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**THE RELATIONSHIP BETWEEN TODDLER TEMPERAMENT AND SOCIAL
COMPETENCE: THE MODERATING ROLE OF EMOTION REGULATION**

A Thesis in
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by
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ABSTRACT

This longitudinal study examined how children's ability to regulate emotions moderated the relationship between toddler temperament and children's social competence. The current study consisted of 126 toddlers at 24/25 months, 70 preschoolers at 4.5 years, and 60 children at the peer visit (mean age 77 months). Toddler temperament groups were created by observing positive and negative affect and approach/withdrawal behavior in a series of high and low intensity tasks. Three groups, inhibited, exuberant, and low reactive, were formed taking a person-centered approach. At 4.5 years, two tasks designed to elicit the emotions of frustration/anger and disappointment was used to measure children's putative regulatory behaviors. When the children were 6-7 years of age, their social behaviors were observed while interacting with 2-3 same-sex, same-aged peers in two free plays. Results revealed direct relations between toddler temperament and later social behaviors with exuberant and inhibited children more likely to exhibit negative peer behaviors than low reactive children. Direct relations were also found between toddler temperament and types of putative regulatory behaviors used. Exuberant and low reactive children were more likely to show goal-directed behavior than inhibited children in a frustrating situation. Several significant interactions with regulatory behaviors in the Disappointment task as the moderating variable emerged when predicting social competence. As low reactive children increase in their negative vocalizations when disappointed they are more likely to show low levels of solitary passive behaviors. Also, exuberant children who showed higher levels of internally-directed behaviors when disappointed were more likely to show higher levels of solitary passive behaviors in the peer context. These same exuberant children were

also found to show lower levels of social play with peers. This study provides support that children's abilities to regulate their emotions differentially affect children's later social behaviors depending on children's temperament.

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Chapter 1

INTRODUCTION

The development of social competence is a fundamental task in early childhood. Just as it is important for children to be able to handle social situations within the family system, a child's ability to interact successfully with individuals outside the family environment, especially within the peer context, is also of great significance. In fact, the ability to successfully and independently interact with peers has been shown to be a vital predictor of later mental health, as well as social and academic outcomes (e.g., Carlton & Winsler, 1999; Denham & Holt, 1993; Ladd, Birch, & Buhs, 1999). As with many constructs in the psychological literature, there are various definitions of social competence. However, a common theme within all definitions of social competence includes "effectiveness in interaction" (Rose-Krasnor, 1997). There are also fundamental traits that researchers generally agree illustrate competent social development in children, including the importance for children to be able to develop positive relationships and to initiate and maintain effective interactions with others, in particular their peers (Rubin, Bukowski, & Parker, 2006).

The vital role that the development of social competence plays in relation to important outcomes in childhood, points to the value of research on this construct. One significant line of research in this area of study involves investigating the role of temperament in the prediction of social competence in children. Researchers have suggested that variation in children's temperament may be responsible for individual differences in the processes that support or thwart socially competent behaviors. Additionally, temperamental traits have been hypothesized to be the underpinnings of

many social behaviors that children exhibit. In turn, researchers posit that these temperament-based social behaviors predict children's peer relationships and social competence (Eisenberg, 2002). Recently, the temperament traits that have received the most attention in predicting social competence in children are negative emotionality and self-regulation (Eisenberg et al., 1993; Eisenberg et al., 1996; Eisenberg, Fabes, Guthrie, & Reiser, 2000; Rubin, Burgess, Dwyer, & Hastings, 2003). Researchers have also investigated the role of temperamental styles in predicting later social competence. For example, the relationship between children exhibiting inhibited temperamental styles and later social competence has been shown repeatedly, with inhibited children displaying higher levels of shy behaviors and lower levels of social competence (e.g., Fox et al., 1995; Kagan, 1999; Rubin, Burgess, & Hastings, 2002).

From birth, children are amazingly different from one another and each infant comes into the world with a unique set of traits that affects and shapes his/her behavior. These distinctive, individual differences in infant's behavioral styles are referred to as temperament (Goldsmith, Buss, Plomin, Rothbart, Thomas, & Chess, 1987). While there are multiple theories of temperament, Rothbart's theory (Rothbart & Bates, 2006; Rothbart & Derryberry, 1981) defines temperament as biologically based individual differences in reactivity and regulation. Reactivity refers to the arousability, excitability, and responsivity of affect, motor activity, and related responses, whereas regulation is the process by which reactivity is modulated (Rothbart & Bates, 2006; Rothbart & Derryberry, 1981).

The degree to which an infant exhibits wariness or distress when confronted with novel situations, objects, or people and how the infant modulates this reactivity,

commonly referred to as approach/withdrawal behaviors, are frequently discussed as aspects of temperament. Infants begin to display individual differences in their approach or withdrawal behaviors at approximately the second half of the first year of life (Goldsmith et al., 1987; Kagan, Reznick, & Snidman, 1990; Rothbart, 1988; Rothbart & Derryberry, 1981). From this research investigating approach and withdrawal behaviors in infants and children, two distinct behavioral profiles were identified. Infants exhibiting hesitation, crying, fussing, and high amounts of negativity are commonly referred to as temperamentally inhibited, or fearful (Garcia-Coll, Kagan, & Reznick, 1984; Kagan, 1997). Conversely, infants showing high levels of approach, or seek out unfamiliar situations, and exhibit high amounts of positivity are commonly labeled temperamentally uninhibited or exuberant (Garcia-Coll et al., 1984; Kagan, 1997; Kagan, Snidman, & Arcus, 1998; Putnam & Stifter, 2005). The construct of behavioral inhibition has received a great deal of attention in predicting social behaviors and functioning in children, as high levels of behavioral inhibition have been shown repeatedly to predict shy and socially withdrawn behavior in early and middle childhood (Kagan, 1999; Rubin et al., 2002), and overall inhibited children have been shown to exhibit lower levels of social competence (Fox et al., 1995).

Conversely, there has been a lack of research on the relationship between children exhibiting uninhibited or exuberant temperamental styles and later social competence. Existing research has found that uninhibited toddlers were more frequently involved in group play when they were five years old (Kochanska & Radke-Yarrow, 1992), and when compared to temperamentally inhibited children, uninhibited children tend to have more positive relationships with friends and are rated as more popular with peers

(Skarpness & Carson, 1986). However, while exuberant/uninhibited children tend to display higher levels of positive affect, especially in novel and exciting situations, and have been shown to be more social, they are also more likely to become frustrated (Rothbart, Evans, & Ahadi, 2000) and are at risk for externalizing behaviors (Putnam & Stifter, 2005; Rubin, Coplan, Fox, & Calkins, 1995; Schwartz, Snidman, & Kagan, 1996). As such, the pathway by which some exuberant children exhibit socially competent behaviors, while others display higher levels of frustration and externalizing behaviors has not been clearly identified.

While research has demonstrated the importance of individual differences in emotionality and regulation in the development of children's social competence, there are also limitations and gaps that should be addressed. One such limitation is that few studies have investigated the pathway by which children exhibiting uninhibited or exuberant temperamental styles develop either competent social behaviors or a lack thereof. As there has been a plethora of research on this development in children showing inhibited temperamental styles (e.g., Kagan, 1999; Rubin et al., 2002; Rubin, Stewart, & Coplan, 1995), little is known about this pathway in uninhibited or exuberant children. In an attempt to fill this void within the literature, the goal of the current study is to investigate the relationship between toddler exuberant temperament and social competence in childhood. Additionally, this study will investigate the extent to which children's ability to regulate anger/frustration and disappointment influences the relations between toddler temperament and childhood social competence.

Many developmental tasks are achieved between the time when temperament profiles of inhibition and exuberance are classified and social competence becomes of

great importance. While a child's temperamental style may predispose him/her to exhibit certain social behaviors in the peer context, the emergence of new abilities may moderate this pathway. A child's ability to regulate his/her emotional arousal is one such skill that could affect the relationship between his/her temperamental style and ability to successfully interact with peers later in childhood. This may be particularly true for uninhibited/exuberant children as they are predisposed towards high levels of frustration. As children develop, standards of appropriate behavior are more frequently imposed. Since exuberant children are predisposed to exhibit high levels of approach behaviors, these rules may lead to high levels of frustration. If these exuberant children have not acquired the ability to regulate anger or frustration by childhood, they may be at risk for negative social outcomes as their inability to emotion regulate may cause them to act inappropriately at times in social situations, even though at other times they are highly positive.

As previously mentioned, a central feature of the temperament perspective proposed by Rothbart and colleagues (Rothbart & Bates, 2006; Rothbart & Derryberry, 1981) includes individual differences in children's ability to regulate emotions and behavior. Recent research within the study of social competence has found that children's ability to regulate their emotions plays a vital role. One line of research has shown the significance of emotion regulation on social outcomes across children varying on their tendency to approach and interact with peers (Rubin et al., 1995). Results from this study found that emotionally dysregulated preschoolers, sociable or unsociable, tended to behave in a manner that elicited peer rejection. Conversely, children who were able to regulate their emotions were found to show higher levels of social competence.

Additional support for the importance of children's ability to regulate has been found by Eisenberg and colleagues (e.g., Eisenberg et al., 1993; Eisenberg et al., 1996; Eisenberg et al., 2000). Overall, this research has shown that children exhibiting high levels of regulation are more likely to be socially competent and exhibit lower levels of externalizing behaviors. Therefore, it appears that the ability to regulate emotional arousal is crucial for children and could explain the pathway by which some exuberant children develop socially competent behaviors, while others are more likely to exhibit high levels of frustration and externalizing behaviors.

In summary, existing research suggests that temperament has a significant impact on social competence, likely through a child's ability to regulate emotions and behavior. Studies have clearly shown that children who are inhibited are likely to exhibit low levels of social competence. This could be because these children are more likely to show high levels of negativity, fearfulness, and socially withdrawn behaviors. Conversely, very little is known about uninhibited or exuberant children in terms of their developmental trajectories toward social competence. While these children exhibit high levels of approach behaviors and positive affect, they also have a tendency to be easily frustrated and exhibit high levels of externalizing behaviors. A possible pathway by which some exuberant children develop socially competent behaviors while others continue to exhibit high levels of frustration and externalizing behaviors, could be the child's ability to regulate his/her emotional arousal. In an effort to empirically support this hypothesis, the aim of the current study is to investigate the role of temperamental exuberance and regulation in predicting later social competence.

Chapter 2

REVIEW OF THE LITERATURE

There will be four core sections in this chapter reviewing the relevant literature. The first section will examine the various theories of temperament, as well as the theoretical approach to temperament that will be used in the current study. Additionally, the first section will discuss the history of approach and withdrawal behaviors, empirical research on behavioral inhibition, including antecedents of inhibited and uninhibited behavior in children, and the current study's conceptualization of temperament. The second section will address relevant theories and approaches to studying emotion regulation as a process, a discussion of individual differences in emotion regulation, and the relationship between temperament and emotion regulation. Additionally, research regarding the regulation of two specific emotions, anger and disappointment, will be presented in this section. Research examining the construct of social competence and its relationship to temperament and the development of emotion regulation will be discussed in the third section. Finally, the fourth section will review the purpose, goals, and hypotheses guiding the current study.

Temperament

Temperament Theories

While there are multiple theories of temperament, it is generally agreed upon that temperament is not a trait, but rather a rubric for a set of associated traits that underlie

individuals' behavior (Goldsmith et al., 1987). There is divergence between the various theoretical frameworks of temperament; however, most of these theories converge on a few central concepts. One point of consensus is each theorist emphasizes that temperament is constitutionally based. While it is commonly believed that temperament is biologically based and shows relative stability across development, temperament is also thought to be modifiable through experience. This more recent perspective emphasizes developmental change in temperament, as opposed to being stable and static. A third point of consensus is that temperament reflects individual differences in behavioral tendencies. Given these points of convergence, temperament theorists tend to diverge on setting criteria for various boundaries and dimensions of temperament (Goldsmith et al., 1987).

Within the temperament literature, four central theoretical frameworks have received the most attention. The most historic of these perspectives is that of Thomas and Chess (Chess & Thomas, 1973; Thomas & Chess, 1977). These researchers defined temperament as “the stylistic component behavior” (pg. 508, Goldsmith et al., 1987) and proposed that temperament “refers only to the *how*, not the *why*, of behavior...” (pg. 86, Chess & Thomas, 1973). Thomas and Chess' theory stressed the bidirectional nature of temperament between the child and his or her environment (Chess & Thomas, 1973; Thomas & Chess, 1977) and they proposed that when there is compatibility and harmony between the child and the environment, this goodness-of-fit assists in promoting optimal development for the child.

Thomas and Chess created nine dimensions of temperament: Activity level, Approach/Withdrawal, Rhythmicity, Adaptability, Sensory Threshold, Quality of Mood,

Intensity of Reaction, Distractibility, and Attention Span/Persistence. From these categories of behavior, they created three typologies of children. The largest cluster of children, characterized by adaptability to change, positive mood, consistent biological functioning, mild to moderate reactions to intensity, and approach to unfamiliar stimuli, were labeled easy children. Conversely, difficult children tended to exhibit negative mood, irregular biological functioning, withdrawal responses to unfamiliar stimuli, high intensity responses, and slow adaptability to change. The third cluster of children, slow-to-warm-up, tended to initially express negative reactions to unfamiliarity, but over time showed more approach behavior (Chess & Thomas, 1973; Thomas & Chess, 1977).

Several comparable theoretical perspectives of temperament arose from the groundbreaking work of Thomas and Chess, including those of Buss and Plomin (1975, 1984), Goldsmith and Campos (1982, 1986), and Rothbart (1986; Rothbart & Derryberry, 1981). While there is some convergence, each of these perspectives has a different focus within their framework. Because many of the constructs central to Rothbart's perspective map onto the goals of the current study, her theoretical framework will be discussed in detail.

Rothbart and colleagues (1986; Rothbart & Derryberry, 1981) have defined temperament as biologically based individual differences in reactivity and regulation that are proposed to be within the realm of attention, affect, and activity (Rothbart, 1986; Rothbart & Bates, 2006; Rothbart & Derryberry, 1981). Reactivity refers to the arousability, excitability, and responsiveness of affect, motor activity, and related responses. Regulation includes processes that modulate reactivity, such as attention, approach/withdrawal, and self-soothing, which serve to facilitate or inhibit the behavioral

and affective response (Rothbart & Bates, 2006; Rothbart & Derryberry, 1981).

Reactivity and regulation have been repeatedly shown to be interrelated and are helpful in describing the development of temperament, as the balance between reactive and regulatory processes is believed to change across development.

Initially based off Thomas and Chess' dimensions of temperament, along with other approaches, Rothbart has found evidence of three dimensions of temperament from as early as infancy: Positive Reactivity/Approach, Negative Affectivity, and Orienting/Regulation (Rothbart, 1981). Continuing this research into childhood, she has repeatedly found three broad temperament factors in children: Surgency/Extraversion, Negative Affectivity, and Effortful Control (Rothbart, Ahadi, Hershey, & Fisher, 2001). Under this perspective, temperament is thought to be relatively stable over development. However, the behavioral expression of temperament, like in other theories, is thought to be influenced and modifiable by the environment.

Just as physical maturation occurs across development, another important aspect of Rothbart's theoretical perspective is that the regulatory aspects of temperament are thought to develop and change over time (Rothbart, 1986; Rothbart & Bates, 1998; Rothbart & Derryberry, 1981). For example, while it is not observable at birth, late in the second half of the first year approach/withdrawal behaviors emerge (Rothbart, 1988). This more passive or reactive form of regulation that develops in the first year permits rudimentary inhibitory control of behavior. Effortful control, a self-regulatory system, begins to emerge late in infancy and continues to develop throughout toddlerhood and early childhood. The development of this system gives the child voluntary control of emotion and behavior (Rothbart, 1989; Rothbart & Bates, 2006). Therefore,

approach/withdrawal behaviors, which are more emotionally based and reactive, develop earlier than the more self-regulative effortful control system, showing that specific temperamental characteristics are present at different points in a child's development.

While there is some convergence among the theoretical frameworks, Rothbart's theory of temperament has several advantages. The first advantage in utilizing Rothbart's perspective is the flexible and dynamic view of temperament taken within this framework. For example, individual differences in reactivity and regulation in children can be used to measure temperament at various levels (e.g., neural and behavioral) within this approach. Therefore, use of this perspective allows the flexibility to view temperament at the biological and behavioral levels of temperament, whereas perspectives such as the one presented by Thomas and Chess (Chess & Thomas, 1973; Thomas & Chess, 1977), focuses only on individual differences in children's behavioral styles (Rothbart & Derryberry, 1981). A second advantage to using Rothbart's theoretical perspective is it provides a broader, more encompassing view of temperament. For example, while Rothbart's theory includes individual differences in children's propensity toward primary emotions, the dimensions of temperament are not limited to only emotionality, as presented by Goldsmith and Campos (1982, 1986). Additionally, the perspective taken by Rothbart includes both positive emotionality as well as individual differences in specific emotions (e.g., fear, anger), whereas Buss and Plomin focus solely on the more global concept of negative emotionality (Goldsmith et al., 1987).

A third advantage to Rothbart's framework is that it acknowledges the interaction that takes place between the individual and environment throughout development.

Behavioral manifestation of temperament can be modified by various environmental factors and is not fixed at birth. Finally, a fourth advantage is the acknowledgement that various aspects of temperament come on line at different points across infancy and early childhood and that temperament continues to develop over time. In summary, while there are multiple theories of temperament, there is some convergence on the principles of temperament. These theories concur that temperament is constitutionally based, shows relative stability over development, and reflects individual differences in behavioral tendencies (Goldsmith et al., 1987). The advantages of Rothbart's theoretical framework, particularly its focus on individual differences in regulation, will be used to guide the current study.

Approach-Withdrawal Behavior

Observational research with animals was among the first in the conception of early theory on approach and withdrawal behaviors. Schneirla (1959) proposed a theory of approach and withdrawal behaviors that has been widely applied and extended from animal models to theories of adult personality and child temperament. Within this theory of biphasic approach-withdrawal (A-W) processes, Schneirla (1959) suggested that the existence of approach and withdrawal systems can be applied to all motivated behavior and exists in all animals. Approach responses, originating from the approach system or A-processes, are in response to low-intensity stimuli in the environment and indicate potential reward. Conversely, withdrawal responses, originating from the withdrawal system or W-processes, are elicited from high-intensity or novel stimuli and indicate potential harm. The motivation to approach or withdraw from a stimulus does not,

however, simply depend on species-specific properties. Instead, Schneirla (1965) proposed that there are individual differences in motivation in approach and withdrawal.

Building upon animal models and extending it to theories of personality in adults, Gray (1982, 1987) proposed a model focusing on the reactivity and interaction between two neural systems: the approach system and the behavioral inhibition system. Within this perspective, approach and inhibition behaviors are viewed as functioning from two distinct systems, not orthogonal constructs on a unidimensional continuum, where one promotes avoidance and the other promotes approach. The Behavioral Activation System (BAS) is theorized to involve sensitivity to rewards and promote behavior toward signals for rewards. These signals are believed to motivate the individual to approach the stimulus. The BAS is composed of the medial forebrain bundle and the lateral hypothalamus areas of the brain. The second system is the Behavioral Inhibition System (BIS) and involves sensitivity to punishment, novelty, and nonreward. This BIS system is activated in these types of situations and inhibits the individual's approach. Within Gray's (1982, 1987) model, the BIS includes the hippocampus, the medial septal area, and the orbital frontal cortex.

The aforementioned theories of approach-withdrawal behaviors have been applied more recently toward understanding childhood individual differences in these tendencies. By extending theories of approach-withdrawal to infancy, Rothbart and colleagues (Rothbart & Derryberry, 1981) have proposed that these behavioral reactions to novelty are an important rudimentary regulatory aspect of temperament. This reactive inhibition of children has been shown to first appear in children late in the first year of life (Kagan, Reznick, & Snidman, 1990; Rothbart, 1988; Rothbart & Derryberry, 1981), about the

same time infants begin to self-locomote and the emotion of fear emerges (Bertenthal & Campos, 1990). A wealth of empirical research and theory of these approach-withdrawal behaviors in infancy and childhood has taken place with a group of children commonly referred to as “behaviorally inhibited” (e.g., Garcia-Coll, Kagan, & Reznick, 1984; Kagan, Reznick, Clarke, Snidman & Garcia-Coll, 1984; Kagan, Reznick, & Snidman, 1987). The purpose of the following section is to review the literature on these behaviorally inhibited and uninhibited children.

Temperamental Profiles of Behavioral Inhibition

It is commonly agreed upon by temperament theorists that children show individual differences when faced with unfamiliar or novel situations and stimuli. In infants, the development of inhibition is thought to appear in the second half of the first year of life (Goldsmith et al., 1987; Kagan, Reznick, & Snidman, 1990; Rothbart, 1988; Rothbart & Derryberry, 1981). Arguably, the most prominent and significant research regarding inhibition has been conducted by Kagan and colleagues (Garcia-Coll, et al., 1984; Kagan, 1994; Kagan, 1997; Kagan et al., 1984; Kagan et al., 1987; Kagan, Reznick, Snidman, Gibbons, & Johnson, 1988; Kagan & Snidman, 1991; Kagan et al., 1998; Rimm-Kaufman & Kagan, 2005). Kagan has coined the term “behavioral inhibition” to describe children that tend to withdraw and show negative affect in response to novelty. In Kagan’s theoretical model of behavioral inhibition, there are individual differences in the degree of reactivity to novelty as a function of excitability in the amygdala and proximate areas of the brain, including the Central Gray (Kagan et al.,

1987). This excitability in the amygdala and surrounding regions is thought to generate heightened fear responses to unfamiliar and novel situations, people, and things.

When presented with unfamiliarity, children who are behaviorally inhibited are biologically predisposed to display high negative reactivity, distress, wariness, and anxiety (Garcia-Coll et al., 1984; Kagan, 1997). These inhibited children have been shown to respond to unfamiliar stimuli with distress, initial avoidance, and high negative reactivity beginning when they are 9-12 months of age. Conversely, children showing low levels of inhibition, or uninhibited children, are more likely to approach novel situations, people, and things and exhibit low levels of negative reactivity when faced with unfamiliarity (Garcia-Coll et al., 1984; Kagan, 1997; Kagan et al., 1998). Additionally, it is thought that approximately 10-15% of toddlers show extremely inhibited or uninhibited behavioral profiles (Kagan, 1991).

Research by Kagan and colleagues was based primarily on a longitudinal study of two cohorts of Caucasian children who were selected from larger samples to be either behaviorally inhibited or uninhibited and were followed from age 2 or 3 until they were 7 ½ years old. Children were screened to find a group of extremely inhibited children and extremely uninhibited children. The children were observed interacting across a variety of unfamiliar situations, people, and objects (Kagan et al., 1988; Garcia-Coll et al., 1984). Behaviors indicating behavioral inhibition included apprehension or withdrawal, proximity to mother, long latencies to interact with the other person or object, crying, and termination of play or vocalizations. Behaviors such as vocalizing more, approaching unfamiliar people and objects, and not tending to stay within close proximity to their mother showed the profile of uninhibited children.

To investigate the continuity of the children's behaviors, these extremely inhibited and uninhibited children were seen again in follow-up visits in preschool and early childhood and a majority of the children remained in their initial classifications of extremely inhibited or uninhibited (Kagan et al., 1984; Kagan et al., 1988; Reznick et al., 1986; Rimm-Kaufman & Kagan, 2005). When the children were 7 ½ years old, about three quarters of the children showing extremely inhibited or uninhibited behavioral profiles at 21 months of age remained in their initial classifications (Kagan et al., 1988). The initially inhibited children were unusually shy, timid, and quiet and the uninhibited children showed higher levels of approach to risky and novel situations and interacted more with unfamiliar peers. Pfeifer, Goldsmith, Davidson, & Rickman (2002) found a comparable pattern of extremely inhibited and uninhibited children. The results from these longitudinal studies provide evidence of moderate continuity in the behaviors of extremely inhibited and uninhibited children.

While three quarters of the children remained in their initial classifications, still one quarter of these children no longer showed behavioral profiles of extremely inhibited or uninhibited children, suggesting some discontinuity (Garcia-Coll et al., 1984; Kagan et al., 1984; Kagan et al., 1987; Kagan, et al., 1988; Pfeifer et al, 2002; Rimm-Kaufman & Kagan, 2005). The astonishing aspect of these studies is that the children were believed to represent the extreme behavioral profiles of inhibited and uninhibited children and therefore showed that even at the extremes there are variations in the development of behavioral inhibition (Fox, Henderson, Marshall, Nichols, & Ghera, 2005). There have been various explanations of this discontinuity, including environmental factors such as parenting and nonparental care, differences in physiological dispositions (Fox,

Henderson, Rubin, Calkins, & Schmidt, 2001), and the development of children's regulatory abilities (Fox et al., 2005). More recently, studies have examined children's ability to regulate their emotions and behaviors as possible moderators of temperament, and will be reviewed in another section.

Once the behavioral profiles of the two groups of inhibited and uninhibited children had been identified, Kagan and colleagues (Kagan, 1994; Kagan & Snidman, 1991; Kagan et al., 1998) began to study the possible early signs of inhibition in children. As research has shown that the amygdala is related to variation in infant crying to unfamiliar stimuli and motor reactivity, Kagan hypothesized that high levels of motor reactivity and crying to novel stimuli could be potential precursors of inhibited and uninhibited behaviors (Kagan, 1991). To study this, Kagan and colleagues collected a sample of 4 month old infants and presented them with a variety of visual stimuli and unfamiliar voices to code their level of motor activity and distressed vocalizations. Children displaying frequent and high levels of limb activity and distress were labeled high-reactive and children showing low levels of motor activity and crying and were labeled low-reactive (Kagan, 1991).

When these children were 14 and 21 months and 4 ½ years of age they were seen again to assess fear and approach to unfamiliar situations. Since at these ages the high-reactive infants were more likely to be inhibited when presented with novel situations and the low-reactive infants were more likely to be uninhibited (Kagan et al., 1998; Kagan, 1997), the authors concluded that behavioral inhibition in children can be predicted from high motor activity and negative reactivity in infancy. These findings have been partially

replicated showing that high levels of negative reactivity and low positivity in infancy was related to inhibited behavior in toddlerhood (Park, Belsky, Putnam, & Crnic, 1997).

Researchers have also expanded upon Kagan's research to include positive affect. Calkins, Fox, & Marshall (1996) selected a group of 4 month old infants who displayed high motor activity and either high positivity or high negative reactivity. Supporting Kagan's findings, infants high in negative emotionality and motor activity were more likely to show inhibited behavior at 14 months. In addition, infants displaying high levels of positivity, not just low levels of negativity, and high motor activity were related to later uninhibited behavior, which they called "exuberant". When these children were seen again at 48 months of age, about one quarter of them continued to display a pattern of inhibited behavior (Fox et al., 2001). Conversely, about one half of the children chosen at 4 months of age for high motor activity and high positive affect continued to show a pattern of exuberance from 4 months to 4 years of age. Parental and observational data supported that these exuberant children exhibited more sociable and less distressed behaviors across the four year period than the continuously inhibited children. These findings suggest that there is a relatively high degree of continuity found within this High Positivity/Exuberant group of children across infancy and early childhood (Fox et al., 2001). In combination with Kagan and colleagues (Kagan & Snidman, 1991; Kagan et al., 1998), the research suggests that negative affect and high motor activity are precursors of inhibited behavior. Conversely, uninhibited behavior seems to be predicted by high levels of positivity and motor activity.

Approach and Inhibition in the Present Study

While the aforementioned research on behavioral inhibition and its antecedents has provided a wealth of knowledge, more current research has extended previous findings to include additional aspects of inhibited and uninhibited behavior. As previously discussed, past research has related early emotionality to approach and inhibition and pointed out the benefit of considering positive and negative reactivity as separate constructs in predicting inhibited behavior (Calkins et al., 1996; Kagan & Snidman, 1991; Kagan et al., 1998; Park et al., 1997). However, within these studies toddler affect was not measured as a component of approach and inhibition concurrently. Additionally, while researchers have considered the role of inhibition in differentiating inhibited and uninhibited behavior in children, it is also possible that children's approach tendencies are involved. Following Gray (1982, 1987), Rothbart has shown that the development of inhibited and approach behavior in infants can be measured by examining developmental variations in their reach behavior toward objects that differ in terms of stimulation and novelty (Rothbart, 1988; 1989). For example, infants may show hesitation in reaching for an object because of their slow approach system, not simply due to the fact that they are inhibited.

Rothbart (1988) conducted a study to investigate the development of individual differences in children's approach and to provide evidence of approach and inhibition as existing as separate entities. By presenting infants with two sets of toys, one of high-intensity and one of low-intensity, it was found that infants' latencies to approach low-intensity toys did not increase, but latencies to approach the high-intensity toys were longer when the children were older. Additionally, this study found evidence for

individual differences in approach late in the first year, with infants who approached the toys faster showing more positive affect. Together, the results from this study suggest that positive affect is a correlate of approach behaviors and the development of inhibition and approach to high-intensity toys may differ across children. The findings of Rothbart (1988) were later replicated by Putnam & Stifter (2002), providing further evidence of the development of approach and inhibition and the link between approach behaviors and positivity.

More recently, in an effort to extend Rothbart's (1988) findings, Putnam and Stifter (2005) conducted a study to illuminate the relationship between children's tendencies to approach or inhibit approach and positive and negative emotionality concurrently. As methodological difficulties have made it challenging to distinguish between approach and inhibition, previous studies (e.g., Kagan et al., 1984; Kagan & Snidman, 1991; Reznick et al., 1989) have used a unidimensional approach by not directly measuring inhibition, but inferring it from a lack of approach. Conversely, Putnam and Stifter (2005) examined both positive and negative affect to assist in a greater understanding of children's motivation to approach or inhibit approach. As part of a larger longitudinal study, these authors conducted laboratory visits with 124 children when they were 6, 12, 24, and 25 months of age. Following the procedures set forth by Rothbart (1988), 6 and 12 month old infants were presented with low-intensity and high-intensity toys. When the children were 24 and 25 months old, they were involved in a variety of tasks, ranging in high- and low-intensity. For each task, approach/withdrawal behaviors and facial and vocal affect were coded, while an overall score was created for each. Consistent with previous findings (Park et al., 1997) results indicated that negative

and positive affect were separate constructs. Additionally, nonemotional approach and inhibition behavior was different than affective displays.

In contrast to previous temperament research, Putnam and Stifter (2005) formed temperament groups based upon 24 and 25 month old toddlers' level of positive affect and negative affect in addition to approach/withdrawal behavior. Using a person-centered approach, three temperament groups were created using cluster analysis: a group high in positive affect and approach were labeled exuberant, a group high in negative affect and low in approach represented inhibited children, and a group low on both positive and negative affect and moderate on approach were labeled low reactive. Results from this study also indicated that children high in positivity, or exuberance, are more likely to exhibit externalizing problems at age 2 (Putnam & Stifter, 2005).

A follow-up of this sample of children found stability of exuberant behavior from toddlerhood to preschool (Stifter, Putnam, & Jahromi, 2008). However, no evidence of the stability of inhibited behavior was found. Additionally, these authors found that when they were 4 years of age, the exuberant children were more likely to exhibit high levels of externalizing and total problem behaviors than inhibited or low reactive children. These studies add to the mounting research indicating that exuberant children may be at risk for developing later problem behaviors. As such, additional research is necessary to understand the developmental pathway by which some exuberant children have positive psychological and social outcomes, while others develop externalizing and problem behaviors.

The temperament groups created by Putnam and Stifter (2005) will be used in the present study. As aforementioned, past research has not considered positive and negative

affect concurrently with approach-withdrawal behaviors when forming temperament groups. Therefore, use of these temperament groups in the present study will provide a unique perspective toward a greater understanding of the relationship between temperament, emotion regulation, and later social competence.

Negative Emotionality

Negative emotionality is a dimension of temperament that has been shown repeatedly as an important predictor of various aspects of later development in children, including competence (Rothbart & Bates, 2006). Parallel to distress proneness, this aspect of temperament is believed to include the emotions of frustration/anger, fear, anticipatory anxiety, sadness, guilt, and discomfort. Research has shown that children who are prone to experience high levels of negative emotions tend to behave more impulsively, negatively, and less constructively than children who experience fewer negative emotions (Rothbart, Ahadi, & Hershey, 1994). In general, negative emotionality has been shown to be a risk factor for children, as it is related to both internalizing and externalizing behavior problems, and peer rejection (Eisenberg et al., 2000).

While negative emotionality is considered on some level in every theory of temperament, how it is measured and used in each theory varies (Goldsmith et al., 1987). For example, within the theory presented by Buss and Plomin (1975, 1984) the trait of negative emotionality includes all aspects of distress. Therefore, within this theory of temperament, various aspects of negative emotionality such as fear and anger/irritable distress are not separated. Conversely, both Goldsmith and Campos (1982, 1986) and Rothbart (Rothbart & Bates, 1998) argue that all individuals vary on the degree to which

they express discrete emotions and thus may have different implications for developmental outcome.

As it has been shown that negative emotionality is itself an important dimension of temperament and should be considered separately from positive emotionality, as well as the fact that it should be broken down into more specific emotions when studied, the perspective taken by Rothbart (1986; Rothbart & Derryberry, 1981) proves to be best for the current study. This is especially true as it has been shown that exuberant or uninhibited children are different on measures of the discrete emotions of fear and anger/irritable distress (Rothbart & Bates, 1998).

In summary, temperament has been described as distinctive, individual differences in infant's behavioral styles (Goldsmith et al., 1987). While there are multiple theories of temperament, Rothbart's theory has many advantages over other frameworks and defines temperament as biologically based individual differences in reactivity and regulation. Frequently researched aspects of temperament are the degree to which an infant exhibits wariness or distress when confronted with novel situations, objects, or people and how the infant modulates this reactivity, commonly referred to as approach/withdrawal behaviors. From research investigating approach/withdrawal behaviors in infants and children, two distinct behavioral profiles have been identified. Infants exhibiting hesitation, crying, fussing, and high amounts of negativity are commonly referred to as temperamentally inhibited, or fearful (Garcia-Coll et al., 1984; Kagan, 1997). Conversely, infants showing high levels of approach or seek out unfamiliar situations and exhibit high amounts of positivity are commonly labeled

temperamentally uninhibited or exuberant (Garcia-Coll et al., 1984; Kagan, 1997; Kagan et al., 1998; Putnam & Stifter, 2005).

As researchers have suggested that temperament traits are the underpinnings of many social behaviors children exhibit and assist in predicting children's later social competence (Eisenberg, 2002), it follows that research should study this developmental pathway in children. There has been an abundance of research on this development in children showing inhibited temperamental styles (e.g., Kagan, 1999; Rubin et al., 2002; Rubin et al., 1995), while little is known about this trajectory in uninhibited or exuberant children. The limited amount of research investigating the relationship between exuberant children and later social behaviors has found that these children are more involved in group play and tend to have more positive relationships with friends (Kochanska & Radke-Yarrow, 1992; Skarpness & Carson, 1986). However, even though these exuberant children show high levels of approach behaviors and positive affect, especially in new and exciting situations, they are also more likely to become easily frustrated (Rothbart, Evans, & Ahadi, 2000) and are at risk for externalizing behaviors (Putnam & Stifter, 2005; Rubin et al., 1995; Schwartz et al., 1996; Stifter et al., 2008).

As exuberant children are inclined to display high levels of approach behaviors and since as they become older and standards of appropriate behavior are more frequently enforced, these children may exhibit higher levels of frustration in response to new rules since their goals are blocked. Temperament appears to be very important in predicting later social competence in children and a possible pathway by which some exuberant children show high levels of frustration, externalizing behaviors and low levels of social competence, while others develop socially competent behaviors, could be the child's

ability to regulate his/her emotional arousal. As such, the aim of the current study is to investigate the role of temperamental exuberance and regulation in predicting later social competence. More specifically, this study will investigate the extent to which children's ability to regulate anger/frustration and disappointment influences the relations between toddler temperament and childhood social competence.

While the importance of the regulation anger/frustration, especially for exuberant children, has been repeatedly discussed, the regulation of disappointment is hypothesized to be important, as well. Disappointment involves both the emotions of anger and sadness and could be a challenge, especially for exuberant children, as this is another situation in which their goals are blocked. As exuberant children are more reward-oriented, they may be more likely to experience anger/frustration when disappointed by not receiving something that they want or having a goal met. For example, if an exuberant child is focused in the possibility of receiving a reward, such as a gift, but instead receives a prize that they did not want, the result may be high levels of frustration by the exuberant child. Therefore, as exuberant children face more constraints (i.e. higher levels of frustration) than other children and if they have not developed the ability to regulate these high levels of anger/frustration, then they may be more likely to exhibit lower levels of social competence and possibly higher levels of problem behaviors. As it is hypothesized that the pathway between toddler exuberance and childhood social competence is moderated by the child's ability to regulate his/her emotions, the following section will review existing literature on emotion regulation.

Emotion Regulation

Recently, the construct of emotion regulation has received considerable scientific attention in psychological research across the lifespan. Areas of research on emotion regulation are multifaceted, covering a range of psychological domains, including emotion, temperament, and cognitive. Overall, the perspectives put forth by emotion and cognitive researchers view emotion regulation from a developmental perspective, emphasizing the emergence and change in regulatory abilities across development. Conversely, temperament researchers have focused on individual differences in emotion regulatory abilities. While each of these perspectives approach the study of this construct differently, they all converge on the idea that emotion regulation is an intricate multifaceted process that takes place early in development (Stifter, 2002).

It is commonly agreed upon that children's ability to regulate their emotions is an important skill that may underlie the development of later outcomes (Calkins, 1994; Cole, Michel, & Teti, 1994; Eisenberg & Fabes, 1992; Thompson, 1994). Recent research has also highlighted the interaction between temperamental reactivity and regulation in predicting important outcomes, such as social competence, in childhood (e.g., Eisenberg, et al., 1996; Eisenberg et al., 1995; Eisenberg et al., 1997; Rubin et al., 1995). However, there is a lack of research on the interaction between emotion regulation and different temperament profiles (e.g., inhibited, exuberant) in children in predicting later developmental outcomes. More specifically and important to the current study, there is a lack of research investigating the role of emotion regulation in uninhibited/exuberant children's trajectory towards social competence.

As there are numerous developmental milestones that take place between when children are identified as inhibited or exuberant and when social competence becomes a central aspect of children's lives, it follows that the emergence of new skills may moderate the developmental trajectory between temperamental styles and later social behaviors. More specifically, a child's ability to regulate his/her emotions is an example of such a developmental task that could affect the pathway between a toddler's temperamental style and ability to successfully interact with peers in childhood. As previously discussed, exuberant children exhibit high levels of approach behaviors and positivity, but they are also prone to display high levels of frustration and externalizing problems. Therefore, the role of emotion regulation may be particularly important in moderating the relationship between temperament and later social competence for uninhibited/exuberant children as they are predisposed towards high levels of frustration. If these exuberant children have not acquired the ability to regulate anger or frustration by childhood, they may be at risk for negative social outcomes and behave inappropriately in social situations. The current study will be using an individual differences perspective of emotion regulation and investigating the role of temperamental exuberance and the regulation of the specific emotions of anger and disappointment in predicting later social competence. Therefore, the view of emotion regulation as presented by the temperament perspective will guide the current study. The following section will also briefly present the definitions and perspectives of emotion regulation as outlined from a developmental perspective.

Perspectives of Emotion Regulation

Within the current literature, there are various ways in which emotion regulation is studied as both a process and an outcome. As there are multiple perspectives of the construct of emotion regulation, it follows that there are numerous ways in which it is defined. This section will briefly outline three common developmental operationalizations of emotion regulation. One of the most widely used definitions of emotion regulation has been presented by Thompson (1990; 1994). From this view, 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" (pg. 27, Thompson, 1994). Within this definition, Thompson (1994) emphasizes the role of suppressing as well as enhancing and maintaining emotional arousal, the important role that external influences serve in regulating emotions, understanding the temporal and intensive features of emotions, and considering the importance of individuals' goals in affecting emotion regulation.

Two other widely used operationalizations of emotion regulation have been presented by Kopp (1982; 1989) and Cole (Cole, Martin, & Dennis, 2004; Cole et al., 1994). Kopp (1989) defined emotion regulation as "...the processes and the characteristics involved in coping with heightened levels of positive and negative emotions including joy, pleasure, distress, anger, fear, and other emotions" (pg. 343). A more recent definition of emotion regulation presented by Cole and colleagues (Cole et al., 2004; Cole et al., 1994) emphasized that emotion regulation involves changes related to activated emotions and that emotions can be both regulated and regulating. Changes

resulting from the activated emotion are referred to as an emotion as regulating.

Conversely, an emotion is regulated when changes occur in the activated emotion.

Each of these definitions of emotion regulation shows a level of convergence, as well as divergence. Differences among these operationalizations include how all-encompassing the definition is and the range that is included within the definition. However, across these definitions there is agreement on the adaptive or survival function inherent within an individual's ability to regulate their emotions and the importance of external sources in assisting in the regulation of emotions. Additionally, each of these definitions discusses emotion regulation as a process. The following section will address briefly the development of emotion regulation processes.

Development of Emotion Regulation

Emotion regulation as a developmental process has been the focus of a plethora of existing research and theory (e.g., Barrett & Campos, 1987; Cole et al., 1994; Eisenberg & Fabes, 1992; Kopp, 1989; Thompson, 1990). It is frequently agreed upon that a child's ability to regulate his/her own emotions and behaviors is a crucial developmental milestone (Eisenberg & Fabes, 1992; Kopp, 1989). While infants' rudimentary ability to regulate their emotions begins to develop in the first year of life (Kopp, 1989; Rothbart, 1989), they are largely dependent on adults to assist in the regulation of their emotions. Toward the end of the first year, social, emotional, motor, and cognitive advances assist in the expansion of emotion regulation competencies, such as attentional abilities and exploration, allowing emotion regulation to become more autonomous (Kopp, 1982; 1989). Additionally, research has shown that across infancy and early toddlerhood

developmental differences in the types of strategies children use to regulate their emotional arousal are identifiable. For example, Rothbart, Ziaie, & O'Boyle (1992) found that when compared to 6.5-month olds, 10-month old infants showed less active self-stimulating and more self-soothing behaviors. Stifter and Braungart (1995) also found support for the increase in these behaviors over this time period. Their results showed that self-comforting behaviors were highly preferred and served a regulatory function in both 5- and 10-month old infants. Additionally, by 10-months of age, infants were using self-comforting behaviors significantly more during periods of decreasing negative arousal.

During the second and third years of a child's life the development of self-awareness, recognition and understanding of causes of distress, and increasing verbal abilities greatly assist in the increasingly autonomous use of regulating emotional arousal (Kopp, 1989; 1992). Additionally, this time period includes important changes within the child's social environment, as networks begin to include peers within the school and neighborhood environments, teachers, and possible new siblings. The presence of these new situations gives the child additional information regarding emotions, the social acceptability of emotions, and how to regulate arousal in given circumstances.

As can be seen, much of the research investigating the development of emotion regulation in infancy and childhood has focused on the use of specific behaviors that are thought to be regulatory. For example, behaviors such as distraction, gaze aversion, looking toward the mother, approach/withdrawal, focusing on the stimulus, and self-soothing behaviors such as thumb-sucking, have been acknowledged as putative regulation strategies (e.g., Grolnick, Bridges, & Connell, 1996; Grolnick, McMenemy, &

Kurowski, 2006; Rothbart et al., 1992). Additionally, as previously discussed, much of this research on putative regulatory behaviors has examined the development of these strategies over time (e.g., Braungart-Rieker & Stifter, 1996; Rothbart et al., 1992; Stifter & Braungart, 1995).

As will be discussed in more detail in a later section, it has been proposed by some researchers that emotion regulation could be at the core of children's social behaviors and relationships, as research has shown that children's capacity to use, understand, and regulate emotions are related to successful peer relationships (Cassidy, Parke, Butkovsky, & Braungart, 1992; Hubbard & Coie, 1994). For example, children who show low levels of behavioral control and high levels of impulsivity are more likely to behave inappropriately in social situations with peers. Overall, the development of more advanced and independent forms of emotion regulation have been found as crucial to the creation and maintenance of positive peer relationships (Denham, Blair, DeMulder, Levitas, Sawyer, & Auerback-Major, 2003; Denham, Blair, Schmidt, & DeMulder, 2002). High levels of regulation have been related to both socially competent behavior and low levels of externalizing behaviors (e.g., Eisenberg et al., 1993; Eisenberg et al., 1996; Eisenberg et al., 2000). Taken together, this evidence suggests that a crucial developmental milestone within this time period involves a child's ability to regulate the intensity and duration of emotional arousal in order to best support the demands of accomplishing his/her goals and sustaining relationships. The child's changing cognitive, social, and emotional abilities continue to evolve throughout early and middle childhood, thereby assisting in more fluid and advanced forms of emotion regulatory abilities.

In summary, the evidence is clear that the development of emotion regulation in infancy and childhood is an important milestone. While these developments in emotion regulation follow a reasonably predictable trajectory in infancy and early childhood (Kopp, 1982; 1989), individual differences in emotionality and regulation are also present. These individual differences lie in both the manner in which infants learn to regulate their emotions, as well as the strategies they obtain as a result of this process. The following section addresses temperament research investigating individual differences in children's emotion regulatory abilities.

Individual Differences in Emotion Regulation

Whereas each of the previously discussed developmental views of emotion regulation is important in understanding normative trajectories, there is also a great interest in studying this construct from an individual differences perspective. At all ages, children vary in their level of emotionality and in the types of strategies they are able to use to regulate their emotions. The role of temperament in affecting the development of emotion regulation has been widely studied (Fox et al., 2001; Rothbart & Bates, 2006; Stifter & Braungart, 1995). In fact, individual differences in regulation are considered a primary aspect of temperament in Rothbart's (Rothbart & Bates, 2006; Rothbart & Derryberry, 1981) model of temperament. Regulation within this model "...refers to the functioning of multilevel processes serving to increase, decrease, maintain, and restructure the patterning of reactivity in either an anticipatory or correctional manner" (pg. 50, Rothbart & Derryberry, 1981). From Rothbart's perspective, children's

temperament affects the degree to which regulation is required and the methods in which children may obtain strategies for regulating emotional arousal.

Individual differences in regulation have been categorized into three behavioral responses or strategies: self-comforting behaviors, avoidance/approach behaviors, and attentional strategies (Rothbart & Derryberry, 1981; Rothbart et al., 1992). Also, research has suggested that infants use varying regulatory behaviors depending on the specific emotion that is elicited (Buss & Goldsmith, 1998). For example, infants displaying fear were more likely to use withdrawal behaviors, whereas distraction and other behaviors were more likely to be used by infants who reacted with anger (Buss & Goldsmith, 1998; Stifter & Braungart, 1995). Self-comforting or self-stimulating behaviors include thumb or finger sucking, rocking, and banging. It has also been suggested that these comforting behaviors can be self-directed, such as physical self-soothing, or they can be directed toward a caregiver by attempting to become closer and attain contact (Grolnick et al., 2006). It is thought that these behaviors regulate the impact of information and assist in reducing stress. The use of these strategies can also be affected by the types and level of reactivity of the child. For example, studies have shown that 12-month olds who were described by their mothers as cautious with strangers were involved in more self-soothing and proximity seeking behaviors than other infants, whereas bolder 12-month olds showed more active strategies, such as self-distraction behaviors, than other infants (Mangelsdorf, Shapiro, & Marzolf, 1995; Parritz, 1996).

The second category of regulatory behavioral responses proposed by Rothbart and Derryberry (1981) are approach and avoidance behaviors. As discussed in a previous

section, approach and avoidance behaviors regulate the quantity and quality of stimulation the child experiences. By inhibiting approach behaviors, turning or leaning away, the child is capable of lowering the impact of the novel or intense circumstance. Conversely, the child is able to enhance his/her reactivity to a stimulus by reaching, grasping, or leaning toward it (Rothbart & Derryberry, 1981). In one study investigating individual differences in these regulatory behaviors, Rothbart and colleagues (Rothbart et al., 1992) measured the relationship between children's affective and motor responses to stimuli that varied in novelty, intensity, and accessibility and maternal rated temperamental traits. Support for the reactive components of young children's approach and avoidance behaviors was found as maternal-rated fear scores were negatively related to children approaching the stimuli but positively related to children's inhibited reach regulatory behaviors (e.g., not completing reaching arm movement). The third category of regulatory behavioral responses, attentional strategies, has become a crucial aspect of Rothbart's perspective. Therefore, the following section will discuss the role of attentional strategies in more detail.

Attention and Emotion Regulation

Within the temperament perspective on emotion regulation, there is a strong line of research regarding the relationship between attention and emotion regulatory behaviors. In particular, Rothbart's (1989) theory of temperament has prompted researchers to investigate the relationship between emotion and self-regulation, especially attention. Attentional processes have been shown to be important in modulating arousal from infancy onward (Rothbart & Posner, 1985). Across infancy and early childhood

there are obvious developmental differences in how successful children are at using attention as a way of regulating emotions. Newborn infants have rudimentary abilities to disengage from overstimulating interactions (Gianino & Tronick, 1988) and attentional orienting has been found to assist in regulating distress in the first year of life (Harman, Rothbart, & Posner, 1997). However, in later months of life, infants transition from a more reactive or stimulus-driven form of attention toward more controlled attention (Rothbart, Posner, & Boylan, 1990) and the development of this executive attention continues to develop throughout preschool and childhood (Rothbart, 1989). The infant's executive attention abilities allows for higher levels of increased attentional control and planning.

There are also individual differences in infants' abilities to successfully employ attention specifically for the regulation of emotional arousal. For example, it has been found that in distress provoking situations, attentional control was related to lower levels of negative emotionality (Rothbart et al., 1990; Rothbart et al., 1992). Additionally, Johnson, Posner, and Rothbart (1991) found that 4 month old infants whose mothers rated them as less fearful, less prone to show anger, and more soothable, were able to disengage attention more readily. Also, children labeled as "easily frustrated" at 6 months have been found as less attentive in tasks measuring attention than children who were less easily frustrated (Calkins et al., 2002).

Individual differences in children's abilities to voluntarily shift attention, initiate actions, inhibit actions, and sustain focus are hypothesized to be early behavioral expressions of a later system that Rothbart labels "effortful control" (Ahadi & Rothbart, 1994). Effortful control describes a special class of self-regulatory processes related to

the maturation of executive attention (Rothbart & Ahadi, 1994; Rothbart et al., 1994; Rothbart & Bates, 2006). Effortful control is defined as a child's ability to inhibit a prepotent behavioral response and to respond with a more appropriate, subdominant behavior (Kochanska, Murray, & Harlan, 2000; Rothbart & Bates, 2006). As can be seen, the temperament construct of effortful control is highly related to many definitions of self-regulation and as such Kochanska, Murray, and Harlan (2000) have described effortful control as being "situated at the intersection of the temperament and behavioral regulation literatures" (pg. 220).

Early forms of effortful control are apparent by 6 to 12 months of age, along with the development of attentional mechanisms associated to the anterior attention network (Rothbart, Derryberry, & Posner, 1994), but continue to develop throughout the toddler and preschool years becoming more voluntary and more differentiated over time (Kochanska et al., 2000; Rothbart et al., 1994). The role of effortful control as a crucial aspect of development is supported by research which has shown it to be related to developmental outcomes such as cognition and social competency (Mischel, Shoda, & Rodriguez, 1989), emotional display rules (Liew, Eisenberg, & Reiser, 2004), conscience development (Kochanska, Murray, & Coy, 1997), and behavior problems (Eisenberg & Fabes, 1992; Eisenberg et al., 1996). As can be seen from this research the temperament construct effortful control adds an important self-regulation dimension to the study of children.

Research by Aksan and Kochanska (2004) studied the association between effortful control and inhibition from infancy to preschool. Results from this investigation found that toddlers low in behavioral inhibition had low effortful control

as preschoolers, whereas toddlers high in inhibition showed more effortful control. Therefore, exuberant or uninhibited children could be at risk for poor effortful control development. Currently, one study has looked at the indirect relationship between surgency and effortful control and found that children rated as higher in surgency (similar to exuberance) and lower in effortful control are more likely to be rejected by peers and aggressive (Gunnar, Sebanc, Rout, Donzella, van Dulmen, 2003). As it is clear that there is a great overlap between the constructs of effortful control, behavioral and emotional regulation, this research suggests that the hypothesis of the current study regarding the importance of emotion regulation in predicting social competence for exuberant children is valid. However, it is obvious that the relationship between early exuberant temperament and later effortful control and emotion regulation is an association that needs further investigation.

Negative Emotionality and Emotion Regulation

While the self-regulatory construct of attentional/effortful control has been demonstrated to be central to the development of emotion regulation, negative emotionality, a reactive component of temperament, has also been widely studied in relation to the development of emotion regulatory abilities. As noted previously, negative emotionality encompasses the emotions of frustration/anger, fear, anticipatory anxiety, sadness, guilt, and discomfort. Research has shown that children who are prone to experience high levels of negative emotions tend to behave more impulsively and less constructively than children who experience fewer negative emotions (Rothbart et al., 1994).

Most research within this area of study has focused on negative emotionality in response to novel or frustrating situations. For example, Braungart-Reiker and Stifter (1996) found that 5-month old infants who showed negative emotionality in response to frustration were more likely to show fewer emotion regulatory behaviors when they were 10 months of age. In another study, Stifter and Spinrad (2002) found that infants exhibiting excessive crying at 6 weeks of age were more likely to show high levels of negative emotionality at 5 and 10 months. More importantly, after controlling for negative reactivity, excessive criers, particularly boys, exhibited lower levels of emotion regulation than typical criers. Additional research exploring the relationship between negative emotionality and emotion regulation found support for the importance of separating negative emotionality into discrete emotions when studying this relationship. For example, Buss and Goldsmith (1998) found that the specific type of emotion (e.g., anger, fear) that children exhibit may impact the type of regulatory strategy that the child uses.

In a study investigating the role of specific regulatory strategies, Morales and Bridges (1996) found that children whose mothers rated them as higher in negative emotionality used more passive forms of regulation, such as focusing more on the desired object and engaging in more comfort seeking from others. However, it is not necessarily the case that infants displaying high levels of negative emotionality show negative outcomes. For example, Stifter and colleagues (Stifter, Spinrad, & Braungart-Rieker, 1999) found that infants who were high in negativity in response to frustration at 5 months, but who also showed high levels of regulation, were the least defiant in compliance tasks with their mothers. Conversely, infants showing high levels of

negativity, but low levels of regulation displayed more defiance and infants showing low levels of negativity and high levels of regulation were more likely to use passive noncompliance. Therefore, these results suggest that children showing high levels of negative emotionality, in particular anger/frustration won't necessarily show negative outcomes. Instead, it is suggested that it isn't just high levels of negativity or regulation, but instead the combination of reactivity and regulation that predict later outcomes.

Additional research studying individual differences in negative emotionality and emotion regulation have found evidence of these early influences in predicting behavior problems, such as externalizing and internalizing behaviors, as well as social competence and functioning (e.g., Eisenberg & Fabes, 1992; Eisenberg et al., 1993; Eisenberg et al., 2000; Eisenberg, Fabes, Murphy, et al., 1994). As the literature regarding temperamental traits as related to later social competence are highly relevant to the current study, a more extensive review of this research will be presented in a later section.

In summary, at all ages, differences in children's level of emotionality and types of strategies they are able to use to regulate their emotions exist. Researchers have extensively studied the role of temperament in affecting the development of emotion regulation in children (Fox et al., 2001; Rothbart & Bates, 2006; Stifter & Braungart, 1995) and individual differences in regulation are thought to be a key aspect of temperament (Rothbart & Bates, 2006; Rothbart & Derryberry, 1981). Two central areas of research within this realm of study include the role of negative emotionality and attentional/effortful control in relation to emotion regulation.

Individual differences in children's regulatory processes have been shown to be related to behavioral adjustment, such as social competence, during early childhood when

emotion regulation becomes a central component of successful outcomes. Additionally, research has shown that a child's ability to regulate negative emotions is crucial to various forms of social behavior. An example of this involves the regulation of disappointment, an emotion that includes both anger and sadness. As children mature, they are socialized to regulate emotional displays to accomplish their own goals, as well as the expectations of their culture. The common culturally accepted emotional display when an individual feels disappointed is to react in a positive manner (Cole, 1986; Cole, Zahn-Waxler, & Smith, 1994; Saarni, 1984). Therefore, if a child has developed effective emotion regulatory abilities, this capability may help the child to display a positive orientation while regulating the propensity to become angry or frustrated. This ability may moderate the relation between toddler exuberance and later social competence, as exuberant children are predisposed to become frustrated when their goals are blocked. Additionally, individuals who violate social norms, such as showing disappointment in a social situation, are at risk to receive social rejection (Scheff, 1984). To support this, previous research has shown that children who are better at using emotional display rules and regulation are more likely to be rated by others as socially competent and better adjusted (Garner, 1996; McDowell & Parke, 2000).

In addition to the regulation of disappointment, as previously discussed, the ability for exuberant children to regulate anger/frustration may be crucial in predicting later social outcomes and behaviors as these children have been found as prone to exhibit high levels of frustration. Therefore, the current study will be investigating the moderating role of exuberant children's ability to regulate the two emotions of anger/frustration and disappointment. As such, the following sections will address the

regulation of two specific types of negative emotions, disappointment and anger/frustration.

Regulation of Anger

One emotion that is commonly studied under the rubric of negative emotionality is anger. While the viewpoint taken by the functional theory of emotion is that anger can motivate an individual to remove obstacles to a desired outcome, thereby serving an adaptive purpose (Saarni, Mumme, & Campos, 1998), anger that is not properly regulated in certain circumstances can have negative consequences. For example, if a child is angered because he/she isn't allowed to play with a toy first and instead one of his/her friends is given the opportunity, it could be harmful for the child's friendship and how he/she is viewed by other children if the child behaves in an overt angered, disruptive, and/or aggressive manner.

Research investigating potential antecedents of anger regulation has largely focused on the role of negative emotionality. It has been hypothesized that while a certain level of distress is necessary for children to learn to regulate emotions successfully (Kopp, 1989), children showing high levels of negative emotionality can become too disorganized when frustrated to learn or use effective regulatory skills (Calkins, 1994; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002). For example, Braungart-Reiker and Stifter (1996) found that 5 month old infants who showed negative emotionality in response to frustration were more likely to show fewer emotion regulatory behaviors when they were 10 months of age. However, even for children high in anger reactivity, the ability to regulate anger has positive consequences. For example,

research has shown that 5 month old infants who were high in negativity in response to anger/frustration but who also displayed high levels of anger regulation were the least defiant when complying with their mothers (Stifter et al., 1999).

Additional research has studied the various emotion regulatory strategies children use when angered. Whereas attentional skills are believed to function to regulate emotions, focusing on the cause of anger or frustration, has been found to be ineffective, and usually increases child anger instead of assisting in regulating it (Gilliom, et al., 2002; Grolnick et al., 1996). Rather, the ability to redirect attention, whether it is looking away or engaging in other activities (Braungart & Stifter, 1991; Fox, 1989) during a frustration task is more effective. Buss and Goldsmith (1998) found that infants who used gaze aversion were less likely to show distress in restraint and goal frustration situations. Additionally, distraction has been found to decrease anger in response to frustration (Calkins & Johnson, 1998; Gilliom et al., 2002).

Research has also focused on individual differences in the use regulatory strategies when presented with a frustrating situation. For example, Eisenberg and colleagues (Eisenberg et al., 1996; Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994) reported that children showing low levels of attentional focusing/shifting were less constructive when they became angered. Furthermore, these children were more likely to show externalizing behavior problems than children who exhibited higher levels of attentional focusing/shifting. Also, research has found that boys who were able to reorient their attentional focus from a source of frustration at 3.5 years old were less likely to be rated by their teachers as having externalizing problems (Gilliom et al., 2002).

As can be seen, previous research has shown the importance of children's ability to regulate anger when presented with frustrating situations and has often investigated the role of infant negative emotionality as a possible precursor to later difficulties in regulating anger (Braugart & Stifter, 1996; Eisenberg & Fabes, 1992). While these studies have focused primarily on the role of negative emotionality when examining regulation during anger-eliciting conditions, it is important for the role of children's temperamental styles to be investigated, as well. This is especially true for children identified as exuberant or uninhibited. As previously discussed, exuberant/uninhibited children show high levels of approach behaviors and as rules and standards are enforced more frequently as they grow and develop, limits on their temperamental style may lead to higher levels of frustration. Therefore, the ability to regulate frustration/anger may be especially important for exuberant/uninhibited children in predicting positive outcomes later in childhood and if they have not acquired the ability to regulate anger by childhood, they may be at high risk for negative social outcomes. For example, if an exuberant child, who may become easily frustrated, has not learned to regulate his/her anger/frustration, they are likely to behave in an inappropriate and socially incompetent manner when presented with challenging situations in the peer or social setting.

Conversely, as inhibited children tend to exhibit a lower threshold for anger/frustration and approach behaviors, it is likely that they are at a lower risk for angry outbursts as children. Therefore, the value of the ability to regulate anger/frustration and disappointment could be less dramatic for these inhibited children in predicting later social outcomes and behaviors. This is not to say that the ability to regulate emotions is not important for inhibited children in predicting later social competence. Conversely,

past research (e.g., Coplan, Rubin, Fox, Calkins, & Stewart, 1994; Rubin et al., 1995) has shown that inhibited children's ability to regulate emotions is very important in predicting more positive social outcomes and a lack of internalizing problem behaviors. However, as inhibited children show high levels of fear and inhibition, it may be more crucial for these children to be able to regulate the emotion of fear, instead of anger/frustration and disappointment.

In an attempt to address these gaps within the literature, the current study will measure the regulation of anger/frustration and test the hypothesis that the ability to regulate anger/frustration is important, especially for exuberant children, in predicting later social competence. The child's ability and manner of regulating anger/frustration will be measured in the Locked Box Task, in which it is hypothesized that when playing with a desired toy is blocked, exuberant children will become frustrated and need to regulate his/her emotions. Additionally, it will be investigated if the regulatory strategies used by children varying in their temperamental styles are distinctive.

Regulation of Disappointment

As previously discussed, the regulation of various forms of negative affect is believed to be very important for adaptive social outcomes in children. While the previous section discussed the importance of anger regulation, another situation that requires affect regulation skills is when a child is disappointed, such as when receiving an unwanted gift. This disappointment of receiving an undesired gift can elicit both sadness and anger. More specifically, sadness can be elicited as the individual realizes that the tribulation cannot be reversed and anger if the individual thinks that the loss

can be regained (Frijda, 1986; Izard, 1977). However, as children mature, they are socialized to regulate emotional displays to achieve their personal goals, as well as to accomplish the goals and expectations of their given culture. The culturally accepted display rule for the expression of emotion in this disappointment situation is to react in a positive manner even though the individual is not happy with the gift (Cole, 1986; Cole et al., 1994; Saarni, 1984). Therefore, this type of disappointing situation is one that necessitates emotion regulation as well as the use of display rules (Saarni, 1999). Display rules, or the expression of appropriate affective-expressive behavior in specific social situations (Davis, 1995; McDowell, O'Neil, & Parke, 2000; Saarni, 1984), are thought to be a step beyond emotion regulation in that they require more than just regulation. A child's ability to mask disappointment and to in turn display positive affect when it is socially appropriate is reflected in his/her understanding of the rules for expressing emotion.

An example of the type of social situation when an individual must use display rules is when he/she receives a gift they do not want. In order to measure this type of regulation in children, a "disappointment paradigm" was created in which children are asked to rank order prizes, which include "good" prizes (e.g., pencils, candy) and "disappointing" prizes (e.g., baby toys, broken toys). Later the child is told that they will receive a prize for being so helpful, but the child is given his or her last choice of prize (Cole, 1986; Saarni, 1984). This structured disappointment paradigm has been shown to reliably elicit negative arousal and behaviors to regulate negative affect, as well as provide an ecologically valid situation as it creates a social experience that children are likely to encounter in their lives (Cole, 1986; Cole et al., 2004; Cole et al.,

1994; Saarni, 1984). Additionally, this is a good task to measure the regulation of emotions resulting from being disappointed as children are socialized to regulate negative feelings about receiving unwanted gifts and must also follow display rules that necessitate positive affect.

Saarni (1984) found that as children mature, they are able to show increased display rule use by exhibiting increased abilities to express positive affect when presented with a disappointing gift. Cole (1986) extended this research and found that even as young as 3 and 4 years of age, children are capable of using display rules when disappointed (Cole, 1986). Additionally, the presence or absence of the assistant affected the children's use of display rules, in which children were more likely to exhibit positive affect in the presence of the assistant as compared to when they were alone. Finally, Cole (1986) and Saarni (1984) have found gender differences in children's use of display rules, with girls showing fewer negative emotions when disappointed than boys.

More recently, research has found that children's difficulties regulating emotional displays are related to problem behaviors and peer rejection (Cole et al., 1994; Eisenberg et al., 1993). Cole and colleagues (1994) found individual differences in normal and at-risk samples of children from early to middle childhood. More specifically, at-risk boys were more likely to show more negative emotions and for longer periods of time than low-risk boys, suggesting their inability to regulate their emotions for the purposes of displaying the appropriate emotion expression. Additionally, boys' displays of anger were predictive of maternal and teacher rated

symptoms of conduct problems, oppositionality, and attention deficit with hyperactivity.

Research has also found that children who were more effective in using display rules in a disappointing situation were rated to be more socially competent by both teachers and peers (Eisenberg et al., 1993; McDowell et al., 2000). Additionally, McDowell and Parke (2000) found that children who used display rules for both negative and positive emotions were rated as more socially competent by teachers and peers. The use of effortful control has also been shown as related to emotional display rules. Liew, Eisenberg, & Reiser (2004) found that children with high levels of effortful control were more likely to mask negative emotions in the disappointment paradigm than children low in effortful control. Additionally, children higher in effortful control and able to use display rules were rated as more socially competent and well-adjusted. Taken together, this research shows the importance of children being able to use display rules in an effort to regulate negative emotional arousal.

The aforementioned research has shown the developmental progression of children's abilities to use display rules within the disappointment paradigm, as well as the role of these abilities in predicting later social adjustment and competence. However, very few studies have examined the role of temperament when studying the role of children's abilities to regulate their emotions in this disappointment situation. More specifically, there is a lack of research investigating the interaction between a child's temperamental style (e.g., exuberant) and his/her ability to regulate disappointment in predicting later social outcomes.

As previously discussed, exuberant children are more inclined to become frustrated, especially in situations where a goal (e.g., something they would like to have) is blocked. Therefore, it is possible that just as with anger regulation it may be extremely important for exuberant children to be able to regulate their disappointment and behave in the socially appropriate manner. To address this gap within the literature, the current study will be investigating the hypothesis that the ability to regulate disappointment is important for exuberant/uninhibited children in predicting later social competence, as the goal of receiving a desired prize is blocked. Additionally, it will be investigated if the regulatory strategies used by children varying in their temperamental styles are distinctive. Conversely, the ability to regulate disappointment may be less important for inhibited children as they are not predisposed to exhibit high levels of frustration and anger. Additionally, inhibited children have been shown to be more punishment-averse than reward-oriented and as such, these children are less likely to need the ability to regulate disappointment as they are less likely to become highly frustrated when they do not receive a desired prize.

Social Competence

The development of social competence is a crucial task in toddlerhood and early childhood. During this time children are exposed to a wider social environment, as networks begin to include peers within the school and neighborhood environments, teachers, and possible new siblings. The development of social competence has been shown as an important predictor of many aspects of later functioning, including mental

health and academic outcomes (e.g., Carlton & Winsler, 1999; Denham & Holt, 1993; Ladd et al., 1999). Additionally, poor peer relationships and low levels of social competence are related to higher rates of school dropout, adolescent delinquent behavior, and adult criminality (Parker & Asher, 1987). As the importance of this ability has been highlighted, recent literature has investigated possible precursors, such as temperament reactivity and regulation, to later social competence in children.

Research has found that temperament is both directly and indirectly related to many different social outcomes across development, such as social competence, as well as internalizing and externalizing behavior problems. This area of research has frequently looked at social competence, as well as externalizing behavior problems because undercontrolled, impulsive, and aggressive behaviors that are commonly related to externalizing behavior problems are also associated with peer rejection. Additionally, children who are at the highest risk for peer victimization and rejection also have higher scores on measures of social withdrawal or aggression (Rubin et al., 2006), which are related to internalizing and externalizing behavior problems. Finally, it appears from research investigating behavior problems and social competence that the ability to regulate one's emotions underlies both outcomes; overall, high levels of regulation is related to social competence and low levels of regulation are related to behavior problems (e.g., Eisenberg et al., 1993; Eisenberg et al., 1996; Eisenberg et al., 2000).

While this research has taken tremendous strides toward a greater understanding of the relationship between social competence and temperamental reactivity and regulation, still many questions remain as there are obvious gaps in current literature. More specifically, within the present literature there is a lack of research investigating

children with temperamental styles other than inhibited (e.g. exuberant/uninhibited). In addition, little is known about whether the regulation of distinct emotions differentially predicts later social competence. To address this gap within the literature, the current study will investigate the relationship between toddler exuberant temperament and social competence in childhood. Additionally, this study will investigate the extent to which children's ability to regulate anger/frustration and disappointment influences the relations between toddler temperament and childhood social competence.

Social Development and Social Competence

The term "social development" has been used to describe various aspects of child development and functioning. Social development has been defined recently as "the behavior patterns, feelings, attitudes, and concepts children manifest in relation to other people and the way that these various aspects change over age" (Schaffer, 1996, pp. 1). In particular, the study of social competence in childhood has been designated as a particularly crucial aspect of research on social development and has therefore been given considerable attention (Rose-Krasnor, 1997; Fabes, Gaertner, & Popp, 2006).

As with many constructs in the psychological literature, there are various definitions and methods of studying social competence currently used in research. However, a common theme within all definitions includes "effectiveness in interaction" (Rose-Krasnor, 1997). While there is not a single definition of social competence, there are fundamental traits that researchers generally agree illustrate competent social development in children. Above all, it is important for children to be able to develop positive relationships and to initiate and maintain effective interactions with others, in

particular their peers (Rubin et al., 2006). Across early childhood, children should become more able to communicate and coordinate their actions and feelings, show more advanced levels of play, modulate and adjust their emotions and actions in an appropriate manner within social interactions, and show higher levels of positive behaviors and lower levels of negative behaviors (e.g., aggression, withdrawal) toward their peers (Fabes et al., 2006; Howes, 1987; Saarni, 1990).

As there are multiple definitions of social competence, typically this construct is measured and operationalized in one of four ways: specific/social skills, sociometric status, relationships, and functional outcomes. Within the social skills approach, social competence is defined as a desirable set of skills and is frequently measured by behavior checklists. The use of this approach to studying social competence has a number of strengths, including use of simple lists of targeted behaviors. However, this approach has been found as difficult to implement due to disagreements as to which specific behaviors should be included in defining social competence. A second and widely utilized method of studying social competence is sociometrics. This peer status approach measures social competence as being well liked by peers. While this is a useful strategy for identifying children who lack social competence, sociometrics does not explain the nature of the child's difficulties (e.g., ability to initiate or maintain relationships) (Rose-Krasnor, 1997).

A third method of studying social competence, the relationship approach, measures it by the quality of the child's relationships, such as friendships. This method includes measuring the skills of both individuals within the relationship. While this friendship method of studying social competence is widely used in the field, difficulties

arise in understanding the causal relationship between friendships and other positive outcomes in the children. Finally, the functional approach encompasses a focus on the outcomes of social behavior, the processes in which these outcomes are obtained, and the recognition of social goals and tasks. While there are several strengths to this approach, including a focus on goals and social outcomes, potential problems arise when considering how to determine success or failure, as well as setting guidelines for deciding what is an optimal amount of social success (Rose-Krasnor, 1997).

As can be seen, there are multiple methods in which social competence is commonly measured. One method for studying social competence is by observing how peers play with each other. For example, the Play Observation Scale (POS, Rubin, 1989) has been used to examine social participation (e.g., parallel, group, solitary) and the cognitive quality of play (e.g., dramatic, constructive, functional-sensorimotor) in a laboratory setting. Behaviors such as aggression, unoccupied behavior, onlooking, exploration, peer conversation, hovering, anxious behaviors, rough-and-tumble play, and transitional behavior are observed using the POS. Recently, researchers have shown that the POS is both reliable and valid (e.g., Coplan & Rubin, 1998; Rubin & Clark, 1983) as well as useful in measuring age, sex, and SES differences in children's play behaviors, and individual differences in play behaviors (e.g., Johnson & Ersheler, 1981; Rubin & Coplan, 1998; Rubin et al., 1995; Rubin, Maioni, & Hornung, 1976).

Despite the variations in how the construct of social competence is measured and defined, research has repeatedly shown that being socially competent is a crucial developmental milestone in early childhood and has a significant impact on a child's trajectory. Therefore, the plethora of recent research on this topic has been stimulated by

the awareness that social experiences and peer relationships in childhood are related to a variety of short- and long-term adjustment outcomes, including social and behavioral problems, school adaptation and academic success, and psychopathology (Buhs & Ladd, 2001; Carlton & Winsler, 1999; Coie, Terry, Lenox, & Lochman, 1995; Denham & Holt, 1993; Ladd et al., 1999).

In summary, while there are various perspectives on how social competence should be defined and measured, all operationalizations of this construct converge on the idea that it includes “effectiveness in interaction” (Rose-Krasnor, 1997). Additionally, the crucial role that the development of this construct plays in behavioral adjustment, points to the importance of additional research on social competence. As relationships between children and their social environments are reciprocal and transactional, the role of children’s individual characteristics and temperament have been shown as important in predicting later social competence in children. The following section will review existing literature on the relationship between various aspects of temperament and later social competence in children.

Relationship between Temperament Characteristics and Social Adjustment

There has been a plethora of research studying direct and indirect effects of infant and child temperament traits on later social outcomes. Researchers have suggested that variation in children’s temperaments may be responsible for individual differences in the processes that support or thwart socially competent behaviors. Additionally, temperamental traits have been hypothesized to be the underpinnings of many social behaviors that children exhibit. In turn, researchers posit that these social behaviors

predict children's peer relationships and social competence (Eisenberg, 2002). Before providing a more detailed discussion of each of the temperamental traits that have been studied in relation to social competence, the following gives an overview of one of the most prominent lines of research in this area of study.

Eisenberg and colleagues (e.g., Eisenberg et al., 2001; Eisenberg & Fabes, 1992; Eisenberg et al., 1993; Eisenberg et al., 1996; Eisenberg et al., 2000; Eisenberg, Fabes, Murphy, et al., 1994; Eisenberg et al., 2004) have extensively studied two dimensions of temperament and emotional functioning that have been shown to influence later successful social interactions in children: emotional reactivity and emotional regulation. Eisenberg has contended that the social behaviors in which children engage are probably influenced by individual differences in emotional responding, such as the intensity and valence of emotion and the use of emotion regulation, in social situations (Eisenberg et al., 1996).

Eisenberg and Fabes (1992) outlined a hypothesized model of the relationship between social functioning, emotional intensity, and three styles of regulation, highly inhibited, under-controlled, and optimally regulated. Children who show highly inhibited regulation behaviors are low in emotion regulation and instrumental coping, but high in behavioral inhibition. Children labeled as under-controlled exhibit low levels of emotion regulation and emotion-related behavioral regulation. Lastly, optimally regulated children show high levels of various forms of adaptive regulation, are moderately high in behavioral inhibition, and are flexible in their use of regulatory behaviors.

In this model, it is suggested that individual differences in emotional intensity and style of regulation predict the quality of social behavior. For example, children low in

behavioral and emotional regulation were predicted to be low in social competence and inclined to show later externalizing problem behaviors. Children showing high negative emotional intensity, low levels of emotional regulation, low instrumental coping, and high levels of behavioral over-control were expected to show low social competence and later internalizing problem behaviors. Finally, children exhibiting optimal regulation were expected to be high in social competence regardless of their level of emotional intensity (Eisenberg & Fabes, 1992). Overall, some support has been found for these hypothesized patterns (e.g., Eisenberg et al., 1997; Fabes et al., 1999). More recently, these authors have contended that the intensity and valence of negative emotion, as well as the type of negative emotion, are components of emotionality that in combination with individual differences in emotion-relevant regulation, predict individual differences in social behavior (Eisenberg et al., 2000).

As previously discussed, several temperament traits have been proposed as the underpinnings of various childhood social behaviors. The aspects of temperament that have received the most attention within this literature related to social outcomes in children include negative emotionality, and self-regulation. In addition, the social competence of behaviorally inhibited children has been investigated. The purpose of the following section is to review the current literature in this area of study.

Negative Emotionality and Social Outcomes

The temperament construct of negative emotionality has received a great deal of attention in predicting later social competence and functioning in children. As previously discussed, negative emotionality is generally described as distress proneness in children and tends to encapsulate the emotions of fear, anxiety, sadness, frustration, anger, guilt,

and discomfort (Rothbart & Bates, 2006). In general, negative emotionality has been shown to be a risk factor for children, as it is related to both internalizing and externalizing behavior problems, and peer rejection (Eisenberg et al., 2000).

Eisenberg and colleagues have shown in a series of longitudinal studies that negative emotionality predicted the overall quality of children's social behavior and adjustment (e.g. Eisenberg et al., 1996; Eisenberg et al., 1997). More specifically, high levels of negative emotionality was positively related to problem behavior and inversely related to socially competent behavior. Eisenberg and colleagues also have found evidence that disruptive anger reactivity negatively affected children's social abilities, which is strongly related to social functioning (Eisenberg et al., 1999). Additionally, children's negative emotionality has been found to undermine the quality of their day to day interactions with peers (Fabes et al., 1999).

These children showing high levels of negative emotionality, sometimes labeled as "difficult", have been shown also to exhibit high levels of aggressive, impulsive behaviors early in childhood (e.g., Rubin et al., 2003). As it has been shown that impulsive and aggressive behavior is often associated with peer rejection later in development, negative emotionality could be indirectly related to poor social outcomes through these behaviors. Additional research has been conducted finding a relationship between negative emotionality and regulation in predicting later social outcomes and this literature will be presented in the following section discussing the impact of regulation on social competence.

Regulation and Social Outcomes

Another aspect of temperament that has been highly researched in relation to social adjustment and outcomes is self-regulation, specifically the ability to regulate emotions. As the development of emotion regulation is considered a major developmental task in toddlerhood and early childhood, it has been proposed that emotion regulation could be at the core of children's social behaviors and relationships. Research has repeatedly shown that children's ability to use, understand, and regulate emotions are related to peer relationships (Cassidy et al., 1992; Hubbard & Coie, 1994). Overall, high levels of regulation has been related to both socially competent behavior and low levels of externalizing behaviors in multiple studies (e.g., Eisenberg et al., 1993; Eisenberg et al., 1996; Eisenberg et al., 2000). Conversely, regulatory undercontrol (e.g., low voluntary behavioral control, impulsivity) has been shown to predict externalizing behavior problems (Eisenberg et al., 2000). Fabes, Hanish, Martin, & Eisenberg (2002) have also found evidence that children who show emotion dysregulation are more likely to show behavioral solitude later in childhood.

One line of research has shown that the impact of emotion dysregulation on social outcomes across different types of children varying on their tendency to approach and interact with peers (Rubin et al., 1995). These researchers studied two types of children, sociable and unsociable. Results from this study found that unsociable children that could regulate their emotions did not show any poor effects from their lack of approach or interaction. Conversely, unsociable children with poor emotion regulation skills showed more behaviorally anxious behaviors, more reticent behaviors when playing alone, and were rated as having more internalizing problems by their parents. Sociable

children who were good emotion regulators were found to be socially competent, whereas sociable children that could not regulate their emotions were more disruptive and aggressive. These researchers concluded that emotionally dysregulated preschoolers, sociable or unsociable, tend to behave in a manner that elicits peer rejection.

Additional research has found a relationship between use of attentional regulation and later social competence. Belsky, Friedman, and Hsieh (2001) found that children's ability to show attentional persistence moderated the relation between negative emotionality and social competence, as rated by the mothers. Raver and colleagues (Raver, Blackburn, Bancroft, & Torp, 1999) found that preschoolers that employed more attentional regulation strategies, such as self-distraction, during a delay task were rated as higher in social competence by teachers and more popular by their peers.

Another strong line of research has looked at the relationship between negative emotionality and regulation as it is related to social adjustment and behaviors in children. Overall, several studies have found that children showing low levels of negative emotionality and high levels of regulation are related to higher levels of social competence, including peer popularity, prosocial behavior, and other social skills, and low levels of problem behaviors (Eisenberg et al., 1995; Eisenberg et al., 1997; Eisenberg et al., 1998; Fabes et al., 1999; Murphy, Shepard, Eisenberg, & Fabes, 2004).

Taken as a whole, it seems that the combination of high negative emotionality and low levels of regulation is particularly maladaptive for children. For example, some research has shown that for children prone to high levels of negative emotions, regulation is especially important for them in terms of behavior problems and social competence (Eisenberg et al., 1993; Eisenberg et al., 1996; Eisenberg et al., 1998). However,

Eisenberg and colleagues (Eisenberg et al., 2000) have also recently found some evidence that children who are in an optimal range of regulation (moderately or relatively high, but not overcontrolled), will show high levels of social functioning, regardless of their level of negative emotionality. Therefore, there is some conflicting evidence as to the interaction between negative emotionality and regulation in regard to social adjustment.

Behavioral Inhibition and Social Outcomes

The temperament construct of behavioral inhibition also has received a great deal of attention in predicting later social competence and functioning in children. Behavioral inhibition has been repeatedly shown to predict shy and socially withdrawn behavior in early and middle childhood (Kagan, 1999; Rubin et al., 2002). This could be because these children are more likely to show high levels of negativity and fearfulness, especially in social or novel situations. These inhibited children are more likely to isolate themselves and withdraw in school classrooms (Kagan et al., 1987; Kagan et al., 1993) and in structured laboratory-based situations with peers (Rubin et al., 1995). Overall, inhibited children have been shown to exhibit lower levels of social competence (Fox et al., 1995) and behavioral inhibition has been repeatedly linked to later internalizing problems in children (e.g. Eisenberg et al., 2000).

In an effort to better understand the relationship between behaviorally inhibited toddlers and later social outcomes, Rubin and colleagues (e.g., Coplan et al., 1994; Rubin et al., 2002; Rubin, et al., 1995) have identified three types of socially withdrawn behavior, or non-social play, in the peer context: solitary-passive, solitary-active, and reticent behaviors. Solitary-passive behavior includes exploring objects and constructive

activity while the child is playing alone in the peer context. Overall, children who frequently show solitary-passive behavior seem to be object-oriented instead of people-oriented and it has been found that these children are more task persistent, do well on object-oriented tasks, and have higher attention spans (Coplan, 1995; Rubin & Coplan, 1998). Children exhibiting these types of behaviors seem to lack motivation to approach or avoid peers, and are not more likely to show psychological maladjustment in early childhood (Rubin et al., 2002; Rubin et al., 1995). In line with this research, Rubin and colleagues (Rubin et al., 1995) found that children who were nonsociable but high in emotion regulatory abilities were more likely to show solitary-passive behavior when involved in solitary activities, as compared to other nonsocial behaviors.

A second type of withdrawn behavior that is less frequently seen is solitary-active behaviors. These behaviors involve repeated sensorimotor actions and solitary dramatizing and are associated with impulsivity, aggression, and peer rejection in preschoolers (Coplan et al., 1994; Rubin, 1982; Rubin & Mills, 1988). Additionally, Coplan (1995) found that the display of solitary-active behaviors by preschool children was positively related to teacher's ratings of externalizing problems. Therefore, as opposed to the original thought that all nonsocial behaviors were related to later internalizing problem behaviors, it appears that solitary-active behaviors are related to externalizing problems.

A third type of socially withdrawn behavior, characterized by frequent occurrence of onlooking, socially wary, and unoccupied behaviors in the peer setting, is reticence. It is hypothesized that reticent children become anxious due to social approach and therefore avoid peer interactions. Reticent children are more likely to show anxious

behaviors and the inability to regulate their emotions (Coplan et al., 1994; Rubin et al., 1995). Additionally, reticent children display lower levels of social competence and prosocial behaviors, and are more likely to develop anxiety problems (Coplan et al., 1994; Eisenberg et al., 1998). It has also been found that social withdrawal and reticence predict peer rejection and victimization as early as when children are of preschool age (Gazelle & Ladd, 2003). Therefore, it appears that there are various outcomes associated with the different forms of nonsocial behavior, and they are not all simply linked to later internalizing problems or low levels of social competence.

The research presented above demonstrates the importance of individual differences in emotionality and regulation in the development of children's levels of social functioning. However, there are limitations and gaps within this research. One is that much of the aforementioned research has used data from questionnaires. While there are strengths in the use of questionnaire data and several studies use data from multiple reporters, it would be advantageous of research to use behavioral observations in obtaining a greater understanding of the development of social competence. An additional limitation of much of this research is that it would be beneficial to differentiate among the various negative emotions (e.g., anger, sadness, anxiety) instead of measuring the overarching term of negative emotionality. It could be that anger/frustration and sadness are differently related to outcomes such as internalizing problems, externalizing problems, and social competence.

As separating the discrete emotions commonly combined in the overarching construct of negative emotionality could be beneficial to a greater understanding of social competence, distinguishing between the effects of children's ability to regulate various

negative emotions (e.g., anger/frustration, disappointment) could also provide a greater insight into this relationship. Additionally, little research has investigated the pathway by which children exhibiting uninhibited or exuberant temperamental styles develop either competent social behaviors or a lack there of, including the role of emotion regulation in this trajectory. As previously discussed, in the current study exuberant children exhibited both high levels of approach and positive affect. As most research has focused on the role of behavioral inhibition and negative emotionality in relation to later social competence, the importance of children exhibiting high levels of positive affect and approach behaviors has been investigated to a lesser extent. To address this gap, the goal of the current study is to investigate the relationship between toddler exuberant temperament and social competence in childhood. Additionally, this study will investigate the extent to which children's ability to regulate anger/frustration and disappointment influences the relations between toddler temperament and childhood social competence. The following section will present the brief literature investigating the relationship between children exhibiting uninhibited temperamental profiles and high levels of positive emotionality to later social adjustment.

Positive Emotionality, Uninhibited Temperament, and Social Outcomes

While there is an extensive literature studying the effects of negative emotionality on social adjustment and outcomes, the importance of positive emotionality and exuberant behavior is widely unknown. A predisposition towards positive emotions, generally measured in terms of happy, cheerful mood, is thought to be adaptive and has been shown to be related to peer competence and prosocial behavior (Denham, McKinley, Couchoud, & Holt, 1990; Eisenberg et al., 1996). However, children

exhibiting intense, high levels of positive affect have been linked to externalizing and conduct problems (Eisenberg et al., 1996; Putnam & Stifter, 2005), as well as high levels of approach (Rothbart & Bates, 1998). While positive affect may serve as a protective factor for some children, problematic behaviors could develop for those who cannot regulate their arousal by not being able to control their intense levels of exuberance and excitement.

More recently, Rydell and colleagues (Rydell, Berlin, & Bohlin, 2003) were among the first to address the role of positive emotionality and regulation. Supporting their hypotheses, it was found that children exhibiting high levels of positive emotionality and low levels of regulation of positive affect were more likely to show externalizing behaviors. Therefore, it could be that exuberant children, who exhibit intense levels of positive affect, may be at risk for problematic outcomes. It is possible, therefore, that the difference in positive and maladaptive social and psychological outcomes for exuberant, positive children could be the child's ability to regulate their emotions.

There has also been a lack of research investigating the relationship between children exhibiting uninhibited or exuberant temperamental styles and later social competence. One study found that toddlers displaying uninhibited behavioral profiles were more frequently involved in group play when they were five years old. Conversely, these uninhibited children were less likely to be involved in solitary play (Kochanska & Radke-Yarrow, 1992). Additionally, when compared to temperamentally inhibited children, sociable children tend to have more positive relationships with friends and are rated as more popular with peers (Skarpness & Carson, 1986). However, as can be seen, there has been a lack of research investigating this pathway between temperamentally

exuberant or uninhibited children and later social competence. In an attempt to extend this literature, the current study will investigate the role of temperamental exuberance and regulation in predicting later social competence.

Proposed Research Questions/Hypotheses

The purpose of the current investigation is to examine longitudinally the relationship between exuberant or uninhibited temperament in toddlerhood and social competence in childhood, compared to other temperament types. Additionally, the current study will examine the extent to which children's ability to regulate anger/frustration and disappointment influences the relations between toddler temperament and childhood social competence. In order to study this, toddler behavior was observed in a series of high and low intensity tasks that measure their positive affect, negative affect, and approach-inhibition behavior. From these observations, three temperament groups were formed: inhibited, exuberant, and low reactive. Inhibited children exhibited low levels of approach and positive affect, but high levels of negative affect. Conversely, exuberant children showed high levels of approach and positive affect, but low levels of negative affect. Finally, low reactive children exhibited moderate levels of approach and low levels of both positive and negative affect.

Children's ability to regulate their emotions that were hypothesized to moderate the relationship between toddler temperament and childhood social competence skills were observed in two tasks designed to elicit either frustration or disappointment. These behaviors were assessed in the Locked Box Task and Disappointment Task that both took

place when the children were 4.5 years old. In the Locked Box Task, each child was presented with the difficult situation of unlocking a box that cannot be unlocked because he/she has the wrong set of keys. This task gave the child the opportunity to regulate his/her frustration in a variety of ways. In the Disappointment Task, the child was presented with a toy that he/she had previously rated as his/her least favorite. This task gave the child the opportunity to regulate his/her disappointment in various ways. Finally, socially competent behaviors were observed in a laboratory free play task involving three or four unfamiliar children. In this task the children were six or seven years of age.

Following are the research questions/hypotheses to be addressed by the proposed study.

1. Is temperament directly related to socially competent behaviors in childhood? More specifically, are exuberant children more likely to be socially competent than inhibited children?

Existing research has shown that infants and toddlers identified as behaviorally inhibited are more likely to exhibit shyness and socially withdrawn behavior in early and middle childhood (Kagan, 1999; Rubin et al., 2002). These shy, socially reticent children also display fewer socially competent behaviors, less positive coping strategies, and are more likely to develop anxiety problems than nonreticent children (e.g., Coplan et al., 1994; Eisenberg et al., 1998). Additional research has focused on “difficult” children, or those high in negative emotionality. These “difficult” children have been found to behave more aggressively and impulsively than other children and are more likely to be rejected by their peers than others.

Conversely, there has been a dearth of literature regarding uninhibited or exuberant children and later social competence. Previous research has shown that uninhibited toddlers are involved in group play more frequently and less likely to be involved in solitary play when they are five years old (Kochanska & Radke-Yarrow, 1992). Additionally, when compared to temperamentally inhibited children, sociable children tend to have more positive relationships with friends and are rated as more popular with peers (Skarpness & Carson, 1986). However, overall there has been a lack of research investigating the pathway between temperamentally exuberant or uninhibited children and later social competence. Given this research and additional studies showing that exuberant or uninhibited toddlers are more likely to exhibit more positive affect, especially when presented with new and exciting situations (Putnam & Stifter, 2005), it is hypothesized that children classified as exuberant will show more socially competent behaviors than inhibited children. As there is no previous research studying the relationship between low reactive temperament and social outcomes, the analyses testing this relationship will be exploratory.

2a. Does the ability to regulate frustration/anger in the Locked Box Task vary by children's temperamental styles?

As children mature and are exposed to a larger social environment, children are also expected to follow certain rules and standards in which to behave (Gralinski & Kopp, 1993). Exuberant children exhibit high levels of positive affect (Putnam & Stifter, 2005), but they are also more likely to display frustration (Rotbhart et al., 2000). As previously discussed, exuberant or uninhibited children show high levels of approach

behavior and as such the ability to follow rules and standards may be difficult for them. Therefore, limits placed on their predisposition to approach new situations and people may cause them to exhibit higher levels of frustration. As exuberant children are more likely to display frustration when a goal is blocked, it is hypothesized that exuberant children are more likely to display frustration and fewer goal-directed strategies in the Locked Box Task. As the developmental pathway between children displaying inhibited temperaments and the ability to regulate anger is very speculative, the analyses testing this relationship will be exploratory. Additionally, as there is no previous research studying this relationship for children exhibiting low reactive temperaments, the analyses testing this relationship will be exploratory.

2b. Does the ability to regulate disappointment vary by children's temperamental styles?

Research investigating individual differences in children's ability to regulate disappointment and use of display rules has focused on at-risk versus normative samples and children high in temperamentally effortful control compared to children exhibiting low levels of effortful control (Cole et al., 1994; Liew et al., 2004). However, there is a lack of literature investigating the role of temperamental styles as it is related to children's use of display rules. As previously mentioned, exuberant children are more likely to become frustrated in situations when a goal, or something they wish to have, is blocked. Therefore, it is hypothesized that exuberant children are more likely to exhibit fewer constructive coping strategies and higher levels of frustration than inhibited children. As the developmental pathway between children displaying inhibited

temperaments and the ability to regulate disappointment is tentative, the analyses testing this relationship will be exploratory. Additionally, as there is no previous research studying this relationship for children exhibiting low reactive temperaments, the analyses testing this relationship will be exploratory.

3a. Does the ability to regulate emotions moderate the relationship between toddler exuberance and later social competence?

Overall, past research has shown that children who are able to regulate negative emotions are more likely to show high levels of social competence and peer acceptance (e.g., Eisenberg et al., 2004; Gunnar et al., 2003; Kochanska et al., 1997). Conversely, children who are unable to regulate negative affect in frustrating and disappointing situations are more likely to show socially incompetent behavior (e.g., Calkins & Dedmon, 2000; Calkins, Gill, Johnson, & Smith, 1999; Eisenberg et al., 1993; McDowell et al., 2000; McDowell & Parke, 2000). Research has also found that children who were more effective in using display rules in a disappointing situation were rated to be more socially competent by both teachers and peers (Eisenberg et al., 1993; McDowell et al., 2000).

As children should become better able to emotion self-regulate from toddlerhood through early childhood, it is hypothesized that the ability to regulate anger/frustration and disappointment will moderate the relation between temperament and social competence. This is especially true for exuberant children who are able to effectively regulate their emotions as they may be better able to maintain their positivity while modulating their inclination to become frustrated. As they are more likely to exhibit

frustration when goals are blocked, the ability to regulate this anger/frustration may be particularly important for them to be socially competent later in childhood.

3b. Does the ability to regulate emotions moderate the relationship between inhibited temperament and later social competence?

As previously stated, overall it appears that the ability to regulate negative emotions is related to higher levels of social competence and peer acceptance, regardless of temperament (e.g., Eisenberg et al., 2004; Gunnar et al., 2003; Kochanska et al., 1997). While the ability to regulate the two negative emotions of anger and disappointment might be particularly important for exuberant children, past research has shown that the ability to regulate negative emotions is important for inhibited children (e.g., Coplan et al., 2001; Rubin et al., 1995). Since inhibited children are predisposed to show high levels of fear, not anger/frustration, it could be that the regulation of fear is most important in predicting positive outcomes. However, since past research has not differentiated among various negative emotions and instead has discussed the regulation of the umbrella term of negative emotions, the current investigation hypothesized that inhibited children who are better able to regulate anger/frustration and disappointment would show more socially competent behaviors in the peer context. As there is no previous research studying this relationship for children exhibiting low reactive temperaments, the analyses testing this relationship will be exploratory.

In summary, in order to answer the aforementioned research questions, a longitudinal design was implemented. Toddler temperament was measured in laboratory observations at 24/25 months. Additionally, children's ability to regulate the emotions of

disappointment and anger/frustration were measured at 4.5 years of age and socially competent behaviors were measured when the children were 6-7 years old.

Chapter 3

METHOD

Participants

The sample used for the current investigation is part of a larger longitudinal study investigating the development of emotion regulation from infancy (2 weeks) to 7 years of age. Recruitment procedures included contacting families through area hospitals and the local Women, Infants, and Children Program (WIC). Inclusion criteria for the study required that infants be full-term and that the participating mothers and fathers must speak and read English. Participants were recruited from predominantly white, educated, middle class families. Of the 150 families recruited, 92.7% were White, 4.6% were African/African American, and approximately 2% were either American Indian or Asian. Maternal and paternal age at the time of entry into the study averaged 29.7 years and 31.8 years, respectively. Mother's and father's education level averaged 15.6 years and 16.3 years, respectively. Additionally, the majority of the participating families reported their family income to be between \$50,000 and \$75, 000. Of the entire sample, 126 families completed the 24/25 month visit, 70 families completed the 4.5 year visit, and 60 at the peer visit (mean age 77 months). Relocation was the most typical reason that families left the study.

Procedures

Data used for the current investigation were obtained from the Emotional Beginnings Project which included observations, questionnaires, and interviews that took

place in both the home and laboratory setting. Observations of the infant and mother were completed at 2 weeks, 2 months, 6 months, 12 months, and 24 months.

Additionally, infants and fathers participated in comparable visits when the infants were 13 and 25 months old. The original study was extended to include a mother and father visit when the children were 4.5 years and 5.5 years. Finally, when the children were in the first grade, they returned to the laboratory to interact with same-sex, same-age peers. The current study included observational data gathered in the 24/25 month visit, the 4.5 year visits, and the peer visit when the children were in the first grade.

In the present study, toddlers came into the laboratory with their mothers at 24 months and their fathers at 25 months. In these visits, they were involved in various tasks used to form temperament groups and measure parenting behaviors in a parent-child interaction. The tasks used in the current investigation are described in more detail in the following section. When the children were 4.5 years old, mothers and their children returned to the laboratory to participate in various tasks that measured emotional reactivity and regulation, receptive language ability, heart rate, and parent-child interactions. Approximately one month later, fathers and their children returned to the laboratory to participate in a series of tasks that measured emotional reactivity and regulation, effortful control, parent-child interactions, and executive function. As the current study is interested in observed measures of emotion regulation, observational data from the Disappointment task (mother visit) and the Locked Box task (father visit) will be used. They are described with more detail in later section. Finally, children and their mothers returned to the laboratory when the children were in the first grade. In this visit, the children interacted with other same-sex, same-aged peers and children's social

behaviors were measured. The details of the social interactions and tasks are described in more detail below.

24 and 25 Month Procedures

A series of tasks in the laboratory were administered when the toddlers were 24 months with their mothers and 25 months with their fathers. These visits were conducted with the intention of measuring the toddler's behavior in a range of tasks to assess temperament. Table 1 presents the order of procedures in the 24 month and 25 month visits. The toddlers were administered tasks involving high- and low-intensity stimuli (e.g., Fox et al., 2001; Kagan et al., 1984) to measure approach and inhibition behaviors. At both visits, toddlers participated in a series of high-intensity tasks that were designed to present a salient or overt threat to the child using intrusion by adult strangers or intense objects. During both the 24 and 25 month visit, an unfamiliar assistant and parent asked the child to join them in playing ring around the rosie three times in between verses. In only the 24 month visit, the toddler had electrodes placed on his/her torso while he/she sat on the mother's lap or in a high chair. In the same visit, in the Champagne Popper task, the experimenter showed a popper to the child while he/she was standing by the parent. The child was told that the popper would make a loud noise and then the experimenter discharged it. The experimenter then asked the toddler if he/she would like to see another one. Afterwards, the experimenter ran a vacuum for one minute.

In the 25 month visit, the child was presented with three varying sets of toys. In each set there was a high-intensity toy (loud toy buzzer, laser gun with lights and sounds, and a moving plastic ball) and a corresponding low-intensity toy (quiet toy buzzer, quiet

laser gun, and still plastic ball). The child was asked to select one toy from each of the three pairs. In the Black Box task at 25 months, the toddler was told that something might be in the large black box and encouraged to explore. Lastly, in the Steps task the toddler was presented with three steps of varying heights from lowest to highest (8, 16, and 19 inches). The toddler was asked if they would like to jump off each step onto a mattress.

In the 24 and 25 month visits, there were also a series of low intensity tasks presented to the toddlers that did not involve risky or loud events. At both visits, the child entered the room for the first time and was told that he/she could explore and walk around as they liked. The parent was asked to not encourage or discourage any of the child's behaviors. Additionally, at both visits, the structured play task between the parent and child was interrupted by a stranger. This unfamiliar female knelt near the child, remained silent for one minute, and then spoke to the parent for one minute. At both visits, the child was given either a set of five or a single "boring" toy. Parents were asked to work on a questionnaire and not engage with their child. After 2 minutes a basket of attractive toys was brought into the room, placed out of the child's reach, and the child was told that "these toys are for later." Afterwards, the child was left for an additional 2 minutes. Finally, at the 25 month visit, after the child was introduced to the laboratory, an assistant sat with a basket of toys and gently asked the child if he/she would like to play with the assistant.

4.5 Year Procedures

Disappointment. At 4.5 years of age, the child returned to the laboratory twice, once with the mother and another time with the father. In the 4.5 year mother visit, the children engaged in a variety of tasks listed in Table 2. However, for the purposes of the current study the only task used from the 4.5 year mother visit was the Disappointment task. Following Cole's (1986) procedure, this Disappointment task was used to assess the child's ability to regulate his/her emotions. At the beginning of the visit, the child was presented with a tray of 5 toys and asked to choose the toy that he/she liked the best. This toy was put aside and the child was then asked to pick which toy he/she liked the least. This process continued until the child had ranked all toys. The child then participated in a series of tasks, was thanked for participating, and told that he/she would receive a prize. The experimenter left the room with the parent and came back with a wrapped prize, which contained the toy that the child had ranked as his/her least favorite.

The child was given the wrapped prize and the experimenter sat across from the child while he/she unwrapped the gift. For the next 30 seconds the experimenter stayed in the room concentrating on paperwork and did not interact with the child. After 30 seconds, the experimenter left the room for one minute, leaving the child alone. A second experimenter came back into the room to interview the child about their feelings toward the gift and the experimenter for giving him/her the gift. Finally, the child was given the opportunity to exchange the gift for any other gift on the tray.

Anger/Frustration. In the 4.5 year father visit, the children participated in a variety of tasks listed in Table 2. However, for the purposes of the current study the only task used from the 4.5 year father visit was the Locked Box task, which was used to

measure emotion regulation (Goldsmith & Rothbart, 1993). In this task, a large clear box and a hand-held video game was placed in front of the child. The experimenter showed the game to the child and then placed it into the box and locked it. The child was then given a ring of keys and shown how the key fit in the lock without actually unlocking it. The child was told that if he/she opened the box he/she could play with the game. The experimenter left the room for two minutes leaving the father and the child. However, the father was instructed that if the child asked for help from him that he should respond with one of the following phrases: “Daddy’s busy,” “I can’t help you right now,” “Wait until I am finished with this,” and/or “I have work to do right now.” After 2 minutes, the father was called out of the room. After another minute the experimenter returned to the room and explained that he/she just found a key in his/her pocket and had the child try to unlock the box. After the box was opened, the child was allowed to play with the game.

Peer Visit Procedures

When the children were in the first grade (mean age 77 months), they returned to the laboratory with their mothers to participate in a visit to interact with 2-3 same-sex, same-aged peers. In the peer visit, the children were introduced to one another and given a snack before engaging in the first free play. Afterwards, the children were asked to clean up the toys. The next task involved asking the children to one at a time give a speech about their last birthday party. Following this speech task, the children engaged in a ticket task where they were asked to make up packets of tickets. A second free play and clean up followed the ticket task. Finally, the children were given thank you prizes for their participation. For the purposes of the current study only the two free play tasks

were used from this visit. In these free play tasks, the children engaged in a free play where the experimenter brought in a tub of toys and spread them out. The children were told that they could play and then they were left alone for 15 minutes.

Measures

24 and 25 month measures

Toddler Temperament Groups. Each task from the 24 and 25 month laboratory visits were coded from videotapes. Behaviors reflecting approach and inhibition used in previous studies were measured (e.g., Fox et al., 2001; Kagan et al., 1984). Proximity to the parent was continuously coded for every task except for ring around the rosie and electrode placement. The scale ranged from 1 (*clinging to the parent*) to 5 (*two or more steps away from the parent*). Reliability was calculated for 13% of the sample and the average kappa was .78. All 1-second proximity scores were averaged to generate a single score. The number of nondistressed, spontaneous vocalizations was also coded during the introduction to the lab, quietly sitting stranger, toy preference, and play with assistant. Kappa was calculated on 13% of the sample at an 83% agreement. Activity level was coded on a scale from 0 (*completely still*) to 4 (*running or vigorous movements*) in 5 second intervals of the introduction to the lab, quietly sitting stranger, toy preference, and play with assistant. For each episode, the scores were averaged to create a proximity score for each episode. Interrater reliability was assessed on 14% of the sample and was .78.

Additionally, episode-specific ratings were made. The child's willingness to put on electrodes was rated on a scale from 1 (*strongly avoids electrode placement*) to 5 (*no*

avoidance of electrode placement). This rating was made based on the consensus of the team leader and two assistants immediately after each visit. Willingness to play ring around the rosie was coded from videotape and each visit was rated three times for each of the three rounds on a scale from 1 (*child actively refuses to play*) to 5 (*child immediately and enthusiastically plays*). Kappa was assessed on 14% of the sample and was .80. Willingness to jump from the steps was rated on a scale from 1 (*no approach to steps*) to 7 (*jumps off prior to prompts*). The individual scores for each of the three steps were summed. Kappa was .85 on 14% of the sample. Degree of exploration of the black box was rated on a scale from 1 (*no approach to box*) to 6 (*places entire head in box*). For 14% of the sample, the Kappa was .85. Latency to choose the toys in the toy preference task was coded in seconds for each set of toys. The three latency scores were summed and multiplied by -1 in order to correspond with the other variables. Reliability was assessed on 14% of the data, and within a 2 second range there was 93% agreement. Finally, off-task behavior in the boring toy task was rated as either 0 (*not engaging in off-task behavior*), 1 (*passive engagement with off-task behavior*), or 2 (*active engagement in off-task behavior*) in 5 second increments. Ratings were averaged to create a single off-task activity score. Kappa was .80 for 14% of the data.

In addition to the above measures, positive and negative affect were coded globally for each task. This additional measure is different from previous research (e.g., Fox et al., 2001; Kagan et al., 1984) and was utilized to create the temperament groups that will be used in the present study (Putnam & Stifter, 2005). Each scale ranged from 0 (*no affect*) to 5 (*continuous, high-intensity affect*). Reliability was assessed on 11% of the sample, with a Kappa of .71 for positive affect and .73 for negative affect.

Ratings made for both visits were combined by averaging across the two visits to reduce the number of variables. An approach-inhibition score was created by standardizing all the non-affect measures, with high scores indicating high approach and low scores signifying low approach. All negative and positive affect codes were also standardized. Scores were then averaged to generate positive affect, negative affect, and approach-inhibition scores. These were collapsed across high-intensity and low-intensity tasks to create six scores: high-intensity behavioral approach-inhibition, high-intensity positive affect, high-intensity negative affect, low-intensity behavioral approach-inhibition, low-intensity positive affect, and low-intensity negative affect (Putnam & Stifter, 2005).

Group formation. A Confirmatory Factor Analysis from all measures of the 24 and 25 months visits supported a three factor model consisting of positive affect, negative affect, and approach/inhibition (Putnam & Stifter, 2005). Afterwards, a cluster analysis was performed to create groups based on these three factors. From this analysis, four groups were created. The first group labeled “extremely inhibited,” was high in negativity and low in approach. A second group labeled “inhibited” was similar to the first group but with less extreme scores. The third group was high in positive affect and approach and labeled “exuberant.” Finally, the fourth group labeled “low/low,” was low on both positive and negative affect and moderate on approach/inhibition. For final analyses, the two inhibited groups (extremely inhibited and inhibited) were combined resulting in three groups labeled “inhibited,” “exuberant,” and “low reactive.”

4.5 year measures

Receptive language ability. The Peabody Picture Vocabulary Test-Third Edition (PPVT; Dunn & Dunn 1981) was used to assess the child's receptive language ability and is used as a control variable in the current study. This test was administered to the child following standardized procedures and scores were given using the age appropriate norms. In the current study, the mean PPVT score was 111.6 with a standard deviation of 12.4.

4.5 year inhibition. The Observed Child Temperament Scale (OCTS; Stifter et al., in press), an adapted version of the Infant Behavior Record (IBR; Bayley, 1969) to be used with preschoolers was used in the current study to globally rate the preschooler's observed temperament throughout the visit. Two observers discussed the child's behavior, came to a consensus at the end of each visit, and then scored the child on the following scales (description; scoring range): Activity level (amount of gross body movement; 1-9), Reaction to novel persons (social responsiveness to examiners; 1-5), Positive affect (level of happiness/positive mood; 1-9), Shyness/fearfulness (degree of fear of persons, situation; 1-9), and Task persistence (degree of on-task behavior; 1-9). In order to simulate typical conditions under which parents rate their children, observers were minimally trained on each of the scales (Stifter, et al., in press). For the current study, temperamental inhibition was created by subtracting the reaction to novel persons scale from the shyness/fearfulness scale. In the current study the mean OCTS inhibition score was .77 with a standard deviation of 2.0.

Disappointment Regulation. The Disappointment Task was used to measure how children react when receiving a gift they did not want. This task was videotaped and

coded off-line by trained research assistants blind to the child's temperament group status. For the purposes of the current study, only the data from the Experimenter Present condition was used, since it is thought that children will regulate their emotions in the presence of the person who gave them the gift, rather than when they are alone. The putative regulatory strategies to be coded were created as a parallel to regulatory strategies coded in the frustration task used in the current study. This was done in order to be able to compare children's regulatory abilities across tasks eliciting differing emotions. Additionally, they are similar to many of the self-regulatory behaviors used in previous research (e.g., Forbes, Fox, Cohn, Galles, & Kovacs, 2006; Cole et al., 1994). The regulatory behaviors were constructive coping, distraction, self-speech, social interaction, positive/neutral vocalizations, and negative vocalizations. Each of these behaviors are listed and described in Table 3. The means and standard deviations for each behavior are broken down by the total sample and by each temperament group in Table 4. Additionally, the intercorrelations among these behaviors are outlined in Table 5.

The frequencies of positive, neutral, and negative vocalizations were created from detailed transcriptions. Reliability was assessed on 30% of the sample, with an overall Kappa of .85. The additional putative regulatory behaviors were coded in 10 second intervals during the 30s Experimenter present condition. Reliability was assessed on 15% of the sample. Kappas for each behavior were .91 for constructive coping, .78 for distraction, .85 for self-speech, and .84 for social interaction.

Anger/Frustration Regulation. The Locked Box task was used to measure how children react when faced with the difficult situation of unlocking a box that cannot be

unlocked. This task was videotaped and coded off-line by trained research assistants blind to the child's temperament group status. The putative regulatory strategies coded were drawn from previous developmental research (e.g., Calkins & Johnson, 1998). The regulatory behaviors were goal-directed action, alternate strategies, self-speech, social support seeking, positive/neutral vocalizations, and negative vocalizations. Each of these behaviors are listed and described in Table 3. As can be seen, the regulatory behaviors coded in the Disappointment task and Locked Box task are similar and in many cases, the same. The behaviors not coded in both tasks were constructive coping and social interaction (Disappointment) and goal-directed, alternate strategies, and social support seeking (Locked Box). The reason for these discrepancies is due to the nature and purpose of each task. For example, goal-directed and alternate strategies behavior would only be seen in the Locked Box task as there is a direct job for the children to perform. Additionally, social interaction (Disappointment) and social support seeking (Locked Box) are similar codes and only differ in the fact that children were asking for help unlocking the box in the Locked Box task and children were not required to specifically ask for help to be coded with social interaction in the Disappointment task.

The frequencies of positive, neutral, and negative vocalizations were created from detailed transcriptions. Reliability was assessed on 25% of the sample. The additional putative regulatory behaviors were coded in 10 second intervals. Reliability was assessed on 5% of the sample. Kappas for each behavior were .90 for goal-directed behavior, .94 for alternate strategies, .84 for self-speech, and .88 for social support seeking. The means and standard deviations for each behavior are broken down by the total sample and by

each temperament group in Table 6. Additionally, the intercorrelations among these behaviors are presented in Table 7.

Peer Visit Measures

Both free play portions of the peer visit, when the children were 6-7 years of age, was used to measure how children behave and interact in a social situation with unfamiliar children. This task was videotaped and coded off-line by trained research assistants blind to the child's temperament group status. Children's behaviors and interactions in this social situation with unfamiliar peers were measured using two observational coding systems: the Play Observation Scale (POS; Rubin, 1989) and a relational coding scheme created specifically for the Emotional Beginnings Project.

Play Observation Scale (POS). The POS was used to code social participation (unoccupied, onlooking, solitary play, parallel play, conversation, and group play) and the cognitive quality of play (functional, dramatic, and constructive play; exploration; games with rules). Each of these behaviors are listed and described in Table 8.

Behaviors were coded every 10 seconds of both 15 minute free play episodes. Reliability was assessed on 32 % of the sample. Kappas for each behavior were .30 for unoccupied, .73 for onlooking, .58 for solitary play, .74 for parallel play, .79 for conversation, .81 for group play, .59 for functional play, and .65 for dramatic play, .67 constructive play, .62 for exploration, .77 for games with rules.

Following previous research the behaviors were aggregated to create the following variables: solitary-passive, reticence, and social play (e.g., Rubin, Burgess, & Hastings, 2002; Fox et al., 1996; Coplan et al., 1994). Reticent behavior was created by summing the proportion of time spent in unoccupied and/or onlooking behaviors. Social

play was computed by combining all group behaviors (group occupied, group constructive, group exploratory, group functional, group dramatic, group games), as well as conversation and proportionalizing them. Solitary-passive behavior was created by summing the proportion of time spent in solitary-exploratory or solitary-constructive play. The means and standard deviations for each behavior are broken down by the total sample and by each temperament group in Table 9. Additionally, the intercorrelations among these behaviors are outlined in Table 10.

Relational Coding. In addition to the POS, children's behaviors were coded using coding scheme intended to measure the child's social initiations in the peer group, as well as the response the child received to these initiations. Initiating interactions, either positive/neutral or negative, were coded when the child looked at and attempted to engage another child either behaviorally or verbally. However, the specific code given depended on how the other child, or the peer, responded to the interaction. Initiating positive/neutral was coded when the peer responded in a positive manner or with no expression. Conversely, initiating negative was coded when the peer used negative facial expressions, negative verbalizations, and/or no response to the interaction attempt. Maintaining interaction was coded when the child continued with an interaction regardless of whether he/she initiated it in the previous interval (e.g., listening to another child, participating in a game/activity). Again, maintaining behaviors were broken down into positive/neutral and negative. Maintaining positive/neutral was coded when the peer responded to the maintenance of the interaction in a positive or neutral manner. Conversely, maintaining negative was coded if the peer responded to the maintenance in a negative manner (e.g., yelling in a negative tone, speak with a negative expression).

These codes were applied to both 15 minute free play episode and coded in 10 second intervals. Reliability was assessed on 22 % of the sample. Kappas for each behavior were .74 for initiating positive/neutral, .85 for initiating negative, .74 for maintaining positive/neutral, and .80 for maintaining negative. The means and standard deviations for each behavior are broken down by the total sample and by each temperament group in Table 9. Additionally, the intercorrelations among these behaviors in are outlined in Table 10.

Data Reduction

In an effort to reduce the number of moderator and outcome variables, correlations and exploratory factor analyses were conducted. Correlations among the putative regulatory behaviors and vocal affect in the Disappointment and Locked Box tasks were examined and are presented in Tables 5 and 7, respectively. Since there were several significant correlations among the variables in each task, in an effort to lower the number of moderating variables, a principal factors extraction was performed for each task's variables separately. Principal components extraction was used prior to principal factors extraction to estimate the number of factors. While the Locked Box task variable, goal-directed behavior was highly correlated with several other variables, this behavior was shown at a high frequency and it was retained due to its value in representing persistence. In addition, principal factors extraction consistently extracted two factors from the remaining Locked Box task variables, using the eigenvalue-greater-than-one extraction criteria and various extraction methods. Therefore, in addition to *goal-directed behavior*, *dysregulation* (negative vocalizations and social support seeking) and

regulatory vocalizations (self-speech, alternate strategies, and positive/neutral vocalizations) were created using Maximum Likelihood extraction method. When oblique rotation was requested, correlations among factors were low and therefore, the orthogonal rotation using varimax was chosen. The final rotated factor matrix can be seen in Table 11.

Three factors were consistently extracted from the Disappointment task variables using the eigenvalue-greater-than-one extraction criteria and various extraction methods. The first factor, *active self-regulation*, consisted of constructive coping, positive/neutral vocalizations, and social interaction. The second factor, *negative vocalizations*, consisted only of that variable. Finally, the third factor, *internally-directed regulatory behaviors*, was made of self-speech and distraction. In contrast to the Locked Box task factors, when an oblique rotation was requested, correlations among factors, particularly factors 1 and 3, were moderately correlated. As such, an oblique rotation (promax) was chosen using Maximum Likelihood extraction method. The final pattern matrix can be seen in Table 12.

Finally, in an effort to reduce the number of outcome variables in the current investigation, a factor analysis was performed for the four variables from the peer relational coding scheme (initiating positive, initiating negative, maintaining positive, maintaining negative). As expected, two factors were consistently extracted from these peer variables using the eigenvalue-greater-than-one extraction criteria and various extraction methods. The first factor, *negative peer behaviors*, consisted of initiating negative and maintaining negative peer behaviors. The second factor, *positive peer behaviors*, consisted of initiating positive and maintaining positive peer behaviors. When

oblique rotation was requested, correlations among factors were low and therefore, the orthogonal rotation using varimax was chosen. The final rotated factor matrix can be seen in Table 13.

Chapter 4

RESULTS

The results from this study are presented in two sections. The first section includes the preliminary analysis examining the role of gender differences. The second section focuses on the primary analyses in which one-way ANOVAs and multiple regression analyses were used to test the main study hypotheses.

Preliminary Analyses

The descriptive data of the study variables for the total sample and separately by temperament groups are presented in the Methods section. Gender differences in putative regulatory behaviors and vocal affect in the Locked Box and Disappointment tasks, PPVT scores, and social competence variables were examined using t-tests. No significant differences for gender were observed. As such, all variables were collapsed across gender.

Primary Analyses

To test the hypotheses of the current investigation, one-way ANOVAs and multiple regression analyses were conducted. One-way ANOVAs were conducted to test for group differences among toddler temperament groups on the childhood social competence variables. Additionally, one-way ANOVAs were used to examine if there

were differences among temperament groups in the types and/or frequencies of putative regulatory behaviors children used in the Locked Box and Disappointment tasks.

Finally, multiple regression analyses were used with child behaviors in the peer context (positive and negative behaviors, social play, reticence, and solitary passive behaviors) as the dependent variables and toddler temperament groups (inhibited, low reactive, and exuberant) and putative regulatory behaviors in the Locked Box and Disappointment task as predictors. More specifically, the role of putative regulatory behaviors in predicting childhood social competence, as well as the interaction between toddler temperament and each of the putative regulatory factors was tested to investigate the moderating influence of children's ability to regulate on the relation between toddler temperament and childhood social competence.

To test these hypotheses, dummy codes were created for the temperament groups with the exuberant group as the reference group. The moderating putative regulatory factor scores were centered to create the interaction terms. Afterwards these moderating variables were multiplied by the temperament group dummy variables in order to create the interaction terms.

Since the child's receptive language ability could affect the child's ability to regulate his/her emotions, PPVT scores were used as a control variable and entered in the first step of all regression analyses. Additionally, since research has shown that toddler temperament, particularly inhibited temperament, is not always stable across childhood, 4.5 year child temperamental inhibition was controlled for by entering the OCTS inhibition score in the second step of all regression analyses. The predictor variables of temperament group and the moderating putative regulatory factor score were entered in

the third step. Finally, the interaction variable between toddler temperament and the putative regulatory factor score were entered.

Results will be presented to address the current investigation's hypotheses in each of the following sections. The first section will present the results from hypothesis 1 by looking at temperament group differences in childhood social competence. The second section will show the results from hypotheses 2a and 2b investigating differences among temperament groups in the types of putative regulatory behaviors children use in the Locked Box and Disappointment tasks. The third section will investigate hypotheses 3a and 3b by reporting on the temperament X putative regulation interactions in predicting social competence.

Direct Relations between Temperament and Socially Competent Behaviors

Previous research has suggested that behaviorally inhibited infants and toddlers are more likely to exhibit shyness and socially withdrawn behavior in early and middle childhood (Kagan, 1999; Rubin, Burgess, & Hastings, 2002). While there is a lack of research investigating exuberant children's social competence, the existing literature suggests that uninhibited children are more likely to have positive relationships with friends (Skarpness & Carson, 1986) and are more likely to be involved in group play than solitary play (Kochanska & Radke-Yarrow, 1992). Therefore, in this study it was hypothesized that exuberant children would show higher levels of social play and positive interactions with peers than inhibited children. Analyses with the low reactive group were exploratory.

One-way ANOVAs were conducted to test for differences between temperament groups on behaviors in the peer free play. Results indicated that there were group differences in negative peer behaviors, as indexed by negative initiating interactions and negative maintaining interactions, $F(2, 57)=3.66, p<.05$. Post hoc analyses using Tukey HSD post hoc criterion for significance indicated that contrary to study hypotheses, exuberant children, $M = .20, SD = .93$ were more likely to show negative peer behaviors than low reactive children, $M = -.45, SD = .77$. Additionally, there was a trend for inhibited children, $M = .20, SD = .70$, to show higher levels of negative peer behaviors than low reactive children.

Direct Relations between Temperament and Putative Regulatory Behaviors

As previously discussed, exuberant children display high levels of approach behavior and positive affect. However, these children are also more likely to exhibit higher levels of frustration than other children. As such, it was hypothesized that exuberant children would be more likely to display frustration and show fewer goal-directed strategies when a goal is blocked in the Locked Box task. As the developmental pathway between children displaying inhibited and low reactive temperaments and the regulation of anger and frustration is speculative, analyses testing this relationship were exploratory.

One-way ANOVAs were conducted to test for differences between temperament groups and putative regulatory behaviors in the Locked Box task. Results showed that there were group differences in goal-directed behaviors in this task, $F(2, 57)=6.76, p<.01$. Post hoc analyses using Tukey HSD post hoc criterion for significance indicated

that contrary to study hypotheses, exuberant children, $M = .18$, $SD = .18$ were more likely to show goal-directed behavior than inhibited children, $M = .14$, $SD = .20$. Additionally, low reactive children, $M = .19$, $SD = .15$ were more likely to show goal-directed behavior than inhibited children. No significant group differences were revealed for Locked Box regulatory vocalizations, $F(2,55)=.86$, $p=.43$, or dysregulation behaviors, $F(2,55)=.80$, $p=.45$. These results suggest that exuberant and low reactive children show more persistence in this type of situation designed to elicit frustration.

As previously discussed, there is a lack of literature investigating the role of temperamental styles as it is related to children's ability to regulate in a disappointing situation. However, as in the Locked Box task, it was hypothesized that exuberant children would exhibit higher levels of frustration and lower levels of constructive coping behaviors than other children. This is due to the fact that this is another situation in which a goal, or something that the child wishes to have it blocked. As with the Locked Box task, the developmental pathway between children displaying inhibited and low reactive temperaments and disappointment regulation is tentative, these analyses were exploratory.

One-way ANOVAs were performed to test for differences between temperament groups and putative regulatory behaviors in the Disappointment task. Results showed that there were no significant differences among temperament groups and the Disappointment variables of active self-regulation, $F(2,53)=1.16$, $p=.32$, negative vocalizations, $F(2, 53)=1.06$, $p=.35$, and internally-directed behaviors, $F(2, 53)=1.75$, $p=.18$. Therefore, these results suggest that inhibited, exuberant, and low reactive

toddlers did not differ in their use of regulatory behaviors when disappointed at 4.5 years of age.

Temperament X Regulatory Behavior Interactions in Predicting Social Competence

Overall, past research has shown that children who are better able to regulate negative emotions tend to show higher levels of social competence and peer acceptance (e.g., Kochanska, Murray, & Coy, 1997; Gunnar, et al., 2003; Eisenberg, Spinrad, Fabes, et al., 2004). Conversely, children who cannot regulate negative emotions are more likely to show socially incompetent behaviors (e.g., Eisenberg et al., 1993; Calkins et al., 1999; Calkins & Dedmon, 2000; McDowell et al., 2000; McDowell & Parke, 2000). Therefore, in the present study it was expected that children who were better able to use putative regulatory behaviors in the Locked Box and Disappointment tasks would show higher levels of social play and positive interactions with peers.

Additionally, past research has shown that there are temperament differences in children's ability to exhibit socially competent behaviors in the peer context (e.g., Kagan, 1999; Kochanska & Radke-Yarrow, 1992; Rubin, Burgess, & Hastings, 2002). As children should become better able to regulate their emotions and behaviors from toddlerhood to early childhood, it was hypothesized that the ability to regulate anger/frustration and disappointment would moderate the relation between toddler temperament and social competence. This was hypothesized to be especially true for exuberant children since as they are more likely to show frustration when their goals are blocked, the ability to regulate anger/frustration and disappointment may be particularly important for them to be socially competent in the peer setting.

While the ability to regulate anger/frustration and disappointment are hypothesized to be especially important for exuberant children in predicting positive social behaviors and the regulation of fear may be more important for inhibited children, it has been shown that inhibited children's ability to regulate negative emotions are more likely to be socially competent (e.g., Coplan et al., 1994; Rubin et al., 1995). Therefore, in the current study it was hypothesized that inhibited children who are able to regulate anger/frustration and disappointment will show more socially competent peer behaviors. As there is no previous research investigating this relationship for low reactive children, the analyses testing this relationship will be exploratory.

The results of the multiple regression analyses revealed several significant main effects and interaction effects. A significant main effect was found for dysregulation in the Locked Box task, $B=.353$, $p<.05$. As children increased their levels of dysregulation in the Locked Box task, their level of reticent behavior in the peer context increased. These results can be found in Table 14. Additionally, a trend for a main effect was found for dysregulation in the Locked Box task, $B=.294$, $p<.10$. As children increased their levels of dysregulatory behaviors in the Locked Box task, their level of negative interactions in the peer context increased. Therefore, from these findings it appears that children who show dysregulatory behaviors when frustrated are more likely to show maladaptive peer behaviors.

Additionally, multiple regression analyses with putative regulatory behaviors in the Disappointment task as the moderator revealed several significant results. As can be seen in Table 14 there was a trend for active self-regulation in the Disappointment task, $B= -.367$, $p<.10$. As children show higher levels of active self-regulation in the

Disappointment task, their level of reticent behavior in the peer context tended to decrease. This finding coupled with the previously discussed main effect regarding dysregulation in predicting reticent behavior supports previous research stating that reticent children are more likely to show low levels of regulation (Coplan et al., 1994; Rubin et al., 1995).

Additionally, there were several significant interactions with Disappointment regulatory behaviors as the moderating variable. As can be seen in Table 15, there was a significant interaction effect between exuberant and low reactive children in predicting solitary passive peer behaviors, $p < .05$, suggesting there were differences in their levels of solitary passive behaviors depending on their use of negative vocalizations in the Disappointment task. Follow-up tests of the simple slopes revealed that the effect was for the low reactive children, $t(7, 46) = -1.843$, $p < .05$, and not for inhibited or exuberant (Figure 1). This suggests that as low reactive children show higher levels of negative vocalizations when disappointed, they show lower levels of solitary passive behaviors. Additionally, as can be seen in Table 15, a significant interaction effect was revealed between exuberant and inhibited children in predicting solitary passive behaviors, $p < .01$, suggesting that there were differences in their levels of solitary passive behaviors depending on their use of internally-directed behaviors when disappointed. Follow-up tests of the simple slopes revealed that the effect was for the exuberant children, $t(7, 46) = 2.198$, $p < .05$, and not for inhibited or low reactive (Figure 2). This interaction suggests that as exuberant children show higher levels of internally-directed behaviors when disappointed, they show higher levels of solitary passive behaviors in the peer context. Finally, supporting this finding, as can be seen in Table 16, another significant interaction

effect was revealed between exuberant and inhibited children in predicting social play in the peer context, $p < .05$. This finding suggests that there were differences in these children's levels of social play behaviors depending on their use of internally-directed behaviors in the Disappointment task. Follow-up tests of the simple slopes revealed that the effect was for the exuberant children, $t(7, 46) = 2.198, p < .05$, and not for the inhibited or low reactive children (Figure 3). This suggests that as exuberant children show higher levels of internally-directed behaviors when disappointed, they show lower levels of social play in the peer context. Coupled together, the last two significant interactions support one another as social play behavior and solitary passive behavior in the peer context are significantly negatively correlated.

There were no significant main effects or interactions with positive peer interactions as the dependent variable. Additionally, there were no significant results between Disappointment variables and Locked Box active self-regulation and internally-directed behaviors moderating negative peer interactions, Locked Box variables and Disappointment active self-regulation moderating solitary passive behaviors, or Locked Box variables and Disappointment active self-regulation and negative vocalizations moderating social play behaviors. However, the significant results from these multiple regressions suggest that for children with varying temperaments, the behaviors they use to regulate their emotions can differentially influence the child's behaviors in a peer context.

Chapter 5

DISCUSSION

Since social competence is such a central developmental task in early childhood and has been shown to be an vital predictor of positive outcomes for children (e.g., Carlton & Winsler, 1999; Denham & Holt, 1993; Ladd et al., 1999), it is of great importance to understand which regulatory behaviors support or hinder children's development of socially competent behaviors. Previous research has suggested that temperament has an important impact on the development of social competence and that this pathway may be through a child's ability to regulate his/her emotions and behaviors. While this research has shown that inhibited children are more likely to show lower levels of social competence (Fox et al., 1995; Kagan, 1999; Rubin et al., 2002), very little is known about exuberant children in regard to their developmental pathways towards social competence.

The limited amount of research investigating the relationship between exuberant temperament and social competence has found that these children are more frequently involved in group play and are more likely to have positive relationships with friends (Kochanska & Radke-Yarrow, 1992; Skarpness & Carson, 1986). While existing research has shown that these children exhibit high levels of approach behaviors and positive affect, they also are more likely to be easily frustrated (Rothbart et al., 2000) and exhibit high levels of externalizing behaviors (e.g., Putnam & Stifter, 2005; Rubin, Coplan, et al., 1995; Schwartz et al., 1996). Therefore, the pathway by which some

exuberant children exhibit socially competent behaviors, while others display higher levels of frustration and externalizing behaviors has not been clearly identified.

The key purpose of the current investigation was to examine how children's ability to regulate the emotions of disappointment and frustration moderated the relations between toddler temperament and social competence in childhood. Additionally, the present study addressed two other research questions. The first aim was to examine the direct relationship between toddler exuberant, low reactive, and inhibited temperament and social competence in childhood. The second aim was to investigate the direct relationship between toddler temperament and the types of putative regulatory behaviors used in frustrating and disappointing situations. The results are presented in three main sections. The first section discusses aim one, the second section discusses aim two, and the third section addresses the interaction between temperament and regulation in predicting social competence. Limitations and future directions are addressed after the current study's findings are discussed.

Direct Relations between Temperament and Socially Competent Behaviors

In the current study, the first hypothesis was that exuberant children would exhibit higher levels of social play and positive interactions with peers than inhibited children. Analyses with the low reactive group were exploratory. This hypothesis was based on the limited amount of existing research investigating the relationship between exuberant or uninhibited temperament and socially competent behaviors. For example, it has been reported that at age five, uninhibited children were more likely to be involved in group play than inhibited children (Kochanska & Radke-Yarrow, 1997). Additionally, research

with sociable children has found that they tend to have more positive relationships with friends and are rated as more popular with peers (Skarpness & Carson, 1986).

Conversely, there is a large existing literature showing that inhibited infants and toddlers are more likely to exhibit shyness and socially withdrawn behavior in early and middle childhood (Kagan, 1999; Rubin et al., 2002). These shy, socially reticent children also display fewer socially competent behaviors, less positive coping strategies, and are more likely to develop anxiety problems than nonreticent children (e.g., Coplan et al., 1994; Eisenberg et al., 1998).

In the current study, results showed that exuberant children were more likely to exhibit negative behaviors in the peer context, indicated by negative initiations and negative maintaining behaviors, than low reactive children. Additionally, there was a trend for inhibited children to show higher levels of negative peer behaviors than low reactive children. While it is not surprising that inhibited children tended to show more negative peer behaviors than low reactive children, the finding for the exuberant children was somewhat surprising. However, this finding might be explained by exuberant children's tendency to be easily frustrated and the risk that these children have for developing externalizing problems (Putnam & Stifter, 2005; Rubin, et al., 1995; Stifter et al., 2008) which could create difficulties when interacting with peers.

Additionally, as previously discussed, while these exuberant children are high in positivity, they are also high on approach and impulsivity. Recall that in the current study, negative peer behaviors were coded when the peer used negative facial expressions, negative verbalizations, and/or no response to the interaction attempt from the child. Therefore, it might not be that exuberant children are truly exhibiting more

“negative behaviors”, but instead, their interactional behaviors could be misinterpreted thereby eliciting negative reactions from the peer. For example, if an exuberant child approaches an inhibited child quickly and with a lot of enthusiasm, their rapid approach and highly intense positivity, may be overwhelming to another child, particularly an inhibited child. Since they do not know the other children, this behavior may have been perceived as negative. While the relational coding scheme in the present study attempts to capture the dynamic process that occurs between children in the peer setting, it would also be advantageous to try to depict why and how certain behaviors are deemed positive or negative by other children.

Another possible explanation for the contradictory finding could be due to the fact that temperament groups in this study were formed differently than in previously conducted studies. In the current investigation, positive and negative affect from behavioral observations were used to form the temperament groups in addition to approach and withdrawal behaviors. Since there is very little research investigating the association between exuberant temperament and later social competence and it can be measured in many different ways, future research should continue to investigate this relationship.

Direct Relations between Temperament and Putative Regulatory Behaviors

The second hypothesis of the current investigation proposed that there would be group differences among the types of regulatory behaviors used in the Locked Box and Disappointment tasks. More specifically, as exuberant children are more prone to exhibit high levels of frustration when their goals are blocked, it was hypothesized that exuberant

children would show higher levels of anger/frustration and lower levels of goal-directed behaviors in the Locked Box task. Using the same reasoning, it was hypothesized that in the Disappointment task, exuberant children would use lower levels of constructive coping behaviors since they could become frustrated easily since the goal of getting a prize that they wanted to receive was blocked. As the developmental pathway between children displaying inhibited and low reactive temperaments and the regulation of anger and frustration is speculative, analyses testing this relationship were exploratory.

Contrary to expectations, it was found that exuberant children were more likely to show goal-directed behavior than inhibited children. Additionally, low reactive children were more likely to show goal-directed behavior during the Locked Box Task than inhibited children. No significant group differences were revealed for Locked Box regulatory vocalizations or dysregulation behaviors. These results suggest that exuberant and low reactive children show more persistence in this type of frustrating situation. While this is counter to the study's hypotheses, this finding can be explained by the fact that exuberant children are more reward-oriented and therefore, might have been extremely focused and persistent in attempting to obtain the toy. As individuals that are high in levels of approach are also highly reward-sensitive, as opposed to punishment-aversive (Gray, 1982; Rothbart et al., 2000), it follows that by 4.5 years of age many exuberant children would have learned persistence in order to obtain rewards. Supporting this, recent research has suggested that exuberant individuals are indeed more persistent when there is a goal involved (Gable & Harmon-Jones, in press).

Finally, since children's ability to regulate their emotions and behaviors was measured at 4.5 years of age, it is probable that most children have learned to at least

moderately regulate their frustration and disappointment by this point in childhood. If this is true, it would explain the lack of group differences among temperament groups in regulatory behaviors. Additionally, children have probably learned the ramifications of not being able to regulate their high levels of frustration/anger, especially exuberant children. Therefore, future research should investigate this hypothesis with younger children, as previous research has shown that the development of external forms of self-regulation is quickly developing in toddlerhood (e.g., Grolnick et al., 2006; Kopp, 1989; 1992).

Emotion Regulation as a Moderator of Temperament and Social Competence

A plethora of previous research has underscored the importance of children's ability to regulate negative emotions in predicting social competence and peer acceptance (e.g., Eisenberg et al., 1993; Eisenberg et al., 2004; Gunnar et al., 2003; Kochanska et al., 1997; McDowell et al., 2000) and that children who are unable to regulate negative affect in frustrating and disappointing situations are more likely to display socially incompetent behavior (e.g., Calkins & Dedmon, 2000; Calkins et al., 1999; Eisenberg et al., 1993; McDowell et al., 2000; McDowell & Parke, 2000). As existing research has shown temperament differences in children's behaviors in the peer context (e.g., Kagan, 1999; Kochanska & Radke-Yarrow, 1992; Rubin, Burgess, & Hastings, 2002), and as children's ability to emotion regulate should become more advanced from toddlerhood to early childhood, it was hypothesized that children's ability to regulate anger/frustration and disappointment would moderate the relation between toddler temperament and socially competent behaviors in childhood. In other words, while a child's temperament may

predispose him/her to exhibit certain behaviors in a social context, the development of new abilities, such as emotion regulation, may moderate this pathway. For example, if an exuberant child, who may become easily frustrated, has not learned to regulate his/her anger/frustration, they are likely to behave in an inappropriate and socially incompetent manner when presented with challenging situations in the peer or social setting. Or, a child low in approach might need to regulate his/her levels of fear and/or negativity in the peer setting, as it is likely that they will be overwhelmed by the presence of a new environment and individuals.

Several significant interactions with regulatory behaviors in the Disappointment task as the moderating variable emerged when predicting social competence. More specifically, it was found that as low reactive children increase in their negative vocalizations when disappointed, they are more likely to show low levels of solitary passive behaviors. Although there is no existing research investigating this relationship for low reactive children, past research has shown that children exhibiting low levels of approach are more likely to show forms of non-social play behavior (e.g., Rubin et al., 1997). Therefore, this research can be applied to this finding with low reactive children as they showed moderate levels of approach behaviors along with low levels of both positive and negative affect. While there were no significant temperament group differences on solitary passive behaviors, low reactive children had the highest mean for solitary passive behaviors, by far. Additionally, the results of the present study showed that low reactive children were significantly less likely to show negative peer behaviors and there was a trend for low reactive children to show lower levels of reticent behaviors.

These findings along with those of past research suggest that low reactive children are in a sense flying under the radar if they are regulating their behavior well and do not appear to be having any problem interactions in the peer setting, such as by showing high levels of solitary passive play. However, if they are not able to appropriately regulate their emotions, such as by showing high levels of negative vocalizations when disappointed, then they are more likely to exhibit lower levels of solitary passive behavior, a non-social behavior that is considered a form of regulating social fear. Therefore, as they get older these low reactive children might not be as low reactive emotionally as they exhibited at 2 years of age. It could be that they do have emotions, as shown by the need for them to regulate disappointment and social fear, but are well or over-regulated as reflected by these findings. As there is little existing research on this group of children, future research should address the developmental stability of temperament style and the pathway by which some of these children tend to show higher levels of reactivity or expression of emotions and varying levels of socially (dis)interested behaviors.

Also, in partial support of the current study's hypotheses it was found that exuberant children, who showed higher levels of internally-directed behaviors when disappointed, were more likely to show higher levels of solitary passive behaviors in the peer context. These same exuberant children were also found to show lower levels of social play with peers. Taken together, these findings would suggest that when exuberant children tend to use high levels of regulatory behaviors that are internally-focused, such as self-speech and distraction, they are more likely to play by themselves than with others in the group setting. This is an interesting finding since existing research has found that

exuberant children are more likely to be involved in group play than inhibited children (Kochanska & Radke-Yarrow, 1997). Therefore, it is possible that by 4.5 years of age, these exuberant children have not only learned to regulate their emotions, but in ways that might be thought of as over-regulating their emotions thereby leading them to deal with things more on an internal level, even in the peer setting. As previously discussed, exuberant children are predisposed to be high in approach and therefore, it is likely that factors in their environments, such as parents, are frequently telling them “no”. As such, it is possible that some of these exuberant children by childhood have begun to overcompensate for their exuberance by over-regulating their emotions and behaviors. If these children have learned to over-regulate their emotions and become more internally-focused, as opposed to being involved in high levels of social engagement and approach, they might prefer to engage in self-directed types of play when in the social setting. This is consistent with existing research showing that children who engage in high levels of solitary play, as indexed by exploratory, constructive behavior, while playing alone, is positively related with high levels of emotion regulation (e.g., Coplan et al., 2001; Rubin et al., 1995).

These findings could also be explained by previous research with this sample where exuberant children were found to be rated by their parents as showing more internalizing problems, as well as externalizing problems at 4.5 years than low reactive or inhibited children (Stifter et al., 2008). Although it was expected that the exuberant children would be more likely to show externalizing behaviors, the higher levels of internalizing behaviors for these children was surprising. The authors concluded that as exuberant children are reward-oriented and motivated by approach, if the persistent effort

toward goal-attainment is not satisfactory, sadness/depression, an internalizing emotion, may develop. Coupled with the findings of the current investigation, it may be that the exuberant children who are showing high levels of solitary passive behaviors, low levels of social play, and high levels of internally-focused regulatory behaviors, have learned to overcompensate for their high levels of approach behaviors and are so internally focused on their emotions and regulating them that they develop internalizing problems.

While there were many interesting findings from the current investigation, there was no support for the study's hypotheses that active self-regulation in both the Locked Box and Disappointment tasks moderated the relationship between toddler exuberant temperament and socially competent peer behaviors in childhood. This is surprising given the research showing the importance of emotion regulation in predicting positive peer interactions and the link between exuberant children and both high levels of group play and externalizing, aggressive behaviors. The lack of findings in the current study regarding these hypotheses can be potentially explained by various factors. One explanation is that much of the existing research has assessed the constructs of temperament, regulation, and socially competent behaviors using different measures than those used in the current study. For example, frequently teacher and parent report measures are employed to measure temperament, regulation, and social competence, whereas in the current investigation behavioral measures were used. Additionally, many studies that have found a pathway between temperament and social competence have solely focused on negative emotionality as a temperament trait (e.g., Eisenberg et al., 1995, Eisenberg, et al., 1998), whereas the current study investigated the temperament styles of inhibited, exuberant, and low reactive. Another explanation of the lack of

findings is that regulation was not directly measured in the current study (e.g., physiological regulation, presence of lowered levels of frustration or disappointment immediately following a regulatory behavior). It could be that the putative regulatory behaviors measured in the current study are not moderating the relationship between temperament and social behaviors, but if regulation was directly measured the study's hypotheses may be supported.

While hypotheses regarding inhibited children were somewhat exploratory, the lack of findings regarding the importance of both temperamental inhibition and children's ability to regulate are contrary to existing research. For example, the use of active self-regulation did not moderate the relation between inhibited temperament and later social behaviors. This null finding could be explained by the varying methods of measuring the regulation of negative emotions. More specifically, most existing research has talked simply about the regulation of negative emotions and not specifically about the regulation of fear, anger, or sadness. Conversely, in the current investigation, tasks used were designed to elicit the specific emotions of anger/frustration and disappointment. Since inhibited children are high in fear, it could be that the regulation of fear is most important in predicting positive social outcomes.

Finally, although there were no specific hypotheses regarding the direct relations between children's regulatory abilities at 4.5 years and social competence two years later, it was found that children's high level of dysregulated behaviors in a frustrating situation was predictive of maladaptive peer behaviors. More specifically, children who displayed higher levels of dysregulation were more likely to show higher levels of both negative behaviors and reticent behaviors in the peer setting. On the positive side, it was also

found that children who showed higher levels of active self-regulation when disappointed were less likely to show reticent behaviors in the peer context.

These findings support previous research that children who are unable to regulate negative emotions in frustrating situations are more likely to show socially incompetent behaviors (e.g., Calkins & Dedmon, 2000; Calkins et al., 1999; Eisenberg et al., 1993). The current investigation also supports past research by showing that reticent children are less likely to be able to regulate their emotions (Coplan et al., 1994; Rubin et al., 1995). Children who show reticent behavior tend to watch other children play without trying to join in, wander around aimlessly, or stare off into space. It is hypothesized that reticent children become anxious due to social approach and therefore avoid peer interactions. As such, it could be that children who can regulate their emotions are better able to deal with being in a social situation, even if they are engaged in non-social play and enjoy playing by themselves, while reticent children have an internal social approach-social avoidance conflict (Asendorf, 1990; Rubin et al., 1995). The current investigation underscores the importance of children's ability to regulate anger/frustration as negative peer behaviors and childhood reticence have been shown to predict additional maladaptive outcomes (e.g., Coplan et al., 1994; Coplan et al., 2001; Eisenberg & Fabes, 2006; Eisenberg, Shepard, et al., 1998).

In summary, the current study partially supports the hypothesis that for children with varying temperaments the behaviors they use to regulate their emotions can differentially influence the child's behaviors in a peer context. Additionally, this study suggests that there are direct associations between toddler temperament, putative emotion regulatory behaviors, and behaviors in the peer setting. However, as this study was

exploratory and among the first to investigate the relationship between exuberant temperament, emotion regulatory behaviors, and social behaviors in the peer setting, the findings should be interpreted with caution until additional studies can replicate the findings.

Limitations and Future Directions

The current study extends upon previous research by using a longitudinal design to investigate how children's ability to regulate the emotions of disappointment and frustration moderated the relations between toddler temperament and social competence in childhood. While this is one of the only existing investigations on the pathway between toddler exuberant temperament and childhood social competence, it was also exploratory and therefore, there were several limitations which should guide future research.

One limitation of the investigation was the overall sample size and restricted number of children within each temperament group. A larger sample size would greatly add more power to the current study by increasing the ability to detect small effects. Future investigations should investigate the study's hypotheses with a larger sample.

Another limitation of the current study was the time points at which each construct was measured. As a lot occurs developmentally from age 2 to age 4.5 years, it is possible that the current study was not able to capture the process occurring between toddler temperament and the development of emotion regulation and socially competent behaviors. In other words, while exuberant temperament has been shown as relatively stable across childhood (e.g., Fox et al., 2001; Pfiefer et al., 2002; Stifter et al., 2008),

inhibited children tend to show lower levels of inhibition across time. Additionally, since children's ability to regulate their emotions and behaviors was measured at 4.5 years of age, it is probable that most children have learned to at least moderately regulate their frustration and disappointment by this point in childhood. If this is true, it would explain the lack of group differences among temperament groups in regulatory behaviors.

Therefore, future research should investigate this hypothesis with younger children, as previous research has shown that the development of external forms of self-regulation is quickly developing in toddlerhood (e.g., Grolnick et al., 2006; Kopp, 1989; 1992).

An additional limitation of the present investigation was the generalizability of the results to a larger population. The results of the current study should be interpreted with caution if applying them to a more diverse population since the children in the current study were from a primarily middle-class, Caucasian, educated sample. Future research should conduct a similar study with a more diverse sample.

In conclusion, this is one of the only studies to measure how emotion regulation moderates the relations between toddler temperament, specifically exuberant temperament, and the child's development of social competence. Additionally, it adds to a growing literature looking at direct associations between toddler temperament, putative emotion regulatory behaviors, and social behaviors in the peer setting. Existing research suggests that temperament has a significant impact on social competence, possibly through a child's ability to regulate emotions and behavior. Therefore, understanding the process by which toddler temperament and children's ability to regulate emotions and their influence on children's future social development is a crucial area of research.

APPENDIX

Table 1

Order of Procedures for the 24 and 25 Month Visits

24 Month Tasks	25 Month Tasks
Physiology and Interview	Black Box
Boredom Susceptibility and Prohibition	Stairs
Free Play	Boredom Susceptibility and Prohibition
Clean Up	Free Play
Behavioral Control	Clean Up
Poppers and Vacuum	Paired Comparison
Structured Play	Structured Play
Stranger Interaction	Stranger Interaction
Mother Separation	Father Separation
Frustration	Delay of Gratification
	Frustration

Table 2

Order of Procedures for the 4.5 Year Mom and Dad Visits

Mom Visit Tasks	Dad Visit Tasks
Introduction Computer Game/Parent Interview	Coping Stories
Electrode Placement	Three Pegs
Reward/Punishment	Day/Night Stroop
Computer Game	Tapping Task
Toy Rating/Baseline ECG	CPT Computer Task
Emotion Vignettes	Walk a Line Slowly
Emotion Interview	Delay of Gratification
Peabody Picture Vocabulary Test (PPVT)	Dinky Toys
Disappointment	Structured Play
Structured Play	Free Play/Clean Up
Free Play/Clean Up	Locked Box Task
Frustration	

Table 3

Disappointment and Locked Box Putative Regulatory Behaviors

Behavior	Description	Task
Constructive Coping	Child actively participated with the toy.	Disappointment
Goal-directed action	Child interacted with the keys or the box or both in a goal-directed manner.	Locked Box
Alternate strategies	Child tried to open the box without using the keys.	Locked Box
Distraction	Child attended to or turned his/her attention to something other than the prize or trying to open the box.	Disappointment
Self-Speech	Child talked to himself/herself in a non-negative manner.	Both
Social Interaction	Child interacted or engaged with another person and was only coded when the child moved toward finding a person to engage with.	Disappointment
Social Support Seeking	Child tried to get help from someone else. these behaviors were only coded when the child actually moved toward finding a person to help.	Locked Box
Positive/Neutral Vocalizations	Content included a positive feeling state (e.g., joy, affection, pride) or a neutral feeling state and/or tone suggested positive or neutral affect.	Both
Negative Vocalizations	Content included a negative feeling state (e.g., anger, sadness, fear) and/or tone suggested negative affect.	Both

Table 4

Descriptive Statistics of Disappointment Task Variables

	Total ¹	Inhibited ²	Low Reactive ³	Exuberant ⁴
Variable	M(SD)	M(SD)	M(SD)	M(SD)
Disappointment Constructive Coping	.44(.17)	.44(.19)	.43(.19)	.45(.16)
Disappointment Self-Speech	.08(.14)	.09(.15)	.04(.12)	.10(.15)
Disappointment Social Interaction	.25(.23)	.24(.27)	.14(.21)	.32(.21)
Disappointment Distraction	.13(.16)	.17(.13)	.12(.19)	.11(.15)
Disappointment Negative Vocalizations	.43(.87)	.23(.60)	.12(.33)	.69(1.1)
Disappointment Positive/ Neutral Vocalizations	3.6(2.9)	9.6(8.9)	8.3(5.6)	7.6(6.4)

¹ The range of N's for the total sample is 58-60 subjects.

² The range of N's for inhibited is 12-13 subjects.

³ The range of N's for low reactive is 15-17 subjects.

⁴ The range of N's for exuberant is 27-30 subjects.

Table 5

Correlation Among Putative Regulatory Behaviors in the Disappointment Task

	Constructive Coping	Social Interaction	Self-Speech	Distraction	Positive/ Neutral Vocalizations	Negative Vocalizations
Constructive Coping	1					
Social Interaction	.453***	1				
Self-Speech	.074	-.067	1			
Distraction	-.035	.028	.105	1		
Positive/ Neutral Vocalizations	.315*	.639***	.281*	.081	1	
Negative Vocalizations	-.072	.237	-.211	.019	.066	1

*** Correlation is significant at the 0.001 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Table 6

Descriptive Statistics of Locked Box Variables

	Total ⁵	Inhibited ⁶	Low Reactive ⁷	Exuberant ⁸
Variable	M(SD)	M(SD)	M(SD)	M(SD)
Locked Box Goal Directed Behavior	.80(.24)	.14(.20)	.19(.15)	.18(.18)
Locked Box Alternate Strategies	.09(.11)	.11(.12)	.12(.14)	.06(.08)
Locked Box Self-Speech	.29(.22)	.38(.28)	.28(.22)	.27(.19)
Locked Box Social Support Seeking	.23(.17)	.21(.16)	.22(.16)	.24(.18)
Locked Box Negative Vocalizations	4.4(7.0)	7.5(12.2)	2.7(2.7)	3.9(5.0)
Locked Box Positive/Neutral Vocalizations	8.2(6.8)	9.6(8.9)	8.3(5.6)	7.6(6.4)

⁵ The range of N's for the total sample is 58-60 subjects.

⁶ The range of N's for inhibited is 12-13 subjects.

⁷ The range of N's for low reactive is 15-17 subjects.

⁸ The range of N's for exuberant is 27-30 subjects.

Table 7

Correlation Among Putative Regulatory Behaviors in the Locked Box Task

	Goal-Directed Behavior	Alternate Strategies	Self-Speech	Social Support Seeking	Positive/Neutral Vocalizations	Negative Vocalizations
Goal-Directed Behavior	1					
Alternate Strategies	-.057	1				
Self-Speech	.064	.216	1			
Social Support Seeking	-.149	.093	.103	1		
Positive/Neutral Vocalizations	.059	.121	.579***	.402**	1	
Negative Vocalizations	-.400***	-.064	-.015	.492***	-.123	1

*** Correlation is significant at the 0.001 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Table 8

POS Behaviors

Behavior	Description
Unoccupied	Child shows a lack of focus or intent (e.g., staring blankly into space, wandering with no specific purpose)
Onlooking	Child did not enter an activity, but instead watched the activities of other children
Solitary Play	Child played greater than 3 feet away from other children.
Parallel Play	Child was playing by himself/herself, but played beside or in the company of other children.
Conversation	Child was actively conversing or transferring verbal information to another child.
Group Play	Child played with other children and there was a common goal to their activity.
Functional Play	An activity that was completed for the pleasure of the physical sensation that it created, such as jumping off a chair or making faces.
Dramatic Play	The pretense of the play was dramatic, such as making a doll talk, pretending to pour water into a cup and then “drinking” it.
Constructive Play	The manipulation of the objects was for the purpose of creating something.
Exploration	The child was focused on examining an object for the purpose of gaining visual information about it’s physical properties, such as examining a toy in his/her hand.

Table 9

Descriptive Statistics of Peer Variables

	Total ⁹	Inhibited ¹⁰	Low Reactive ¹¹	Exuberant ¹²
Variable	M(SD)	M(SD)	M(SD)	M(SD)
Initiating Positive Peer	.06(.03)	.06(.03)	.05(.03)	.06(.03)
Maintaining Positive Peer	.48(.21)	.42(.17)	.54(.25)	.47(.19)
Initiating Negative Peer	.03(.02)	.03(.01)	.02(.02)	.03(.02)
Maintaining Negative Peer	.03(.03)	.04(.03)	.03(.03)	.03(.03)
Aggressive Behaviors	.003(.007)	.004(.008)	.002(.005)	.003(.007)
Solitary Passive	.10(.11)	.09(.07)	.19(.16)	.10(.10)
Reticence	.15(.12)	.14(.11)	.12(.09)	.18(.15)
Social Play	.63(.30)	.60(.30)	.66(.37)	.62(.26)

⁹ The range of N's for the total sample is 58-60 subjects.

¹⁰ The range of N's for inhibited is 12-13 subjects.

¹¹ The range of N's for low reactive is 15-17 subjects.

¹² The range of N's for exuberant is 27-30 subjects.

Table 10

Correlation Among Peer Variables

	Initiating Positive	Initiating Negative	Maintaining Positive	Maintaining Negative	Social Play	Solitary Passive	Reticence
Initiating Positive	1						
Initiating Negative	.23	1					
Maintaining Positive	.24*	-.13	1				
Maintaining Negative	.08	.30**	-.01	1			
Social Play	.40***	.15	.85***	.17	1		
Solitary Passive	-.13	-.07	-.55***	-.11	-.57***	1	
Reticence	-.31**	.00	-.48***	-.27*	-.52***	.22	1

*** Correlation is significant at the 0.001 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Table 11

*Locked Box Rotated Factor Matrix*¹³

Variable	Factor 1	Factor 2
Self-Speech	.59	.03
Positive/Neutral Vocalizations	.99	.03
Alternate Strategies	.12	.05
Social Support Seeking	.37	.93
Negative Vocalizations	-.14	.60

¹³ Goal-Directed behavior was retained as a separate variable and therefore not included in the factor analysis.

Table 12

Disappointment Pattern Matrix

Variable	Factor 1	Factor 2	Factor 3
Constructive Coping	.81	-.40	-.25
Social Interaction	.82	.29	-.01
Positive/Neutral Vocalizations	.52	.12	.38
Negative Vocalizations	-.07	.50	.03
Distraction	-.07	.08	.21
Self-Speech	.01	-.36	.70

Table 13

Peer Rotated Factor Matrix

Variable	Factor 1	Factor 2
Initiating Negative	.80	-.02
Maintaining Negative	.44	.10
Initiating Positive	.34	.53
Maintaining Positive	-.05	.64

Table 14

Multiple Regression Results for Reticence

	B	SE(B)	β	F	R ²
I. Locked Box Dysregulation				1.24	.15
PPVT	-.001	.167	-.10		
OCTS	-.02	.01	-.27		
Low Reactive	-.07	.04	-.25		
Inhibited	-.03	.05	-.11		
Locked Box Dysregulation	.04*	.02	.35		
Low Reactive X Dysregulation	-.04	.05	-.16		
Inhibited X Dysregulation	-.03	.04	-.12		
II. Disappointment Active Self-Regulation				1.24	.16
PPVT	-.001	.001	-.09		
OCTS	-.01	.01	-.24		
Low Reactive	-.07+	.04	-.27		
Inhibited	-.03	.05	-.11		
Active Self-Regulation	-.05+	.03	-.37		
Low Reactive X Active Self-Regulation	.03	.05	.19		
Inhibited X Active Self-Regulation	.02	.04	.06		

* $p < .05$ + $p < .1$

Table 15

Multiple Regression Results for Solitary Passive

	B	SE(B)	β	F	R ²
I. Disappointment Negative Vocalizations				1.19	.15
PPVT	.00	.001	.04		
OCTS	-.009	.008	-.16		
Low Reactive	.01	.04	.05		
Inhibited	-.02	.04	-.06		
Negative Vocalizations	.04	.03	.29		
Low Reactive X Negative Vocalizations	-.10*	.05	-.46		
Inhibited X Negative Vocalizations	-.02	.06	-.04		
II. Disappointment Internally-Directed				1.37	.17
PPVT	.002	.001	.21		
OCTS	-.01	.008	-.19		
Low Reactive	.04	.04	.157		
Inhibited	-.04	.04	-.13		
Internally-Directed	.08*	.04	.61		
Low Reactive X Internally-Directed	-.08	.07	-.18		
Inhibited X Internally-Directed	-.12**	.05	-.65		

* $p < .05$ ** $p < .01$

Table 16

Multiple Regression Results for Social Play

	B	SE(B)	β	F	R ²
I. Disappointment Internally-Directed				.94	.13
PPVT	.00	.003	-.002		
OCTS	.02	.02	.160		
Low Reactive	.02	.10	.03		
Inhibited	-.03	.11	-.04		
Internally-Directed	-.16*	.10	-.46		
Low Reactive X Internally-Directed	.19	.18	.18		
Inhibited X Internally-Directed	.25*	.12	.56		

* $p < .05$

Figure 1

Disappointment Negative Vocalizations Moderates the Relations Between Low Reactive and Solitary Passive Peer Behaviors

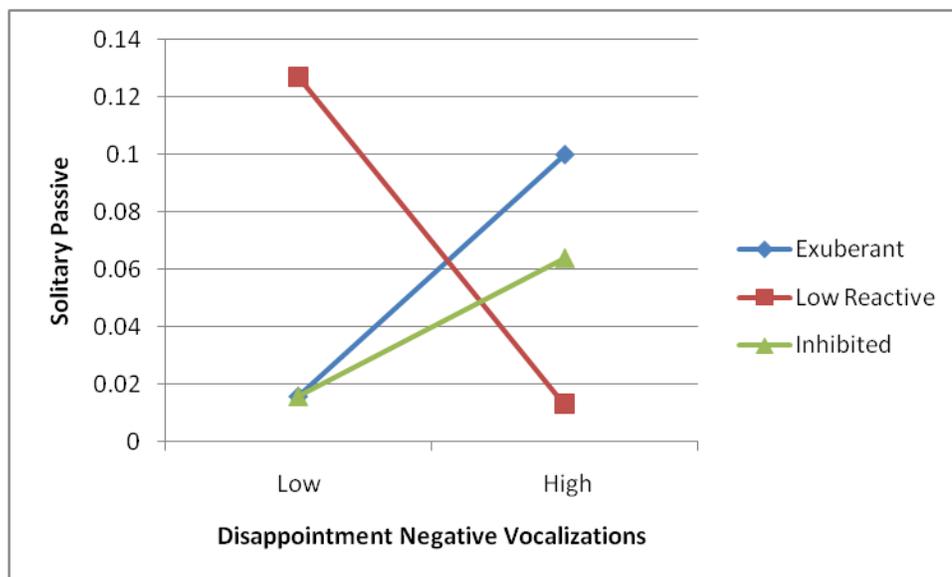


Figure 2

Disappointment Internally-Directed Behavior Moderates the Relations Between Exuberant and Solitary Passive Peer Behaviors

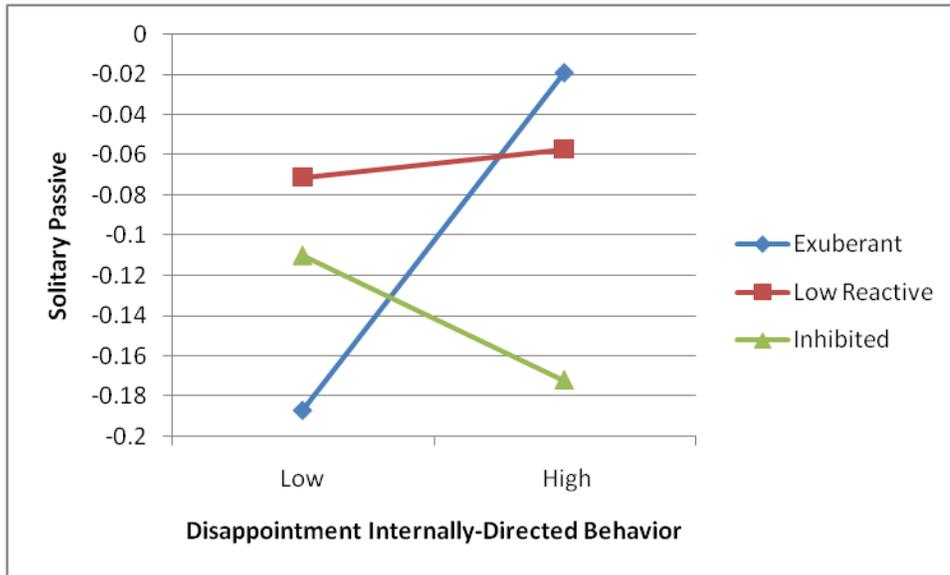
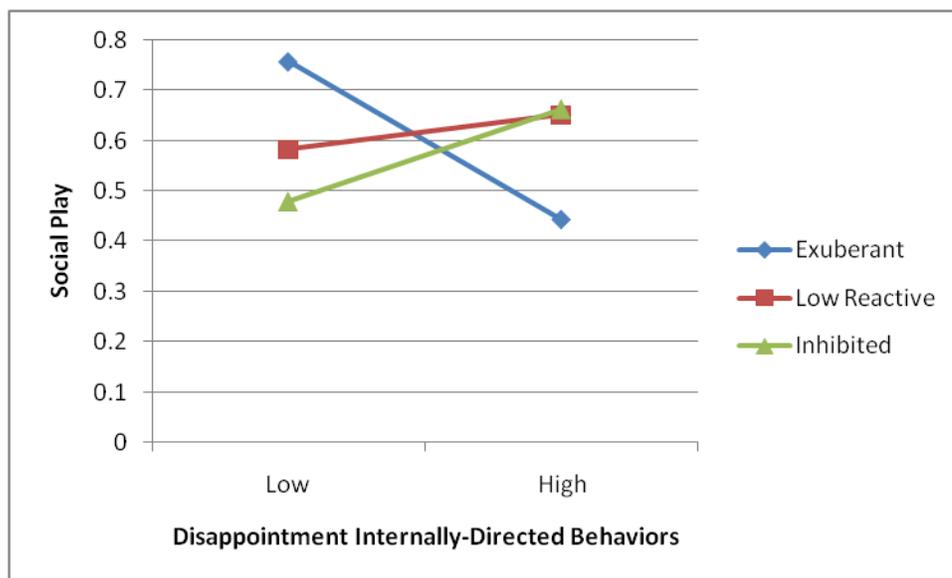


Figure 3

Disappointment Internally-Directed Behavior Moderates the Relations Between Exuberant and Peer Social Play



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