CHILD EMOTIONAL REACTIVITY AND REGULATION: PARENTAL INFLUENCES AND IMPLICATIONS FOR SOCIOEMOTIONAL AND ACADEMIC COMPONENTS OF SCHOOL READINESS

by

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DISSERTATION ABSTRACT

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Title: Child Emotional Reactivity and Regulation: Parental Influences and Implications for Socioemotional and Academic Components of School Readiness

The dissertation titled "Child Emotional Reactivity and Regulation: Parental Influences and Implications for Socioemotional and Academic Components of School Readiness" investigates how child and caregiver factors impact emotion regulation in preschoolers (defined here as ages 3-5), and how emotion regulation then affects measures of socioemotional and academic school readiness. In this cross-sectional study, mothers and their biological children participated in video recorded parent-child interactions, from which we coded maternal and child emotion regulation strategies, as well as child negative affect. Child academic school readiness was directly assessed in the lab after the parent-child interaction, and child socioemotional functioning was assessed via parent report. These data were used to test the following research questions: 1) To what extent do preschool-aged children utilize emotion regulation strategies modeled by their mothers?; 2) To what extent does negative affect moderate the usage of children's emotion regulation strategies?; 3) How do emotion regulation strategies used by preschool-aged children relate to scores on standardized socioemotional and academic school readiness screeners? Determining how children learn to engage in emotion regulation strategies, and investigating the correspondence between certain emotion regulation strategies and school

readiness, is an important consideration for prevention of academic and behavioral problems at school entry. Additionally, understanding how children's levels of negative emotionality impacts their ability to engage in more adaptive emotion regulation strategies may help determine which children may benefit from early intervention to mitigate the negative effects of emotional dysregulation on academic and socioemotional competence.

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CHAPTER I

INTRODUCTION

Child Emotional Reactivity and Regulation

Emotional reactivity, or the type, intensity, and frequency of emotions that children express can have immediate and long-term consequences on their socioemotional and academic performance in school. Children who have more even temperaments and more moderate levels of emotional intensity are rated as more teachable by their teachers and achieve at higher academic levels compared to children without these characteristics (Keogh, 1992; Martin, Drew, Gaddis, & Moseley, 1988). Regulation of negative emotionality in kindergarten has also been shown to moderate the relationship between behavioral regulation and socially appropriate behavior, and predict kindergarten social competence (Denham et al., 2003; Eisenberg, Fabes, Guthrie & Reiser, 2000). Importantly, for children who demonstrate higher levels of negative emotions, emotion regulation is an even more salient predictor of social competence (Denham et al., 2003).

Emotion regulation (ER) is a process of utilizing skills and strategies to modulate, inhibit and enhance emotions to the extent needed for achieving a desired outcome (Calkins, 2007; Thompson, 1994). The ability to regulate emotions develops rapidly in the early years of life and improves slowly into adulthood (Eisenberg, Spinrad, & Eggum, 2010). Advances in executive functioning, behavioral regulation, and language provide preschool aged children with new means of navigating emotional situations (Blankson et al., 2017; Montroy, Bowles, Skibbe, McClelland & Morrison, 2016; Cole, Martine & Dennis, 2004).

Consistent with an optimal arousal perspective, higher levels of emotion reactivity coupled with higher levels of regulation in infancy and toddlerhood may facilitate the development of cognitive and regulatory abilities later in childhood (Ursache, Blair, Stifter & Voegltine, 2012). However, young children who experience intense levels of emotions in the absence of regulation may be at risk for developing patterns of brain activity that result in more reactivity and less regulation in response to emotionally arousing stimuli over time (C. Blair, 2002; Raver, Garner & Smith-Donald, 2007). The effectiveness of emotion regulation strategies is somewhat contingent upon the intensity of the emotional reaction, or the magnitude of activation in coordinated response systems that constitute emotion (Sheppes & Gross, 2012). Consequently, previous research examining the link between emotional reactivity and regulation has found that children who demonstrated more negative emotionality were less successful in using emotion regulation strategies (Morris & Silk, 2001; as cited in Morris, 2007). Therefore, children who experience more intense, negative emotions may have more difficulty successfully engaging in emotion regulation strategies.

Understanding the relation between children's levels of negative emotionality and their ability to engage in adaptive emotion regulation strategies may be an important consideration for early intervention and prevention of emotional dysregulation. Previous studies have found that preschoolers were more successful at regulating their emotions when using strategies such as distraction (i.e., engaging with other objects and activities). Conversely, focusing on the object of frustration, or engaging in cognitive regulation (i.e., reasoning) resulted in more expression of emotional distress (Grolnick et al., 1996; Putnam et al., 2002). Therefore, it is important to determine which categories of emotion

regulation strategies are most useful in this age range. The majority of the literature has assessed children's emotion regulation through survey methods—the present study advances this literature by investigating these processes using direct observation and categorization of children's emotion regulation strategies.

Child Emotion Regulation and School Readiness

As young children are entering school, they are tasked with successfully navigating new relationships, rules, and academic environments which are likely to elicit a range of emotions (e.g., anxiety, excitement, frustration). Learning to regulate the outward expression of emotion in response to classroom stimuli is a crucial task of early childhood and an important predictor of concurrent and subsequent academic and social development (Harrington, Trevino, Lopez & Giuliani, 2019; Kopp, 1989; Ursache, Blair, & Raver, 2012).

Emotion Regulation and Academic Readiness

Emotion regulation may help promote preschool-aged children's school adjustment, school readiness, and long-term academic success by maintaining optimal levels of emotional arousal (Ursache, Blair & Raver, 2012). As such, children who are able to regulate negative emotions in order to remain more emotionally positive in the face of academic challenges tend to have higher grades and higher standardized test scores (Gumora & Arsenio, 2002).

Emotion regulation skills also support children's academic achievement by reinforcing executive functioning processes that underlie attentional and behavioral regulation (Blankson et al., 2017; Ursache, Blair, Stifter & Voegtline, 2013). Early mastery of emotion regulation is thought to support children in developing patterns of

brain connectivity between the prefrontal cortex and amygdala, which, in turn, facilitate regulation of emotional responses to classroom stimuli in a way that focuses attention for learning, promotes sustained task engagement, and enables acquisition of academic information (C. Blair, 2002; Eisenberg, Sadovsky, & Spinrad, 2005; Graziano, Reavis, Keane, & Calkins, 2007; Raver, Garner & Smith-Donald, 2007).

Indeed, levels of emotion regulation in preschool are associated with better cognitive school readiness by kindergarten (Brophy-Herb, Zajicek-Farber, Bocknek, McKelvey & Stansbury, 2013), executive functioning (Ferrier, Bassett & Denham, 2014), teacher ratings of attention and academic competence (Salisch, Denham & Koch, 2017; Trentacosta & Izard, 2007), the ability to attend to, encode, and recall academic information (Raver, Garner & Smith-Donald, 2007), academic achievement (Izard et al., 2001; Leerkes, Paradise, O'Brien, Calkins & Lange, 2008), and standardized literacy and math achievement scores, controlling for IQ, behavior problems and the student-teacher relationship (Graziano et al., 2007). Emotion regulation abilities in early childhood also predict distal academic outcomes such as GPA, adolescent achievement scores, retention, failure to graduate, dropout, and suspension or expulsion (Eisenberg et al., 2005; Hill & Craft, 2003; Wiley, Siperstein, Bountress, Forness & Brigham, 2008).

Emotion Regulation and Socioemotional Readiness

The development of emotion regulation skills in early childhood may be a critical component of achieving socioemotional competence (Leerkes et al., 2008). Emotion regulation supports behavioral regulation processes that result in fewer externalizing behaviors, and enable children to establish positive peer and teacher relationships (C. Blair, 2002; Blankson et al., 2017; Denham et al., 2003; Eisenberg, Valiente, & Eggum,

2010; Hill et al., 2006). Children with more developed emotion regulation skills have greater control over how they respond to others, and thus are viewed more favorably by peers and are more likely to engage in appropriate interactions with teachers and peers (Blankson et al., 2017; Eisenberg et al., 2000). By kindergarten, children's social competence, successful peer interactions, and peer acceptance predict mental health outcomes throughout grade school, such as positive attitudes towards school, less school avoidance, adaptive school adjustment, higher grades, and greater academic achievement (Denham et al., 2003; Eisenberg et al., 2005; Ladd, 2003; O'Neil et al., 1997).

The specific types of emotion regulation strategies that facilitate socioemotional and academic competence at school entry have not been determined. Identifying emotion regulation strategies that work well for children in this age could be an important component of interventions seeking to promote academic and socioemotional school readiness. Furthermore, interventions targeting emotion regulation may be particularly important for students who demonstrate high levels of negative emotions at school entry.

Parent Influences on Child Emotion Regulation

Given that children's emotion regulation abilities at school entry have been shown to predict academic and socioemotional trajectories throughout schooling, consideration of parenting factors that contribute to the development of emotion regulation is an important aspect of prevention and early intervention efforts. While emotional reactivity and emotion regulation are somewhat heritable, they are also influenced by social contexts and parenting behaviors (McRae et al., 2017; Raby et al., 2012). Therefore, early caregiving environments may potentiate individual differences in emotion regulation. According to Morris and colleagues (2007), caregivers teach children about emotion

regulation through their parenting behaviors and reactions to their child's emotions, through their modeled emotional displays and regulation attempts, and through explicit teaching and emotion coaching.

Components of parenting styles, such as sensitivity and responsivity to their child's emotional cues are associated with children's emotion regulation (Morris et al., 2007). For instance, responsive caregiving promotes the use of adaptive emotion regulation (e.g., using language to express feelings) and effortful control abilities in children (Eisenberg, Spinrad & Eggum, 2010; Tobin, Sansosti, & McIntyre, 2007). Conversely, caregivers' punitive or aggressive responses to children's negative emotions can lead the child to develop maladaptive emotion regulation strategies (e.g., hitting) (Eisenberg, Spinrad & Eggum, 2010). As mentioned previously, children who experience high levels of emotional reactivity coupled with high levels of emotion regulation tend to demonstrate better regulatory abilities later in childhood (Ursache et al., 2012). However, these same children, who manifest high levels of emotion reactivity and regulation, also tend to experience higher levels of supportive, sensitive caregiving (Ursache et al., 2012). A large literature shows that parents who demonstrate higher levels of sensitivity and responsivity to their child's emotional cues, cultivate a relationship characterized by warmth and nurturance, and provide contingent positive responses to child initiations, facilitate the development of emotion regulation skills in early infancy and childhood (Ainsworth, Bell, & Stayton, 1974; Warren, Brady, Sterling, Fleming, & Marquis, 2010; Lowe et al., 2012). However, few studies examining parenting styles and child emotion regulation have investigated the moderating role of child characteristics, such as emotionality (Morris et al., 2007). Additionally, it is important to investigate specific

strategies parents use to help their child cope with negative emotions rather than looking at parenting styles broadly.

From a social learning theory perspective, parents who demonstrate more sensitivity and responsivity may also influence their children's emotion regulation by modeling more effective emotion regulation strategies themselves (Bandura, 1977). Social learning theory suggests that children's behaviors are influenced by observational learning, where they encode and imitate the behaviors they have observed (Bandura, 1977). Related studies of children's observational learning have found that children imitated their mother's pain reactions (Goodman & McGrath, 2003), and adult's self-regulation strategies during a delay of gratification task (Correiveau, Min, Chin & Doan, 2016). Therefore, another way children may learn about emotions and emotion regulation is by observing and imitating their parent's emotion regulation strategies through a process known as emotion socialization (Morris et al., 2007; Parke, 1994). Through emotion socialization, parents' emotional displays and regulation attempts implicitly teach children which emotions are acceptable within the family context and how to manage their experience of those emotions (Morris et al., 2007). Thus, parents may promote children's emotion regulation by modeling appropriate emotional responses with appropriate language and actions (K. Blair et al., 2004). However, much of this work focuses on socialization of emotion more broadly whereas the current study is more narrowly focused on the socialization of emotion regulation. Additionally, rather than focusing on how children model their parents attempts to regulate their own emotions, this study is concerned with how children model the strategies parents use when helping their child to regulate their negative emotions.

In addition to parental reactions to children's emotion and modeled emotional displays, parents may also explicitly teach their children strategies for regulating emotions through emotion coaching (Morris, 2007). Caregiver's behaviors and actions in response to their child's emotions may be especially influential for preschoolers' emotion regulation strategy development as young children frequently rely on help from others in modulating their emotions (Kopp, 1989; Thompson, 1994). Previous research has found that parental attempts to support children to engage in positive cognitive reframes and attempts at redirecting attention were associated with lower levels of expressed negative emotions (Morris, Silk, Steinberg, Aucoin & Keyes, 2007). While studies have investigated what strategies parents use to coach children through emotionally laden situations and the subsequent impact on the child's expressed emotions, there is a need to investigate how the strategies parents use to regulate their child's emotions corresponds to their child's emotion regulation strategy use. The process by which children learn emotion regulation strategies from their parents may be partly influenced through modeling the strategies the parent uses to help their child manage their emotions and partly influenced by their parent's support in using such strategies. This study will address an important gap in the literature by investigating whether children can independently imitate the strategies used by their mothers when responding to their negative emotions during a waiting task, and how child factors, such as negative emotionality, interact with parenting behaviors to predict children's emotion regulatory skills on a separate, independent waiting task.

CHAPTER II

SUMMARY AND HYPOTHESES

Emotion regulation in early childhood has been linked to the ability to regulate attention in the service of attending to academic information (Raver, Garner, & Smith-Donald, 2007), and the ability to regulate behaviors in order to engage in appropriate social interactions with peers (Blankson et al., 2017). For children who demonstrate high levels of negative emotions, their ability to engage in emotion regulation may be even more important for promoting socioemotional and academic success at school entry (Denham et al., 2003; Ursache et al, 2012). Finally, the degree to which parents model strategies to help their child regulate their emotions may influence how children incorporate these strategies into their emotion regulation repertoire. Thus, there is a need to investigate unique parental contributions to the development of emotion regulation strategies in young children.

Determining how children learn to engage in emotion regulation strategies and investigating the correspondence between certain emotion regulation strategies and school readiness is an important consideration for prevention of academic and behavioral problems at school entry. Additionally, understanding how children's levels of negative emotionality impacts their ability to engage in more adaptive emotion regulation strategies may help determine which children may benefit from early intervention to mitigate the negative effects of emotional dysregulation on academic and socioemotional school readiness. Therefore, the present study investigated the degree to which preschool-aged children utilize emotion regulation strategies modeled by their parents, and whether the extent to which children utilize strategies to regulate their emotions is moderated by

their levels of negative affect. In addition, this study examined whether emotion regulation strategies used by preschool-aged children relate to scores on standardized socioemotional and academic school readiness screeners. Specifically, the study investigated the following hypotheses:

1. The frequency of certain types emotion regulation strategies modeled by mothers will be correlated with the frequency of the same emotion regulation strategy types utilized by their preschool aged children.
2. The extent to which children imitate emotion regulation strategies modeled by their mothers will be moderated by the child's levels of negative affect, such that children with higher levels of negative affect will engage in fewer emotion regulation strategies.
3. Specific emotion regulation strategies (i.e., distraction and self-comforting) used by preschool aged children will be associated with higher scores on standardized socioemotional and academic school readiness screeners.

CHAPTER III

METHODS

Participants

This study is part of an ongoing larger investigation of parent influences on the development of self-regulation in mothers and their 3- to 5-year-old children (Giuliani, PI). Biological mother-child dyads (N = 88) were recruited from the Eugene/Springfield metropolitan area through physical and online flyers. Criteria for participation were mothers over the age of 18 with biological children between the ages of 3 and 5 who had not yet entered kindergarten. Mother-child dyads were excluded from the study if mothers had less than half-time custody of the child, had a history of a significant neurological disorder, or were taking medication that affects cognitive function; if the child had a developmental delay, sensory impairments, or the mother believed the child would not be able to participate in the study successfully; if the family was involved in child welfare; or if the family reported that their primary language was not English.

The sample size for the current study is 78 due to missing data and technical errors with video recordings. The following demographics describe the 78 participants included in this study and are summarized in Table 1. The mothers were 33.55 years-old (SD = 4.93), on average, with an average of 15.35 years of education (SD = 2.46), and 89.7% of the mothers identified as Caucasian. The preschoolers were 4.07 years-old on average (SD = 0.78), 52.6% were male, and 87.20% identified as Caucasian. The average household income for the participants was $70,646.71 ($SD$ = 48,455.09).

The stopping rule for participant recruitment for the larger study was determined by budgetary constraints. Thus, an *a priori* power analysis to determine the sample size necessary for analyses was not performed for the current study. In addition, there are so

few studies in the literature reporting effect sizes for analyses with variables similar to the ones used in this study that an *a priori* power analysis would have been challenging regardless. Post-hoc sensitivity analyses were conducted for each hypothesis using G-power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009) in order to determine what effect sizes this sample was powered to detect with an alpha of .05 and power of .8. For hypothesis 1, in which the correlations between parent and child emotion regulation strategies were investigated, a sensitivity analysis indicated that this study was appropriately powered to detect correlations of r = .31 and above. For hypothesis 2, which investigated the main effects of maternal emotion regulation, child negative affect, and the interaction between the two on child emotion regulation, a sensitivity analysis indicated this study was adequately powered to detect an effect size of $f^2 = 0.15$ and above. For hypothesis 3, investigating the effects of child emotion regulation on school readiness, a sensitivity analysis indicated the study was adequately powered to detect an effect size of $f^2 = 0.19$ and above. According to Cohen (1988), these correspond to medium effect sizes (r = .3, $f^2 = 0.12$).

Table 1 *Child and Mother Demographics (N= 78)*

Demographics	*M*/*n*	*SD*/%	*Range*
Child			
Sex (male)	41.00	52.50	
% Caucasian	68.00	87.20	
Mean age (years)	4.07	0.78	3.01 - 5.62
Mother			
% Caucasian	70.00	89.70	
Mean age (years)	33.55	4.93	25.00 - 43.00
Years of education	15.35	2.46	8.00 - 22.00
Annual income	70,646.71	48,455.90	0.00 - 260,000.00

Procedures

The data for this study were collected as part of a larger cross-sectional study investigating the associations between parenting, brain activity, and self-regulation skills (Giuliani, PI). The study involved two separate three-hour visits to the University of Oregon. During the first visit, the mother and child engaged in video-recorded interactions, the mother completed a demographics questionnaire, and the child completed assessments of school readiness and self-regulation. In the second visit, the mother completed behavioral measures of self-regulation during a functional MRI scan and additional questionnaires. Only the data collected during the first visit are used in this study.

When the parent-child dyads arrived to the lab for their first visit, an experimenter reviewed the informed consent document with the parent, and then the child was shown a developmentally appropriate picture schedule detailing the activities they would complete during the session. The parent and child engaged in 10 minutes of video-recorded free play followed by 2 minutes of cleaning up. At the end of the two minute clean up, the experimenters initiated the denied request episode followed by the academic school readiness assessment and battery of self-regulation measures, including the delay of gratification task. Both the denied request episode and delay of gratification task were recorded and coded for emotion regulation strategy use by parents and children, respectively (described below).

Denied Request Episode

The denied request episode was adapted from Stansbury and Sigman (2000). After conducting a 10-minute video-recorded free play interaction in which the dyads

were asked to play with some toys as they normally would, the dyads were instructed to clean up the toys for two minutes. After two minutes, the experimenters returned to remove the remaining toys from the room. Then one experimenter led the parent out of the room while another experimenter entered the room and presented the child with an array of snacks and candy as a prize for cleaning up. Outside of the room, the parent was told that the other experimenter would be offering the child a snack as a prize for cleaning up, but not to let the child eat the snack until the experimenters returned for the next activity. At the same time, the other experimenter provided the child with a selection of snacks and candy, let the child pick one snack, and then told the child that it was OK to eat it now, but they needed to ask their mom first. The experimenters then reunited the parent with the child and left the room for two minutes. At the end of the two minutes, the experimenters returned and told the child they could eat the snack if they wanted.

Delay of Gratification Task

The delay of gratification task was adapted from Kochanska, Murray and Coy (1997). During this task, an experimenter provided the child with three snack choices: M&Ms, fruit gummies, and fish crackers. After the child made a choice, the experimenter placed one of the snack items on a napkin in front of the child, and told the child that if they waited until the experimenter rang the bell to eat the snack, they would get one more snack item. This task consisted of four trials of increasing length- 30 seconds, 60 seconds, 120 seconds, and 180 seconds. The experimenter picked up the bell halfway through each trial and rang the bell at the end of each trial. If the child waited until the experimenter rang the bell to eat the snack, then they were provided with an additional snack item.

Measures

Family Demographics

The mothers completed a demographics questionnaire to collect relevant background information to be used as control variables in statistical analyses. The mothers reported on their date of birth, ethnicity, years of schooling, and income. They also reported on their child's date of birth, ethnicity, and sex. Other information (e.g., preschool attendance) was also collected and is not reported here.

Maternal Emotion Regulation Strategies

The video-recorded denied request episode was coded for the strategies the mothers used to regulate their child's negative emotions in response to the denied request. Mother emotion regulation strategy use was coded using an adapted version of the coding scheme by (Stansbury & Sigman, 2000) (See Appendix A for maternal emotion regulation coding scheme). The following modifications were made to the coding scheme: (1) Two instrumental regulation strategies were added to the scheme—removing the desired snack item and instructing the child to change their behavior—to be consistent with the situation modification strategies described by Gross & Thompson (2007); (2) A positive cognitive reframe item was added to the cognitive regulation strategies, which was used by Morris (2011); (3) The items "Mother states own authority" and "mother threatens worse outcome" were combined due to the low frequency of observing these strategies; (4) the dichotomous "yes/no" coding scale was changes to a 0-3 scale representing the frequency and intensity of the observed strategies, where a 0 means "behavior did not occur" and a 3 indicates "the behavior was clearly demonstrated at multiple points throughout the interaction". Coders used the 0-3 scale to

record the presence of individual emotion regulation strategies. The scores for the individual strategies were then averaged to create a subscale score in the following domains: (1) Comforting; (2) Instrumental Regulation; (3) Cognitive Regulation; and (4) Distraction. Consistent with Stansbury and Sigman (2000), the emotion regulation subscales were used in analyses rather than the individual emotion regulation strategies.

Three graduate-level coders coded the denied request episodes to capture the mother's use of emotion regulation strategies. The coders completed 4 hours of training and were required to demonstrate at least 80% exact agreement across 2 videos before coding independently. During training, the average exact percent agreement between coders was 88%, with a range from 73%-100%. After establishing reliability, all of the videos were coded at least twice by independent coders. The coders met on a weekly basis to discuss ambiguous coding items. For Comforting and Cognitive Regulation, the coders demonstrated a high degree of reliability with an average ICC of 0.82, 95% CI [0.74, 0.88] and 0.81, 95% CI [0.72, 0.87]. For Instrumental Regulation, the average ICC was 0.67, 95% CI [0.54, 0.77], and for Distraction the average ICC was 0.51, 95% CI [0.35, 0.64].

Child Emotion Regulation Strategies

The video-recorded delay of gratification task was coded for the child's emotion regulation strategy use using an adapted version of the Stansbury and Sigman (2000) scheme (See Appendix B for child emotion regulation coding scheme). A number of modifications were made to ensure that the coding scheme would be suitable for use during the snack delay task. In the category of self-comforting strategies, requesting a transitional object was removed because it was not relevant to the snack delay scenario as

toys and other objects were not available during the task. Under the instrumental regulation category, a few changes were made. The items "focusing on the snack/task" and "child distances themselves from the task" were added to be consistent with regulation strategies documented by Grolnick (1996) and Eisenberg and Fabes (1994). The "child bargains or compromises" item was moved from the cognitive regulation strategy section to the instrumental strategies section, as it seemed to align with Stansbury & Sigman's (2010) definition of instrumental behaviors which includes verbal objections and seeking to eliminate the source of frustration. The items "child contradicts mother's reasons" and "child gives mother reason for granting the request" were removed because those were not relevant to the snack delay scenario. Finally, the dichotomous "yes/no" coding scale was changes to a 0-3 scale representing the frequency and intensity of the observed strategies, where a 0 means "behavior did not occur" and a 3 indicates "the behavior was clearly demonstrated at multiple points throughout the interaction". Coders used the 0-3 scale to record the presence of individual emotion regulation strategies. The scores for the individual strategies were then averaged to create a subscale score in the following domains: (1) Comforting; (2) Instrumental Regulation; (3) Cognitive Regulation; and (4) Distraction. Consistent with Stansbury and Sigman (2000) the emotion regulation subscales were used in analyses rather than the individual emotion regulation strategies.

The same coders, training procedures, and reliability methods used for the mother emotion regulation strategies were used for the child strategies. During training, the average exact percent agreement between coders was 81%. After establishing reliability, 81% of the videos were coded at least twice by independent coders. The coders met on a

weekly basis to discuss ambiguous coding items. For Comforting and Distraction, the coders demonstrated a high degree of reliability with an average ICC of 0.90, 95% CI [0.83, 0.93] and 0.92, 95% CI [0.87, 0.95]. For Instrumental Regulation, the coders demonstrated adequate reliability with an average ICC of 0.72, 95% CI [0.59, 0.81]. For Cognitive Regulation, the average ICC was 0.54, 95% CI [0.36, 0.69].

Child Negative Affect

Parent-reported child negative affect was measured using the BASC-3 Behavioral and Emotional Screening System-Preschool (BESS-P; Kamphaus & Reynolds, 2015). The BESS-P is a parent report form designed for preschool aged children between the ages of 3 and 5. The BESS-P contains 34 items that are rated on a 4-point Likert scale from "never" to "almost always". The BESS-P produces three subindexes: (1) Externalizing Risk Index, (2) Internalizing Risk Index, and (3) Adaptive Skills Risk Index. The Externalizing and Internalizing subindexes were used to create a composite of parent reported child negative affect. The internalizing subindex asks about items such as "My child is negative about things" and "My child is easily frustrated". The Externalizing subindex ask about items such as "My child throws tantrums" and "My child loses their temper too easily". The Internalizing and Externalizing subindexes demonstrated adequate reliability with Cronbach's alphas of .75 and .83 respectively for the current sample. The Internalizing and Externalizing subindexes were correlated at .578 ($p <$ .001), thus the subindexes were Z-scored and averaged to create a composite variable of parent-reported child negative affect.

The child's observed levels of negative affect during the parent-child interactions was measured using the Parent Child Interaction System (PARCHISY; Deater-Deckard,

Pylas & Petrill, 1997). The PARCHISY coding scheme assesses individual mother and child characteristics in addition to the quality of mother-child interactions. Negative affect is one of 8 individual child characteristics that is rated on a 7-point scale. The negative affect scale measures the frequency of the child demonstrating negative affect from 1 meaning "no negative affect displayed" to 7 meaning "constant negative affect-always scowling/frowning, voice always in harsh tones". The videos were coded by undergraduate level coders trained to 80% agreement. The total percent agreement, defined as an exact match between two coders was .54, agreement defined as two coders rating an item within plus or minus one-point difference, was .88.

Per the dissertation committee's recommendation, the child's negative affect was operationalized using a composite of both observed and parent reported negative affect. Thus, the negative affect scale of the PARCHISY and the Internalizing and Externalizing indexes of the BESS-P were Z-scored and averaged to create a composite of observed and parent-reported negative affect. Due to low inter-rater reliability of the Negative Affect Scale of the PARCHISY, and the low base rates of observed negative affect, a composite of negative affect was also created using only the Internalizing and Externalizing subscales of the BESS. Both composite variables were used to create separate interaction terms to test the hypothesis that child negative affect moderates the association between maternal and child emotion regulation strategy use. The results of each interaction are presented in the results.

Child Socioemotional Functioning

Children's socioemotional functioning was assessed using the Devereux Early Childhood Assessment- Preschool (DECA-P2; LeBuffe, Ross, Fleming & Naglieri,

2013). The mothers in this study completed this rating scale online via a Qualtrics link. The DECA-P2 includes 38 items rated on a 5-point Likert scale with 1 meaning "never" and 5 meaning "almost always". Items included statements such as "my child tries different ways to solve a problem" and "my child fights with other children". The DECA-P2 produces four subscale scores, and one composite score. The subscales include: (1) initiative; (2) self-regulation; (3) attachment/relationships; and (4) behavioral concerns. The initiative, self-regulation and attachment/relationship subscales are combined to create a composite score called Total Protective Factors (TPF). The TPF composite, which was used in this study, is an indicator of overall socioemotional functioning, with higher scores indicating better socioemotional functioning. The TPF composite represents the child's raw scores on the DECA-P2 and demonstrated adequate reliability with a Cronbach's alpha of .66 for the current sample.

Child Academic School Readiness

Children's academic school readiness was assessed via the Bracken School Readiness Assessment – 3rd Edition (BSRA-3; Bracken, 2006). The BSRA-3 is a standardized, norm-referenced assessment for children ages 3 to 6 that measures concept knowledge in the following domains: (1) Colors; (2) Letters; (3) Numbers/Counting; (4) Size/Comparison; and (5) Shapes. The children are shown a visual stimulus, provided with a verbal instruction, and asked to respond receptively (by pointing) to the correct answer. The total raw score on the BRSA-3 was transformed to a standard score. The BSRA-3 has demonstrated adequate test-retest reliability ranging from .76-.92 (Bracken, 2006).

CHAPTER IV

RESULTS

Before conducting analyses, the distributions of the data were visually inspected to ensure that underlying assumptions of the analyses were met. A Tukey transformation was used for the maternal distraction, maternal instrumental, and child cognitive variables so that they were closer to approximating a normal distribution. These transformed variables were used in the following analyses (Table 2).

Table 2 *Mother and Child Variable Descriptive Statistics*

Statistic	N	*M*	*SD*	Range
Child variables				
BRSA-3	77	104.86	15.31	63.00-141.00
DECA-TPF	77	128.00	8.47	81.93-128.00
BESS-P**	78	0.00	0.89	-1.70-2.58
PARCHISY/BESS-P**	78	0.01	0.72	-1.29-2.27
Cognitive	77	0.06	0.26	0.00-1.67
Comforting	78	1.16	0.93	0.00-3.00
Instrumental	78	0.83	0.35	0.10-1.80
Distraction	78	1.73	1.15	0.00-3.00
Mother variables				
Cognitive	78	0.65	0.49	0.00-2.08
Comforting	78	0.50	0.62	0.00-2.00
Instrumental	77	0.43	0.09	0.00-1.83
Distraction	78	2.27	0.82	0.00-3.00

Note. The BESS-P represents the Z-scored internalizing/externalizing composite; PARCHISY/BESS-P represents the Z-scored composite of both variables (marked with an *). All other data shown are raw data.
*indicates a Z-scored variable.

Coherence Between Mother and Child Emotion Regulation Strategies

It was hypothesized that the types of emotion regulation strategies the mother used during the denied request episode would be positively correlated with the types of emotion regulation strategies the child exhibited during the delay of gratification task. A

series of bivariate correlations were used to test for coherence between mother's use of each of the four categories of emotion regulation strategies and their child's use of the same four categories. Contrary to the hypothesis, no significant associations between maternal emotion regulation strategies and child emotion regulation strategies were observed ($p > .08$). The correlation matrix is presented in Table 3.

Table 3 *Correlations Among Mother and Child Emotion Regulation Strategies*

	Mother Strategy			
Child Strategy	Comforting	Instrumental	Distraction	Cognitive
Comforting	-.06	-.02	-.04	.12
Instrumental	.00	-.08	-.10	-.06
Cognitive	.19	-.07	-.04	-.08
Distraction	-.02	-.02	-.02	.04

Notes. Some of the variable distributions were skewed and asymmetrical. The correlations should be interpreted with caution.
* $p < .05$. ** $p < .001$.

Additionally, four separate linear regression models were used to test the association between mother and child emotion regulation strategy use, controlling for child age and sex. In each model, the child's sex, age, and one maternal strategy (e.g., comforting) were added as predictors of the analogous child emotion regulation strategy (e.g., comforting). None of the associations between maternal strategies and child strategies were significant ($p > .33$). However, child age was significantly associated with child cognitive regulation, $t(73) = 2.60$, $p = .01$.

Child Emotion Regulation Moderated by Negative Affect

It was hypothesized that the extent to which children imitate emotion regulation strategies exhibited by their mother would depend on the child's level of negative affect.

Moderation analyses were conducted to investigate whether child negative affect influences the association between maternal and child emotion regulation strategies.

First, four moderation analyses were conducted with a single maternal emotion regulation strategy as the predictor for the same child emotion regulation strategy and the combined observed (PARCHISY) and parent reported (BESS-P) child negative affect as the moderator. For child cognitive regulation, the main effects of maternal cognitive strategy use and child negative affect, nor the interaction between the two, were significant ($p > .41$). For the child's use of comforting, the main effects of maternal use of comforting and child negative affect were not significant predictors, nor was the interaction between the two ($p > .45$). For child instrumental regulation, child negative affect was significantly associated, $t(73) = 2.25$, $p = .03$, but maternal instrumental regulation and the interaction term were not significantly associated with child instrumental regulation ($p > .23$; Table 4). For distraction, the interaction between maternal use of distraction and child negative affect was significantly negatively associated with the child's use of distraction, $t(74) = -2.42$, $p = .02$ (Table 5). For children who were low in negative affect, there was a positive association between mother and child use of distraction. However, there was a negative association between mother and child use of distraction for children high in negative affect. The main effects of maternal use of distraction and child negative affect on child distraction were not significant. The results of a Johnson-Neyman test for regions of significance indicate that when child negative affect is outside of the interval [-1.19, 0.93], the slope of maternal distraction is $p < .05$.

Table 4 *Regression Results using Child Instrumental Regulation as the Criterion*

Predictor	*b*	*b* 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	Fit
(Intercept)	1.82**	[1.74, 1.90]			
Maternal instrumental^	-0.38	[-1.22, 0.46]	.01	[-.03, .05]	
Child negative affect^	0.12*	[0.01, 0.23]	.06	[-.04, .17]	
Maternal instrumental^* child negative affect^	0.67	[-0.46, 1.80]	.02	[-.04, .07]	
					R^2 = .080

Note. Child negative affect represents the composite of PARCHISY and BESS-P scores. A significant *b*-weight indicates the semi-partial correlation is also significant. *b* represents unstandardized regression weights. sr^2 represents the semi-partial correlation squared. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.
^ indicates a centered variable. * indicates p < .05. ** indicates p < .01.

Table 5 *Regression Results using Child Distraction as the Criterion*

Predictor	*b*	*b* 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	Fit
(Intercept)	2.66**	[2.40, 2.92]			
Maternal distraction^	0.00	[-0.01, 0.01]	.00	[-.00, .00]	
Child negative affect^	0.02	[-0.35, 0.38]	.00	[-.00, .00]	
Maternal distraction^ * child negative affect^	-0.01*	[-0.02, -0.00]	.07	[-.04, .18]	
					R^2 = .074

Note. Child negative affect represents the composite of PARCHISY and BESS-P scores. A significant *b*-weight indicates the semi-partial correlation is also significant. *b* represents unstandardized regression weights. sr^2 represents the semi-partial correlation squared. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.
^indicates a centered variable. * indicates p < .05. ** indicates p < .01.

Due to the low base rate of observed negative affect, the same moderations were reanalyzed using only parent reported (BESS-P) negative affect. The main effects of mother emotion regulation and child negative affect on child emotion regulation, as well as the interaction between the two, were not significant for comforting ($p > .37$),

cognitive ($p > .40$), or instrumental regulation ($p > .41$). For distraction, the interaction between maternal distraction and child negative affect remained significantly associated with child distraction, $t(73) = -2.23$, $p = .03$ (Table 6). Results of Johnson-Neyman test for regions of significance indicate that when child negative affect is outside of the interval [-1.70, 1.22], the slope of maternal distraction is $p < .05$.

Table 6 *Regression Results using Child Distraction as the Criterion*

Predictor	*b*	*b* 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	Fit
(Intercept)	2.66**	[2.39, 2.93]			
Maternal distraction^	-0.00	[-0.01, 0.01]	.00	[-.00, .00]	
Child negative affect^	-0.09	[-0.40, 0.22]	.00	[-.02, .03]	
Maternal distraction^* child negative affect^	-0.01*	[-0.01, -0.00]	.07	[-.04, .18]	
					$R^2 = .074$

Note. Child negative affect represents the BESS-P scores. A significant *b*-weight indicates the semi-partial correlation is also significant. *b* represents unstandardized regression weights. sr^2 represents the semi-partial correlation squared. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.
^ indicates a centered variable. * indicates p < .05. ** indicates p < .01.

Child Emotion Regulation and School Readiness

The last study aim was to investigate whether specific categories of emotion regulation strategies used by preschool-aged children were associated with higher scores on socioemotional and academic school readiness screeners. It was hypothesized that certain strategies, such as distraction and self-comforting, would be associated with higher scores on standardized school readiness screeners than strategies such as instrumental or cognitive regulation.

Socioemotional School Readiness

A multiple linear regression was used to test the association between child emotion regulation strategies and socioemotional school readiness (DECA-P2), controlling for child age and sex. All four types of emotion regulation strategies were added into the model as predictors along with child age and sex with DECA-P2 scores as the outcome. Child use of cognitive regulation during the snack delay was significantly associated with higher parent-reported socioemotional competence when controlling for the other types of emotion regulation strategies, child age and sex, $t(69) = 2.10$, $p = .039$. Child age was also significantly associated with socioemotional competence, $t(69) = -2.12$, $p < .05$. Since child age was not significantly associated with socioemotional functioning in step 1 of this model, the significant association between child age and socioemotional functioning in step 2 indicates that this association only emerges once variation in emotion regulation strategy usage is accounted for in the model. The overall model was not significant, $p = 0.19$ (Table 7)

Table 7 *Regression Results using Socioemotional School Readiness (DECA-P2) as the Criterion*

Step	Predictor	*b*	*b* 95% CI [LL, UL]	*beta*	*beta* 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	*r*	Fit
1	(Intercept)	115.86**	[105.51, 126.21]						
	Child age	-1.69	[-4.18, 0.81]	-0.15	[-0.38, 0.07]	.02	[-.04, .09]	-.15	
	Child sex	1.41	[-2.43, 5.26]	0.08	[-0.14, 0.31]	.01	[-.03, .04]	.08	
									R^2 = .030
2	(Intercept)	128.31**	[109.76, 146.86]						
	Child comforting	0.50	[-3.22, 4.22]	0.05	[-0.35, 0.45]	.00	[-.01, .01]	.12	
	Child distraction	1.06	[-1.87, 3.99]	0.14	[-0.26, 0.54]	.01	[-.03, .04]	.14	
	Child cognitive	8.87*	[0.46, 17.29]	0.26	[0.01, 0.50]	.06	[-.04, .15]	.18	
	Child instrumental	-1.87	[-7.58, 3.84]	-0.08	[-0.31, 0.16]	.01	[-.03, .04]	-.04	
	Child age	-2.78*	[-5.41, -0.16]	-0.25	[-0.49, -0.01]	.06	[-.04, .16]	-.16	
	Child sex	0.36	[-3.63, 4.34]	0.02	[-0.21, 0.26]	.00	[-.01, .01]	.08	
									R^2 = .116

Note. A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. sr^2 represents the semi-partial correlation squared. *r* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.
* indicates $p < .05$. ** indicates $p < .01$.

Academic School Readiness

A multiple linear regression was used to test the association between child emotion regulation strategies and academic school readiness (BSRA-3), controlling for child age and sex. All four types of emotion regulation strategies were added into the model as predictors along with child age and sex, with BSRA-3 scores as the outcome. The overall model was not significant, $p = .11$ (Table 8). However, instrumental regulation was significantly negatively associated with BSRA-3 scores when controlling for other emotion regulation strategies, child age and sex, $t(69) = -2.02$, $p = .047$. There was also a trend-level association between distraction and academic school readiness, controlling for the other variables in the model, $t(69) = 1.73$, $p = .09$.

Table 8 *Regression Results using Academic School Readiness (BRSA-3) as the Criterion*

Predictor	*b*	*b* 95% CI [LL, UL]	*beta*	*beta* 95% CI [LL, UL]	sr^2	sr^2 95% CI [LL, UL]	*r*	Fit
(Intercept)	142.88**	[109.61, 176.14]						
Comforting	-1.45	[-8.06, 5.17]	-0.09	[-0.48, 0.31]	.00	[-.02, .02]	.12	
Distraction	4.53	[-0.70, 9.77]	0.34	[-0.05, 0.73]	.04	[-.04, .12]	.19	
Cognitive	11.16	[-3.32, 25.64]	0.19	[-0.06, 0.43]	.03	[-.04, .10]	.10	
Instrumental	-10.28*	[-20.41, -0.15]	-0.23	[-0.46, -0.00]	.05	[-.04, .14]	-.16	
Age	-4.22	[-8.94, 0.49]	-0.21	[-0.45, 0.02]	.04	[-.04, .12]	-.12	
Sex	-2.86	[-9.92, 4.21]	-0.09	[-0.32, 0.14]	.01	[-.03, .05]	-.04	
								R^2 = .140

Note. A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. sr^2 represents the semi-partial correlation squared. *r* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.
* indicates $p < .05$. ** indicates $p < .01$.

CHAPTER V

DISCUSSION

The current study built upon the current literature on childhood self-regulation by directly observing and categorizing children's emotion regulation strategies, rather than relying on self- or parent-report. The current study also addressed an important gap in the literature by examining the mechanisms by which children learn emotion regulation strategies from caregivers.

Contrary to hypothesis 1, the results indicated there was no association between maternal modeled emotion regulation strategies during the denied request episode and child emotion regulation strategies exhibited during the delay of gratification task. There are a few factors that could have contributed to this result. First, some of the variables had a severe positive skew. Transformations were conducted to correct the skew, but the variables distributions still were not normally distributed. The distributions of the variables could impact the associations found through correlational analyses. Second, the laboratory situations (denied request and snack delay) may not have elicited the intensity of emotional reactivity—and thus regulation—children and parents experience in their daily lives. Lastly, it may also be that the types of emotion regulation strategies we observed mothers using in the lab were not representative of the types of strategies that they use to regulate their child's emotions in real-world contexts. Perhaps the mothers behaved differently than they normally would simply because they were aware they were being observed. The mothers may have been more mindful of the strategies they were using or attempted to engage in behaviors they deemed more socially desirable.

Additionally, mothers may have been more responsive to their child's emotions than usual in the absence of real-world distractions and stressors.

This study also investigated how children's levels of negative affect impacts the association between mother and child emotion regulation strategy use. The results were somewhat consistent with the hypotheses in that children's levels of negative affect did influence the association between mother and child emotion regulation strategy use for some categories of emotion regulation. The results showed that children with higher levels of negative affect tended to engage in more instrumental regulation strategies. The results also revealed that child negative affect moderated the association between mother's use of distraction and the child's use of distraction such that children with higher levels of negative affect were less likely to imitate mother's use of distraction as a regulation strategy. However, not all child emotion regulation strategies were moderated by the child's negative affect, as anticipated. One explanation is that the intensity of negative emotions differentially affects emotion regulation strategy usage (Sheppes & Gross, 2012). Another explanation is that the parent-child interactions did not actually elicit high levels of negative affect in the children. The similarity in results between the PARCHISY/BESS-P composite versus just the parent reported BESS-P composite suggests that including observed negative affect (PARCHISY) did not provide additional explanatory power with regard to the moderating effect of child negative affect on mother-child emotion regulation strategy use. More work with children's observed reactions to situations that elicit high levels of negative affect is needed to determine if the moderating effect of negative affect on mother-child emotion regulation use is limited to distraction, or if that strategy is simply the most sensitive to child negative affect.

The final aim of the study was to investigate whether certain categories of emotion regulation strategies were associated with children's socioemotional and academic school readiness. Contrary to the study hypotheses, cognitive regulation was the only strategy that was significantly associated with higher socioemotional school readiness scores. This finding may be due in part to the fact that socioemotional readiness was only assessed via parent report rather than teacher-report or observed behavior. In terms of academic school readiness, instrumental regulation was found to be significantly negatively associated BRSA-3 scores. This makes sense if instrumental regulation strategies are conceptualized as less successful emotion regulation strategies. By definition, instrumental strategies function to eliminate the source of frustration (Stansbury & Sigman, 2000), which necessitates focusing on the object of frustration. However, focusing on the object of frustration is also associated with higher levels of distress in preschoolers (Grolnick et al., 1996). Therefore, instrumental regulation strategies may reflect a relative lack of emotion regulation at this age.

Limitations

It was surprising to find that maternal emotion regulation strategy use was not associated with their child's use of the same strategies. It may be that a brief observation of mother's emotion socialization observed in the lab is not representative of their typical behaviors. It could also be that factors other than emotion socialization and parent modeling influence children's use of emotion regulation strategies. For example, previous research indicates that both genetics and parent behaviors shape the expression of genes relating to emotional reactivity and regulation (McRae et al., 2017; Raby et al., 2012).

This study also only included mothers, but children may also imitate emotion regulation strategies of other caregivers such as fathers, grandparents, or siblings.

Another limitation of this study is that the children demonstrated low levels of observed negative affect overall. Thus, the operationalization of negative affect included mother-reported internalizing and externalizing behaviors, making it difficult to investigate how observed negative affect directly impacts child emotion regulation strategy use. Due to the low levels of observed negative affect, these findings may not be representative of the strategies the children may use to regulate their emotions when experiencing higher levels of distress.

The present study also only measured the child's socioemotional functioning through parent-report. This offers a limited view of the child's true socioemotional functioning and may not be highly correlated with behavioral measures due to the nature of self-report (Dang, King & Inzlicht, 2020). Therefore, the findings may not be representative of the association between emotion regulation and children's actual socioemotional functioning.

Finally, the sample was relatively small and racially and ethnically homogenous which limits the generalizability of these findings. Due to the small sample size, the study may have been underpowered to detect smaller effect sizes, including those seen in the correlations between mother and child emotion regulation strategies. This study was also cross-sectional which prevents causal exploration into children's use of emotion regulation strategies.

Future Directions

Future research should continue to investigate the factors that influence emotion socialization, including genetic contributions and emotion regulation strategies of family members with whom the child spends a significant amount of time. It would also be helpful to combine observed parent emotion regulation strategies with self-report. The emotion regulatory behaviors that parents exhibit in a semi-structured observation may not represent their natural tendencies toward certain types of regulatory strategies. Similarly, it may be helpful to have children report on their knowledge of emotion regulation strategies. Previous research has accomplished this by acting out scenarios with puppets and asking the children what strategies they could use to feel better. This may provide more information about strategies that are difficult to capture with observation, such as cognitive regulation.

In future studies, it may be useful to use tasks that elicit higher levels of negative affect from the children or seek to recruit populations of children known to experience and display higher levels of negative affect. For example, frustration or disappointment paradigms may be effective in this regard. Regardless, the use of measures beyond parent-reported child negative affect is important to determine how children's negative affect impacts their ability to engage in emotion regulation strategies and their readiness for school.

The investigation into children's imitation of emotion regulation strategies from adults could be strengthened by introducing experimental control. Due to the cross-sectional nature of the current study, we cannot be certain whether the children were imitating the emotion regulation strategies modeled by their parents in the lab, or simply

relying on their learning history with engaging in emotional regulation. Future work should vary the conditions in which children are exposed to an adult model of emotion regulation and see if children imitate the strategies on a subsequent task. Involving a teaching component may also elucidate how negative affect impacts children's ability to model explicitly taught emotion regulation strategies.

APPENDIX A
MATERNAL EMOTION REGULATION CODING SHEET

Regulation Strategy	Examples of Strategy	Presence of Strategy			
Comforting		0	1	2	3
1. Mother comforts child physically	*Mother rubs child's back.* *Mother hugs and rocks child.*	0	1	2	3
2. Mother comforts child verbally	*Mother sings to child.* *Mother says "It's Ok"*	0	1	2	3
Instrumental Regulation (situation modification)		0	1	2	3
3. Mother gives in to child's request	*Mother gives the candy to the child.*	0	1	2	3
4. Mother removes the desired snack item	*Mother hides the snack in their purse* *Mother eats the snack*	0	1	2	3
5. Mother restates demand/ instructs child to change their behavior	*Mother says, "I already said you can't have the snack right now. Stop asking".* *Mother wags finger at child*	0	1	2	3
6. Mother compromises or bargains with the child	*Mother says, "You can eat half of the candy now, and half later".* *Mother says "I'll give you a treat when we get home"*	0	1	2	3
Cognitive Regulation		0	1	2	3
7. Mother states reasons for denied request	*Mother says, "They said we have to wait until they come back for the next activity".*	0	1	2	3
8. Mother focuses on the positive outcome	*Mother says, "Just think- after this you get candy! So lucky!"* *Mother says, "We only have to wait a couple minutes until you get the candy!"*	0	1	2	3
9. Mother directs child in reframing the situation	*Mother says, "It was really nice of them to give you a snack for cleaning up"* *Mother praises child for waiting*	0	1	2	3
10. Mother states authority/threatens worse outcome	*Mother says, "Do it because I said so."* *Mother says, "If you ask me again I'm going to throw the candy out."*	0	1	2	3
Distraction		0	1	2	3
11. Mother engages child in alternative activities	*Mother says, "Let's count how many skittles are on the wrapper"* *Mother plays alphabet game while they wait for the experimenter to re-enter.*	0	1	2	3

APPENDIX B
CHILD EMOTION REGULATION CODING SHEET

Regulation Strategy	Examples of Strategy	Frequency of Strategy			
Self-Comforting		0	1	2	3
1. Child seeks parent for comfort	*Child approaches mother and leans on mother's lap.* *Child looks at their mother while waiting*	0	1	2	3
2. Child comforts themselves	*Child sucks own fingers, hugs self, chews on the neck of their t-shirt or strokes own hair.*	0	1	2	3
Instrumental Regulation (situation modification)		0	1	2	3
3. Child verbally requests or demands snack	*Child says, "Can I have the snack now?"* *Child says, "Give it to me!"*	0	1	2	3
4. Child focuses on the snack/task	*Child stares at the snack item* *Child touches, licks, or bites the snack item*	0	1	2	3
5. Child distances themselves from the task	*Child slides chair away from the table* *Child covers the snack with the napkin*	0	1	2	3
6. Child attempts to get the desired object/ eats the snack item	*Child eats the snack before the experimenter rings the bell.* *Child rings the bell so they can access the snack*	0	1	2	3
7. Child bargains or compromises	*Child says "How about I just eat this one now, and you can give me the second one later"* *Child says, "I'm just going to taste it. But I won't eat it".*	0	1	2	3
Cognitive Regulation		0	1	2	3
8. Child asks for explanations of snack delay	*Child says, "Why do I have to wait for the bell?" or "Why can't I eat it now?".*	0	1	2	3
9. Child focuses on positive outcome	*Child says, "I'm going to get 2 gummies!"*	0	1	2	3
10. Child reframes situation	*Child says, "I'm good at waiting"* *Child says, "Only a little bit longer!"*	0	1	2	3
Distraction		0	1	2	3
11. Child initiates or participates in alternative activities	*Child sings a song.* *Child crawls around on the floor.* *Child attempts to talk to the experimenter*	0	1	2	3
12. Child shifts attention/gaze away from the task	*Child makes faces at their mother* *Child looks around the room*	0	1	2	3

REFERENCES CITED

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. F. (1974). Infant-mother attachment and social development: Socialization as a product of reciprocal responsiveness to signals. In M. P. M. Richards (Ed.), *The integration of a child into a social world* (pp. 99-135). New York, NY, US: Cambridge University Press.

Bandura, A., & Walters, R. H. (1977). *Social learning theory* (Vol. 1). Englewood Cliffs, NJ: Prentice-hall.

Bariola, E., Gullone, E., & Hughes, E. K. (2011). Child and adolescent emotion regulation: The role of parental emotion regulation and expression. *Clinical Child and Family Psychology Review*, 14(2), 198–212. doi:10.1007/s10567-011-0092-5

Blair, C. (2002). School readiness: Integrating cognition and emotion in a neurobiological conceptualization of children's functioning at school entry. *American psychologist*, *57*(2), 111.

Blair, K. A., Denham, S. A., Kochanoff, A., & Whipple, B. (2004). Playing it cool: Temperament, emotion regulation, and social behavior in preschoolers. *Journal of School Psychology*, *42*(6), 419–443. https://doi.org/10.1016/j.jsp.2004.10.002

Blankson, A. N., Weaver, J. M., Leerkes, E. M., O'Brien, M., Calkins, S. D., & Marcovitch, S. (2017). Cognitive and emotional processes as predictors of a successful transition into school. *Early Education and Development*, 28, 1–20.

Bracken, B. A. (2006). *Bracken Basic Concept Scale (3rd ed., Receptive).* San Antonio, TX: Harcourt Brace & Company, Educational Measurement.

Brophy-Herb, H. E., Zajicek-Farber, M. L., Bocknek, E. L., McKelvey, L. M., & Stansbury, K. (2013). Longitudinal connections of maternal supportiveness and early emotion regulation to children's school readiness in low-income families. *Journal of the Society for Social Work and Research, 4*(1), 2-19.

Calkins, S. D. (2007). The emergence of self-regulation: Biological and behavioral control mechanisms supporting toddler competencies. *Socioemotional development in the toddler years: Transitions and transformations*, 261-284.

Cohen, J. E. (1988). *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Cole, P. M., Zahn-Waxler, C., Fox, N. A., Usher, B. A., & Welsh, J. D. (1996). Individual differences in emotion regulation and behavior problems in preschool children. *Journal of Abnormal Psychology*, *105*(4), 518.

Corriveau, K. H., Min, G., Chin, J., & Doan, S. (2016). Do as I do, not as I say: actions speak louder than words in preschoolers learning from others. *Journal of experimental child psychology*, 143, 179-187.

Dang, J., King, K. M., & Inzlicht, M. (2020). Why Are Self-Report and Behavioral Measures Weakly Correlated?. *Trends in cognitive sciences*, *24*(4), 267-269.

Deater-Deckard, K., Pylas, M. V., & Petrill, S. A. (1997). The Parent-child interaction system (PARCHISY). *London: Institute of Psychiatry*.

Denham, S. A., Blair, K. A., DeMulder, E., Levitas, J., Sawyer, K., Auerbach–Major, S., & Queenan, P. (2003). Preschool emotional competence: Pathway to social competence?. *Child development*, *74*(1), 238-256.

Eisenberg, N., & Fabes, R. (1994). Mothers' Reactions to Children's Negative Emotions: Relations to Children's Temperament and Anger Behavior. *Merrill-Palmer Quarterly,40*(1), 138-156. Retrieved April 6, 2020, from www.jstor.org/stable/23087912

Eisenberg, N., Fabes, R. A., Guthrie, I. K., & Reiser, M. (2000). Dispositional emotionality and regulation: Their role in predicting quality of social functioning. *Journal of Personality and Social Psychology, 78*(1), 136-157. doi:10.1037/0022-3514.78.1.136

Eisenberg, N., Sadovsky, A., & Spinrad, T. L. (2005). Associations of emotion-related regulation with language skills, emotion knowledge, and academic outcomes. *New Directions for Child and Adolescent Development, 106,* 109-118.

Eisenberg, N., Spinrad, T. L., & Eggum, N. D. (2010). Emotion-Related Self-Regulation and Its Relation to Children's Maladjustment. *Annual Review of Clinical Psychology*, 6(1), 495–525. https://doi.org/10.1146/annurev.clinpsy.121208.131208

Eisenberg, N., Valiente, C., & Eggum, N. D. (2010). Self-regulation and school readiness. *Early Education and Development*, *21*(5), 681-698.

Faul, F., Erdfelder, E., Buchner, A., & Lang, A.-G. (2009). Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. *Behavior Research Methods*, *41*, 1149–1160.

Ferrier, D. E., Bassett, H. H., & Denham, S. A. (2014). Relations between executive function and emotionality in preschoolers: Exploring a transitive cognitive-emotion linkage. *Frontiers in Psychology, 5,* Article ID 487.

Goodman, J. E., & McGrath, P. J. (2003). Mothers' modeling influences children's pain during a cold pressor task. *Pain*, 104(3), 559-565.

Graziano, P. A., Reavis, R. D., Keane, S. P., & Calkins, S. D. (2007). The role of emotion regulation in children's early academic success. *Journal of school psychology*, *45*(1), 3-19.

Grolnick, W. S., Bridges, L. J., & Connell, J. P. (1996). Emotion regulation in two-year-olds: Strategies and emotional expression in four contexts. *Child development*, *67*(3), 928-941.

Gross, J. J., & Thompson, R. A. (2007). Emotion Regulation: Conceptual Foundations. In J. J. Gross (Ed.), *Handbook of emotion regulation* (p. 3–24). The Guilford Press.

Gumora, G., & Arsenio, W. F. (2002). Emotionality, emotion regulation, and school performance in middle school children. *Journal of School Psychology*, 40, 395–413.

Harrington, E., Trevino, S., Lopez, S. & Giuliani, N. (in press). Emotion regulation in early childhood: implications for socioemotional and academic components of school readiness. *Emotion,*

Hill, A. L., Degnan, K. A., Calkins, S. D., & Keane, S. P. (2006). Profiles of externalizing behavior problems for boys and girls across preschool: the roles of emotion regulation and inattention. *Developmental psychology*, *42*(5), 913.

Izard, C., Fine, S., Schultz, D., Mostow, A., Ackerman, B., & Youngstrom, E. (2001). Emotion knowledge as a predictor of social behavior and academic competence in children at risk. *Psychological science*, *12*(1), 18-23.

Kamphaus, R. W., Reynolds, C. R. (2015). Behavior Assessment System for Children–Third Edition (BASC-3): *Behavioral and Emotional Screening System (BESS).* Bloomington, MN: Pearson.

Keogh, B. K. (1992). Temperament and teachers' views of teachability. In W. Carey & S. McDevitt (Eds.), *Prevention and early intervention: Individual differences as risk factors for the mental health of children* (pp. 246–254). New York: Bruner/Mazel.

Kochanska, G., Murray, K., & Coy, K. C. (1997). Inhibitory control as a contributor to conscience in childhood: From toddler to early school age. *Child development*, *68*(2), 263-277.

Kopp, C. B. (1989). Regulation of Distress and Negative Emotions: A Developmental View. *Developmental Psychology*. https://doi.org/10.1037/0012-1649.25.3.343

Ladd, G. W. (2003). Probing the adaptive significance of children's behavior and relationships in the school context: A child by environment perspective. In R. Kail (Ed.), *Advances in Child Development and Behavior*, 31, 43–103.

LeBuffe, P. A., Ross, K. M., Fleming, J. L., & Naglieri, J. A. (2013). The Devereux Suite: Assessing and promoting resilience in children ages 1 month to 14 years. In *Resilience in children, adolescents, and adults* (pp. 45-59). Springer, New York, NY.

Leerkes, E. M., Paradise, M., O'Brien, M., Calkins, S. D., & Lange, G. (2008). Emotion and cognition processes in preschool children. *Merrill-Palmer Quarterly, 54*(1), 102-124.

Lowe, J. R., MacLean, P. C., Duncan, A. F., Aragón, C., Schrader, R. M., Caprihan, A., & Phillips, J. P. (2012). Association of Maternal Interaction with Emotional Regulation in 4 and 9 Month Infants During the Still Face Paradigm. *Infant Behavior & Development*, *35*(2), 295–302.

Martin, R. P., Drew, K. D., Gaddis, L. R., & Moseley, M. (1988). Prediction of elementary school achievement from preschool temperament: Three studies. *School Psychology Review*.

McRae, K., Rhee, S. H., Gatt, J. M., Godinez, D., Williams, L. M., & Gross, J. J. (2017). Genetic and environmental influences on emotion regulation: A twin study of cognitive reappraisal and expressive suppression. *Emotion*, 17(5), 772–777.

Montroy, J., Bowles, R.P., Skibbe, L.E., McClelland, M.M., & Morrison, F. J. (2016). The development of self-regulation across early childhood. *Developmental Psychology*, 52(11), 1744–1762. Retrieved from http://dx.doi.org/10.1037/dev0000159

Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L.R. (2007). The role of the family context in the development of emotion regulation. *Social Development*, 16, 361–388.

O'Neil, R., Welsh, M., Parke, R. D., Wang, S., & Strand, C. (1997). A longitudinal assessment of the academic correlates of early peer acceptance and rejection. *Journal of clinical child psychology*, *26*(3), 290-303.

Parke, R. D. (1994). Progress, paradigms, and unresolved problems: A commentary on recent advances in our understanding of children's emotions. *Merrill-Palmer Quarterly*, 40(1), 157–169.

Putnam, S. P., Spritz, B. L., & Stifter, C. A. (2002). Mother-child coregulation during delay of gratification at 30 months. *Infancy*, *3*(2), 209-225.

Raby, K. L., Cicchetti, D., Carlson, E. A., Cutuli, J. J., Englund, M. M., & Egeland, B. (2012). Genetic and caregiving-based contributions to infant attachment: Unique associations with distress reactivity and attachment security. *Psychological Science*, 23(9), 1016-1023.

Raver, C. C., Garner, P. W., & Smith-Donald, R. (2007). The roles of emotion regulation and emotion knowledge for children's academic readiness: Are the links causal? In R. C. Pianta, M. J. Cox, & K. L. Snow (Eds.), *School readiness and the transition to kindergarten in the era of accountability* (pp. 121-147). Baltimore, MD, US: Paul H Brookes Publishing.

Salisch, M., Denham, S. A., & Koch, T. (2017). Emotion knowledge and attention problems in young children: A cross-lagged panel study on the direction of effects. *Journal of Abnormal Child Psychology, 45*(1), 45-56.

Sheppes, G., & Gross, J. J. (2012). Emotion regulation effectiveness: What works when. *Handbook of Psychology, Second Edition*, *5*.

Stansbury, K., & Sigman, M. (2000). Responses of preschoolers in two frustrating episodes: Emergence of complex strategies for emotion regulation. *The Journal of Genetic Psychology*, *161*(2), 182-202.

Thompson, R. A. (1994). Emotion regulation: A theme in search of a definition. *Monographs of the Society for Research in Child Development*, *59*(2–3), 25–52. https://doi.org/10.1111/j.1540-5834.1994.tb01276.x

Tobin, R. M., Sansosti, F. J., & McIntyre, L. L. (2007). Developing emotional competence in preschoolers: A review of regulation research and recommendations for practice. *Contemporary School Psychology*. https://doi.org/10.1007/BF03340935

Trentacosta, C., & Izard, C. (2007). Kindergarten children's emotion competence as a predictor of their academic competence in first grade. *Emotion*, 7, 77–88. doi:10.1037/1528-3542.7.1.77

Ursache, A., Blair, C., & Raver, C. C. (2012). The promotion of self-regulation as a means of enhancing school readiness and early achievement in children at risk for school failure. *Child Development Perspectives*, *6*(2), 122-128.

Ursache, A., Blair, C., Stifter, C., & Voegtline, K. (2013). Emotional Reactivity and Regulation in Infancy Interact to Predict Executive Functioning in Early Childhood. *Developmental Psychology*, *49*(1), 127–137. https://doi.org/10.1037/a0027728

Warren, S. F., Brady, N., Sterling, A., Fleming, K., & Marquis, J. (2010). Maternal Responsivity Predicts Language Development in Young Children With Fragile X Syndrome. *American Journal on Intellectual and Developmental Disabilities*, *115*(1), 54–75. http://doi.org/10.1352/1944-7558-115.1.54

Wiley, A. L., Siperstein, G. N., Bountress, K. E., Forness, S. R., & Brigham, F. J. (2008). School context and the academic achievement of students with emotional disturbance. *Behavioral Disorders*, *33*(4), 198-210.