What do Words Really Say? An Examination of Associations between Preschool Emotion Language and Emotional Development

Amy Elizabeth Neal

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Julie C. Dunsmore, Committee Chair

Jungmeen Kim-Spoon

Thomas H. Ollendick

Cynthia L. Smith

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Abstract

This study examines associations of emotion language with emotion understanding and emotion regulation during the preschool years. There is evidence that the way parents talk about emotions with their children promotes children’s emotion understanding and regulation (e.g. Bird & Reese, 2006; Laible, 2011). However, there has been little attention paid to associations of these outcomes with children’s emotion language. In this study, I examined associations of children’s emotion language on their emotion understanding and emotion regulation, and tested whether parents’ emotion language was indirectly associated with these outcomes through children’s emotion language. One hundred fifty-six 3- to 5-year-old children participated with their primary caregiver. Parent-child dyads engaged in an emotion-laden conversation to measure parent and child emotion language. Children also engaged in the locked box task (Cole et al., 2009; Goldsmith et al., 1993) to measure emotion regulation and completed the Diagnostic Analysis of Nonverbal Accuracy (Nowicki & Duke, 1994) to measure emotion understanding. Results differed for younger preschoolers (36 – 53 months) compared with older preschoolers (54 – 69 months) in regard to emotion regulation. For younger preschoolers, path analyses indicated an indirect effect in which parent emotion talk was associated with less attention shifting during the locked box task. There was also a direct effect in which children’s greater use of emotion labels was positively associated with emotion understanding. Results may reflect the rapid emotional development occurring during the preschool years and suggest the importance of early emotion socialization.
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Introduction

Emotion regulation and emotion understanding are robust predictors for an assortment of important outcomes for preschool-age children (Denham, 1986; Denham, 2006; Shields et al., 2001). For instance, both emotion understanding and emotion regulation in the preschool years have been linked to school readiness (Denham, 2006; Shields et al., 2001). Additionally, emotion understanding has a reciprocal relationship with social competence (Denham, 1998), which is also known to be vital to development (Denham, 2006; Eisenberg & Fabes, 1992). There is also evidence that greater emotion understanding is associated with greater prosocial behavior in children (Denham, 1986). Additionally, there is growing evidence indicating links between emotion dysregulation and a variety of psychopathologies (Cole & Deater-Deckard, 2009). Taken together, emotion understanding and regulation are important predictors of developmental outcomes. Therefore, it is important to better understand ways to promote these abilities.

The way parents talk about emotions is positively associated with emotion understanding and regulation in preschoolers (e.g. Bird & Reese, 2006; Laible, 2011). For example, parental elaboration and explanations about the causes of emotions during conversations about past events are both associated with preschoolers’ emotion understanding (van Bergen & Salmon, 2010). Also, parents who talk more about empathy have preschool children with greater emotion understanding (Garner, Jones, Gaddy, & Rennie, 1997). Given the importance of parents’ emotion language, it seems likely that children’s emotion language might also play a role in their understanding and regulation of emotions. However, there is very little research that has focused on the language used by children in these conversations. Additionally, the limited work on child emotion language is currently inconclusive. There is evidence of a positive association between
child emotion language and emotion understanding (Laible, 2011; Raikes & Thompson, 2008). However, in one study, only one correlation was found between emotion understanding and three different indicators of child emotion language across two contexts; the other correlations between indicators of child emotion language and emotion understanding were nonsignificant (Laible, 2011).

The purpose of this study is to further investigate the associations between parent emotion language, child emotion language, and child emotion understanding and emotion regulation. First, I will discuss emotion understanding and emotion regulation, with particular reference to the importance of the preschool years. Next, I will describe research on parent-child emotion language, including methods used to examine parent-child discourse and associations with emotion understanding and emotion regulation.

**Emotion Understanding**

Emotion understanding encompasses understanding one’s own emotions, the ability to identify and understand other’s emotions, and the ability to use language to discuss emotions (Denham, 1998; Izard, 2001). The key elements of emotion understanding emerge in the preschool years (Denham et al., 2003; Pons, Harris, & de Rosnay, 2004). This is the time when children begin to identify emotions in both themselves and others. Additionally, children now possess language skills that allow them to discuss both neutral and emotion-laden topics.

Emotion understanding has emerged as a predictor for many important future outcomes. First, emotion understanding has a reciprocal relationship with social competence (Denham, 1998), which is important for both academic performance and social acceptance by peers and teachers (Denham, 2006). There is also evidence that greater emotion understanding is positively associated with a child’s prosocial behavior (Denham, 1986). Longitudinal work...
showed that emotion understanding in preschoolers predicted greater positive behavior at 9 years of age, such as social cooperation and self-control (Izard et al., 2001). Also, a meta-analysis has indicated an association between low emotion understanding and internalizing problems across childhood and adolescence with the effect sizes getting larger with age (Trentacosta & Fine, 2009). Together, the literature supports the idea that emotion understanding plays an integral role in social outcomes including social competence and acceptance (Denham, 1998; Miller et al., 2005) as well as behavioral outcomes such as prosocial behavior and self-control (Denham, 1986; Izard et al., 2001) and internalizing behavior (Trentacosta & Fine, 2009).

The Affective Knowledge Test (AKT; Denham 1986) is the most widely used measure of emotion understanding in preschool children. This task uses puppets to get children to label emotion expressions as well as emotions portrayed in short stories. This task works well for very young children; however, it has demonstrated a ceiling effect around 54 months (Denham, 2006) making it less appropriate for older preschoolers. The identification of another individual’s emotional expression is often used as a measure for emotion understanding across a wider age range (Camras, Periman, Fries, & Pollak, 2006; Nowicki & Duke, 1994). The Diagnostic Analysis of Nonverbal Accuracy (DANVA) is a set of standardized stimuli in which participants identify whether the individual is feeling happy, sad, mad, or scared (Nowicki & Duke, 1994). The DANVA has been used to examine the associations between emotion understanding and social development in preschoolers with higher DANVA scores being associated with greater social competence (Nowicki & Mitchell, 1998). The DANVA can test a variety of nonverbal receiving modes including facial expressions, tone of voice, and postures. Because the standardized administration of the DANVA reduces potential confounds due to experimenter error, it was selected as the measure of emotion understanding for this study.
**Emotion Regulation**

Definitions of emotion regulation typically involve efforts to alter the internal state and/or the outward expression of a felt emotion (Eisenberg & Fabes, 1992). Preschoolers have typically developed several skills, including language, effortful control, and motor skills, that provide for a wider array of regulation strategies than were previously available to them (Cole, Martin & Dennis, 2004). Additionally, Cole and colleagues (2004) point out that the preschool years are when we begin to see children putting these skills together in order to initiate regulatory strategies during situations known to elicit negative emotions.

Like emotion understanding, emotion regulation has emerged as a robust predictor for future outcomes (Denham, 1986; Denham, 2006; Shields et al., 2001). For instance, both emotion understanding and emotion regulation in the preschool years have been linked to school readiness upon entering kindergarten (Denham, 2006; Shields et al., 2001). At-risk preschoolers with higher levels of emotion regulation have better social skills with peers and closer relationships with teachers (Spritz, Sandberg, Maher, & Zajdel, 2010). Additionally, there is growing evidence indicating links between emotion dysregulation and a variety of psychopathologies (Cole & Deater-Deckard, 2009). Taken together, emotion regulation is essential for optimal development, with preschool emotion regulation skills having associations with both behavioral (Cole & Deater-Deckard, 2009; Spritz et al., 2010) and academic (Denham, 2006; Shields et al., 2001) outcomes.

A multitude of options have arisen as potential ways to measure emotion regulation, each with its own strengths and weaknesses. Measures often involve observing behaviors in situations known to provoke specified emotions (e.g., Saarni, 1984) or asking children about their emotion regulation strategies through interviews and/or vignettes (e.g., Cole et al., 2009). Behavioral
observations have typically been thought to provide a more accurate measure of emotion regulation (Adrian, Zeman, & Veits, 2011). Although this is a popular belief, it must also be considered that children become better able to hide behavioral indicators of emotion regulation as they get older. Therefore, observational methods are likely to be more effective when children are younger. Observational methods for emotion regulation remain the most widely used measures of emotion regulation in infants, toddlers, and preschoolers (Adrian et al., 2011).

Reactions to the locked box protocol, which is designed to elicit anger, have been used as a measure of emotion regulation in several studies (e.g. Cole et al., 2009; Dennis, Cole, Wiggins, Cohen, & Zalewski, 2009). In this task, the child is given a locked, clear box with an appealing toy inside. They are also given many incorrect keys that will not unlock the box, making it impossible for them to retrieve the toy. The child is then left to work alone while they attempt to get the toy. This method also provides the opportunity to measure a variety of different behaviors that are commonly used as emotion regulation strategies rather than simply the presence or absence of emotion regulation. Thus, children’s responses to the locked box task were used as the measure of emotion regulation for this study.

The Importance of the Preschool Years

The preschool years are a key time period for emotional development. Emotional development is an ongoing process that begins in infancy with basic understanding occurring in the preschool years and a more complex understanding developing closer to adolescence (Pons et al., 2004). Pons and colleagues (2004) break emotional development into nine components ranging from basic identification of emotions, which is seen in the preschool years, to more complex concepts such as understanding mixed emotions, which is often not mastered until 9-11 years of age. This approach points out the complexities of emotional development. Not only is
there a vast age range in which significant developments are seen, but there are several facets that must be taken into consideration to provide a full understanding.

While emotional development occurs across multiple developmental time periods, there are several advances in emotional development that appear during the preschool years that make this time period especially interesting (Denham et al., 2003). First, preschoolers typically have the ability to identify a range of emotions, both in themselves and others (Denham et al., 2003; Pons et al., 2004). Preschoolers also demonstrate a developing ability to talk about emotions. This is likely due both in part to advances in language development that allow them to use language to discuss emotions as well as advances in general memory. Children also begin to understand the causes and consequences of their emotions and emotion expressions toward the end of the preschool years (Denham, 1998). A child at the end of the preschool years will have a very different understanding of and reaction to emotions than a child just entering this time period. This rapid development makes the preschool years an exciting and informative time to study emotional development. Additionally, the established implications of both emotion understanding and emotion regulation for school readiness (Denham, 2006; Shields et al., 2001) make understanding how these constructs develop and ways to promote their development a potential mechanism to encourage a smooth transition into kindergarten.

Emotion understanding and emotion regulation improve early in the preschool years with preschoolers beginning to easily identifying emotions (Denham et al., 2003). Also, cognitive gains, such as effortful control, aid the development of emotion regulation in preschoolers (Kochanska, Murray, & Harlan, 2000). The rapid change in both emotion understanding (Pons et al., 2004) and emotion regulation (Cole et al., 2009) make the preschool years an ideal time to study how these constructs may be influenced by emotion-laden conversations.
Parent-Child Discourse about Emotions

The use of language has previously been linked to emotional development (Bloom, Beckwith, & Capatides, 1988; Denham, Cook, & Zoller, 1992). Language provides a means for preschoolers to discuss and explore their emotions (Bloom et al., 1988) and provides an extra tool children can use to aid in emotion regulation (Cole, Armstrong, & Pemberton, 2010; Cole et al., 2004). The use of detail in verbal descriptions of emotions increases with age and shows a positive relationship with other measures of social and emotional development, including emotion understanding (Denham et al., 1992). Bloom and colleagues (1988) suggest that language is a mechanism through which young children can express themselves, including their internal emotion states.

Links with Emotion Understanding. The way parents talk about emotions with their children can affect children’s emotion understanding. Children of mothers who discussed empathy more during an emotion discussion task showed higher levels of emotion understanding (Garner et al., 1997). Mothers who more frequently discuss the causes and consequences of emotions have children who are better able to understand how others are likely to feel. However, when mothers label emotions without providing further explanation, children show fewer gains in emotion understanding than when explanations are provided (Garner, Dunsmore, & Southam-Gerrow, 2008; Garner et al., 1997; van Bergen & Salmon, 2010).

Colwell and Hart (2006) found that mothers of preschoolers who engaged in emotional framing were more likely to have children with greater emotion understanding. Emotional framing involves augmenting the use of emotion words through the use of typical emotion expressions (Colwell & Hart, 2006). In other words, when parents showed greater nonverbal
emotional expressiveness when talking about emotions, their preschool children showed greater emotion understanding.

Additionally, parental elaboration about emotions is related to a deeper understanding of emotions (Laible & Song, 2006; van Bergen & Salmon, 2010). This means that parents who help their child expand on the emotions being discussed to create a coherent story of the event have children with greater emotion understanding. Across these different ways of describing parents’ emotion talk – explanations, framing, and elaboration – results indicate that parents’ deeper engagement in talk about emotions with their child is linked to child emotion understanding.

Although there is far less research examining child emotion language than there is examining parent emotion language, there is a growing body of literature to indicate an association between child emotion language and emotion understanding. Fabes, Eisenberg, Hanish, and Spinrad (2001) found that peers better liked children who used more emotion language. Additionally, children’s use of explanations for emotions is positively related to their engagement in prosocial behavior (Garner et al., 2008). Because children who are higher in socio-emotional competence typically have better social skills (Denham, 1998) and exhibit more prosocial behavior (Denham, 1986), these findings suggest a possible association between children’s emotion language and their emotion understanding. Fabes and colleagues (2001) suggest that their results may indicate that deeper discussion of emotion (e.g. explanations) may provide children with an understanding of how emotions influence social interactions.

Additionally, Raikes and Thompson (2008) found a positive association between at-risk preschoolers’ use of emotion words and emotion understanding. Thompson (2010) further examined associations between attachment, child emotion language, and emotion understanding.
in the same at-risk sample, finding that the association between attachment and emotion understanding was mediated through the child’s use of emotion language for preschoolers in Head Start programs. Thompson (2010) suggested that a secure attachment provides an environment in which preschoolers are able to discuss their emotions and build a better understanding. Thus, children’s greater use of emotion words may aid their development of emotion understanding and social skills as well as play a mediating role for more distal influences.

**Links with Emotion Regulation.** As with emotion understanding, there is evidence that parent emotion language helps children learn how to regulate emotions. Greater parental elaboration during conversations about emotions is related to greater emotion regulation in the child (Fivush, 2007; Fivush, Haden, & Reese, 2006). This is thought to be especially true when discussions were about stressful events (Fivush, 2007). Additionally, parents report that they talk about emotions with their children because they believe it will help them develop emotion regulation skills (Kulkofsky & Koh, 2009).

Although there is not yet conclusive evidence, there is reason to believe that child emotion language during emotion-laden conversations would be related to emotion regulation. Cole and colleagues (2010) suggest that children use language as a way to aid in their regulation of difficult emotions. In other words, they may talk themselves through the emotion in order to regulate their experience and/or behaviors. Therefore, it seems that the more children talk about emotions, the better they may be able to regulate their emotions in the moment. This suggests that children who talk more about emotions may have better emotion regulation than those who talk less about emotions.
**Methods used to Examine Parent-Child Discourse.** Parents discuss emotions with their children in a variety of contexts throughout daily activities. Unfortunately, researchers are not privy to the full extent of conversations parents and children have. The storybook task and the autobiographical memory task have been two common tasks used in research settings to engage parents and preschool-age children in discussion about emotion.

The storybook task involves having the parent and child read a wordless picture book together. A variety of books have been used, but a common characteristic is that the book is likely to elicit emotion-laden conversations. Example stories include a child losing and later rescuing a pet (Laible & Song, 2006) or a family outing (Garner et al., 2008). In this task, the dyad has to create the story that goes with the pictures (Brown & Dunn, 1991; Colwell & Hart, 2006; Garner et al., 2008; Garner et al., 1997; Laible, 2004; Laible & Song, 2006). Researchers can then code the story created for reference to emotions and conversation style.

Associations between conversation style and emotional development are also examined using the autobiographical memory task (Bird & Reese, 2006; Laible, 2004; Laible, 2011; Laible & Song, 2006; Reese & Fivush, 1993). In the autobiographical memory task, children are asked to discuss memories with either a parent or experimenter. Autobiographical memory is generally thought of as an explicit memory that one has of a specific instance or event (Nelson & Fivush, 2004). Children are believed to develop autobiographical memory throughout the preschool years with noticeable gains beginning at 3 years of age (Farrant & Reese, 2000; Nelson & Fivush, 2004). Similar to the storybook task, autobiographical memory conversations can be coded for reference to emotions and conversation style.

In studies including both the storybook and autobiographical memory tasks, there have been mixed results. When both the storybook and autobiographical tasks were used, children’s
emotion understanding was associated with parents’ elaboration during the autobiographical memory tasks, but no association was found between emotion understanding and parents’ elaboration style during the storybook conversations (Laible, 2004; Laible & Song, 2006). Initially, no association was seen between the storybook task and emotion understanding (Laible, 2004). However, a subsequent study found that shared positivity during the storybook task was associated with preschoolers’ emotion understanding (Laible and Song, 2006).

The storybook task has the advantage of controlling for story context across all dyads. However, this added control might actually hinder the conversations because they may not be as relevant to the child. The dyad may not engage in the same depth of conversation they might if they were discussing the child’s actual experience. This is essential because explanation of the causes and consequences of emotions promotes a deeper understanding of emotion than labeling emotions without providing an explanation (Garner et al., 1997). Thus, greater depth of conversation may be needed to see the most meaningful influences on emotional development. Because of this, an autobiographical memory task was used in this study to elicit parent-child conversations and measure parent and child use of emotion language.

**Summary.** As the above review shows, research strongly supports the importance of parents’ emotion-related discourse in children’s developing emotion understanding and emotion regulation. There has been less focus on children’s emotion-related discourse. Existing studies on child emotion language are sparse and provide inconclusive evidence (Denham et al., 2003; Fabes et al., 2001; Laible, 2011; Raikes & Thompson, 2006).

Adult communication partners often match each other’s verbal behavior during conversations (Gonzales, Hancock, & Pennebaker, 2010). Therefore, when parents are providing greater emotional content during a conversation, children may also be engaged in more emotion
language. Should this be found, opportunities for parent training could be explored in future research as an early intervention strategy that would promote child discussion of emotion and, thus, emotion understanding and regulation.

**The Proposed Model**

The purpose of this study was to determine if child emotion language is associated with emotion understanding and emotion regulation during the preschool years. This study used the autobiographical memory paradigm to engage preschoolers in conversations about emotion-laden events they have experienced. The proposed model is summarized in Figure 1. I hypothesized that child emotion language would partially mediate the association between parent emotion language and the two emotion outcomes, with child emotionality also moderating the relation between child emotion language and emotion regulation. Child age, language ability, and gender were used as covariates when analyses indicated any significant associations with the constructs in the model. Child age and language ability were included as covariates to ensure findings were not a result of maturation or general language skills, respectively. Gender was included because there are often gender differences in emotion expression (Chaplin & Aldao, 2013).

The language that parents use when they talk to their children about emotions is a predictor for children’s emotional development (Fivush, 2007; Garner et al., 1997; Laible, 2011; Raikes & Thompson, 2006; van Bergen & Salmon, 2010) that was expected to show an indirect influence on emotion understanding and emotion regulation through children’s emotion language. Indicators for parents’ emotion language were proposed to be the use of labels and explanations following previous research indicating they are associated with emotional development (Garner et al., 1997; van Bergen & Salmon, 2010).
My focus on children’s emotion language is novel. I predicted that greater discussion of emotions by children would be related to greater emotion understanding and emotion regulation. Additionally, I hypothesized that child emotion language would partially mediate the known relations from parent emotion language to child emotion understanding and emotion regulation. Similar to parents’ emotion language, the proposed indicators for children’s emotion language were the use of labels and explanations. Indicators for children’s emotion understanding were the ability to correctly identify emotions expressed through both facial expression and tone of voice. In regard to emotion regulation, Cole and colleagues (2004) note that an important feature of emotion regulation is to allow individuals to persist through challenges. Therefore, the proposed indicators for children’s emotion regulation were focus on the task and persistence to retrieve the toy during the locked box task.

I also expected that the child’s emotionality would moderate the association between child emotion language and emotion regulation. This hypothesis was considered exploratory because previous research has not examined how behaviors may interact with emotionality to promote emotion regulation. Children who experience less emotion need to engage in less emotion regulation in order to appropriately regulate their negative emotion. In contrast, children who are high in emotionality will need greater emotion regulation skills to regulate their frustration. However, children who need greater emotion regulation and engage in greater discussion of emotion (hypothesized to increase regulation ability) may show the highest levels of emotion regulation. The proposed indicators for emotionality were anger and sadness because those are the emotions most likely to be elicited by the locked box task.

Last, I expected the two outcomes, emotion understanding and emotion regulation, to be correlated with each other. Both constructs are facets of the child’s overall emotional
development, and they are associated with other outcomes (e.g. school readiness) in the same way. Therefore, a positive correlation between emotion understanding and regulation was expected.
Method

Data for this study were collected as part of a larger study to investigate multiple facets of parental emotion socialization in preschoolers. Table 1 presents all tasks that were used with those included in the analyses for this study in bold. Data collection took place in the Children’s Emotion Lab at Virginia Tech.

Participants & Recruitment

Preschoolers 3 to 5 years of age, along with a primary caregiver, were recruited. All children who participated had not yet started kindergarten. A total of 156 dyads visited the lab. One bilingual dyad spoke to each other in Spanish during the emotion talk task; a translation of their conversation was used for coding and analyses. Two dyads were excluded from analyses because the parent instructed the child to talk in English during the emotion talk task even though it was clear the child was not comfortable talking to the parent in English. Thus, the final sample for analyses consisted of 154 dyads. Distribution across ages was relatively even; however, there were the most 3-year-olds and the least 5-year-olds. Gender was evenly distributed with 77 girls and 77 boys. Table 2 provides a detailed breakdown of age and gender distribution.

Table 3 provides the full demographic information about the sample. The sample was predominantly Caucasian and predominantly middle or upper class. Most children lived with two parents, and children participated predominantly with mothers.

Families were recruited in the Blacksburg, VA area using flyers (Appendix A), online message boards, email groups, a database of previous participants, and a commercial mailing list. Parents received a $10 gift card as compensation for time, and children were given two small toys to take home during the last task. Childcare was provided for any siblings attending the
Recruitment efforts targeted family friendly locations and organizations such as Head Start programs, daycare centers, playgrounds, children’s gyms, women’s centers, and local universities. Interested families were given information about the study and scheduled for a visit via phone or email, depending on their expressed preference. After a visit was scheduled, families were mailed an appointment reminder, information about event selection for the emotion talk task, and a questionnaire.

Procedure

Families visited the Children’s Emotion Lab at an agreed upon time for participation. They were greeted outside and given a parking pass. The study was explained to the parent during the consent process (Appendix B). Once parental consent was received, the experimenter briefly explained the tasks to the child and asked for verbal assent (Appendix C). After receiving parental consent and child assent, the experimenter began the tasks described below as well as the tasks for the larger study; the order and brief description of all tasks is provided in Table 1. Children were given two small toys as the last step of the protocol. The parent was given the gift card and signed a receipt before leaving the lab. The experimenter ensured each child left in a neutral or positive mood and escorted the family back out to their vehicle.

Measures

Demographics. Parents completed a demographics form to assess various demographic characteristics of the child, the attending parent, and the child’s other parent (Appendix D). Questions ranged from age and ethnicity to education and work status. One parent did not complete the demographic questionnaire.

Clinical Evaluation of Language Fundamentals Preschool – Second Edition (CELF Preschool-2; Semel, Wig, & Secord, 2004). The CELF Preschool-2 is a standardized language
measure for preschoolers 3- to 6-years-old in which the experimenter proceeds through a series of scripted tasks that target several areas of language ability. This measure was used as a covariate to ensure that the results are an indication of emotion language and not general language ability.

The standardized scoring protocols provided for each subscale were followed (Semel et al., 2004). The CELF Preschool-2 has been extensively tested for both reliability and validity. During scale development inter-item reliability was tested for each subscale with a different alpha being calculated for every 6-month age interval. Cronbach’s alphas for all subscales are greater than .8 for 3 to 5 year olds. Additionally, agreement between scores was at least 95% for all subscales that required subjective scoring. The CELF Preschool-2 has moderate to high correlations ($r \geq .55$) with other versions of the CELF and strong correlations ($r = .73 - .76$) with the Preschool Language Measure (Semel et al., 2004).

The CELF Preschool-2 examines multiple facets of language; the standard scores for core language, expressive language, and receptive language were considered as possible covariates. These standard scores were all highly correlated ($r \geq .77$) and were correlated with the other variables in a similar direction. When there were differences in how the three language scores correlated with other variables, core language was usually correlated with the other variable and one or both of the other two were not. Therefore, core language was selected as the language covariate to be used in analyses. Core language includes an understanding of sentence structure, word structure, and expressive vocabulary. One child did not have a receptive language score; it was left as a missing score because receptive language was not included in the analyses. One child did not complete the CELF and did not have language scores; a mean substitution was used.
for core language because the estimation used in the final analyses does not allow missing data for any covariates.

**Parent-Child Emotion Talk Task.** Each parent-child dyad was asked to engage in two autobiographical memory conversations about emotion-laden events. One of the conversations was about an event when the child was happy and the other was about a time when the child was upset. The ordering of these two conversations was counterbalanced to control for order effects. This task was explained to parents prior to scheduling, in a letter mailed home after scheduling, and during the visit. The explanations provided guidelines to help the parent select events that fit certain criteria and help parents start thinking about events to discuss prior to arrival. To be consistent with previous research using the autobiographical memory task, dyads were asked to not talk about events that often become routine (e.g. birthdays) or events that have their own script such as a movie (Bird & Reese, 2006; Farrar, Fasig, & Welch-Ross, 1997; Haden, Haine, & Fivush, 1997). Avoiding these types of events makes it more likely the dyad will discuss the child’s experience during the event. For example, it would be easy for a discussion about a movie they saw to focus on the movie’s plot and not the child’s experience. Parents were also provided with popular topics to aid in event selection. The example topics were visiting grandparents or outings such as a sporting event or museum for happy events and a separation from a parent or a disagreement with a friend for times when they were upset (Haden et al., 1997).

The parent was instructed to talk to the child in a natural manner just as they would at home. The dyad was left alone in the room and given two and a half minutes to discuss each event; they were prompted with a soft knock on the door when it was time to switch events. A
card was provided to the parent that summarized the instructions, selected events, and the order in which the events should be discussed (Appendix E).

The conversations were transcribed to allow for coding of both parent and child emotion language. The coding identified each emotion label used and then determined if an explanation was provided for the emotion label (Cervantes & Callanan, 1998; Appendix F). Three coders were trained, and 26% of transcripts were coded for reliability by all coders. Labeling an emotion was any mention of an emotion whether or not additional information is provided (κ = .97 for both parents and children). Explanations included causes of the emotion, behavioral results of emotion, interventions to cope with the emotion, and elicitation to provide more information about the emotion. The hypotheses for this study involve explanations as a whole; therefore, a composite of the four types of explanations was created (κ = .89, parents; κ = .88, children).

**Locked Box Task.** The locked box task is a measure to elicit anger that has been adapted from the Laboratory Temperament Assessment Battery – Preschool Version (PS Lab-TAB; Goldsmith, Reilly, Lemery, Longley, & Prescot, 1993). It can be used as a childhood measure of both emotion regulation and emotionality (Cole et al., 2009; Dennis et al., 2009). Children were asked whether they would rather play with a Buzz and Woody toy or a prince and princess toy. The toy that was not selected was placed out of the child’s sight; the selected toy was placed in a transparent box. The experimenter then closed the box and put a lock on the box. She then demonstrated to the child how to insert a key into the lock and turn the key to open the lock. The experimenter then gave the child the locked box and keys, instructing the child to use the keys to open the box. The experimenter then left the room for 4 minutes while the parent remained in the room with the child. However, the correct key was not on the ring of keys given to the child,
making the task impossible. Parents had previously been asked not to assist the child with the lock and to say they could not help right now if the child requested assistance. The researcher returned with the correct key after 4 minutes and allowed the child time to play with the toy and return to a positive or neutral affect.

The child’s responses were coded for both emotionality (Appendix G) and emotion regulation (Appendix H). Two separate coding teams coded emotionality and regulation; 20% of the sample was coded for reliability. All codes provided in the manuals (except fear) were coded, and an ICC of at least .70 was attained. The one exception is that fear could not be coded because it occurred too infrequently for reliability to be reached. The behaviors were coded using the same 5-second epochs for both emotionality and regulation coding; the average across all epochs was used in analyses.

The emotionality codes expected to be elicited by the locked box and planned for the analyses were anger (ICC = .83) and sadness (ICC = .89). Emotionality was coded based on facial, body, and vocal indicators of these emotions on a scale of 0 (no emotion) to 3 (intense emotion) based on Lab-TAB (Goldsmith et al., 1993).

The locked box task was also coded for several behaviors that indicate emotion regulation. There were several behaviors coded that could be relevant to the hypotheses. First, persistence (ICC = .96) and focus were included in the proposed model. Persistence was coded on a 0 – 2 scale indicating how much time the child was actively trying to open the box during each 5-second epoch. Focus was coded as either focus without vocalizations (ICC = .92), focus with task relevant vocalizations (ICC = .96), or focus with task irrelevant vocalization (ICC = .80); all types of focus were coded as either absent (0) or present (1) for each 5-second epoch. A composite of these three codes was made to provide a variable indicating the child’s focus on the
locked box. Attending to the parent (ICC = .96) and distraction were additional codes that are often used to indicate emotion regulation and were ultimately used in the analyses. Distraction was coded as either being visual distraction (without vocalizations; ICC = .97) or verbal distraction (with vocalizations; ICC = .91). Attending to parent, visual distraction, and verbal distraction were all coded as either absent (0) or present (1) during each 5-second epoch. A composite of these three codes was created to provide a variable indicating when the child shifted focus away from the locked box.

**Diagnostic Analysis of Nonverbal Accuracy** (DANVA; Nowicki & Duke, 1994). The DANVA was used to measure the child's emotion understanding across two modalities: facial expression and tone of voice. Both modalities were presented to children using a laptop computer; the ordering of the modalities was counterbalanced to control for order effects. The experimenter used verbal and visual prompts to direct the child’s attention to the computer prior to displaying an emotion stimuli. For facial expression, children were briefly (2 seconds) shown a picture of an individual and then prompted as to whether the person was happy, sad, mad, or scared. Each child was shown 24 photographs of people displaying typical emotional expressions. The tone of voice test involved playing 24 audio clips of a person saying the sentence, "I'm going out of the room now, and I'll be back later." The tone of voice used to say that sentence varied for each clip. Again, the child was asked to identify each person as happy, sad, mad, or scared.

The DANVA manual provides scoring information (Nowicki & Duke, 1994). Each response was scored as correct if the child correctly identified the emotion expressed and incorrect if any other response was given. Children were prompted multiple times (e.g. “Which do you think?”) if they responded they did not know. If children saw the emotion stimuli and
only answered they did not know, it was coded as an incorrect response. It was considered missing data if they did not see or hear the emotion stimuli. This occurred most often due to child refusal or distraction, but occasionally due to computer error. Correct responses were given a 1 and incorrect responses were given a 0, yielding a score between 0 and 24 for each modality and an overall total score between 0 and 48. If children missed no more than one item on either faces or voices, their scores were prorated. Faces scores were prorated for 2 children, and voices scores were prorated for 5 children. If children missed multiple emotion stimuli, they were not given a score on the DANVA. Seven children did not receive a score for faces; nine children did not receive a score for voices. Four of those children did not receive a score for either; therefore, 12 children did not receive a total DANVA score. FIML estimation was used, which allows inclusion of participants with missing data on endogenous variables.

The DANVA has been used in many studies and has shown evidence of reliability and validity. Studies of criterion validity have demonstrated that children who make more errors on the DANVA have lower social competence (Nowicki & Mitchell, 1998). Construct validity has been demonstrated by moderate to strong correlations between the modalities and a previous version of the DANVA. Nowicki and Carton (1993) found sufficient inter-item reliability ($\alpha \geq .7$) for children 2.8 years to 5.11 years. Despite the previous evidence of reliability, the inter-item reliability was low for this sample. Cronbach’s alpha was calculated using the scored responses (correct or incorrect) for faces, voices, and the two subtests combined ($\alpha = .56$, $\alpha = .45$, $\alpha = .62$, respectively).
Results

Preliminary Analyses

Descriptive statistics were first examined to check for normality. Table 4 provides the descriptive statistics for all variables considered for analyses. Many variables from the emotion talk task and locked box tasks demonstrated high skew and kurtosis; a z-test was used to determine which were significantly different from a normal distribution (Kim, 2013). A square root transformation with a base of 1 was used for any variables found to violate normality prior to their use in any analyses (Hopkins, 2002; Osborne, 2002). These included parent and child labels and explanations, sadness, focus, distraction, attending to parent, and the composite of distraction and attending to parent. Even after the transformation, child explanations continued to have high skew and kurtosis. Therefore, a categorical variable was created that identified children as either explainers (used at least one explanation) or nonexplainers (did not use any explanations).

Next, correlations between the variables (see Table 5) were examined to initially observe patterns between variables and determine what covariates were needed. Correlations indicated that child age was related to most other variables; therefore, it must be included in the models tested. T-tests were performed to test for child gender differences and determine where gender would be needed as a covariate. Sadness ($t(152) = 2.86, p = < .05$) and looking toward their parent ($t(152) = 2.90, p < .05$) during the locked box task showed significant gender differences, with girls showing more sadness and looking at parents more often. Language abilities were correlated with several variables including anger, distraction, and DANVA faces. As discussed above, core language was chosen as the index for the language ability covariate.
The correlations also indicated there may be some concerns fitting the proposed model. For example, the high correlations between emotion labels and explanations for both parents and children could indicate linear dependency. The lack of a significant correlation between anger and sadness also indicates it may not be appropriate to use these two variables as indicators of the same construct (negative emotionality). Lastly, both focus and persistence had a positive correlation with anger, indicating they are not appropriate indicators for emotion regulation. These concerns will be discussed in greater detail below when fitting the measurement model.

**Statistical Analyses**

Mplus 7.11 was used to test the proposed model and all subsequent models. There was very little missing data (discussed above), and Little’s MCAR test (Little, 1988) indicated that missing data was missing completely at random. Therefore, full information maximum likelihood (FIML) estimation was used. This method of estimation uses all available data without imputing missing data. FIML does not allow missing data on covariates because assumptions (e.g., normality) are not made about variables not actually in the model. Therefore, mean substitution was used for the one child who did not receive a core language score. Bootstrapping with 1000 resamples was used for all models because of the hypotheses regarding indirect effects (Preacher & Hayes, 2008). This method resamples the data and tests the indirect effect for each sample.

Model fit was determined by multiple fit indices. The $\chi^2$ goodness of fit, root mean square of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis Index (TLI) are reported for each model. The null hypothesis for the $\chi^2$ goodness of fit test indicates consistency with the covariance matrix; therefore, a nonsignificant $\chi^2$ indicates that the model fits the data well (Kline, 2011). RMSEA is an indication of the discrepancy between the
population and sample with lower values indicating better fit; a RMSEA of .05 or less is used to indicate good fit (Kline, 2011). Both the CFI and TLI compare the target model to the baseline model and increases as the target model fits better than baseline (West, Taylor, & Wu, 2012). Both CFI and TLI get larger as the model has better fit, and values greater than .95 indicate that the model fits the data well (West et al., 2012).

**Testing the Proposed Model**

**Measurement Model.** A measurement model in which latent constructs were identified and all correlated with each other was first tested. As mentioned above, the correlations indicated there might be some difficulties with fitting the measurement model. The biggest concern for fitting a measurement model was the high correlation between labels and explanations, especially for parents ($r (153) = .84, p < .05$). The indicators for a given construct should be correlated to indicate they are part of a unified construct. However, when they are too similar there is linear dependency between the indicators, or one indicator is a linear combination of the other. Linear dependency between indicators can cause the covariance matrix to be not positive definite, which does not allow estimation (Kline, 2011). This did occur when the measurement model was tested. Therefore, it was not possible to fit the model as proposed.

**Redefining the Constructs.** Given the correlations and linear dependency between parent emotion language indicators, a path model is a better method to examine the constructs than a full structural model. Not only does a path model address linear dependency by only using one indicator, but it can also address the concerns about the proposed indicators for negative emotionality and emotion regulation. However, one challenge with using a path model is determining which of the available indicators, or composite of indicators, should be used.
First, I will address the indicator to be used for emotion language. The indicators used for parent and child emotion language should be analogous to each other. A composite of labels and explanations could not be used for two reasons: (1) they are linearly dependent for parents and (2) despite being mathematically similar the indicators are conceptually dissimilar enough that adding them together could be problematic. It would not be possible to interpret a composite of labels and explanations; a high score could mean the individual either used a lot of emotion labels or used a combination of emotion labels and explanations. Therefore, either labels or explanations alone needed to be used as the indicator. There was very low variability in the use of child explanations, causing the variable to become dichotomized for analyses. This indicates that child explanations would be less appropriate for further analyses than child emotion labels. Therefore, only emotion labels will be used as the indicator for parent and child emotion language.

The next construct to consider is emotion regulation. It was initially proposed that focus and persistence would be indicators of effective emotion regulation. However, the correlations indicate the opposite. A positive correlation was seen between anger and both focus ($r (153) = .44, p < .05$) and persistence ($r (153) = .58, p < .05$). There should be a negative association with anger if a behavior is down-regulating emotion. These positive correlations suggest that neither focus nor persistence were effective strategies for regulating emotion or indicative of internal regulatory strategies. Therefore, other behaviors commonly thought to down-regulate negative emotion were considered. Distraction is a commonly used emotion regulation strategy in the emotion regulation literature (Calkins & Johnson, 1998; Cole et al., 2009; Eisenberg & Fabes, 1992). Therefore, a measure of children shifting their attention away from the frustrating task was desired. The codes that represented this behavior were distraction and attention toward
parent. A composite of these was created and used in further analyses as the indicator for emotion regulation. This new “look away” variable indicates when children shifted their attention away from the frustrating task, whether toward their parent or another object in the room. Distraction, looking at their parent, and the composite were all negatively correlated with anger, suggesting that these strategies did aid with children’s emotion regulation. For this reason, looking away (whether toward the parent or another object) will be the emotion regulation indicator used in the following path models.

Next, the possible indicators to be used for negative emotionality were examined. The proposed indicators were anger and sadness during the locked box task. Anger and sadness could not be added together to form a composite because the nonsignificant correlation between the variables indicates that anger and sadness are not representative of the same latent construct during the locked box task. The correlation between anger and sadness was not significant ($r$ (153) = -.13, $p = ns$); however, it does suggest an inverse relationship. Therefore, not only does this suggest the observed emotions are not part of the same latent construct, it would be difficult to interpret results from the composite score. In selecting between anger and sadness as the indicator for emotionality, anger was determined to be the better indicator. The primary reason for selecting anger was that the locked box task is specifically designed to elicit anger (Goldsmith et al., 1993). An added benefit of using anger is that it had a better distribution and did not show gender differences. Therefore, anger during the locked box was used as the indicator of emotionality in subsequent analyses.

For emotion understanding, variable selection was straightforward. The DANVA is designed in such a way that each modality can be used individually or in conjunction with another modality by creating a composite variable. Using the two modalities as separate
indicators was proposed in the initial structural model; however, a composite of faces and voices was created for use as the indicator of emotion understanding for the following analyses.

In sum, the associations between the indicators did not allow moving forward with the proposed model as it was originally specified. Therefore, I changed from a structural model approach, with multiple indicators for each construct, to a path analysis, with single indicators for each construct. The indicators being used for some of the constructs also changed. A summary of the indicators that were used in subsequent models can be found in Table 6. Emotion labels used is now the only indicator for parent and child emotion language instead of both emotion labels and explanations. Emotion regulation is operationalized as shifting attention away from the locked box, and emotionality only includes anger during the locked box task. Lastly, emotion understanding is now represented by a total score of all faces and voices identified correctly.

Alternate Models

Three alternate models, along with nested model comparisons of the third model, were tested; fit statistics for all models can be found in Table 7. The first was a path model testing the proposed associations between variables (including any needed covariates) using the new indicators discussed above. This alternate model suggested age was responsible for much of the variability in the data. A second alternate model was thus tested to further investigate these associations at different ages. A third, more parsimonious model in which the interaction between child emotion labels and emotionality was removed was also examined; nested models were used to test for invariance across ages.

Model 1. The first alternate model remained very similar to the proposed model. The associations between variables were not altered; only the indicators were changed as discussed
above. Age was included as a covariate for child emotion labels, emotion understanding, and emotion regulation due to significant correlations with these variables. This model can be found in Figure 2. The chi-square and CFI were the only fit indices that indicated the model fit the data well (see Table 7); therefore, the model showed poor fit and additional alternate models were examined. Although the model is not fully interpreted because of poor fit, it does suggest that age accounts for much of the variance in emotion understanding and emotion regulation. Therefore, the next model took a different approach to age differences in an effort to improve model fit.

**Model 2.** The first path model covaried child age. In this second alternate model, I considered whether there may be an interaction in which the relations between emotion labels and the outcomes differ across ages. Thus, this alternate model used age as a moderator to further examine age differences. The model tested the same associations between constructs; however, it compared younger preschoolers to older preschoolers. This allowed me to see whether and how the associations between constructs differ for younger and older preschoolers.

The sample was divided into two groups. The younger group included children 36 months to 53 months, and the older group included children 54 months to the oldest child in the sample (69 months). This cutoff was selected for the sample because it both captures a developmental transition and divides the sample relatively evenly. There are 81 children in the younger group and 73 in the older group. Descriptive statistics and correlations for the variables in the model and potential covariates within each age group are provided in Tables 8 and 9, respectively. Language is correlated with DANVA scores in both age groups and was used as a covariate. There were also significant gender differences for looking away from the locked box in the older group ($t(71) = 2.64, p < .05$). For this reason, gender was also used as a covariate in the model.
This model is represented for both younger and older preschoolers in Figures 3a and 3b, respectively. This model did fit the data well across fit indices (see Table 7). Examination of this model indicated that the interaction between child emotion labels and emotionality was not significant. Although this model fit the data well, the exploratory nature of the interaction hypothesis warranted consideration of a more parsimonious model. First, the hypothesized interaction was exploratory; a model without the interaction is more analogous to previous research. There is evidence of emotionality and emotion regulation interacting to influence other outcomes (Eisenberg & Fabes, 1992); however, there is no known evidence of emotionality interacting with other behaviors or skills to promote emotion regulation. Additionally, parsimonious models are preferred when multiple models are theoretically plausible and show similar fit (Kline, 2011; Wu et al., 2010). The hypothesis was exploratory, and the model demonstrated that the interaction was not providing information about the associations between child emotion labels and emotionality. Therefore, a more parsimonious model that did not include the interaction was tested.

**Model 3.** To summarize, in the first alternate model, I changed to a path model approach and altered the indicators being used. In the second alternate model, age was viewed as a moderator instead of a covariate. This model removed the interaction between child emotion labels and emotionality to examine a more parsimonious model. The interaction was hypothesized based on the expected association between child emotion labels and emotion regulation. Not only was the interaction not significant in any model, but the direct effect of child emotion labels was not significant for the older group. Therefore, I wanted to examine the more parsimonious model. Although the interaction was removed, emotionality remained in the model as a covariate. Not only do the correlations support the use of emotionality as a covariate,
there is previous evidence that emotionality affects emotion regulation in multiple ways (Eisenberg & Fabes, 1992).

A two-group model was tested to determine if younger and older preschoolers had the same pattern of relationships between the constructs. All indices indicated that the model fit the data well (see Table 7). This model showed an equivalent fit as the second alternate model. This third model was selected because it is more analogous with previous research and more parsimonious models are preferred when fit is similar between the two models (Kline, 2011; Wu et al., 2010). Nested model comparisons were used to determine if there was invariance across age groups. All paths were free to vary across age groups making this the least restrictive of the nested models.

**Invariance Across Groups.** Each nested model imposed invariance on one additional path until the difference in $\chi^2$ indicated the restriction significantly worsened model fit. Table 10 provides the nested model comparisons. Due to my focus on child emotion language, direct effects including child emotion labels were restricted first. Additionally, paths were restricted in the order of their proposed causal direction. The most restrictive model that did not significantly worsen model fit demonstrated invariance across age groups on the direct effects of parent emotion labels on child emotion labels and child emotion labels on emotion understanding; this was selected as the final model.

**Final Model**

The final model imposed invariance across age groups on the direct effect of parent emotion labels on child emotion labels and child emotion labels on emotion understanding; invariance on additional pathways significantly worsened model fit. This model is represented in Figures 4a and 4b for younger and older preschooler, respectively. There was a main effect for
parent emotion labels on child emotion labels for both younger (b* = .502, p < .05) and older preschoolers (b* = .435, p < .05). Children’s use of emotion labels was also positively associated with emotion understanding for both younger (b* = 172, p = .05) and older preschoolers (b* = .220, p = .05). There was a negative association between child emotion labels and emotion regulation for younger preschoolers (b* = -.293, p < .05), but the effect was nonsignificant for older preschoolers. There was also a significant indirect effect of parent emotion labels on emotion regulation (b* = -.147, p < .05) for the younger preschoolers. In other words, children used more emotion labels and looked away from the locked box less when their parents used more emotion labels. The indirect effect of parent emotion labels on emotion regulation was not significant for the older preschoolers (b* = .025, p = ns), and the indirect effect of parent emotion labels on emotion understanding was not significant for either younger (b* = .086, p = ns) or older preschoolers (b* = .096, p = ns).

There was not a direct effect of parent emotion labels on emotion understanding or emotion regulation for either age group. Lastly, emotion understanding and emotion regulation were not significantly correlated for either group.
Discussion

The purpose of this study was to examine how child emotion language, in addition to parent emotion language, may influence emotion understanding and emotion regulation during the preschool years. The results highlight both the influence of emotion socialization and the importance of better understanding the influence of emotion socialization across this developmental time period. To better understand the age differences and the impact on the results, it is important to first think about the influence of age on the constructs measured and characteristics of the ages included in each group. First, I will discuss how age was related to the constructs and how this influenced model changes. Next, I will discuss the developmental differences for the younger and older age groups that were used to explore age differences. This will be followed by a discussion of each hypothesized path in the model. Next, I will discuss how the indicators were changed from the proposed model. Lastly, I will end with a discussion of strengths, limitations, and future directions.

Influence of Age

There is rapid change throughout the preschool years, which is evident in both previous literature and the data from this study. Initially, I planned to use age as a covariate to ensure results were not due to maturation alone. However, the data suggested that it might be worthwhile to explore age differences as a moderator. First, age was correlated with most child variables in the model. Correlations indicated that older children were more likely than younger children to use emotion labels during the emotion talk task. Additionally, child age was associated with most variables in the locked box task. Older children showed greater anger, focus, and persistence but less distraction and attention to their parent. Older children also showed greater emotion understanding across both modalities of the DANVA. Child age was
not correlated with the emotion labels or explanations used by parents during the emotion talk task. The correlations alone indicated that the constructs in the model are highly related to age. This was also supported in the first path model, which indicated age was the strongest predictor for both emotion understanding and emotion regulation. I wanted to further determine how age influenced the associations between emotion language and emotion development. Therefore, age was used as a 2-group moderator to test for equivalence across age. The results indicated that there was a lack of equivalence across groups for associations with emotion regulation; emotion labels only influenced emotion regulation for the younger preschoolers.

**Younger and Older Preschoolers.** The sample was split at 4.5 years to include age as a moderator for the model. This is a developmentally appropriate age because several changes are seen around that age or a little later. There is advancement in children’s emotion development between 3 and 5 years of age (Pons et al., 2004). Younger preschoolers can typically identify basic emotion expressions, but they are not able to understand more complex aspects of emotion such as causes and consequences. In contrast, most children are not only able to label emotions but also understand the causes, consequences, and how emotions can vary across situations by 5 years of age (Pons et al., 2004). They also begin understanding that they can control their emotions (Cole et al., 2009; Denham, 1998).

There are also more general shifts in children’s development that separate these age groups. For instance, there is a shift in a child’s sense of self around this time (Harter, 2003). Younger children (2-4 years) are likely to describe themselves using concrete observable features (e.g. hair color); whereas, older children (5-7 years) are more likely to use competencies (e.g. smart) to describe themselves. There is also a shift in how children think that begins around 5
years of age with children beginning to better understand causal reasoning (McCormack & Hoerl, 2007). These changes may help older preschoolers be more confident that they would be able to solve a challenging task.

In sum, there are several developmental changes around the age of 5 with some occurring a little earlier and others slightly later. This, in conjunction with the age distribution of the sample, supported splitting the sample at 4.5 years, which allowed the examination of emotion development at earlier and later points during the preschool years.

**Hypothesized Paths**

In general, I hypothesized that parent emotion language would have both direct and indirect effects through child emotion language on two emotion outcomes (emotion understanding and emotion regulation), with child emotionality also moderating the association between child emotion language and emotion regulation. Results from path analyses indicated that the hypothesized paths varied across age for emotion regulation. It is also important to examine the descriptive statistics and correlations to fully understand associations between variables. The preliminary analyses and results for each hypothesized path are discussed below with an emphasis on age differences.

**Examining the Data.** The descriptive statistics are within the expected range for most of the variables. However, there were lower than expected values for some indicators. Child emotion explanations occurred less frequently than desired and would be considered to have a floor effect; child explanations were not included in the analyses for this reason. Although I had hoped for greater range in child emotion explanations, children in this age group are still developing language skills and emotion understanding, so it may be considered developmentally appropriate that they were not spontaneously providing emotion explanations. In fact, frequency
of children’s use of emotion explanations in this study was similar to children’s reference to emotion causes in another sample of preschool children (Laible, 2011).

Additionally, the locked box task elicited low levels of anger on average. An examination of previous literature showed that this is consistent with other samples when a similar coding scheme was used (Graziano, Calkins, & Keane, 2011; Day & Smith, 2013). Other studies that report episodes of frustration found an average of 4-5 frustration episodes during the task (Blakson, O’Brien, Leerkes, Marcovitch, & Calkins, 2012; Dennis et al., 2009). The coding scheme used in this study does not allow a direct comparison to studies using episodes of frustration because it accounted for more subtle facets of anger (e.g., furrowed brow). However, the reports are consistent with observations of the children. Many children would display low anger or neutral affect for much of the task and then display a few episodes of higher levels of anger at various times during the task.

There are many interesting findings within the correlations among variables (see Table 5). Children’s use of emotion labels is positively correlated with both the DANVA total score and faces modality. This supports the hypothesis that child engagement in emotion-laden conversations is important for emotion understanding. In contrast, the predictors were not correlated with any potential indicators of emotion regulation as predicted. It was necessary to account for other variables, such as anger, to begin seeing associations between emotion language and emotion regulation. Also, I found that age was correlated with child emotion labels, emotion understanding, and emotion regulation as discussed above. This suggests that these skills are changing during this developmental period and child age should be considered for any interpretation.
Emotion Language and Emotion Understanding. I found that a child’s use of emotion labels was associated with higher emotion understanding. However, the expected associations between parent emotion talk and emotion understanding were not found.

There was not a significant direct or indirect effect of parent emotion labels influencing emotion understanding for either age group. This is contrary to previous research that had found a positive association between parent emotion language and emotion understanding in preschoolers (Fivush, 2007; Garner et al., 1997; Laible, 2011; Raikes & Thompson, 2006; van Bergen & Salmon, 2010). The previous research indicating a direct effect only examined parent emotion language without taking the child’s emotion language into account. However, parent emotion labels and emotion understanding were not significantly correlated, indicating there was not an association even before taking child emotion labels into account. Therefore, it is difficult to say exactly what caused this deviation from previous research. Both the aspects of emotion language examined and the emotion understanding task used in this study differed from what was used in the previous research. For example, Laible (2011) used multiple indices of maternal emotion talk and included identifying emotions in the context of a story as part of emotion understanding. In-depth emotion discussion (i.e. multiple conversation turns), but not emotion causes or validations, was positively associated with emotion understanding. The way parents talk about emotion-laden events, especially if they are having more in-depth conversations, may help children use the context of the story to identify emotion-eliciting events.

There were also some measurement concerns with the emotion understanding task because the inter-item reliability was lower than in previous literature. Despite the low alpha, there was good variability of responses, and the responses fell within the expected range for the age group. Additionally, low reliability would make it less likely to find results, and the results
show a main effect of child emotion labels on emotion understanding. Therefore, it seems the DANVA is providing information related to the child’s emotion understanding. In contrast, the hypothesized indirect effect of parent emotion labels was not supported but neared significance ($p < .07$) for both groups. It is possible that the measurement error obscured an indirect effect. Despite the lack of an association of parents’ use of emotion labels with children’s emotion understanding, these data show that children were better able to recognize emotions in photographs when they used more emotion labels.

**Emotion Language and Emotion Regulation.** It was hypothesized that there would be both a direct effect of parent emotion language and an indirect effect through child emotion language that would increase emotion regulation. This hypothesis was not supported by the data. Just as with emotion understanding, there was not a direct effect of parents’ use of emotion labels, which contradicts previous literature (Fivush, 2007; Fivush et al., 2006). As with emotion understanding, there was not a significant correlation between parent emotion labels and emotion regulation, suggesting the nonsignificant path is not solely due to taking child emotion labels into account. Previous research supporting a link between parental emotion language and children’s emotion regulation measured maternal elaborations instead of parents’ use of emotion labels. Elaboration may be more likely to foster child engagement because it is used to help the child create a coherent story using questions to add detail about both the event and the meaning (Fivush, 2007). This also fits with Garner and colleagues’ (1997) finding regarding better emotional perspective taking when parents provided more details about causes and consequences of emotions. In other words, greater structure in how parents talk about emotions may be what helps children learn to regulate their emotions, rather than simple labeling of emotions.
The more surprising result regarding emotion regulation was that younger preschoolers engaged in fewer emotion regulation behaviors when emotions were discussed more during the emotion talk task. In other words, the younger children shifted attention away from the locked box less when more emotion labels were used. Post hoc analyses indicate this was primarily driven by including attention to the parent in operationalizing emotion regulation. Child use of emotion labels was negatively correlated with attending to the parent \( (r (80) = -.29, p < .05) \) but not distraction \( (r (80) = -.18, p = ns) \) for the younger preschoolers. This was further supported by follow up path models in which either attending to the parent or distraction was used alone instead of the composite of the two. The interpretations remained the same as the final model when only attending to parent was used. However, when distraction alone was used in the model, the indirect effect from parent emotion labels and the direct effect from child emotion labels to distraction became nonsignificant. Thus, children who used more emotion labels were less likely to look specifically toward their parent during the locked box task.

Additional analyses were performed to better understand when children were looking at their parent during the locked box task. Attending to the parent was examined during the first half of the task and compared to the last half of the task. Table 11 provides descriptive statistics and correlations for the first and last half of the task by age group. Younger preschoolers who used more emotion labels were less likely to look at their parent during the first half of the task \( (r (80) = -.36, p < .05) \) but not during the last half of the task. In contrast, for older preschoolers, there was no association between using child emotion labels and attending to their parent during the first half of the task. Rather, older preschoolers who used more emotion labels were more likely to look at their parent during the second half of the locked box task \( (r (72) = .27, p < .05) \). One possible interpretation of these correlations is that older preschoolers who used emotion
labels may be seeking help from their parent, but only after their own attempts have not worked. Similarly, it may be that younger preschoolers who used more emotion labels were more likely to delay seeking help from the parent. Therefore, the younger preschoolers who are using more emotion labels may be acting more like the older preschoolers in that they are delaying seeking help from their parent. If this interpretation is correct, then it may be that using emotion labels helps preschoolers begin to shift away from relying on external regulation at an earlier age.

It is also interesting that path models showed no significant effects relating to emotion regulation for the older preschoolers. We know that children move from seeking external sources of emotion regulation to internally regulating emotions during the preschool years. Specifically, 4-year-old children have demonstrated a better understanding of a range of strategies used to regulate anger than 3-year-old children (Cole et al., 2009). Additionally, greater recognition of effective emotion regulation strategies is associated with fewer attempts to get help during a challenging task (Cole et al., 2009). Therefore, as children get older, we expect them to be attending to the parent less and using other emotion regulation strategies such as trying alternate solutions or thinking about something else. Because the negative effect for younger preschoolers seemed to be driven by looking toward the parent, it follows that the older group would not be engaging in this behavior.

T-tests also indicated that the older children were more persistent \((t (152) = -5.09, p < .05)\) and expressed more anger \((t (152) = -2.26, p < .05)\). This indicates that the older children are spending more time on task and less likely to be seeking external sources of regulation, but they are not yet effectively regulating their negative emotion. Although this may be due to the changes in emotion regulation during the preschool years as noted above, it may also be partially due to the task being impossible. The older children not only have better motor skills that would
make it easier for them to open a lock, but they are also likely to have experienced a range of difficult situations in which they were able to succeed. As mentioned above, this is around the same age that children will start describing themselves in terms of competencies rather than physical characteristics (Harter, 2003). The older children are more likely to believe they have the capability to open a lock without assistance. Therefore, they may seek assistance from the parent less often and get angrier when their best attempts fail.

**Emotionality.** The interaction between child emotion labels and emotionality was also not supported and ultimately removed from the model. This hypothesis was based on the hypothesis that child emotion labels would have a positive impact on emotion regulation. It was thought that if children discussing emotions used more emotion regulation, then children who are high in emotionality (needing more regulation) and discuss emotions more would be better able to regulate their emotions. Because the link between child emotion labels and emotion regulation was negative rather than positive, and supported only for the younger age group, it is not surprising that the hypothesized interaction of emotionality with child emotion language was not supported. Emotionality remained as a covariate because emotionality is known to influence emotion regulation (Eisenberg & Fabes, 1992), and emotion regulation was negatively correlated with anger.

**Emotion Understanding and Emotion Regulation.** It was also surprising that emotion understanding and emotion regulation were not correlated in any of the models. A positive correlation was hypothesized between the two constructs. A positive correlation was expected because previous research indicates that the two constructs are related to other variables (e.g. school-readiness) in similar ways (Denham, 2006; Shields et al., 2001). They are also both
considered to be facets of emotional development. Therefore, it seems there should be at least a small correlation. However, this was not supported by the data.

Previous research that measured both constructs is limited and has been very mixed. In older at-risk populations, one study found a positive association for 9 to 13-year-olds (Cunningham, Kliewer, & Garner, 2009) whereas another study with 5 to 9-year-olds did not (Duncombe, Havighurst, Holland, & Frankling, 2013). This suggests that an association between emotion understanding and emotion regulation may develop over time. Additionally, affective social competence, which includes abilities to understand and regulate emotions, is a dynamic process in which each component influences the others (Halberstadt, Denham, & Dunsmore, 2001). A reciprocal influence over time would strengthen an association between emotion understanding and regulation.

Within the preschool years, Carlson and Wang (2007) found positive relations between emotion understanding and emotion regulation in preschoolers. However, correlations varied depending on the exact task (Carlson & Wang, 2007). That study also used a measure of emotion understanding that involved identifying emotions in a story and providing a cause for the emotion. Being able to identify the cause of an emotion may help children identify ways to regulate the emotion. In other words, emotion regulation may be aided by understanding the reasons for the emotion. Overall, it appears an association between emotion understanding and emotion regulation may be emerging throughout childhood, but tasks that measure varying aspects of emotion understanding may be needed to see this development. Future longitudinal research is needed to better draw conclusions.

Examining the Indicators Used
As discussed above, many of the proposed indicators were changed during the analyses. This allowed the models tested to use the indicators that worked best with both their conceptual definitions and the patterns in the data. Emotion labels, or words used during the emotion talk task, were used for parent and child emotion language instead of including both labels and explanations. This was selected because emotion explanations were too infrequent to be an appropriate indicator for children, and it was important to use analogous variables for both parent and child emotion language.

As discussed above, the previous literature has used measures of parental emotion language that included discussion of causes and consequences of emotion (explanatory emotion talk) and the structure of the conversation (e.g. elaboration). Therefore, a more comprehensive measure of parental emotion language may provide different results. However, there was a strong correlation between parent emotion labels and parent emotion explanations in the sample ($r (153) = .84, p < .05$). Furthermore, correlations showed no associations of parents’ use of explanations with children’s emotionality, emotion regulation, or emotion understanding. Future studies including a variety of tasks (e.g. story book and autobiographical conversations) as well as a variety of coding schemes for parent-child discourse will be helpful for understanding task-specific influences.

Directing visual attention away from the locked box task, whether attention was directed toward the parent or another object in the room, was used to indicate emotion regulation. This is supported by both previous literature (Calkins & Johnson, 1998; Cole et al., 2009; Eisenberg & Fabes, 1992) and the negative correlation between looking away and anger ($r (153) = -.41, p < .05$). This is also believed to be a better indicator of emotion regulation than persistence because the task is impossible; no amount of perseverance will accomplish the task. That likely explains
why there was a positive correlation between persistence and anger. When current efforts
toward a goal are not making any progress, it is beneficial to shift attention and regroup or make
a new plan. Although the composite of looking at the parent and distraction fit both conceptually
and with the correlations, post hoc analyses indicated that focusing on specific strategies
(distraction or attending to their parent) might provide more insight into the regulation strategies
used during the task. However, the composite was used for analyses due to the close conceptual
fit with the construct.

**Strengths, Limitations, and Future Directions**

As with any research study, there are some strengths that should be noted and limitations
to address. This study adds to the literature because it provides insight into the influence of child
emotion language on developmental outcomes. Children’s contribution to emotion-laden
conversations has been largely ignored in previous research. We can see here that the words
children use are an important piece of their emotional development. In order to better understand
emotion socialization during the preschool years, this study used observational and standardized
tasks to examine multiple constructs, as well as multiple potential indicators for these constructs,
in a large sample of preschoolers.

There were some limitations that influenced the interpretation of the findings. First, the
sample predominantly included Caucasian, middle- to upper-class families. Findings will need
to be replicated in diverse samples before generalizing to the wider population. Additionally, the
protocol was a little long for the preschoolers. Multiple efforts were made to keep the child
engaged throughout the duration of the visit. However, it should be noted that boredom was a
concern for the DANVA, which came near the end of the visit. The DANVA had the most
missing data of all the tasks, and, as discussed earlier, a lower alpha than in previous studies with
this age group. This may be a result of inattention. Though these concerns should be kept in mind when interpreting the results, measurement error makes it less likely to find significant effects as discussed above. Also, this was a cross-sectional study with all data being collected during one visit. Causal implications cannot be made about the associations between emotion language and emotion understanding or regulation for this reason; longitudinal studies will be needed to fully examine directionality.

As mentioned above, there may be some concerns with low levels of anger being expressed during the locked box task. This might influence results in many ways. First, it is not possible to determine if children are regulating their anger or not experiencing anger with this data. This is a common limitation in research on emotion and emotion regulation (Cole et al., 2004); it is not possible to fully separate emotion and emotion regulation. There are both observable (behavioral) and nonobservable (cognitive, physiological) components to emotion and emotion regulation. The coding schemes used for this study examined observable behaviors. However, these data do not account for children’s internal experience during the locked box task. There may be felt anger and emotion regulation techniques that are not accounted for in these analyses. There is no way to fully capture emotion and emotion regulation. However, future studies may include additional measures, such as physiological measures, to better separate the two constructs. Patterns of physiological arousal may provide greater insight to internal processes. For example, temporal changes in physiological arousal may indicate an emotion was felt and then regulated (Cole et al., 2004); a potential indicator of physiological changes might be an elevated heart rate followed by a decline. Physiological measures still need to be interpreted with caution because factors other than emotion may impact physiological arousal; children who
are more active during the task (e.g., walking to their parent or trying to pry the box open) would likely show larger fluctuations in arousal than children who sit quietly using the keys.

If the low mean levels of anger were indicative of children not experiencing anger, this task would not be providing information about regulation behaviors used by children because regulation would not be needed. However, observations of the children during the task indicate that most children experienced anger. Ethical concerns prevent using tasks that would elicit high levels of prolonged anger. Therefore, a more powerful task should be used with great caution. Additionally, the coding included both duration and intensity of emotion; it does not distinguish between the child who has short anger outbursts and the child who showed low levels of anger throughout the entire task. Therefore, I cannot determine if different patterns of anger reactions may have influenced the regulation strategies used by children. Anger outbursts may require greater use of behavioral regulation strategies to inhibit socially inappropriate behaviors. Still, although some details may be missed, examining both intensity and duration was preferred because this provides a more comprehensive measure that includes a large range of possible anger reactions.

This study has provided an initial exploration of child emotion language and emotion development. However, there are many questions left unanswered. In general, the findings across many studies indicate that the exact measures used influence the results despite all being intended as measures for the same latent construct. A systematic analysis of how these tasks differ in terms of construct and criterion validity would greatly increase both our understanding of the constructs and our ability to interpret results from each task.

This study focused on preschool-aged children. Future research is needed to investigate effective strategies with older children. We can see from the current results that associations of
parental emotion socialization with children’s emotional development may differ across developmental periods. It would be interesting to examine how these associations continue to change throughout childhood and adolescence. As discussed above, it is expected that associations between emotion understanding and emotion regulation will strengthen as children develop. Additionally, there may be less influence of verbally discussing emotions as children get older and begin to regulate their emotional expressions and become more concerned about social desirability. There may be more influence of journaling or other private means of reflecting on emotions than emotion-laden conversations.

Overall, results support an association of emotion-laden discussions with children’s emotion understanding and emotion regulation. Furthermore, across both early and later preschool years, parents’ use of emotion terms was related to children’s usage. These results suggest that it may be useful to attend to both children’s and parents’ emotion language. Additionally, these results demonstrate the importance of focusing on developmental shifts that occur during the preschool years for emotion regulation. Future research may address whether promoting children’s use of emotion language will create positive change in their emotional development.
References


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<tr>
<th>Activity</th>
<th>Est. Time</th>
<th>Description of activity</th>
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<tr>
<td>Consent and Warm Up</td>
<td>Variable</td>
<td>The parent (P) and child (C) will be met in the parking lot and escorted into the playroom. The experimenter (E) will explain the details of the visit to the mother while a second experimenter (E2) entertains the child. Any questions the mother has will be answered. Informed consent from the mother and assent from the child will be obtained.</td>
</tr>
<tr>
<td>Language Measure</td>
<td>20 min</td>
<td>E will have C answer some questions using a flipbook that proceeds through a series of scripted tasks.</td>
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<tr>
<td>Parent-Child Emotion Talk Task</td>
<td>5 min</td>
<td>P and C will be asked to talk about two events they experienced together. E will fully explain the task to P before the talk task begins. P and C will be asked to discuss one event in which C was happy and one event in which C was upset. E will help P select appropriate events prior to the task. The order of the emotions will be counterbalanced.</td>
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<tr>
<td>Block Tower</td>
<td>2 min</td>
<td>C will be asked to take turns building a block tower with E.</td>
</tr>
<tr>
<td>Locked Box</td>
<td>4 min</td>
<td>A desired toy will be placed in a locked container that C will not be able to open; the correct key to open the lock will not be on the ring of keys given to C. After a period of 4 minutes, E will give C the correct key to open the box and will allow C to play with the toy that was locked in the box.</td>
</tr>
<tr>
<td>Selective Attention Task</td>
<td>4 min</td>
<td>C will match pictures by shape and color.</td>
</tr>
<tr>
<td>DANVA</td>
<td>10 min</td>
<td>C will be asked to identify emotions expressed via facial expression and tone of voice. The order of modalities will be counterbalanced. C will be quickly shown photographs for facial expressions and played audio clips for tone of voice (24 each in the 2 sets) and asked whether the person is happy, sad, angry, or scared.</td>
</tr>
<tr>
<td>Dinky Toys</td>
<td>2 min</td>
<td>E will present C with a small box of toys for children to pick from. E will ask C to indicate which toy C wants to take home with them without touching the toys.</td>
</tr>
<tr>
<td>Questionnaires</td>
<td>Variable</td>
<td>CBQ, SEFQ, PBACE, CBCL, <strong>Demographics</strong></td>
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*Note. Measures for this study are bold.*
Table 2

*Child Age and Gender*

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<td>4yo</td>
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<td>77</td>
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Table 3

*Sample Characteristics*

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<td>Mother</td>
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<td>Other</td>
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<td>Doctoral Degree</td>
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*Note.* Parent information provided refers to the primary caregiver that participated with the child.
Table 4

**Descriptive Statistics**

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### Table 5

**Correlations**

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<td>2. Parent Explanations</td>
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<td>3. Child Labels</td>
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<td>.491**</td>
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<tr>
<td>5. Anger</td>
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<td>-.092</td>
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<td>6. Sadness</td>
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<td>7. Focus</td>
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<td>-.011</td>
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<td>.226**</td>
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<td>8. Persistence</td>
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<td>10. Look Away</td>
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<td>-.041</td>
<td>-.058</td>
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<td>-.048</td>
<td>-.128</td>
<td>-.027</td>
<td>-.413**</td>
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<td>.885**</td>
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<td>12. DANVA Face</td>
<td>.020</td>
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<td>.220**</td>
<td>.109</td>
<td>.010</td>
<td>.174*</td>
<td>.100</td>
<td>.126</td>
<td>-.103</td>
<td>-.009</td>
<td>-.071</td>
<td>--</td>
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<tr>
<td>13. DANVA Voice</td>
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<td>.105</td>
<td>.109</td>
<td>.022</td>
<td>.075</td>
<td>.020</td>
<td>.125</td>
<td>.207*</td>
<td>-.134</td>
<td>-.149</td>
<td>-.168*</td>
<td>.325**</td>
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<tr>
<td>14. DANVA Total</td>
<td>.091</td>
<td>.074</td>
<td>.221**</td>
<td>.100</td>
<td>.027</td>
<td>.107</td>
<td>.116</td>
<td>.206*</td>
<td>-.134</td>
<td>-.102</td>
<td>-.142</td>
<td>.826**</td>
<td>.802**</td>
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<tr>
<td>15. Core Language</td>
<td>.053</td>
<td>.029</td>
<td>.071</td>
<td>.065</td>
<td>-.190*</td>
<td>.019</td>
<td>-.168*</td>
<td>-.152</td>
<td>.168*</td>
<td>.023</td>
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<td>.228**</td>
<td>-.062</td>
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<tr>
<td>16. Receptive Lang.</td>
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<td>.127</td>
<td>-.136</td>
<td>.020</td>
<td>-.138</td>
<td>-.102</td>
<td>.113</td>
<td>-.012</td>
<td>.071</td>
<td>.221**</td>
<td>.013</td>
<td>.134</td>
<td>.835**</td>
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<tr>
<td>17. Expressive Lang.</td>
<td>.048</td>
<td>-.008</td>
<td>.090</td>
<td>.082</td>
<td>-.192*</td>
<td>-.027</td>
<td>-.143</td>
<td>-.110</td>
<td>.143</td>
<td>-.025</td>
<td>.081</td>
<td>.219**</td>
<td>.030</td>
<td>.157</td>
<td>.891**</td>
<td>.772**</td>
<td>--</td>
</tr>
<tr>
<td>18. Age</td>
<td>.100</td>
<td>.097</td>
<td>.166*</td>
<td>.004</td>
<td>.188*</td>
<td>.031</td>
<td>.305**</td>
<td>.441**</td>
<td>-.327**</td>
<td>-.187*</td>
<td>-.315**</td>
<td>.363**</td>
<td>.510**</td>
<td>.535**</td>
<td>-.331**</td>
<td>-.205*</td>
<td>-.253**</td>
</tr>
</tbody>
</table>

** p < .01; *p < .05
Table 6

*Indicators used in Path Models*

<table>
<thead>
<tr>
<th>Construct</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Emotion Language</td>
<td>Emotion labels used by the parent during the emotion talk task</td>
</tr>
<tr>
<td>Child Emotion Language</td>
<td>Emotion labels used by the child during the emotion talk task</td>
</tr>
<tr>
<td>Emotion Understanding</td>
<td>Composite of DANVA Faces and DANVA Voices</td>
</tr>
<tr>
<td>Emotion Regulation</td>
<td>Composite of distraction and attending to parent during locked box</td>
</tr>
<tr>
<td>Negative Emotionality</td>
<td>Anger during locked box</td>
</tr>
<tr>
<td>Language Ability</td>
<td>Core language subscale of the CELF</td>
</tr>
<tr>
<td>Gender</td>
<td>Parent report of child’s gender</td>
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</tbody>
</table>
Table 7

*Fit Statistics for all Models*

<table>
<thead>
<tr>
<th>Model</th>
<th>Model Summary</th>
<th>$\chi^2$ (df)</th>
<th>$p$</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>Proposed Paths</td>
<td>7.779 (4)</td>
<td>.10</td>
<td>0.078</td>
<td>0.970</td>
<td>0.887</td>
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<tr>
<td>Model 2</td>
<td>1 + Age Groups</td>
<td>15.862 (16)</td>
<td>.46</td>
<td>0.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Model 3a</td>
<td>2 + Emotionality Covaried</td>
<td>7.914 (12)</td>
<td>.79</td>
<td>0.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Model 3b</td>
<td>3a + P $\rightarrow$ C Invariant</td>
<td>9.505 (13)</td>
<td>.73</td>
<td>0.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Model 3c</td>
<td>3b + C $\rightarrow$ EU Invariant</td>
<td>11.650 (14)</td>
<td>.63</td>
<td>0.000</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Model 3d</td>
<td>3b + C $\rightarrow$ ER Invariant</td>
<td>15.399 (14)</td>
<td>.35</td>
<td>0.036</td>
<td>0.983</td>
<td>0.963</td>
</tr>
<tr>
<td>Model 3e</td>
<td>3b + C $\rightarrow$ EU &amp; C $\rightarrow$ ER Invariant</td>
<td>17.110 (15)</td>
<td>.31</td>
<td>0.043</td>
<td>0.974</td>
<td>0.948</td>
</tr>
</tbody>
</table>

*Note.* P = parent emotion labels; C = child emotion labels; EU = emotion understanding; ER = emotion regulation.
Table 8

*Descriptive Statistics by Age Group*

<table>
<thead>
<tr>
<th></th>
<th>Younger Preschoolers</th>
<th></th>
<th></th>
<th>Older Preschoolers</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Parent Labels</td>
<td>Child Labels</td>
<td>Anger</td>
<td>Look Away</td>
<td>Danva Total</td>
<td>Core Lang.</td>
</tr>
<tr>
<td>N</td>
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<td>81</td>
<td>81</td>
<td>81</td>
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<td>81</td>
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<tr>
<td>Mean</td>
<td>7.21</td>
<td>1.91</td>
<td>0.74</td>
<td>0.44</td>
<td>19.64</td>
<td>108.16</td>
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<tr>
<td>SD</td>
<td>4.49</td>
<td>1.98</td>
<td>0.39</td>
<td>0.26</td>
<td>4.71</td>
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<tr>
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<td>1.00</td>
<td>0.71</td>
<td>0.40</td>
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<td>108.00</td>
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<tr>
<td>Minimum</td>
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<td>0.00</td>
<td>0.06</td>
<td>0.02</td>
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<td>83.00</td>
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<td>Maximum</td>
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<td>9.00</td>
<td>1.77</td>
<td>0.98</td>
<td>28.43</td>
<td>137.00</td>
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<tr>
<td></td>
<td>Parent Labels</td>
<td>Child Labels</td>
<td>Anger</td>
<td>Look Away</td>
<td>Danva Total</td>
<td>Core Lang.</td>
</tr>
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<td>73</td>
<td>73</td>
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<tr>
<td>Mean</td>
<td>7.73</td>
<td>2.59</td>
<td>0.89</td>
<td>0.30</td>
<td>23.84</td>
<td>98.60</td>
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<tr>
<td>SD</td>
<td>5.31</td>
<td>3.36</td>
<td>0.43</td>
<td>0.22</td>
<td>4.69</td>
<td>12.18</td>
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<tr>
<td>Median</td>
<td>7.00</td>
<td>1.00</td>
<td>0.89</td>
<td>0.25</td>
<td>24.50</td>
<td>98.00</td>
</tr>
<tr>
<td>Minimum</td>
<td>0.00</td>
<td>0.00</td>
<td>0.19</td>
<td>0.00</td>
<td>12.00</td>
<td>71.00</td>
</tr>
<tr>
<td>Maximum</td>
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<td>14.00</td>
<td>1.92</td>
<td>1.11</td>
<td>33.00</td>
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Table 9

*Correlations by Age Group: Younger Children in the Lower Triangle & Older Children in the Upper Triangle*

<table>
<thead>
<tr>
<th></th>
<th>Parent Labels</th>
<th>Child Labels</th>
<th>Anger</th>
<th>Look Away</th>
<th>Danva Total</th>
<th>Core Lang.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parent Labels</td>
<td>--</td>
<td>.516**</td>
<td>-.098</td>
<td>-.054</td>
<td>.081</td>
<td>.097</td>
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<tr>
<td>Child Labels</td>
<td>.444**</td>
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<td>-.022</td>
<td>.031</td>
<td>.144</td>
<td>.121</td>
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<tr>
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<td>.111</td>
<td>--</td>
<td>-.398**</td>
<td>-.099</td>
<td>-.023</td>
</tr>
<tr>
<td>Look Away</td>
<td>-.022</td>
<td>-.270*</td>
<td>-.377**</td>
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<td>-.028</td>
<td>-.085</td>
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<tr>
<td>Danva Total</td>
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<td>.316**</td>
<td>-.047</td>
<td>-.039</td>
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<td>.267*</td>
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<td>Core Lang.</td>
<td>.045</td>
<td>.102</td>
<td>-.255*</td>
<td>.107</td>
<td>.356**</td>
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**p < .01; *p < .05**
Table 10

Nested Model Comparisons Testing for Age Invariance

<table>
<thead>
<tr>
<th>Model</th>
<th>Invariant Paths</th>
<th>$\chi^2$ (df)</th>
<th>RMSEA</th>
<th>CFI</th>
<th>TLI</th>
<th>Comparison</th>
<th>$\Delta\chi^2$ (Δdf)</th>
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</thead>
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<tr>
<td>3a</td>
<td>None</td>
<td>7.914 (12)</td>
<td>0.000</td>
<td>1.000</td>
<td>1.000</td>
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<td></td>
</tr>
<tr>
<td>3b</td>
<td>P $\rightarrow$ C</td>
<td>9.505 (13)</td>
<td>0.000</td>
<td>1.000</td>
<td>1.000</td>
<td>3b vs. 3a</td>
<td>1.591 (1)</td>
</tr>
<tr>
<td>3c</td>
<td>P $\rightarrow$ C, C $\rightarrow$ EU</td>
<td>11.650 (14)</td>
<td>0.000</td>
<td>1.000</td>
<td>1.000</td>
<td>3c vs. 3b</td>
<td>2.145 (1)</td>
</tr>
<tr>
<td>3d</td>
<td>P $\rightarrow$ C, C $\rightarrow$ ER</td>
<td>15.399 (14)</td>
<td>0.036</td>
<td>0.983</td>
<td>0.963</td>
<td>3d vs. 3b</td>
<td>5.894 (1)*</td>
</tr>
<tr>
<td>3e</td>
<td>P $\rightarrow$ C, C $\rightarrow$ EU, C $\rightarrow$ ER</td>
<td>17.110 (15)</td>
<td>0.043</td>
<td>0.974</td>
<td>0.948</td>
<td>3e vs. 3c</td>
<td>5.460 (1)*</td>
</tr>
</tbody>
</table>

Note. P = parent emotion labels; C = child emotion labels; EU = emotion understanding; ER = emotion regulation. Best fitting model bolded. *$p < .05$
Table 11

Descriptive statistics and correlations for child labels and attention to parent during the first and last halves of the locked box task. Younger preschoolers are represented in the lower triangle of the correlation table; older preschoolers are in the upper triangle.

<table>
<thead>
<tr>
<th></th>
<th>Young M</th>
<th>Young SD</th>
<th>Older M</th>
<th>Older SD</th>
<th>Child Labels</th>
<th>Attend Early</th>
<th>Attend Late</th>
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</thead>
<tbody>
<tr>
<td>Child Labels</td>
<td>1.91</td>
<td>2.00</td>
<td>2.59</td>
<td>3.36</td>
<td>--</td>
<td>-.05</td>
<td>.27*</td>
</tr>
<tr>
<td>Attend Early</td>
<td>.15</td>
<td>.15</td>
<td>.12</td>
<td>.13</td>
<td>-.36**</td>
<td>--</td>
<td>.50**</td>
</tr>
<tr>
<td>Attend Late</td>
<td>.20</td>
<td>.15</td>
<td>.16</td>
<td>.17</td>
<td>-.14</td>
<td>.55**</td>
<td>--</td>
</tr>
</tbody>
</table>

**p < .01; *p < .05


Figure 1. The Proposed Model.

![Diagram showing the relationships between Parent Language, Child Language, Emotion Understanding, Emotion Regulation, Emotionality, and specific emotions (Anger, Sadness, Labels, Explanations, Faces, Voices, Focus, Persistence).]
Figure 2. The first path model testing the association between emotion language, emotion understanding, and emotion regulation. Standardized coefficients are presented for each path with significant parameters indicated by an * and bold lines.
Figure 3. Alternate model that first used age as a 2-group moderator showing associations between emotion language, emotion understanding, and emotion regulation. Standardized coefficients are presented for each path with significant parameters indicated by an * and bold lines.

(a) Younger Preschoolers

(b) Older Preschoolers
Figure 4. Final model of associations between emotion language, emotion understanding, and emotion regulation. Standardized coefficients are presented for each path with significant parameters indicated by an * and bold lines.

(a) Younger Preschoolers

(b) Older Preschoolers
Appendix A: Recruitment Flyer and Handout

Children's Emotions Lab
Department of Human Development
techkids@vt.edu
540-231-1390

Are you a parent with a child aged 4 or 5 years?

Two Virginia Tech graduate students are working together to study parent-child interactions, children's emotion understanding, and children's private speech. We are looking for parents (primary caregiver) and their children (between 4 and 5 years of age, pre-kindergarten) in the New River Valley area to participate in a study that will be both of our dissertations! We invite you and your child to participate! For your participation in the study, you will receive a $10 Target gift card and your child will be given a present to take home as a thank you!

Participation in this project will involve one visit (lasting about an hour) to the Children’s Emotions Lab at Virginia Tech. Your child will get to play lots of games, including building a block tower and matching different pictures. For one activity, we will ask you to talk with your child about different events. We will also measure your child's language ability. There will also be some questions that we will want you to answer about you and your child’s behavior. Child care will be provided for brothers and sisters.

If you are interested in hearing more about the study, please e-mail us at techkids@vt.edu or give us a call at 540-231-1390 (please leave a message with your name and phone number). We want to tell you all the details to see if you and your child would be interested in participating.

Kimberly Day, M.S.  Doctoral Candidate in Human Development
Amy Neal, M.A.  Doctoral Candidate in Psychology
Cindy Smith, Ph.D.  Associate Professor of Human Development
Julie Dunsmore, Ph.D.  Associate Professor of Psychology
Appendix B: Parental Consent

Emotion Understanding and Regulation Study

Cynthia L. Smith, Ph.D., Associate Professor of Human Development, Virginia Tech
Julie C. Dunsmore, Ph.D., Associate Professor of Psychology, Virginia Tech
Kimberly L. Day, M.S., Human Development Doctoral Candidate, Virginia Tech
Amy Neal, M.A., Psychology Doctoral Candidate, Virginia Tech

I. Purpose of this Research
This study is to examine young children’s (ages 3-5 years) emotion understanding and regulation.

II. Procedures
You and your child will spend approximately an hour in our laboratory playroom. You will always be
in the room with your child. During most activities, we will ask you to work on questionnaires while the
experimenter interacts with your child, but we’ll ask you to interact with your child for one of the activities.
To begin, the experimenter will ask your child some questions using a flipbook. Then, the experimenter
will ask you and your child to discuss an event that made them happy and an event that made them upset.
Afterwards, the experimenter and your child will build a block tower. Next, your child and the experimenter
will play with some toys which will be locked in a clear container. Your child will be given a set of keys and
allowed to work on opening the lock; however, the correct key will not be on the ring of keys. The
experimenter will bring in the correct key after 4 minutes and allow your child to play with the toys. Your child
will then be asked to match pictures based on either color or shape. Next, we will ask your child to identify
whether someone is happy, sad, angry, or scared based on facial expression, posture, and tone of voice. Finally,
the experimenter will let your child pick two toys to take home by telling the experimenter which toys they
would like.
During the activities when the experimenter is playing with your child, we will ask you to work on some
more questionnaires. If you do not finish the questionnaires, we will ask you to take them home and mail them
back to us in the envelope provided. We anticipate the visit will take approximately an hour, but it may go
longer if your child needs any breaks. The activities will be video recorded.

III. Risks
There are no foreseeable risks aside from possible lack of desire to participate, boredom, or mild
frustration. Your child will be praised and encouraged to assure that they leave in a positive mood.

IV. Benefits
No promise or guarantee of benefits has been made to encourage you to participate. The benefits you
may gain for participation include learning more about your child’s language abilities, ability to self-regulate
and use of private speech. The benefits for your child include playing fun, new activities with a willing partner.
There are no costs to you or any other party.

V. Extent of Anonymity or Confidentiality
Information gathered for this study will be confidential, and the information from each individual child
will be identified by code number only. Information linking your child's name and code number will be kept in
a secure file. We will videotape the entire session because this allows us to go back at a later date and code
your child’s behaviors. Video data will identify children only by ID number and will be stored securely in our
research lab. Only individuals associated with the research will have access to any of the data. Data will be
destroyed 5 years after final publications of the results of this study. It is possible that the Institutional Review
Board (IRB) may view this study’s collected data for auditing purposes. The IRB is responsible for the
oversight of the protection of human subjects involved in research. In any study involving children, direct
evidence of abuse must be reported.
VI. Compensation
Families that participate will be given a $10 giftcard to Target. Children will be given two small prizes.

VII. Freedom to Withdraw
Your and your child’s participation are strictly voluntary, and you may withdraw at any time for any reasons. Your child will be free to stop participating at any time. There is no penalty for withdrawing.

VIII. Parent Responsibilities
I voluntarily agree to participate and to let my child participate in this study. I will complete activities with my child and questionnaires.

X. Parent’s Consent to Participate
I have read and understand the above information. I have received a copy of this form. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent to participate in this study.

______________________________________
Parent printed name

_______________________________________________ Date__________
Parent signature

XI. Parent’s Permission for Child to Participate
I have read and understand the above information. I have received a copy of this form. I have had all my questions answered. I hereby acknowledge the above and give my voluntary consent for my child named below to participate in this study.

______________________________________        ________________________________________
Parent printed name                          Child printed name

_______________________________________________ Date__________
Parent signature

Should I have any pertinent questions about this research or its conduct, research subjects' rights, and whom to contact in the event of a research-related injury to the subject, I may contact:

Dr. Cynthia L. Smith (540) 231- 4793 / smithcl@vt.edu
Dr. Julie C. Dunsmore (540) 231- 4201 / jdunsmor@vt.edu
Kimberly L. Day (540) 231-1390 / kday08@vt.edu
Amy Neal (540) 231-8179 / amyneal@vt.edu
Investigator(s)

Dr. Anisa Zvonkovic (540) 231-6110 / anisaz@vt.edu
Departmental Reviewer/Department Head Telephone/e-mail

Dr. David Moore (540) 231-4991 / moored@vt.edu
Chair, Virginia Tech Institutional Review Board for the Protection of Human Subjects,
Office of Research Compliance
2000 Kraft Drive, Suite 2000 (0497)
Blacksburg, VA 24060 Telephone/e-mail
Appendix C: Child Assent

Children’s Assent Form
Emotion Understanding and Regulation

Cynthia L. Smith, Ph.D., Associate Professor of Human Development, Virginia Tech
Julie C. Dunsmore, Ph.D., Associate Professor of Psychology, Virginia Tech
Kimberly L. Day, M.S., Human Development Doctoral Candidate, Virginia Tech
Amy Neal, M.A., Psychology Doctoral Candidate, Virginia Tech

I. Explanation of Research to Child
We’re going to play some fun games today. Some of the games you’ll play with me and some of the activities will be with your mom. You’ll get to play with a lot of toys. We’re going to build a block tower, match different pictures, and some other games.

II. Asking for Child’s Verbal Assent
Are you ready to play? Shall we get the games ready?

III. Witness Affirmation
The child verbally agreed to participate in this research study.

_______________________________
Child’s name

_______________________________
Signature of witness

Date
Appendix D: Demographics Questionnaire

**Demographic Information**

Questions About Your Child

1. How would you describe your child’s ethnicity?
   - O Hispanic or Latino
   - O Not Hispanic or Latino

2. How would you describe your child’s race?
   - O American Indian/Alaska Native
   - O Asian
   - O Native Hawaiian or Other Pacific Islander
   - O Black or African American
   - O White
   - O Other (describe) __________________________

Questions About You

3. Please indicate your relationship to child:
   - O Mother
   - O Father
   - O Other: __________________________

5. Your own age: _____________

7. How would you describe your ethnicity?
   - O Hispanic or Latino
   - O Not Hispanic or Latino

9. How would you describe your race?
   - O American Indian/Alaska Native
   - O Asian
   - O Native Hawaiian or Other Pacific Islander
   - O Black or African American
   - O White
   - O Other (describe) __________________________

11. What is the highest level of education that you have completed?
   - O Grade school (What grade?) __________________
   - O Some high school (What grade?) ______________
   - O High school graduate _________________________
   - O College graduate (2-year college) _____________
   - O College graduate (4-year college) ______________
   - O Master’s degree ______________________________
   - O Ph.D., M.D., or other doctoral level degree ______

13. Are you currently employed?
   - O Yes
   - O No

15. If yes, how old was your child in months when you

Questions About Your Child’s Other Parent

4. Please indicate the relationship your child’s other parent has to your child:
   - O Mother
   - O Father
   - O Other: __________________________

6. Your child’s other parent’s age: ______

8. How would you describe your child’s other parent’s ethnicity?
   - O Hispanic or Latino
   - O Not Hispanic or Latino

10. How would you describe your child’s other parent’s race?
   - O American Indian/Alaska Native
   - O Asian
   - O Native Hawaiian or Other Pacific Islander
   - O Black or African American
   - O White
   - O Other (describe) __________________________

12. What is the highest level of education that your child’s other parent has completed?
   - O Grade school (What grade?) __________________
   - O Some high school (What grade?) ______________
   - O High school graduate _________________________
   - O College graduate (2-year college) _____________
   - O College graduate (4-year college) ______________
   - O Master’s degree ______________________________
   - O Ph.D., M.D., or other doctoral level degree ______

14. Is your child’s other parent currently employed?
   - O Yes
   - O No

16. If yes, how old was your child in months when your child’s
started working? _______________

17. How many hours do you work?
   - O Less than 10
   - O Between 10 and 20
   - O Between 20 and 30
   - O Over 30

18. How many hours a week does your child’s other parent work?
   - O Less than 10
   - O Between 10 and 20
   - O Between 20 and 30
   - O Over 30

19. Please describe your current occupation or job title: __________________________________________

20. Please describe your child’s other parent’s current occupation or job title:
    __________________________________________

21. Describe your position and main duties
    __________________________________________

22. Describe your child’s other parent’s main position and duties
    __________________________________________

23. Are you currently a student?
   - O Yes, full time
   - O Yes, part time
   - O No

24. Is your child’s other parent currently a student?
   - O Yes, full time
   - O Yes, part time
   - O No

25. If yes, how old was your child in months when you became a student? ____________

26. If yes, how old was your child in months when your child’s other parent became a student? ____________

27. What is your current marital status?
   - O Married
   - O Single and living with child’s other parent
   - O Single
   - O Divorced
   - O Separated
   - O Widowed
   - O Other (Please describe)

28. If married, how long have you been married?
   - Number of years ______________________
   - Number of months ______________________

29. How many brothers or sisters does your child have that live in the same home?
   - Number of brothers ________
   - Number of sisters ________
   - Ages of brothers ________
   - Ages of sisters ________

30. Do any other adult relatives (besides you and your child’s other parent) live in your household?
   - O Yes    If yes, how many and who? ______________________________________
   - O No

31. What is your annual combined family income (before taxes)? This does not include any welfare or food stamps.
   - O less than $15,000
   - O $15,000-$30,000
   - O $30,000-$45,000
   - O $45,000-$60,000
   - O $60,000-$75,000
   - O $75,000-$100,000
   - O Over 100,000
Appendix E: Emotion Talk Instruction Card

Discussing Family Events

Please talk about this event first:

When you hear the knock on the door, please switch and start talking about:

*Please remember to discuss the events with your child just as you would at home.*

Procedure:
1. Read through the manual before coding each time for any revisions or additional examples.
2. Before coding each transcript, make sure to read the entire transcript.
3. Make sure to code each transcript twice to double-check your codes. It might be helpful to code all your transcripts, then go back one by one, instead of coding it and immediately double checking (i.e. give yourself a break between coding and double checking).
4. Code each conversation turn. Your transcripts will be separated by conversation turns.

Codes:
Every conversation turn will be coded as either no mention of emotion, labeling of an emotion without explanation, or explaining an emotion. An explanation gives a reason for the emotion. They can be in the same sentence (e.g. I was sad because they wouldn’t let me play with them) or in adjoining sentences (e.g. They wouldn’t let me play with them. I was sad.).

Conversation turns coded as explanations will be coded as one of the following types of explanations:

- **Cause:** Mentions or asks about the cause of an emotion
  Example: I was sad because they wouldn’t let me play with them.
- **Result:** Mentions or asks about the behavioral result of an emotion
  Example: Did you cry when you were sad?
- **Intervention:** Mentions or asks about an intervention related to the emotion. The intervention might be an action that resolves the problem caused or an action that distracts away from the emotion
  Example: You’re sad you couldn’t play at school. You can go play your friend Suzy now.
  Example: Don’t be sad. Let’s go play your favorite game.
- **Elicitation:** Requests an explanation without giving causal information
  Example: Why did that make you sad?
Appendix G: Locked Box Emotion Coding Manual

EUR Study:
Emotion Coding Manual for Locked Box Task

Timings

All behaviors are coded in 5-second intervals as present/absent unless otherwise noted. Be sure to use the same start times used in the regulation coding if it has already been completed. If the regulation coding has not been completed, make sure the regulation coders know that they should be using your start times.

If the start times have not been done for the regulation coding, start coding when the experimenter closes the door when leaving the room.

Notes

• If the child stated an emotion word (e.g., “I’m sad.”), this was generally coded as a low (1) sign of the emotion, even without other indicators.
• Consider duration as well as intensity when deciding on a code for a 5 second epoch.
• Emotion codes are based on facial, bodily, and verbal indicators of the emotion.
EMOTION CODES SUMMARY

**Fear**

- **0** = No fear observed
- **1** = Low intensity fear. Mild, vague or very brief facial expression of fear. May include some decreased activity or bodily tension or turning away or withdrawing.
- **2** = Moderate fear. Moderate intensity fear or more prolonged mild fear. May include some facial fear, whimpering, or whining, or bodily fear (tensing, visible and sustained tensing of the muscles, decreased activity).
- **3** = Intense fear. Intense or prolonged fear expression, may include freezing or trembling, tensing of the entire body with no motion

**Sadness**

- **0** = No sadness observed
- **1** = Low intensity sadness. Mild, vague or very brief facial expression of sadness. May include some minimal bodily sadness (slight slump, drop of head, slumped shoulders, head in arms or hands)
- **2** = Moderate sadness. Moderate intensity sadness or more prolonged mild sadness or whimpering, fussing or low intensity sad cry (sad cry has a more rhythmic quality than anger cry). May include some bodily sadness (slight slump, drop of head, slumped shoulders, head in arms or hands)
- **3** = Intense sadness. Intense or prolonged facial sadness, or full intensity sad cry, may include high intensity bodily sadness

**Anger/Frustration**

- **0** = No anger or frustration observed
- **1** = Low intensity anger. Mild, vague or very brief facial expression of anger, or mild protest verbalization or low intensity bodily struggle (kicking or banging).
- **2** = Moderate anger. Moderate intensity facial expression or more prolonged mild facial expression of anger or definite protest, fussing, or low intensity angry cry. May include moderate intensity bodily struggle (pulling of arms, pulling forward, arching back, kicking)
- **3** = Intense anger. Intense or prolonged facial anger or full intensity cry. May include high intensity resistance or more continuous struggle (pulling of arms, pulling forward, arching back, kicking)

**Positive**

- **0** = No positive emotion observed
- **1** = Low intensity smile– a small smile or positive vocalization
- **2** = Moderate intensity smile or more prolonged low intensity smile. May include positive vocalization
- **3** = Intense smile, laughter, or prolonged smiles. May include positive vocalizations (squealing).
Descriptions of each type of indicator for each emotion

**Fear**
- **Facial:** Brows straight or normal, slightly raised or drawn together. May be lines or bulging in forehead. Eyelids raised and tense. Mouth open, corners straight back. In older kids and adults, white should show above pupils, but infants have fatty eyelids so white may not show in fearful infants.
- **Bodily:** Bodily movement that indicates child is fearful or wary of the object/experimenter. Apparent and sudden decrease in activity level, breathing may be seen, the body is in an awkward posture, trembling due to extreme muscular tension. Freezing may occur. Freezing is when some part of or whole body becomes still or rigid in response to stimuli. Limbs may appear stiff and lifeless or frozen in an awkward position. A good indication of freezing behavior is being able to see the child physically breathe. Attention can be focused on the source or elsewhere.
- **Vocal:** Negative vocalizations of fear, such as whimpering or whining

**Sadness**
- **Facial:** Inner corners of brows raised, outer corners lowered, so the skin below the brows forms a "triangle". Eyes narrowed or squinted, cheeks raised. Corners of mouth pulled down and out. Mouth could be open or closed. Upper lip often protrudes at the center.
- **Bodily:** Bodily movement that indicates child is sad in response to object or experimenter. Appears deflated, head dropped, shoulders slumped, sinking in chair
- **Vocalizations:** Negative vocalizations of sadness, crying that is rhythmic, softer than angry cry

**Anger/Frustration**
- **Facial:** Brows down straight or slanting down toward the center. Brows are often drawn together. May be bulges or wrinkled around brows. Cheeks should be raised. Mouth could be straight, angular, or drawn tightly shut.
- **Bodily:** Bodily movement that indicates child is angry in response to object or experimenter. Bodily tension indicating frustration, stomps, pounds fists.
- **Vocalizations:** Negative vocalizations of frustration, angry protests, angry cry (loud, strong cry)

**Positive/Pleasure**
- **Facial:** Cheeks raise, eyes may appear squinted, lip corners rise
- **Bodily:** Bodily Pleasure generally is any body expression to display pleasure. Child moves body with much energy in response to pleasure. May clap, throw up hands, or jump.
- **Vocalizations:** Positive vocalizations, including squealing, laughing, etc.

**Touch container (Present/Absent)**
- Code if child touches the container, lock, and/or keys during the epoch
Appendix H: Locked Box Regulation Coding Manual

EUR LB Regulation Coding

Timings

All behaviors coded in 5-second intervals as present/absent unless otherwise noted. **Be sure to use the same times used in the emotion coding or transcription** if that has already been completed. If the emotion coding and transcription has not been completed, make sure the emotion coders and transcribers know that they should be using your start times.

If the times have not been done, begin coding when the door shuts after the experimenter leaves the room.

**Behavioral Codes** – unless indicated otherwise the following are coded as present/absent.

**Focused on stimulus**
When the child is focused on the stimulus, code it as either visual or verbal:

- **Visual (FS)**
  Child is focused on the stimulus for the task (*container/keys/toys*). To code, eyes should be open and stay fixated on the stimulus for 2 seconds or more. A brief glance is not considered focused. May also include times when child is playing with stimulus. Child is not speaking but focused on the task.

- **Verbal about task (FSV)**
  Child is focused on the task but also speaking about the task (e.g., “Not this key” or “I wonder which key”). Also included is when a child is singing about the task.

- **Verbal other (FSO)**
  Child is focused on the task and singing (not about task), humming, whistling, etc.

**Distraction**
When the child is using distraction, code it as either visual or verbal:

- **Visual (DS)**
  Child is focused on an object that is not the focal stimulus (e.g., body, lights in room, poster, microphone). The child should be focused on the distracter for 2 seconds or more. A brief glance is not considered focused.

- **Verbal (DSV)**
  Child is not focused on the focal stimulus and is talking about something other than the task or focal stimulus (but not talking to parent). May include times when child is singing, talking to/about a poster or something in the room (e.g., “Look, it’s Tigger” or “I like Pooh Bear”), talking about things not related to the current task (as long as it is not directed toward parent). Whistling, singing, humming, etc. while not focused on the box would most likely also fall under this category.
**Child persistence (CP)**

0 = Child does not appear interested in using keys to try to get toy out of the container. May be touching container but not actively trying to open it.

1 = Child is actively trying to open container for ½ the time; or child is purposefully sorting through keys to find next key but may not actively be trying to open container (child playing with keys is not coded as persistence)

2 = Child is actively trying to open the container for more than ½ of the time

**Self-comforting (SC)**

Engages in any manipulation of body, clothing, or material or other auto-manipulative behaviors (like rocking to soothe themselves). Behaviors may include: clasping hands, hair, face; sucking on fingers, thumb, hands; rubbing face or clothing; picking nose. Batting at face or head is not considered self-comforting. Behaviors appear to be unconscious and for soothing purposes. Behaviors should be more than fidgeting and will typically last for 2 seconds or longer.

**Talks to parent (TP)**

Child is using language to communicate with the parent. Vocalizations that are not words can be included if they serve a clear communicative function. Do not include vocalizations tied to emotion (e.g., grunting while trying to open container).

0 = no language toward parent

1 = child uses language/vocalization directed toward parent once (one statement) during period (e.g., help, mommy, ducky)

2 = child uses language/vocalizations repetitively during the period (more than one statement)

**Attend to parent (AP)**

Eyes are focused on the mother. To code attend to mother, eyes must be open and stay fixated on mother for 2 seconds or more. A brief glance is not considered focused.

**Checking In with parent (CI)**

Child looks very briefly, usually less than 1 or 2 seconds, at parent not with the intent of interaction. Checking In is a visual spot check, e.g. to see where mother is and what she is doing. Often when a look is too brief to determine what type of look it was it is Checking In.

**Proximity to parent (PXP)**

0 = beyond 2 feet away from caregiver

1 = within 2 feet of caregiver

2 = touching caregiver, or immediately next to her (standing next to caregiver’s legs if sitting)

**Parent neutral (PN)**

0 = Mother is neutral for the period. She remains uninvolved with the child.

1 = Mother is somewhat neutral but gets involved sometimes. Parent may briefly encourage the child but in general tends to follow the script given by only making 1-2 minimal comments (“I’ll help when I’m finished with these questions.”).

2 = Mother is very involved. She may continue talking to the child, soothing the child etc. She is involved most of the time. She says more than 1-2 brief comments
Notes for locked box:
If the child is using the keys in order to open the box, that would be coded as focused on the stimulus; however, if the child is playing with the keys (i.e., is not using them to try to open the box, is not sorting through them to try to find the right key, but is just fiddling with them, etc.), that would be coded as distraction.

If the child is talking about the keys, toys, opening the box, etc. while looking at the box or trying to get the box open, that would fall under focused on the stimulus (unless the child glances at mother indicating that he/she is talking to the mother). If the child is humming, singing, whistling, etc. while focused on the box, that behavior would most likely be coded as self-comforting (and focus on stimulus would also be coded). Whistling, singing, humming, etc. while not focused on the box, would most likely be coded as distraction.