged demonstrating that 24m maternal emotion talk predicted 36m child emotion talk, which in turn marginally predicted 48m strategy understanding, which then predicted 5yr anger expression.

Chapter 4. DISCUSSION

The findings of the present study are the first longitudinal evidence that changes in the use of emotion terms over time are a function of selected child and parent characteristics and that a child's use of emotion terms is associated with developmental changes in emotion regulation strategy understanding and behavior. The longitudinal approach permitted an investigation of the relations between emotion language and emotion regulation during a period of rapid language and emotional development. During this period, functional use of language in the context of emotion should aid emotion regulation (Cole et al., 2010). Although it is known that talking about internal states, more generally, is associated with preschooler's emotion knowledge and perspective-taking (e.g., Dunn et al., 1991; Garner et al., 1997), this was the first study to demonstrate that mothers' use of emotion terms before their children are skillful in using language predicts children's later use of these terms, which in turn predict their later emotion understanding (i.e., regulatory strategy understanding) as well as their actual emotional expression and regulatory efforts in anger-eliciting situations. This documents in a more sophisticated manner the importance of the development of mother and child emotion language during early childhood and raises new questions for future research.

The present study adds to the literatures on internal state language, emotion knowledge, and self-regulation by providing information about how emotion language *grows* over time and eventually comes to influence how children cope with frustrating situations. Specifically, the major aims of the study were two-fold: (1) to describe changes in mother and child emotion language over the course of early childhood by longitudinally examining how child gender, temperament, and language status, as well as parent education and parenting quality influence the amount and growth of this language, and (2) to investigate a mediation model, whereby early

maternal emotion talk predicts child emotion talk, which then leads to greater emotion regulatory strategy understanding and regulatory behavior, which in turn predicts less anger expression during a frustrating task. As will be discussed, the findings provided partial support for the mediation model.

Growth in Emotion Language

As expected, mothers used emotion terms before most toddlers did. Children used little emotion language at 18 and 24m, but thereafter their emotion references increased steadily. Moreover, as children made more frequent references to emotions, mothers' references began to decrease. Most importantly, the growth in children's use of emotion language during the preschool years depended on mothers' earlier use of emotion terms.

Most work has placed the onset of children's emotion language between 18 and 20 months and by 28 months most children use some emotion labels (e.g., Bretherton et al., 1981; Bretherton et al., 1986; Taumoepeau & Ruffman, 2008); however in the present study 94% of the children still used no emotion terms at 24m, even though a task that afforded emotion talk was used. This may be due to differences in the study design, including how emotion language was assessed and sample characteristics. First, the studies that found children's emotion talk begins around 18m used maternal report of children's emotion talk, whereas the present study assessed children's emotion talk through laboratory observation of a wordless book task. The discrepancy in these findings raises important questions about methodology. Specifically, maternal report of child emotion language, at a time when there are large individual differences in children's expressive language abilities, may provide a fuller picture of children's emotion talk, given that mothers would presumably have greater access to children's use of emotion terms in daily life. In contrast, the wordless book task is a moment in time in which mother and child emotion talk may

or may not be representative of their use of this language in everyday life. That being said, an advantage of the wordless book task is that it does not rely on parent report, which can be subject to biases, and it pulls for variability in family emotion talk. More work needs to be done to better understand the relations between children's emotion talk across parent-report, lab-based, and naturalistic settings.

Second, families recruited for the present study were from economically strained households, which are less advantaged than those typically studied in emotion language research. In fact, the amount of emotion language used by children in the present study was similar to that of children living below the poverty threshold (e.g., Garner et al., 1997). Thus, the present findings are consistent with research showing that socioeconomic conditions are a robust correlate of child language development (Hart & Risley, 1995; Hoff-Ginsberg, 1991). A question that remains to be answered is whether children from less advantaged families use fewer emotion references regardless of the way this talk is assessed.

Given the developmental links between parent and child emotion talk demonstrated in this and other studies, the onset and growth of children's emotion language is likely best understood in the context of parent's use of this language. In fact, a cross-sectional study of 2-, 3-, and 4-year-olds found that the relations between mother and child emotion talk varied by child age and how mothers were talking about emotions (Cervantes & Callanan, 1998). Specifically, 2-year-olds' emotion talk was related to mothers' use of labels and questions about the causes of emotions, 3-year-olds' emotion talk was related only to mothers' use of labels and 4-year-olds' emotion talk was related to mothers' use of explanations. These results were regarded as consistent with a scaffolding effect, in which different aspects of mothers' emotion talk are important at different ages. However, the cross-sectional design of most studies (but see

Taumoepeau & Ruffman, 2008) limits conclusions about developmental change in the way emotion terms are used.

Comparing the present longitudinal findings with those of published studies, it appears that mothers in the present study used fewer emotion references than more advantaged mothers when children were 18 and 24m, but used similar amounts of emotion language after 36m (see Ruffman et al., 2002; Taumoepeau & Ruffman, 2008). The results of the present study demonstrated the importance of mothers' use of emotion language at 24m in predicting children's later emotion language, and yet these mothers used less emotion language during the toddler years than more advantaged mothers; therefore, it is understandable that children in the present study used less emotion language compared to their more advantaged counterparts.

In addition to observing relations between the frequency of mother and child emotion references at different age points in early childhood, the present study was the first to show that the amount of maternal emotion talk influences the *growth* of children's emotion talk. Interestingly, children showed faster growth in emotion language when mothers used fewer emotion terms at 36 months. This finding is consistent with work by Hart and Risley (1995) on language development that documented changes in parental linguistic input as a function of children's language ability. Across all income levels, they found that parents provided linguistic stimulation before their young children began speaking, but once children started speaking, this stimulation dropped off and the modal parental response to children's verbal bids was ignoring.

A possibility that may warrant more attention is whether rapid growth in emotion talk, provides a buffer from a host of child and parent characteristics (e.g., difficult temperament and lower quality parenting) that places them at greater risk for poorer emotional competence. Quicker growth in emotion talk is likely to enhance children's emotional awareness and self-

regulatory skill, which in turn could serve as a protective factor as children are navigating their environments. Moreover, further investigation is needed to understand how qualities of the child (e.g., temperament and gender), as well as qualities of the parent (e.g., sensitivity, knowledge of child development) relate to growth in emotion talk. This work has the potential to pinpoint which children may need additional support before they are able to catch up to their peers in terms of self-regulatory ability. The present study demonstrated that children rated lower in effortful control also had mothers that used more emotion references. Children with poorer dispositional regulation are at greater risk of poor emotional competence and likely perceived by their mothers as requiring more emotion socialization. In addition, children rated higher in surgency were also less likely to use emotion terms, and thus these children might represent another group that would benefit from added emotion socialization.

Interestingly, the present study indicated that boys presented with greater vulnerabilities in terms of emotion regulation development, as mothers of boys rated them lower in effortful control and higher in surgency than did mothers of girls. In addition, boys expressed more anger than girls during the challenging tasks. At the same time, mothers of boys increased their use of emotion talk over early childhood more rapidly than mothers of girls, and boys' emotion references also increased more rapidly than those of girls. When gender differences are found in studies of emotion language, parents usually used more and a greater variety of emotion words with toddler- and preschool-age daughters than with sons, and by school-age, girls talked more about emotions than boys (Adams et al., 1995; Cervantes & Callanan, 1998; Dunn et al., 1987; Kuebli, Butler & Fivush, 1995). Possibly, in the present sample, mothers may have used emotion language with boys *because* they had less well-regulated emotion or activity. Indeed, recent work has shown that boys are slower to integrate language and self-regulatory skills, and may

therefore require additional scaffolding (Vallaton & Ayoub, 2011). Given the additional finding of more rapid growth in boys' emotion talk between 36m and 5y, mothers appeared to stimulate emotion talk in their sons, which strengthened their understanding of emotions at age 5 years.

Sensitive parenting has been associated with a multitude of positive outcomes, including the development of secure attachments (Ainsworth, Blehar, Waters, & Wall, 1978) and socio-emotional competence (Steelman, Assel, Swank, Smith, & Landry, 2002), therefore it is not surprising that mothers who were observed to be higher in sensitivity were also likely to use more emotion terms and have children that used more emotion terms. Sensitive mothers may use more emotion language in order to help their children become aware of their own internal experience, to aid their children's communication and understanding of emotional experiences, and as a tool for emotion regulation.

Relations among Emotion Talk, ER Strategy Understanding, and Emotion Regulation

This study was the first to demonstrate that emotion talk predicts children's understanding of regulatory strategies, as well as children's anger expression and use of regulatory strategies in situations designed to elicit frustration. Although much work on internal state language has shown that mother and/or child internal state references are associated with child emotion understanding, perspective-taking, and theory of mind, the present study's longitudinal approach allowed the opportunity to observe how the development of mother and child emotion language in early childhood related to children's emotion regulation knowledge and observable behavior. Importantly, although maternal emotion talk has important implications for children's use of emotion terms, it was children's own emotion language that predicted regulatory strategy understanding. This finding is consistent with other work that showed concurrent relations between children's emotion labels and emotion understanding at age 3 years

(Raikes & Thompson, 2006). Given that children predominately used emotion references to simply label feelings, it suggests that preschoolers do not need to talk about emotions in sophisticated ways to be able to verbalize effective methods for managing emotions. An issue, however, that will require further research is the difference between recognizing effective strategies and generating them. In this and other studies (Cole et al., 2009), these two ways of tapping emotion knowledge were not related.

Across both tasks, the more children referenced emotion at age 3 years, the less anger they expressed during frustrating tasks when they were 4- or 5-years old. This finding is consistent with research demonstrating concurrent relations between emotion talk and observations of affective balance (or the relative balance of happy to angry emotional displays) during free-play in the classroom (Denham et al., 1992), as well as mother-reported aggressive behavior (Laible & Song, 2006). The present study adds to the literature in interesting ways by showing that the unique effects of children's emotion language can be seen up to 2 years later and in challenging tasks that have the potential to stress children's self-regulatory capacities.

Along with children's emotion talk, children's strategy understanding (generation, specifically) also predicted anger expression. Of further interest is that anger expression and regulatory attempts predicted later strategy generation, demonstrating that less anger expression and greater engagement in regulatory efforts, aids children's understanding and ability to verbalize regulatory strategies. However, these relations only existed for one of the two anger-eliciting tasks used in this study, notably the delay task for which the mother was present, though occupied. Strategy generation is surely a more complex skill, requiring the coordination of multiple processes, including expressive language, memory, emotion knowledge, and the interpersonal comfort to verbalize one's ideas in a novel situation with an unfamiliar examiner.

Therefore, as a result of these integrated processes, children should be better equipped to effectively manage their anger in frustrating situations, as was found in this study. It is therefore interesting that the relations only emerged for the task that involved waiting for mother to complete work before opening a gift.

The presence of the mother in this task may have afforded the child additional support as he or she tried to cope with the wait. Mothers may be an organizing (intentionally or unintentionally) and comforting presence in situations that have the potential to frustrate a young child, and therefore a mother's presence may allow children to use their knowledge of regulatory strategies to distract themselves during the wait. However, another important distinction between the two tasks is that one (the Wait Task) required children to inhibit efforts to achieve their goals (open the gift) whereas the other (the Locked Box Task) allowed children to persist in trying to achieve the goal of opening the box. It is possible that these different types of tasks and the different ways that anger functions influenced the relations between strategy understanding, anger expression, and regulatory attempts. Indeed, modulated anger is associated with persisting at trying to open the box in the Locked Box Task (Dennis et al., 2009), and therefore strategy understanding may play less of a role when children are attempting to open the box. However, once children start to realize that their persistent efforts are not successful, then strategy understanding may play a larger role in managing the sadness that might arise as children begin to give up on their goal of opening the box. Indeed, how children handle their sadness during the Locked Box Task (e.g., taking a break by distracting themselves briefly) may be more indicative of their strategy understanding. Also, the Wait Task is longer than the Locked Box and therefore children may be more likely to call on their regulatory strategy understanding to deal with prolonged periods of frustration.

It should be noted that the findings from the present study are inconsistent with cross-sectional work on ER strategy understanding that found child strategy recognition was associated with regulatory behavior during the Locked Box (Cole et al., 2009). Regulatory efforts during the Wait Task were not included in their study so it is unknown whether the relations between strategy understanding and emotion regulation found in the present study would have been upheld. The difference in findings may be a function of the way regulatory behavior was indexed, as Cole and colleagues used frequency as an index of regulatory behavior, whereas the present study used a latent construct of temporal characteristics (i.e., frequency, latency, and duration) as an index of regulatory behavior. Further work is needed to understand this discrepancy in findings.

Clinical Implications

A key component of many preventive intervention programs is helping children use their language skills to understand and communicate about emotions and emotional situations, as well as to promote anger regulation in children, particularly with children from lower income homes (Bierman et al., 2008; Denham & Burton, 1996; Izard et al., 2008). Also, most early intervention programs and cognitive behavior therapies (CBT) view language and talk about inner states as a central mechanism of change. In early prevention programs, for example, children are taught to label and talk about the causes and consequences of their feelings, as well as verbally explore ways of handling frustrating situations and problematic social interactions (Bierman et al., 2008; Havighurst, Harley, & Prior, 2004; Izard et al., 2008). Because interventions often consist of a number of interrelated components, the unique effect of using emotion talk is uncertain.

The present study sheds light on the mechanisms by which the use of emotion language advantages self-regulation. Of interest, recent work has shown that a 6-session community

intervention for parents of children between 4 and 6 years old (i.e., Tuning into Kids) had positive effects on parental emotion talk (Havighurst, Wilson, Prior, & Kehoe, 2010). However, the present study highlights the need to intervene even earlier, as the frequency of emotion references by children as young as 3 years old has important implications for later understanding of regulatory strategies and emotion regulation. In addition, this and future work may help to further pinpoint children who may be more in need of emotion language stimulation than others. Also, future work in this area has the potential to inform intervention for young children by delineating specific strategies that might be taught to parents to accelerate children's growth in emotion talk, and in turn positively impact emotion regulation abilities.

Limitations & Future Directions

The findings suggest that there are additional questions to be asked about the development of emotion language and its relation to children's emotion regulation. Several features of the present study could be improved in ways that would enhance research on this topic. First, although the present study helped to elucidate how mean levels of emotion talk influenced mean levels of children's strategy understanding and emotion regulation, it will be important to examine how growth in emotion talk influences growth in other aspects of emotional competence. Second, changes to the coding of emotion talk could provide a more comprehensive picture of how mother and child emotion language contribute to children's emotion regulation. Specifically, it may be useful to gather more detail about the emotional conversations, including how often mothers and children initiated the emotion talk, how connected and elaborative the conversations were, and how emotions were discussed, in terms of the use of questions to elicit information about emotions and emotional explanations. Much work on internal state language, including emotion discourse, has shown that aspects of mother-child

conversations, such as emotional explanations, elaboration, and connectedness, relate to children's emotion understanding (Ensor & Hughes, 208; Garner et al., 1997; Laible, 2004b; Laible & Song, 2006). Relatedly, language research demonstrates that parents who regularly ask a lot of wh-questions and open-ended questions have children who produce more elaborative narratives (Fivush, 1991; Fivush & Fromhoff, 1988; McCabe & Peterson, 1991).

In addition, an examination of the different emotions discussed (e.g., anger, sadness, fear, happiness) may aid understanding of the gender differences, as well as whether the relations between emotion talk, strategy understanding, and emotion expression can be further delineated based on specific types of emotion references. Indeed, mothers have been known to talk more about anger with sons than with daughters and talk more about sadness with daughters than with sons (Fivush, 1991).

In a similar vein, children's ER strategy understanding should be further investigated in order to more fully understand the links between strategy recognition and generation, as well as the differences between understanding angry and sad regulatory strategies. Cole and colleagues (2009) found that the effects of strategy recognition on children's regulatory attempts in a frustrating task varied by children's understanding of regulatory strategies for anger versus sadness. Relatedly, further examination of children's negative emotional displays is warranted, as children often express multiple emotions challenging tasks (Potegal & Davidson, 2003; Potegal et al., 2003). A functional perspective of emotions implies that children likely use different regulatory behaviors to cope with sadness compared to anger, and this deserves further attention.

Although wordless books are frequently used to elicit conversations about internal states, it is unclear whether conversations that arise during this task are representative of the

conversations that occur in children's daily life. When emotion talk is compared across lab tasks, there is little relation between mother-child emotion language in reminiscing tasks and story-telling tasks (Laible, 2004b). It would seem that tasks that pull for emotion talk that more closely approximate conversations parents and children have in everyday life would be better predictors of child outcomes. Therefore, future work should compare mother and child emotion talk generated in lab tasks to talk that occurs naturally within the home environment in order to more fully understand how relations among emotion talk, children's strategy understanding, and children's emotion regulation vary by context. In a related point, more needs to be understood about the unique contributions of fathers in emotion socialization, and emotion talk in particular. Presumably, fathers also contribute to emotional conversations in children's daily lives. Adams and colleagues (1995) found that children used more emotion words in conversations with fathers compared to mothers during a reminiscing task. It is also known that fathers who were more accepting and responsive to children's expressions of anger and sadness at 5 years old had children who were socially competent at 8 years old (Gottman et al., 1997). Other research has shown that father's socialization of emotional expression is related to boys' social competence in kindergarten and first grade, whereas father's controlling behavior predicts teacher ratings of girls' aggression (McDowell, Kim, O'Neil, & Parke, 2002). Clearly, there is much to learn about the role of fathers in the development of children's emotional competence.

In addition, the families that comprised the sample are under-represented in the literature, which limits the generality of the findings. The focus on families with economic strain was done in an attempt to capture the variability associated with parenting quality, education, and language but without the deleterious factors associated with poverty or the advantages associated with

higher income (Hart & Risley, 1995; Hoff-Ginsburg, 1991). Future research should address the diversity of children and families.

Finally, it is uncertain how both changes and stability in the tasks over time may have influenced the findings. Longitudinal research must continue to grapple with the challenge of using developmentally sensitive measures across a period of rapid growth in language and emotion.

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Vita

Laura Marie Armstrong

EDUCATION

Undergraduate	B.S., Brown University, May 2002 Major: Psychology Magna cum Laude Honors in Psychology
Graduate	M.S., The Pennsylvania State University, University Park, February 2008 Major: Clinical Psychology
	Ph.D., The Pennsylvania State University, University Park, August 2011 Major: Clinical Psychology Program Advisor: Pamela Cole, Ph.D.
Internship	Brown University, Providence, RI, July 2010 – June 2011 A.P.A. approved internship in Clinical Psychology Psychology Resident (Track: Child Clinical)

HONORS AND AWARDS

Graduate	Honorable Mention, Graduate Research Fellowship, National Science Foundation, 2005
	Pre-doctoral T32 Fellow, Child Study Center-Prevention Research Center Integrative Research Training in Early Childhood Mental Health, NIH Public Health Service/National Institute of Mental Health, 2006-2008
	International Conference on Infant Studies (ICIS) Graduate Student Award, 2008
	Society for Research in Child Development (SRCD) Travel Award, 2009
	Pre-doctoral Research Fellowship Incentive Award, Penn State University, 2010
	Bunton-Waller Graduate Award, Penn State University, 2004-2005 & 2009-2010

GRANTS

1. Early childhood emotion regulation: Neurodevelopmental integration across domains
   National Institute of Health/National Institute of Child Health and Human Development
   F31HD063318-01 PI: L.M. Armstrong
   Dates: 5/2010-04/2011 Total Direct Amount: $27,262