

TEMPERAMENT AND EMOTION REGULATION: PREDICTING SOCIAL  
COMPETENCE, INTERNALIZING, AND EXTERNALIZING BEHAVIORAL  
OUTCOMES

by

Nicole B. Fettig  
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Committee:

\_\_\_\_\_ Director  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ Department Chairperson  
\_\_\_\_\_ Program Director  
\_\_\_\_\_ Dean, College of Humanities and Social  
Sciences

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Temperament and Emotion Regulation: Predicting Social Competence, Internalizing, and  
Externalizing Behavioral Outcomes

A Dissertation submitted in partial fulfillment of the requirements for the degree of  
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by

Nicole B. Fettig  
Master of Arts  
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Director: Susanne Denham, University Professor  
Department of Psychology

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George Mason University  
Fairfax, VA



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## **DEDICATION**

This is dedicated to my loving husband Zach, my two wonderful children Ella and Connor, and my parents, Doug and Lupe Bowling. They have taught me more about growth, change, and positive outcomes than I could ever have learned on my own.

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## TABLE OF CONTENTS

	Page
List of Tables .....	vii
List of Figures .....	viii
List of Abbreviations and/or Symbols .....	ix
Abstract .....	x
Chapter One .....	1
Introduction.....	2
Temperament.....	3
Negative Affect.....	5
Surgency .....	6
Effortful Control .....	7
Emotion Regulation.....	10
Chapter Two.....	16
Research Questions.....	17
Chapter Three.....	20
Method .....	21
Participants .....	21
Measures.....	21
Temperament .....	21
Emotion Regulation Strategies - Emotion Elicitation and Regulation Assessment. .	22
Teacher-rated social behavior – Social Competence and Behavior Evaluation (SCBE- 30). .....	27
Chapter Four .....	28
Data Analysis .....	29
Chapter Five.....	30
Results.....	31

Research Question 1: Main Effects of temperament and emotion regulation strategy use .....	33
Research Question 2: Interactions between temperament and emotion regulation strategy use .....	33
Externalizing behavior.....	33
Internalizing behavior.....	34
Social Competence. ....	37
Research Question 3: Main and interactive effects of multiple strategy use .....	38
Chapter Six.....	39
Discussion.....	40
Research Question 1: Main Effects of Temperament on Children’s Social-emotional Development .....	40
Research Question 2: Interaction Effects on Children’s Social-emotional Development .....	41
Active Distraction x Effortful Control Interaction Predicting Externalizing Behavior .....	41
Passive waiting x Negative Affect Interaction Predicting Internalizing Behaviors ..	42
Information Gathering x Temperament Interactions Predicting Internalizing Behaviors .....	43
Active Distraction x Effortful Control Interaction Predicting Social Competence Behaviors .....	44
Research Question 3: The Use of Multiple Strategies in Predicting Preschool Social-Emotional Outcomes .....	46
Limitations .....	46
Implications .....	47
References.....	1

## LIST OF TABLES

Table	Page
Table 1: EERA Task, Description, and Target Responses .....	24
Table 2: Zero-order correlations and descriptive statistics .....	31
Table 3: Results of full structural equation models .....	32

## LIST OF FIGURES

Figure	Page
Figure 1: Active distraction x effortful control interaction predicting children's externalizing behaviors .....	<b>Error! Bookmark not defined.</b>
Figure 2: Negative affect x passive waiting interaction predicting preschooler internalizing behaviors.....	<b>Error! Bookmark not defined.</b>
Figure 3: Information gathering x surgency interaction predicting internalizing behavior .....	<b>Error! Bookmark not defined.</b>
Figure 4:Information gathering x effortful control predicting internalizing behaviors .....	<b>Error! Bookmark not defined.</b>
Figure 5: Active distraction x effortful control predicting social competence .....	<b>Error! Bookmark not defined.</b>

## LIST OF ABBREVIATIONS

Emotion Elicitation and Regulation Assessment.....	EERA
Laboratory Temperament Assessment Battery.....	Lab-TAB

## **ABSTRACT**

### **TEMPERAMENT AND EMOTION REGULATION: PREDICTING SOCIAL COMPETENCE, INTERNALIZING, AND EXTERNALIZING BEHAVIORAL OUTCOMES**

Nicole B. Fettig, Ph.D.

George Mason University, 2015

Dissertation Director: Dr. Susanne Denham

In this study, I examine the unique and interactive contributions of temperament and specific emotion regulation strategies in predicting preschooler externalizing and internalizing behaviors as well as their social competence. Parent reports of child temperament were obtained, emotion regulation strategy usage was directly assessed, and behavior problems and social competence was obtained from the child's preschool teacher. Results indicated that children with lower effortful control displayed greater externalizing behavior. A marginally significant interaction emerged indicating that preschooler active distraction was more strongly related to children's externalizing behaviors when children had less effortful control. The relation between children's passive waiting strategy usage and internalizing behaviors was strongest for children with low negative affect. Moreover, two marginally significant interactions with children's information gathering suggest that increased information gathering increases preschooler-

internalizing behaviors when children are low in effortful control and high in surgency. Finally, the negative relation between children's active distraction and social competence was strongest for those children with low effortful control. Thus, results suggest that prevention or intervention methods might be used to target children with low effortful control.

## **CHAPTER ONE**

## INTRODUCTION

Temperament and emotion regulation are popular topics in the developmental literature today, as the ability to manage one's emotional experiences is a crucial part of individual well-being. Developmental research continues to examine how individual differences in emotionality and regulation both singularly and jointly predict a variety of aspects of social competence and problem behaviors (Eisenberg, Fabes, Gunthrie, & Reiser, 2000). Temperament is defined as biologically-based individual differences in emotional reactivity to social and affective cues in the environment, coupled with differences in the intrinsic ability to regulate these initial responses (Rothbart, Ellis, & Posner, 2004). Emotion regulation is defined as "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (Thompson, 1994, p. 27 – 28). Emotion regulation is distinctly related to the quality of one's social interactions and interpersonal relationships (Thompson & Calkins, 1996), and the organization of behavior in socially appropriate ways (Thompson, 1994). Taken together, both temperament and emotion regulation contribute to the development of young children's social-emotional behavior; however the processes by which the child's dispositional characteristics interact with particular emotion regulatory strategies may lead to variation in the prediction of both adaptive and maladaptive outcomes.

In the study of preschool aged children, pathways to social competence are of profound importance as they contribute to higher quality interpersonal relationships

(Denham et al., 2003) and positive academic outcomes (Carlton & Winsler, 1999). Of equal importance is the study of factors contributing to the development of maladaptive social and emotional behaviors. Researchers who have examined the development of social and emotional competencies and lack thereof have focused on intrapersonal factors (e.g., gender, temperament, regulation), however, few researchers have examined how these factors combined may collectively or interactively predict young children's outcomes (Rubin et al., 2003). Moreover, research examining specific types of negative emotionality paired with specific regulatory behaviors is limited (Eisenberg et al., 2002). Given that both temperament and emotion regulation are important contributors to children's behavior in the classroom (Blair, Denham, Kochanoff, & Whipple, 2004; Sanson, Hemphill, Yagmurlu, & McClowry, 2011) we sought to examine whether and how these factors uniquely and interactively contribute to the prediction of social competence, internalizing, and externalizing behaviors. In particular, we examine different patterns of temperament characteristics and regulatory behaviors (e.g. passive and active) that may predict preschoolers' social and emotional behaviors in the classroom.

## **Temperament**

Individual differences in temperament reflect differences in reactivity and regulation that involve emotion, motivation, and attention-related processes in response to social and affective cues (Cole, Martin, & Dennis, 2004). In particular, reactivity refers to the arousability of motor, affective, and sensory response systems, and regulation refers to the processes involved in modulating reactivity (Rothbart, Ahadi, Hershey, &

Fisher, 2001). Thus, a child's temperament describes the way in which he/she approaches and reacts to the world.

Variation in specific temperamental dispositions may contribute to increased risk for children who have difficulty with initial reactivity and subsequent regulation. In particular, high levels of negative emotional reactivity are associated with poor social emotional functioning and increased risk for anxiety and depression (Belsky, Fearon, & Bell, 2007; Perez-Edgar & Fox, 2005; Puliafico & Kendall, 2006). Additionally, children who have negative affectivity paired with difficulty with regulation are at an increased risk for behavior problems (Forbes, Fox, Cohn, Galles, & Kovas, 2006; Silk, Steinberg, & Morris, 2003) and later psychopathology (Eisenberg et al., 2001; Fox & Calkins, 2003). Taken together, these data suggest that varying temperamental tendencies contribute to different developmental trajectories toward psychological well-being or difficulty.

Temperament-linked differences are biologically based and relatively stable over time (Howarth, Fettig, Curby, & Bell, under review; Rothbart & Bates, 2006), underlying the development of personality and later behavior. Following the Rothbart theory-driven approach, temperament may be assessed from infancy to adulthood through the measurement of over 20 finely differentiated dimensions (Shiner et al., 2012). The Rothbart questionnaires consistently identify three higher order factors: negative affectivity, surgency, and effortful control.

## **Negative Affect**

Negative affectivity reflects an individuals' behavioral tendencies that may include discomfort, sadness, fear, anger/frustration, and, difficulty with soothability (Rothbart et al., 2001). The broad construct of negative affectivity has received acceptance in temperament research (Sanson, Hemphill, & Smart, 2004), and has been widely studied for its role in the development of externalizing problem behaviors and internalizing problems. In a recent study, negative affectivity at age 3 was predictive of the presence of several DSM-IV disorders at age 4, including oppositional defiant disorder, separation anxiety, specific phobia, and social phobia (de la Osa, Granero, Penelo, Domenech, & Ezpeleta, 2013).

Negative affectivity may influence outcomes of child adjustment in several different ways: directly, indirectly, and through moderation (e.g., temperament x temperament and temperament x environment). One example of a direct effect of negative affectivity on later psychopathology is evident in the research surrounding extreme negative reactivity, fearfulness, and the development of social anxiety disorders. In particular, infants characterized by extreme negative reactivity to novel situations often are later described as behaviorally inhibited and may be at risk for clinical levels of anxiety (Perez-Edgar et al., 2010). Another means through which negative affectivity relates to later outcomes is through indirect, linear effects. For example, negative affectivity may bias processing about self and others, which in turn may lead to negative social information processing and later aggression (Rothbart & Bates, 2006). Finally, negative affectivity may interact with the environment or other intrapersonal factors to

influence later adjustment. For example, children with high negative emotionality and low attentional control may display increased risk for anxiety, whereas children with high negative emotionality and high attentional control display no maladjustment (Rothbart & Bates, 2006). In another example, young children who have difficulty inhibiting negative affect and high approach tendencies when appropriate are more likely to develop disruptive disorders (Rubin et al., 2003).

### **Surgency**

Surgency/extraversion reflects high-energy activation and may be derived from four dimensions including: impulsivity, high intensity pleasure, and activity level and low levels of shyness (Rothbart et al., 2001). Previous work examining the surgency/extraversion factor focuses on two key features – suggesting that both positive affect and approach behavior distinguish this factor from others (Degnan et al., 2011). Additionally, researchers have posited that surgency/extraversion represents individual differences in brain mechanisms underlying energy/activation response systems and regulation of arousal (Deater-Deckard, Mullineaux, Petrill, & Thompson, 2009). In general, surgency/extraversion characterizes a strong motivation to seek out novelty and respond to the environment with heightened positive affectivity.

Previous literature has linked surgency/extraversion to both externalizing and prosocial behavior (Degnan, et al., 2011). Children characterized by high temperamental Surgency/Extraversion before kindergarten were more likely to exhibit hyperactivity and aggression in the kindergarten classroom (Berdan, Keane, Calkins, 2008). However, regulatory processes that serve to mitigate trajectories towards maladaptive behaviors

may moderate these relations. Rothbart and Bates (2006) and others (e.g. Eisenberg et al., 2000) suggest that effective emotion regulation may serve to moderate the relation between temperamental extremes and children's prosocial or problematic behaviors. For example, children characterized by high surgency paired with nonregulation may be associated with attention-deficit/hyperactivity disorder (de la Osa et al, 2013), whereas the same trait with good regulation may be linked with no maladjustment.

### **Effortful Control**

Effortful control is defined by the ability to inhibit dominant responses in order to perform a subdominant response, to detect errors, to engage in planning, and to focus attention (Rothbart & Rueda, 2005). Effortful control denotes a class of self-regulatory temperament dimensions including: inhibitory control, attention focusing, low intensity pleasure, and perceptual sensitivity. Effortful control has been linked to the attention network system of the brain, and emerges between 6 and 12 months (Kochanska, Murray, & Harlan, 2000). Furthermore, the system develops considerably between 2 and 7 years of age (Rothbart & Rueda, 2005). Research has focused on two processes associated with effortful control – the ability to inhibit reactive tendencies and the ability to shift attention and focus on alternative stimuli (Rudasill & Konold, 2008), because these abilities have been linked to young children's successful self-regulation (Rothbart & Rueda, 2005).

Effortful control represents a set of skills or processes involved in the purposeful shifting of attention, inhibition of behavior (as needed), planning, the correction of errors, and control of thoughts and feelings (e.g. Eisenberg & Spinrad, 2004). The underlying mechanisms involved in effortful control include the executive functioning system in the

prefrontal cortex and the anterior cingulated gyrus in the paleocortex (Posner & Rothbart, 1998). Children's ability to attend and adapt to the demands of specific social situations in appropriate ways is an important skill for the development of social emotional competence. The development of effortful control in preschool children has important implications for understanding the development of such socially adaptive/maladaptive behaviors (Olson, Sameroff, Kerr, Lopez, & Wellman, 2005). High levels of effortful control are related to children's ability to keep an "even keel" of behavioral expression (Eisenberg et al., 2003). Moreover, high levels of effortful control have been associated with lower levels of externalizing problems and with better social skills and social competence (Sanson et al., 2009) as well as greater academic achievement from preschool through middle school (Walker & Henderson, 2012; Deater-Deckard et al., 2009).

The relations between effortful control and social emotional outcomes may illustrate direct, indirect, and moderation effects (Rothbart & Bates, 2006). Directly, effortful control may be considered a key system responsible for the successful development of cognitive and emotional regulation of children's behavior (Rothbart & Rueda, 2005). And, because it is plausible to train attention abilities known to relate to the control of action, researchers and early childhood educators might examine interventions targeting these abilities.

Additionally, Eisenberg, Valiente, and Eggum (2010) suggest that effortful control may indirectly influence academic success through social functioning in school. Specifically, effortful control is positively related to school liking and participation

(Valiente, Lemery-Chalfant, & Castro, 2007) as well as feelings of relatedness and engagement (Furrer & Skinner, 2003) which in turn predicts academic success (Eisenberg, Valiente, Eggum, 2010). Thus, young children's effortful control predicts perceptions and behaviors at school, which go on to predict academic performance. Finally, effortful control may interact with the environment to influence outcomes such that attentional orienting may augment an individuals' response to their environment for good or for bad (Rothbart & Bates, 2006).

Temperament is an inherited disposition (Rothbart & Bates, 2006), whereas emotion regulation may be learned (Rubin et al., 1995). Although temperament refers to relatively stable dispositions, temperament traits themselves develop over time, as other developing systems influence motivation and behavior (Putnam, Ellis, & Rothbart, 2001). Moreover, temperament-linked differences are the product of an evolving set of complex interactions between biologically and environmentally driven factors that work together throughout development (Shiner et al., 2012; Rothbart & Derryberry, 1981). Of particular interest here, the temperament attribute of effortful control refers to characteristics that assist in the control or modulation of reactivity. This regulatory component of temperament develops through maturation as well as through interactions with the environment (e.g., parent socialization) into a set of skills used for regulatory processes (Denham, 2007; Rubin et al., 1995).

By preschool, typically developing children have adopted a set of self-serving emotion regulatory strategies as a product of cognitive development as well as socialization influences (Denham, 2007; Denham, 1998). The differences in which young

children's emotion regulation strategies influence temperamental reactivity may set children on different developmental trajectories. Given the influence of emotion regulation on the relation between temperament and social emotional outcomes, surprisingly few studies have examined specific strategies during very early childhood – that is, between the ages of 2 and 4 years. Thus, although temperament may predispose an individual to certain outcomes (Blair et al., 2004), the strategies young children employ to regulate emotion and the interaction between temperament and regulation may play an equally large role in predicting adjustment.

### **Emotion Regulation**

Emotion and emotion regulation are crucial in the field of developmental science, because the ability to manage one's emotional experiences is important for individual well-being. Emotional regulation involves a complex network of systems, including physiological arousal, facial and behavioral expression, attention and motivation. These systems are all subject to an individual's perception of the environment, experience, and cognitive evaluations (Thompson, 1994). When children learn to down-regulate or de-escalate arousal, they are better equipped to manage their emotions and better able to navigate across different social contexts. Thus, the development of emotion regulatory skills over the first years of life is critical to a child's healthy development (Fox & Calkins, 2003).

In exploring the link between temperament, emotion regulation, and social and emotional behaviors, developmental perspectives often overlap. In the context of temperament, regulation is conceptualized as the processes by which individuals'

modulate physiological and psychological arousal (Rothbart and Derryberry 1981). Distinct from temperament, regulation is operationalized as the modulation of an emotional experience or the behavior or situation associated with the emotional experience (Eisenberg and Fabes, 1992). To expand upon these views, regulatory processes not only modulate, but also initiate and maintain an emotional experience and the arousal, cognitions, and behaviors associated with it (Thompson, 1994; Walden & Smith, 1997). Furthermore, Cole, Michel, and Teti (1994) highlight the notion that regulatory processes must allow us to respond to emotional experiences in such a way that is “socially tolerable and sufficiently flexible” (p. 76), such that we both permit *and* delay spontaneous reactions as necessary. Taken together, emotion regulation is a process by which we manage emotional arousal, as needed.

In previous work examining preschoolers’ response to a disappointment, researchers proposed a set of regulatory strategies that young children display, including (a) active self-regulation, (b) passive toleration, (c) disruptive behavior and (d) limit testing (Cole, Zahn-Waxler, Smith, 1994). In this study, the authors derived several insightful results between emotional expressiveness and regulatory strategies. Cole and colleagues (1994) found that active self-regulation was positively correlated with joy and negatively related to negative emotion. Passive toleration was positively associated with girls’ anger and more intense negative emotion as well as being negatively related to joy. And, disruptive behavior was associated with anger and the duration of negativity for boys as well as intensity of negativity for girls. The authors conclude that most children made attempts to regulate their emotions, however, some were more efficient than others

in sustaining that effort (Cole et al., 1994). Based on these findings, only the use of active self-regulation strategies was associated with positive emotion during a disappointment, suggesting that the employment of these strategies may lead to more socially competent behaviors.

Young children's regulation of their negative emotion expression is an important developmental task. The strategies employed must be functional in reducing distress and some strategies have been shown to be more effective than others. Grolnick, Bridges and Connell (1996) identify several regulatory strategies with a sample of 2-year-olds, including: (a) active engagement with a substitute toy – which involved sustained manipulation of toy, (b) passive use of objects, (c) symbolic self-soothing, (d) physical self-soothing, (e) other-directed, and (f) focus on frustration. Across the challenging situations (e.g., food delay, separation procedure), 2-year-old children displayed all six regulatory strategies, with active engagement being the most frequently employed. Children who used active engagement strategies were less emotionally distressed compared to those children who focused on the frustrating situation (e.g., searched for object). Thus, in comparison to strategies that focus attention on the situation (e.g., soothing behaviors, focus on frustration) strategies requiring attentional reorientation away from the emotion-eliciting situation may be the most effective. In another example, Gilliom and colleagues (2002) examined the same set of emotion regulatory strategies as Grolnick, Bridges, & Connell (1996) and found that the use of particular strategies as well as flexible application of multiple strategies was crucial in the achievement of self-control. Three-year-old boys who reoriented their attention away from anger eliciting

situations through active distraction or passive waiting had fewer teacher-rated externalizing problems than their peers who employed information gathering strategies (Gilliom et al., 2002). Those boys who focused attention on the frustrating situation were perceived as less cooperative and had increased externalizing problems. The authors suggest that these results are consistent with the theoretical models of attention, proposing that shifting attention, be it active or passive, are effective means by which to regulate arousal. Additionally, the study found that boys who used three regulatory strategies compared to those who only used one, were rated as less aggressive and disruptive (Gilliom et al., 2002). It is therefore possible that young children who employ multiple strategies while attempting to regulate their emotions are less likely to develop maladaptive behaviors.

Although children's active distraction suggests adaptive emotion regulation, it is worth noting that children's active distraction involves a broad range of behaviors that serve to shift their attention from negative emotionally eliciting situations. For example, active distraction may include children's active engagement in playing/exploring the broken toy (e.g. imaginary play scenario or trying to repair it) or it may include children's distraction of the task (e.g. exploring the room, singing). As such, active distraction encompasses multiple levels of regulatory competence, including attentional and behavioral regulation in addition to direct regulation of emotion (Trentacosta & Shaw, 2009). Therefore, children's use of active distraction may represent a variation of regulatory competencies as well as their efficiency in the employment of the executive attention system in tasks involving conflict.

Taken together, research examining the influence of emotion regulation strategies in predicting social and emotional outcomes has elucidated some important associations suggesting that strategies that make use of attentional processes may serve to benefit young children. Although the extant literature on emotion regulation strategies provides compelling evidence for the relations to social competence and problem behaviors, interactions between emotion regulation and temperament may predict the quality of children's social and emotional adjustment more accurately than direct linear effects (Blair et al., 2004; Eisenberg et al., 2002). For example, Blair and colleagues (2004) found that passive coping strategies moderated the relations between temperament and internalizing and externalizing behavioral outcomes. In particular, for boys characterized as highly irritable-frustrated, the positive relation between greater passive coping strategies and externalizing social behaviors increased. Alternatively, boys characterized as highly sad-fearful and who employed passive coping strategies had fewer externalizing behaviors. In addition, girls who were highly irritable-frustrated and used less passive strategies were reported as having higher internalizing behaviors. According to the authors, passive coping may reflect high behavioral inhibition such that passive coping strategies reflect rumination and focused attention on the negative stimuli presented. Given that the use of passive waiting for some children temperamentally at risk for maladjustment increases the likelihood of that risk, it is a plausible explanation that emotion regulatory strategies reflecting problems with attention may lead towards pathways towards psychopathology.

In summary, the research reviewed herein provides a basis for the developmental models of temperament and emotion regulation as they relate to social and emotional outcomes. Exploring the contributions of both temperament and emotion regulation as they singularly and jointly predict young children's developmental outcomes is an important endeavor, as we might then begin to develop early methods to prevent maladjustment and discover paths towards resiliency. In particular, this research may identify potential buffers between temperamental risk and maladaptive developmental outcomes, which may contribute to the promotion of psychological health.

## **CHAPTER TWO**

## RESEARCH QUESTIONS

In the current study, I explore the development of social and emotional behavior as related to direct and interactive influences between temperament and emotion regulation. What is clear from the existing literature is that both temperament and emotion regulation play unique and interactive roles in predicting children's behavior. However, there is no work to date that has examined preschooler emotion regulation strategy usage using structured paradigms in the preschool setting. The advantages to using this approach is twofold; 1) we increase the likelihood of obtaining a more diverse sample as children did not have to rely on parents to bring them into a laboratory and 2) children's reactivity caused by a novel environment (like a research laboratory) is reduced. Furthermore, a unique contribution of the current study is that we utilize a multi-method approach including maternal report of temperament, structured observation by trained researchers, and teacher report of social and emotional outcomes. I am particularly interested in elucidating emotion regulation strategies that somehow confer resiliency to individuals who are temperamentally at risk for adverse developmental outcomes. Identifying patterns of "buffering" may contribute to young children's adaptability and promote resilience. In addition, I examine whether the use of multiple strategies in challenging situation leads to more socially competent classroom behaviors.

RQ1: *Main effects*. How do temperament and emotion regulation strategy use uniquely relate to children's social and emotional competence and incompetencies (e.g. internalizing and externalizing behaviors)?

*Hypotheses:* Given previous work examining the three temperament subscales described herein, it is proposed that a) negative affect is positively associated with both internalizing and externalizing behaviors, b) surgency is negatively related to internalizing behaviors and c) effortful control is positively related to social competence behaviors and negatively related to children's externalizing behaviors. In terms of emotion regulation strategies, given the research on attention-related emotion regulation, I suspect that both active distraction and passive waiting are related to children's social and emotional outcomes. I do not expect any main effects of disruptive behavior as children, were rarely (if ever) observed engaging in such behavior. In addition, I do not expect to see any main effects of information gathering given previous work that suggests the strategy may be more representative of involvement in the task rather than regulating one's emotional experience.

RQ2: *Interaction.* Does child temperament moderate the relation between children emotion regulation strategy usage and their social-emotional behaviors?

*Hypotheses:* I expect that temperament will interact with emotion regulation strategies to predict adaptive and maladaptive outcomes. In particular, for those children with low levels of effortful control, greater active distraction is associated with increased social competence. Additionally, I expect for children with greater negative affect, the use of passive waiting strategies may exacerbate the relation between temperament risk and social and emotional outcome. For example, children with greater negative affect and more passive waiting strategy use may be associated with greater maladaptive outcomes as opposed to children with negative affect and less passive waiting strategy employment.

RQ3: *Main effect and Interaction.* Does the use of multiple strategies uniquely predict child social-emotional outcomes? Are the effects of temperament moderated by the use of multiple strategies?

H3: I expect that the use of multiple strategies will predict better outcomes, compared to the use of a single strategy.

## **CHAPTER THREE**

## **METHOD**

### **Participants**

Participants in this study included 337 children (181 boys, 156 girls) from a longitudinal study of teacher socialization of social and emotional competencies in preschool. The first cohort included 175 children and the second cohort 162 children. Families were recruited at the beginning of the academic school year from three and four year-old preschool classrooms in 22 private, and 2 Head Start, centers in the Northern Virginia area. Across the 24 preschool centers, children were nested in 81 classrooms. Data used in the present study were collected at the beginning of the school year for each cohort. All children were typically developing and ranged in age from 33 – 60 months ( $M = 48.10$ ,  $SD = 7.22$ ). Of the total sample, 237 participants provided demographic information. Participating children were 75% Caucasian, 16% African American, 8% Asian, and 1% American Indian/Alaskan Native or Native Hawaiian/other Pacific Islander. In general, most participants spoke English as their primary language and the average education level of parents who provided demographic information was some college education.

### **Measures**

#### **Temperament.**

Parents reported on children's temperament with the Child Behavior Questionnaire-Very Short Form (CBQ-VSF; Putnam & Rothbart, 2006), yielding scales of effortful control,

negative affect, and surgency. The CBQ-VSF includes 36 items on which parents report on questions about their children's typical reactions to different situations in the past 6 months. These questions are answered using a seven-point Likert-type scale on which 1 *never*, 4 *about half the time*, and 7 *always*. In previous work, the consistency in factor structure across the life span is remarkable (Putnam, Sanson, & Rothbart, 2002) and the CBQ-VSF specifically has shown adequate stability throughout preschool (Putnam & Rothbart, 2006). Further, the three broad factors including negative affect, surgency, and effortful control, have been linked to a number of adjustment outcomes making them useful traits to examine in current and future research focused on intervention and prevention of psychopathology (Shiner et al., 2012). In this study, internal consistency estimates ranged from .69 to .71.

### **Emotion Regulation Strategies - Emotion Elicitation and Regulation**

**Assessment.** Children's emotion regulation was assessed using the Emotion Elicitation and Regulation Assessment (EERA; Fettig et al., 2012). EERA is a field-ready measure of emotionality and regulation in preschool-age children modified from the Preschool version of the Laboratory Temperament Assessment Battery (Lab-TAB; Goldsmith et al., 1993). Lab-TAB is a standardized battery of assessments that allows for comparisons across studies. However, one of the limitations of Lab-TAB is that it is designed for laboratory settings and is not appropriate for research methodology conducted in naturalistic settings. Research designed to examine emotionality and regulation is especially sensitive to context and therefore naturalistic settings reduce the amount of reactivity that may be attributed to a novel environment (i.e. laboratory). Thus, we

modified several Lab-TAB tasks in order to examine how children show emotions, the relative time course of these emotions, and the frequency of regulatory strategies in challenging situations within naturalistic environments (e.g. preschool).

Three tasks were modified to facilitate live administration and coding of emotionality and regulation strategies simultaneously. The procedure for each task required administrators to obtain a baseline emotion, which included both emotion (e.g., happy, sad, angry, neutral) and intensity (e.g., high happy, low sad). Then, at the onset of the task, data collectors coded emotion, intensity, and emotion regulation strategy usage throughout the task, as well as code during a recovery period for two of the three tasks. Operational definitions for emotions and their intensity included considerations of three channels by which emotionality and intensity may be observed: facial, vocal, and behavioral. For example, anger was defined by any display of irritation, frustration, or disappointment. Facial representations of angry would include pursed lips, eyebrows furrowed down, clenched teeth, and/or a classic square mouth. Anger via a vocal channel might include a child's utterance of "grr" or raising their voice. Finally, a behavioral display of anger may include throwing objects, active noncompliance, and/or crossing one's arms. Intensity was coded as low if behavioral indicators were above threshold and clear enough in one channel to denote the presence of emotion. High intensity emotional behaviors were coded when emotion was displayed more clearly in two or more channels. The program (ER Observe; EERA) used to code, time stamped the onset of behaviors and provides frequency of occurrence, duration, and rate of change of emotionality and intensity. Furthermore, the presence of emotion regulatory strategies is coded.

During the administration of two EERA tasks eliciting negatively valenced emotions (Disappointing Toy & Impossibly Perfect Circles), the presence of four emotion regulatory strategies usage were coded throughout the task.

**Table 1: EERA Task, Description, and Target Responses**

EERA Task/ Duration	Description	Emotion Regulation Strategy
Negative Affectivity Domain		
Impossibly Perfect Circles (2 minutes + 10 second recovery)	Children are asked to draw circles for 2 minutes and are mildly criticized for each one but praised for final effort.	Active Distraction, Information Gathering,
Disappointing Toy (1 minute + 10 second recovery)	A child is given a “gift” for their good participation but finds a broken toy inside the gift box/bag and must therefore deal with the disappointment over a pleasant expectation not being met before the researcher apologizes for the mistake and gives the child a gift.	Disruptive Behavior, and Passive Waiting

The emotion regulatory strategies were as follows: *active distraction*, which involved a functional behavior that allows the child not to attend to a difficult situation. This strategy included purposeful behaviors in which the focus of attention is not on the task (including fantasy play, exploration of the room, putting the toy back in the box, singing, etc.). *Information gathering* involved asking questions aimed at learning more about the situation and not questions or statement indicating that the child wanted to change the situation (e.g. “how do I make a perfect circle?”, “where is my present?”). *Disruptive behaviors* include behaviors that are inappropriate, possibly aggressive or making hostile remarks (e.g. breaking or throwing toys). *Passive waiting* strategies are non-functional behaviors oriented to the environment without active task engagement. For example, the child may be fidgeting with fingers, looking around the room, and/or standing or sitting quietly and doing nothing else. In addition to these, researchers noted children’s assertive verbalizations, including statements indicating a cognitive way to deal with frustration (e.g. “I already drew you a perfect circle”). Children’s emotion regulation strategy usage will be an average of each strategy usage across the two tasks as well as composite measures of strategy use. To answer whether or not increased strategy usage moderates the link between temperament and social emotional outcomes, I created a variable to reflect how many different kinds of strategies used (e.g. 1 strategy used, 2 strategies used, and 3 strategies used).

**Training and reliability.** All data collectors attended a training across several days in which master coders went over video segments of actual EERA administration in

relation to the coding described above and within the EERA manual. Master coders discussed what constituted emotional expression, intensity, and strategy usage.

Furthermore, master coders trained data collectors on the ER observe program and there extensive practice with administration and coding was undertaken. To be deemed reliable at the end of training, data collectors had to pass three steps: (a) administration certification; (b) video reliability of coding; and (c) live reliability of coding.

Certification of the administration required that data collectors memorized the script and were able to administer without error – this included following the script, timing of prompts, use of the ER Observe program, and establishing appropriate rapport with the child. Video reliability required data collectors to observe 7 video examples and code emotion, intensity, and strategy usage in 10 second epochs. For example, the disappointing gift task is 60 seconds long with an additional 10 seconds for coding recovery, thus 7 10 second time intervals are used to record the presence of emotion and regulation strategy. The epochs were then lumped together for scoring and thus data were continuous. Video reliability showed good to excellent reliability average measure Intra-Class Correlations (ICC), ranging from .77 to .90 for emotions, and .79 to .98 for strategies  $p < .001$ . Live reliability required the data collector to administer and code using the ER observe program on a tablet computer simultaneously. Here, a master coder acted as a child (using an established script) and the other master coder dual coded with the data collector seeking reliability. Live reliability showed that ongoing training was needed by about half of the coders and this was accomplished with further discussion and practice coding a recording of the master coders enacting different scenarios for each

task. After initial retraining, percentage agreement reliability was as follows: emotions = 93%. intensity = 88% regulation strategies = 79%. ICCs are reported for video reliability due to the continuous nature of the data, however, percent agreement is reported for live reliability because we examined categorical data for each coded response.

### **Teacher-rated social behavior – Social Competence and Behavior Evaluation (SCBE- 30).**

Aspects of children's social and emotional adjustment in school were evaluated using the SCBE-30 (LaFreniere & Dumas, 1996). The SCBE-30 is a teacher-report questionnaire yielding three subscales: externalizing, internalizing, and social competence behaviors. The questionnaire, typically completed by preschool teachers, contains 30 items, consisting of 5-point ratings that address different social behaviors associated with the child's emotional behaviors. Previous work has offered support for construct and convergent validity (LaFreniere and Dumas, 1996) via moderate associations with measures of anxiety-withdrawal and conduct disorder (Denham et al., 2003). For our sample, internal consistency ranged from .84 to .92. In this study, we examine each subscale as possible outcomes related to preschoolers' temperament and emotion regulation.

## **CHAPTER FOUR**

## DATA ANALYSIS

Analyses examined the contribution of temperament, emotion regulation strategies, and their interaction on children's internalizing, externalizing, and socially competent behavior. Analyses were conducted in Structural Equation Modeling (SEM) framework that would answer our research questions in Mplus software (Muthen & Muthen, 1998 – 2012). All predictor variables including temperament (Negative Affect, Sugency, and Effortful Control) and emotion regulation strategies (Active Distraction, Information Gathering, Passive Waiting, Multiple Strategy Use), as well as age, were grand mean centered. Children's disruptive behaviors were not included in the analyses because there were no instances of the behavior in either task. Centered temperament and emotion regulation strategy variables were then used to define 12 interaction terms. Control variables included gender and age. Predictors of interest included temperament dimensions, emotion regulation strategies, and the interaction terms. All predictors were allowed to correlate by default and resulted in a saturated model with perfect fit. Additionally, outcome variables including internalizing, externalizing, and social competence behaviors were correlated. I used the TYPE = COMPLEX option with an MLR estimator to account for children nested in classrooms. Further, SEM uses full-information maximum likelihood to account for missing data.

## **CHAPTER FIVE**

## RESULTS

Means, standard deviations, and correlations were conducted on all variables  
(Table 2).

**Table 2: Zero-order correlations and descriptive statistics**

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Gender (1 = Female)	-											
2. Age	-.01	-										
3. Negative Affect	.09	.04	-									
4. Surgency	-.13*	-.09	-.11	-								
5. Effortful Control	.14*	.03	.12	-.07	-							
6. Active Distraction	-.01	-.15**	.09	.07	.04	-						
7. Information Gathering	-.16**	.14**	.01	.13*	-.15*	.07	-					
8. Passive Waiting	.03	-.08	-.01	-.11	.03	-.03	-.25**	-				
9. Multiple	-.04	-.10	.01	.03	-.02	.43**	.23**	.31**	-			
10. Externalizing	-.12*	-.07	.01	.06	-.18**	.08	.08	-.08	.04	-		
11. Social Competence	.17**	.09	.05	-.05	.24**	-.16**	-.11	-.00	-.10	-.50**	-	
12. Internalizing	.00	.05	-.05	-.15*	-.10	.10	.03	-.06	.01	.26**	-.38**	-
n	337	337	243	243	243	333	333	333	333	283	283	283
Raw mean	1.46	48.10	4.06	4.60	5.33	0.66	0.85	0.35	1.89	1.99	3.74	1.76
Raw standard deviation	0.50	7.22	0.87	0.81	0.81	.54	1.03	0.42	.74	0.97	0.78	0.68
Raw minimum	0	33.00	1.67	2.08	2.33	0	0	0	0	1.00	1.20	1.00
Raw maximum	1.00	60.00	6.50	6.50	7.00	2.50	6.0	3.00	3.00	5.00	5.00	4.50

\*p<0.05, \*\*p<0.01

In terms of the control variables, gender (being female) was significantly positively related to effortful control and social competency and significantly negatively related to surgency, information gathering strategy usage and externalizing behaviors. Older children used less active distraction strategies and more information gathering. Among the temperament scales, surgency was positively related to information gathering and negatively related to children's internalizing behaviors. Temperamental effortful

control was negatively related to information gathering and externalizing behaviors and positively related to social competency. In terms of the emotion regulatory strategies, active distraction was negatively related to children’s social competency. As expected, information gathering and passive waiting were negatively related to one another. And, the use of multiple strategies was positively related to active distraction, information gathering, and passive waiting. Last, the teacher reported child behavioral outcomes (externalizing and internalizing behaviors, social competency behaviors) were correlated with one another in the expected directions.

Results of the structural equation model are presented in Table 3.

**Table 3: Results of full structural equation models**

Outcome	Externalizing			Internalizing			Social Competence		
	<i>B</i>	<i>SE</i>	<i>t-ratio</i>	<i>B</i>	<i>SE</i>	<i>t-ratio</i>	<i>B</i>	<i>SE</i>	<i>t-ratio</i>
Gender	-0.15	0.12	-1.25	-0.02	0.09	-0.24	0.21	0.09	2.30*
Age	-0.01	0.01	-0.82	0.01	0.01	0.81	0.01	0.01	0.64
Negative Affect (NA)	-0.13	0.17	-0.79	-0.11	0.15	-0.78	0.14	0.15	0.92
Surgency (S)	0.17	0.25	0.68	-0.06	0.15	-0.38	0.22	0.21	1.07
Effortful Control (EC)	-0.46	0.17	-2.70**	-0.04	0.13	-0.31	-0.08	0.15	-0.50
Active Distraction (AD)	0.55	1.27	0.43	0.50	0.89	0.56	-1.93	1.45	-1.33
Information Gathering (IG)	-0.56	0.80	-0.71	0.13	0.48	0.26	0.01	0.46	0.03
Passive Waiting (PW)	-1.35	1.89	-0.72	1.17	1.06	1.11	-0.83	1.63	-0.51
Multiple (M)	-0.42	1.23	-0.34	-0.07	0.74	-0.10	0.61	0.84	0.72
NA X AD	0.08	0.19	0.44	0.14	0.12	1.19	-0.06	0.15	-0.40
NA X IG	0.05	0.06	0.80	0.01	0.04	0.31	-0.01	0.05	-0.27
NA X PW	-0.11	0.13	-0.84	-0.23	0.08	-2.74**	0.13	0.11	1.15
NA X M	0.07	0.14	0.49	0.02	0.09	0.25	-0.07	0.08	-0.78
S X AD	0.15	0.14	1.07	0.02	0.10	0.24	-0.08	0.17	0.49

S X IG	-0.13	0.07	-0.18	0.07	0.04	1.77 <sup>+</sup>	0.09	0.06	1.55
S X PW	0.04	0.25	0.16	-0.03	0.12	-0.24	0.13	0.20	0.65
S X M	-0.13	0.20	-0.65	-0.09	0.10	-0.85	-0.15	0.15	-1.03
EC X AD	-0.27	0.16	-1.74 <sup>+</sup>	-0.19	0.13	-1.48	0.43	0.16	2.56**
EC X IG	0.09	0.10	0.84	-0.11	0.06	-1.75 <sup>+</sup>	-0.09	0.06	-1.41
EC X PW	0.27	0.22	1.21	-0.04	0.13	-0.33	-0.07	0.20	-0.34
EC X M	0.14	0.15	0.94	0.07	0.09	0.85	0.07	0.09	0.79

<sup>+</sup> p<0.08, \* p<0.05, \*\*p<0.01

### **Research Question 1: Main Effects of temperament and emotion regulation strategy use**

As expected, a main effect emerged such that children’s effortful control was negatively related to children’s externalizing behavior. For preschooler social competence, gender (being female) was a significant predictor. However age and gender were not predictive of children’s externalizing and internalizing behavior outcomes.

### **Research Question 2: Interactions between temperament and emotion regulation strategy use**

**Externalizing behavior.** A marginally significant interaction emerged suggesting that children’s effortful control moderates the relation between active distraction and externalizing behaviors. See Figure 1. The results suggest a trend of relations such that for children with lower effortful control, there is a positive relation between active distraction strategy usage and externalizing behaviors, whereas there is less of a relation between using active distraction and externalizing behaviors for children with higher effortful control.

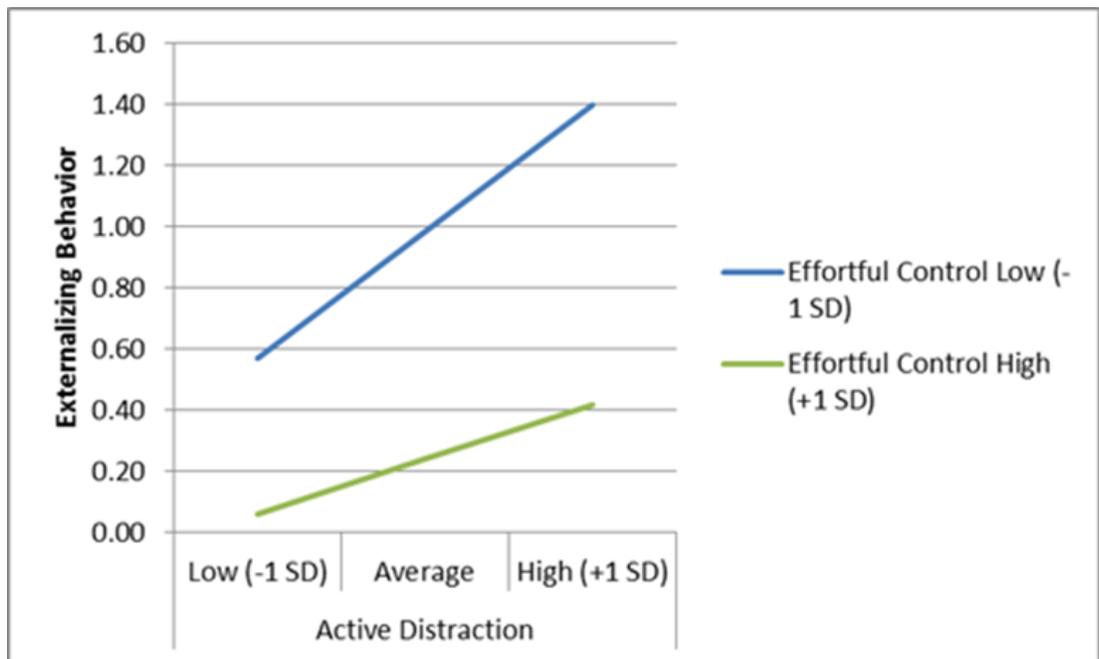


Figure 1: Active distraction x effortful control interaction predicting children's externalizing behaviors

**Internalizing behavior.** Results indicated that one significant and two marginal interactions exist. Children's negative affect moderated the relation between passive waiting and teacher ratings of child internalizing behaviors. See Figure 2. Thus, for children low in negative affect, use of passive waiting was more strongly positively related to internalizing behaviors than for children high in negative affect.

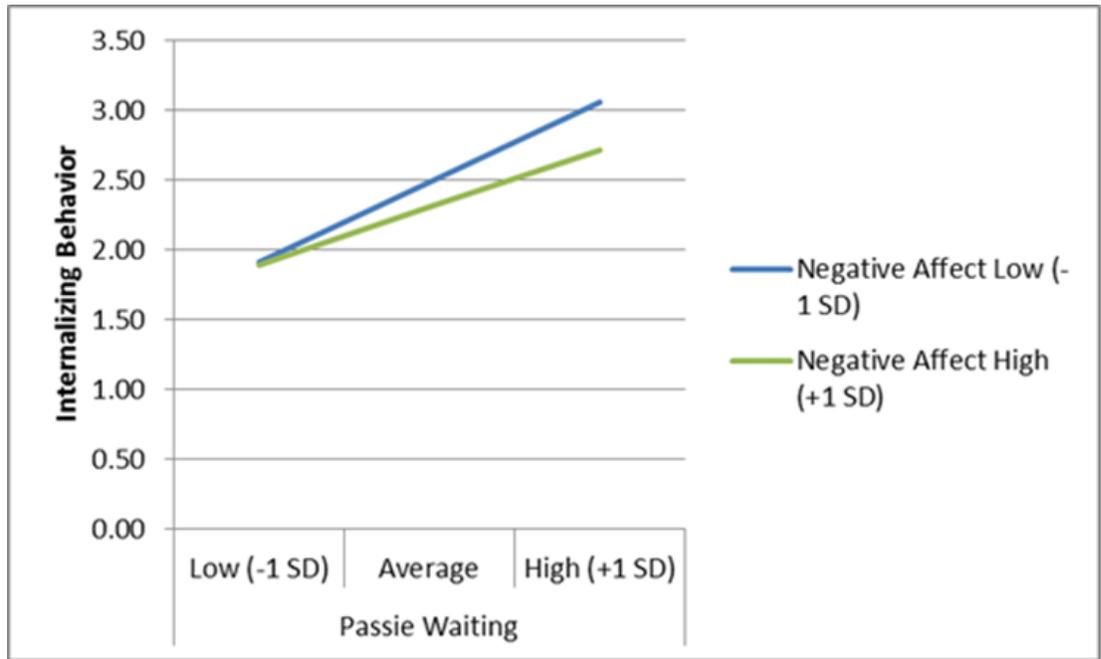
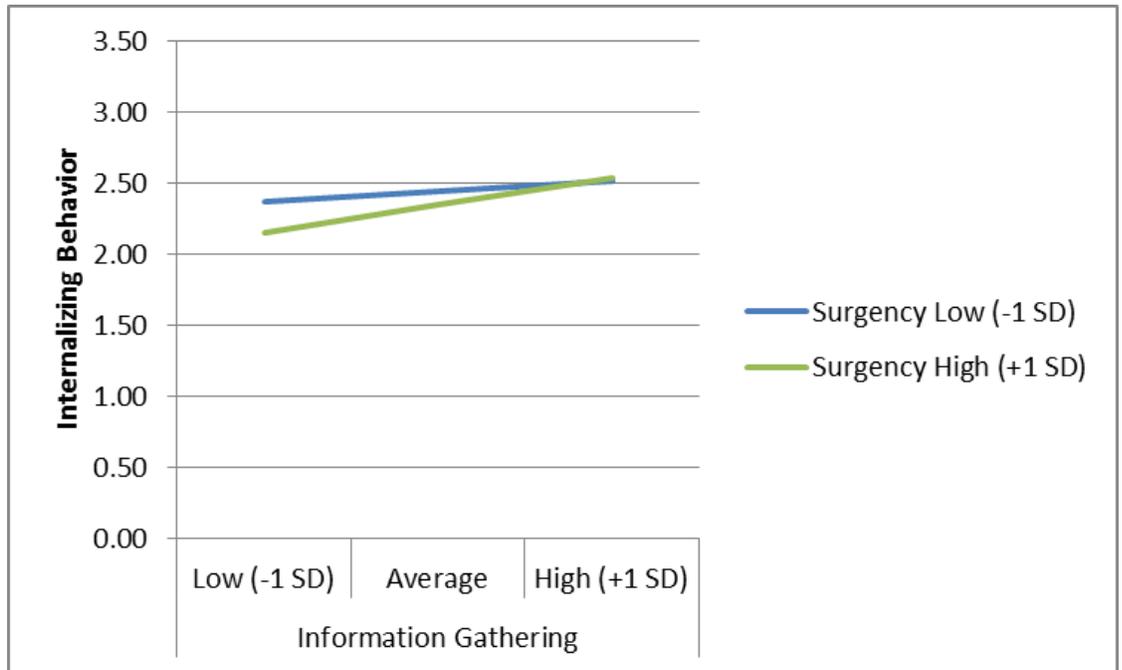


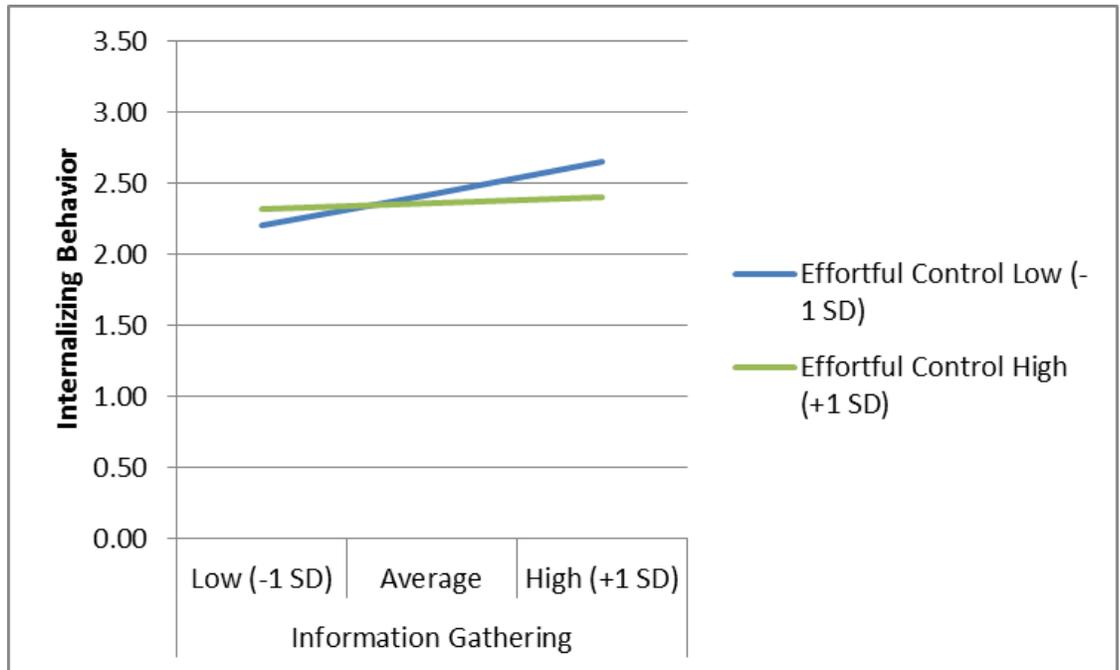
Figure 2: Negative affect x passive waiting interaction predicting preschooler internalizing behaviors

For preschoolers' internalizing behaviors, the interaction between information gathering and surgency was marginally significant. See Figure 3. These findings represent a trend suggesting that, for children higher in surgency, teachers' evaluations of internalizing behaviors tend to be positively related to information gathering.



**Figure 3: Information gathering x surgency interaction predicting internalizing behavior**

Additionally, a marginally significant interaction emerged between children's effortful control and information gathering. See Figure 4. The results suggest a trend of relations such that for children with lower effortful control there is a positive relation between information gathering strategy usage and internalizing behaviors.



**Figure 4: Information gathering x effortful control predicting internalizing behaviors**

**Social Competence.** Children’s effortful control moderated the relation between active distraction and teacher ratings of child social competence. See Figure 5. Thus, for children low in effortful control, use of active distraction was more strongly negatively related to social competence than for children high in effortful control.

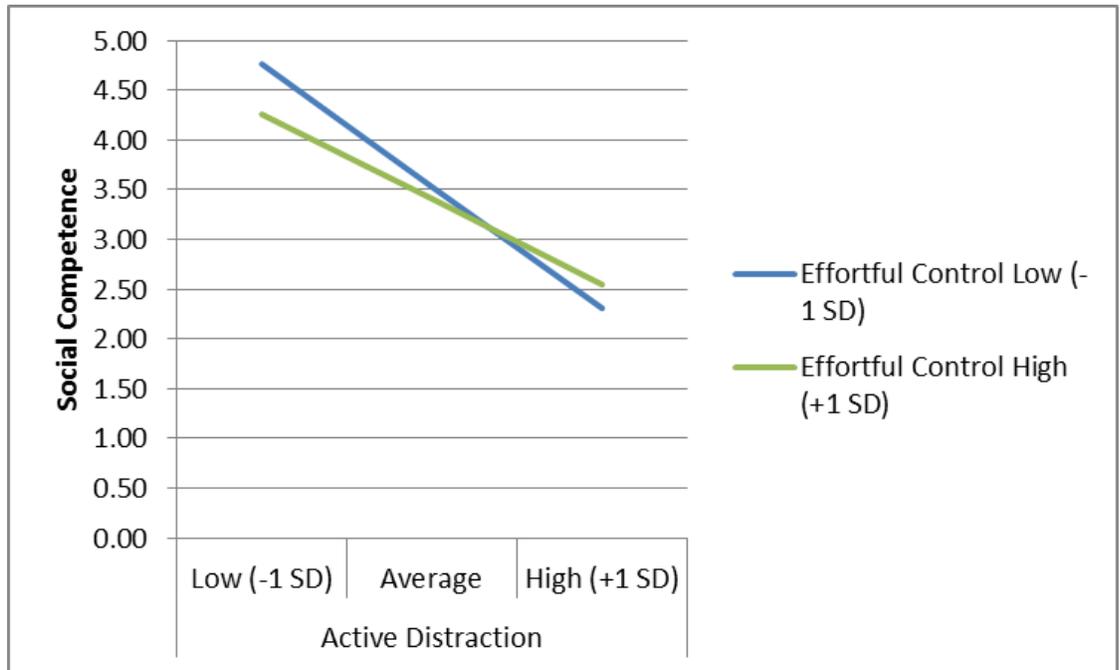


Figure 5: Active distraction x effortful control predicting social competence

### Research Question 3: Main and interactive effects of multiple strategy use

To answer my third research question, I evaluated the main effects and interactive effects of the use of multiple strategies in predicting children’s social-emotional outcomes. In the evaluation of this research question, there were no significant main or interactive effects in predicting children’s externalizing, internalizing, and social competence.

## **CHAPTER SIX**

## DISCUSSION

The aim of the current study was to determine the unique and interactive effects of children's temperament and emotion regulation strategy usage on facets of preschooler social-emotional development. In addition, I sought to examine the effects of the use of multiple regulatory strategies on children's social-emotional outcomes. In general, evidence from this investigation supports individual as well as interactive relations between intrapersonal characteristics and may provide researchers with a better understanding of the antecedents of behavioral risk and resilience. The results presented herein indicated that there were main effects of temperament and gender on externalizing behaviors and social competence, respectively, as well as temperament moderated relations between the use of specific emotion regulatory strategies and preschooler social-emotional outcomes. Notably, the use of multiple emotion regulatory strategies was not predictive for any outcome both separately and in conjunction with temperament.

### **Research Question 1: Main Effects of Temperament on Children's Social-emotional Development**

Consistent with previous research and my hypothesis, children's effortful control was negatively related to their externalizing behaviors (Eisenberg et al., 1996, Eisenberg et al., 2001). Temperamental effortful control reflects individual differences in the attentional control aspects of regulation (Gartstein & Fagot, 2003). Therefore, children's increased abilities in shifting attention, planning, focusing, and inhibiting dominant

responses collectively contribute to the regulation of externalizing tendencies (Eisenberg et al., 2005). Given that effortful control is consistently found to negatively predict children's externalizing behaviors, future research aimed at abating the deleterious effects of children's externalizing difficulties should focus on attention training and inhibitory control interventions.

In addition to the main effect of effortful control, I also hypothesized a significant main effect of negative affect on externalizing behaviors. Given the large body of literature that has related temperamental negative emotion to both externalizing and internalizing type behaviors (Rothbart, 2011; Rothbart & Bates, 2006), it is surprising that the results were inconsistent with the extant literature and my hypotheses. However, it is possible that the lack of findings is a result of the use of the Very Short Form of the CBQ. Given that only one main effect emerged from the analysis, it is possible that the limited number of items for each factor (12) limited the predictive power of my temperament data.

## **Research Question 2: Interaction Effects on Children's Social-emotional Development**

### **Active Distraction x Effortful Control Interaction Predicting**

**Externalizing Behavior.** Results suggest a pattern of relations between children's effortful control and active distraction strategy usage in predicting externalizing behaviors. For preschoolers who were characterized as having low levels of effortful control, use of active distraction was more highly positively related to externalizing behaviors than for children high in effortful control. Although these results were

marginally significant they are worth considering. These patterns indicate that active distraction strategy usage may work differently for children with different temperaments. In particular, children with greater effortful control may be shifting attention from the emotion eliciting situation to focus on more positively salient environmental stimuli, whereas those children with lower levels of effortful control may use active distraction strategies focused on the emotion eliciting situation. To illustrate this more clearly, one child may use the undesired toy in an imaginary play scenario whereas another may rewrap the gift – both behaviors are functionally distracting, however, one may be more successful in regulating the child’s emotion. In sum, it may be that children with higher levels of effortful control are better able to redirect their attention from distressing stimuli to dampen negative emotions whereas children with lower levels of effortful control are less effective.

**Passive waiting x Negative Affect Interaction Predicting Internalizing Behaviors.** Our results suggest that temperament does not influence preschooler’s internalizing behaviors by itself; it does so only in conjunction with the employment of specific regulation strategy usage. One significant and two marginally significant interactions emerged predicting internalizing behaviors in preschoolers. Unexpectedly, the interaction between children’s passive waiting and negative affect indicated that having lower levels of negative affect was associated with an increase in the relation between passive waiting and preschooler internalizing behaviors. Thus, children exhibiting less negative affect and more passive waiting appear to be at a particular risk for internalizing-type difficulties. These findings are contradictory to those obtained by

Blair et al., (2004), in which girls characterized by high levels of temperamental irritability and frustration and who used more passive coping techniques displayed more internalizing behaviors. Although I hypothesized a similar pattern of results, the Blair and colleagues (2004) study was in contrast to the present study in two ways: 1) researchers used different measures of negative emotionality and regulation strategies and 2) examined the relations between temperament and emotion regulation separately for boys and girls. Blair et al., (2004) suggest the notion that negative emotionality and passive strategy usage reflects rumination on the emotion eliciting situation and thus leads to more internalizing behaviors.

However, it is also plausible that the findings from the present study present another explanation. It may be that children characterized by their parents as having low levels of negative affectivity are those children who do not outwardly express their negative emotions. Thus, children with lower negative affect may include those children who “bottle up” their emotions. In addition, when children with low negative affect employ passive coping strategies, they may be perpetuating tendencies to reflect inwardly which may in turn lead towards internalizing behaviors (e.g. timid, afraid, avoids new situations, worries, inhibited or uneasy in a group).

**Information Gathering x Temperament Interactions Predicting Internalizing Behaviors.** The two marginal interactions that emerged included temperamental surgency and effortful control as moderators of the relation between information gathering and internalizing behaviors. Examination of the Information Gathering X Surgency interaction suggests that the positive relation between information

gathering and internalizing behaviors tends to be stronger for children who are more surgent. The interaction between information gathering and effortful control illustrates another pattern of behaviors to suggest that for children with less effortful control, the more information gathering used in emotional situations, the more likely they are to be regarded as having internalizing behaviors. Research has shown that children with specific patterns of high emotional reactivity and decreased attention regulation are more prone to experiencing symptoms of internalizing disorders (Eisenberg, Cumberland, Spinrad, Fabes et al., 2001). Thus, a typically unregulated child who makes frequent attempts to gain information about the situation may be displaying behaviors related to anxious tendencies. Children who are less able to shift attention and modulate their emotional reactivity and who ask a lot of questions pertaining to the emotion eliciting situation are likely those children who tend to avoid new situations and appear sad, unhappy, or anxious when presented with a new situation. Taken together, the two marginally significant interactions with children's information gathering suggest that increased information gathering positively predicts preschooler-internalizing behaviors when children are low in effortful control and high in surgency. Thus, for those children who have difficulty shifting attention and also those who are temperamentally impulsive, asking questions about an emotionally eliciting situation may indicate higher levels of sadness and anxiety in preschoolers.

**Active Distraction x Effortful Control Interaction Predicting Social Competence Behaviors.** Surprisingly, the hypothesized interaction between active distraction and children's effortful control in predicting social competence was in the

unexpected direction. I hypothesized that those children who use more active distraction and are characterized as having less effortful control would have greater social competence. The notion is that children low in effortful control but who employ learned active distraction strategies to reorient attention and shift their focus from the negative emotion eliciting situation would have greater social competence (e.g. negotiate solutions to conflicts, comfort or assist children in difficulty).

However, this explanation was not supported in the findings. Rather, the results suggest that for children with low effortful control the negative relation between active distraction and social competence was stronger than for those children with more effortful control. Thompson and Calkins (1996) suggest that the effectiveness of a given strategy depends not only on its impact on emotional experience but also on the demands of the social context in which it was used. In the case of the present study, children's active distraction was coded by any observed functional behavior that shifted their attention from the situation. This could include any number of behaviors that range from engaging in a play scenario to removing themselves from the task by walking around the room or trying to leave the room altogether. Thus, children's active distraction in the face of emotion eliciting situations may not be the most useful strategy of emotion regulation in context of situations that require some level of engagement. In particular, this may be most evident for those children who have lower effortful control given that they may have greater difficulty focusing their attention on the EERA tasks to begin with.

### **Research Question 3: The Use of Multiple Strategies in Predicting Preschool Social-Emotional Outcomes**

Inconsistent with previous research, children who employed more strategies did not fair any better than those who used one strategy. Gilliom and colleagues (2002) found that boys who used a greater number of effective regulatory strategies at age 3.5 were better adjusted at age 6. In contrast to the current study, previous research suggests that more strategy usage at an earlier age predicts later adjusted whereas the present study examines concurrent relations (Gilliom et al., 2002). Although it is plausible that more regulation strategy usage in emotion eliciting situations might benefit later adjustment, it may be difficult to observe this trend in the preschool years as children have just recently acquired these skills.

#### **Limitations**

There are several limitations that warrant discussion. One limitation of the current study is the amount of missing temperament data. Although missing values were accounted for in the statistical software through FIML and MLR, any missing data can decrease generalizability of results and lower power to detect interaction effects (McClelland & Judd, 1993). Furthermore, given the use of the Very Short Form of the CBQ, missing data on a relatively small number of items may have reduced predictive power in obtaining both main and interactive effects.

Another limitation relates to the methodology to capture emotion regulation strategies. Given that emotion regulation is operationalized as the modulation of an emotional experience, the present study assumes that children first experienced a negative

emotion and then employed a regulation strategy to down-regulate arousal. Although the two tasks have been shown to elicit sadness and anger (Fettig et al, in preparation), further studies exploring the sequence of a negative emotion expressed followed by a strategy would be fruitful. Additionally, future work in this area might explore children's physiological arousal around the negative emotion-eliciting situation paired with the use of an emotion regulation strategy.

Finally, a limitation of this study is that the findings may not apply to children who are characterized as temperamentally or behaviorally at risk (i.e. temperamental extreme groups). The sample was not extremely high risk; therefore, one must be cautious in generalizing the findings to groups of children with levels of clinical problems. As such, it is important to replicate the associations found in this study with high-risk children.

## **Implications**

The first contribution of the present study is that it is one of the first to use a field-ready measure of assessments that are typically done in a laboratory environment. The simultaneous administration and coding of EERA allows researchers to examine preschooler emotionality across various contexts, the time course of their emotions, and the frequency of regulatory strategy usage. To the best of my knowledge, no existing direct assessment measure allows for real-time coding of emotion regulation in field settings. The use of EERA reduces the time and expense associated with laboratory assessments and may also reduce the amount of reactivity associated with bringing children into a laboratory setting. The field based objective behavioral assessment is a

new and exciting methodology yielding rich and meaningful data surrounding children's emotion and emotion regulation strategy use.

This study illustrates the importance of examining multiple individual difference factors and the interaction between temperament and emotion regulation in the development of children's social emotional development. Despite the lack of findings to support a "buffering"

model (as hoped), my results suggest that social-emotional interventions may be best targeted at children who are low in effortful control. In addition to low levels of effortful control predicting preschooler-externalizing behaviors, effortful control moderated the relation between children's active distraction and social competence. Thus, interventions aimed at training attentional control and the inhibition of dominant behavioral tendencies might reduce young children's risk of developing later psychopathology.

Another contribution from the present study and one notably different from prior studies in this area, is the measurement of each construct. Each construct was measured with a different method: temperament with parent report, emotion regulation with direct assessment, and children's social-emotional outcomes with teacher report. In addition, children's emotion regulation strategy usage was measured across two negative emotion eliciting tasks – adding variability of context to the measure of preschooler regulatory behavior. Furthermore, the results were obtained from a racially diverse sample with participants from both private and Head Start preschool centers. Additionally, the children in the current sample are low-risk (e.g. not clinically-referred), and thus our

findings may be more generalizable. Taken together, the findings herein make important contributions to knowledge about individual difference factors contributing to preschooler social emotional development at a pivotal time in early childhood.

Overall, temperament and emotion regulation strategy usage were found to uniquely and interactively predict children's social emotional behaviors. Future research that examines additional factors (e.g. effectiveness of strategy usage) that might mitigate the relations between individual difference factors and children's social emotional development should prove most informative. In addition, longitudinal explorations of preschooler strategy usage as well as physiological measurements associated with children's regulation of affect may further contribute to the understanding of children's social emotional development.

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## **BIOGRAPHY**

Nicole B. Fettig was born October 2, 1984 in Washington, DC. She received her Bachelor of Arts from East Carolina University where her passion for research began. She received an Intramural Research Training Award from the NIH/NICHD to work with rhesus macaques exploring the role of gene x environment interactions. Her passion for rigorous scientific inquiry led her to pursue child development research at George Mason University where she earned a Master of Arts and a Doctor of Philosophy degree.