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The current study examined the effect of early emotion regulation and reactivity on later behavioral outcomes. Differential forms of reactivity were thought to interact with attentional control to predict internalizing or externalizing behavior. Additionally, social preference was examined as a moderator or mediator of these relations. Ratings of reactivity and regulation were obtained by mother report when the children were four years old. Social preference was obtained through peer report of likability. Finally, children self-reported on internalizing symptoms, and mothers and teachers reported on externalizing symptoms at age ten. Hierarchical regression analyses revealed direct effects of anger reactivity and attentional control on externalizing behavior and an interaction between sadness/ fear reactivity and attentional control predicting internalizing behavior. Social preference was found to mediate the relation between attentional control and internalizing behavior. Implications for future research examining the role of reactivity and regulation on maladaptive behavior were discussed.

PREDICTING BEHAVIORAL OUTCOMES FROM REACTIVITY AND REGULATION AND THE ROLE OF SOCIAL PREFERENCE

by

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TABLE OF CONTENTS

Page

LIST OF TABLES iv

LIST OF FIGURES vi

CHAPTER

I. INTRODUCTION 1

II. METHOD 13

III. RESULTS 22

IV. DISCUSSION 31

REFERENCES 39

APPENDIX A. CHILD BEHAVIOR QUESTIONNAIRE SUBSCALES 51

APPENDIX B. TABLES AND FIGURES 53

LIST OF TABLES

Page

Table 1. Descriptive Statistics for Raw Scores of Independent and Dependent Variables 53

Table 2. Correlation Coefficients for Independent and Dependent Variables 54

Table 3. Descriptive Statistics for Independent and Dependent Composite Variables 55

Table 4. Correlation Coefficients for Independent and Dependent Composite Variables 56

Table 5. Anger Reactivity, Attentional Control, and Anger Reactivity X Attentional Control Regressed onto Externalizing Behaviors 57

Table 6. Social Preference Moderating the Relation between Individual Factors and Externalizing Behaviors 58

Table 7. Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Internalizing Behaviors 59

Table 8. Descriptive Statistics for All Study Variables by Gender and Differences 62

Table 9. Anger Reactivity, Attentional Control, and Anger Reactivity X Attentional Control Regressed onto Internalizing Behaviors 63

Table 10. Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Internalizing Behaviors Excluding 16 Kids with Elevated Levels of Both Internalizing and Externalizing Behavior 65

Table 11. Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Depressive Symptoms (CDI) 66

Table 12. Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Anxious Symptoms (MASC) 68

LIST OF TABLES

Page

Table 13. Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Socially Anxious Symptoms (MASC).....69

LIST OF FIGURES

Page

Figure 1. Interaction of Sadness/ Fear Reactivity and Attentional Control Predicting Internalizing Behavior 60

Figure 2. Mediation Model with Beta Weights and Significance Levels 61

Figure 3. Interaction of Anger Reactivity and Attentional Control Predicting Internalizing Behavior. 64

Figure 4. Mediation Model with Beta Weights and Significance Levels 67

CHAPTER I

INTRODUCTION

Maladaptive behavior in youth has typically been conceptualized into two domains: internalizing behavior and externalizing behavior. Internalizing behavior, broadly defined as depressive and anxious symptoms, represents a pervasive problem that negatively impacts current functioning and characteristically leads to further psychopathology in adulthood, such as major depressive disorder and diagnosable anxiety (Yap, Allen & Sheeber, 2007). Externalizing behavior is characterized by conduct problems, aggressive or disruptive actions, and antisocial behaviors and can also lead to a pattern of maladaptive behavior in adulthood (Zhou, Hofer, Eisenberg, Reiser, Spinrad, & Fabes, 2007). Considering these harmful outcomes, it is imperative to correctly identify precursors to internalizing and externalizing behavior, thereby intervening and altering negative outcomes. Individual factors have been shown to be predictive of later internalizing and externalizing behavior (Calkins, Gill, Johnson & Smith, 1999; Rothbart, Ahadi & Hershey, 1994); however, greater specificity is needed to clarify these associations. Additionally, it would be beneficial to discern how specific individual factors operate in concert to predict distinct outcomes. Another gap in the literature is that individual factors are rarely placed in a context when predicting internalizing and externalizing behavior. Considering the influential effect of the school

environment during early development (Blair, Denham, Kochanoff & Whipple, 2004) psychosocial determinants should be further explored. Finally, it is important to consider the specific processes individual and psychosocial factors may have in predicting distinct outcomes.

Individual Factors

Reactivity

A specific individual factor that has emerged in the literature as a predictor of behavioral outcomes is reactivity. Reactivity is defined as the propensity to display emotions, either positive or negative, and more explicitly as the arousability of motor, affective, and sensory response systems (Rothbart, 1989). Negative reactivity has been examined globally and linked to general maladjustment (Eisenberg et al., 2009). However, in the vein of greater specificity, reactivity has been divided into separate components that have differential associations with behavioral outcomes. One component captures emotions characteristic of inhibition, under which researchers have grouped together fear and sadness; the second component is characteristic of anger. Research has linked anger reactivity to later aggressiveness and externalizing behavior (Janson & Mathiesen, 2008; Betts, Gullone & Allen, 2009; Eisenberg, Cumberland, Spinrad, Fabes, Shepard, Reiser, Murphy, Losoya & Guthrie, 2001); while displays fear and sadness reactivity are most typically predictive of later anxiety and depression (Clark, Watson & Mineka, 1994). Janson and Mathiesen (2008) analyzed mother report of sadness/ fear reactivity and problem behaviors longitudinally and found stable maternal reports of reactivity, as well as a significant link between fear and sadness reactivity and elevated

internalizing problems. These results were consistent across gender. Eisenberg and colleagues (2009) also longitudinally examined the relation of both components of reactivity to externalizing, internalizing and co-occurring behavior problems. Specifically, participants high in anger reactivity were prone to externalizing behavior, and fear/ sadness reactivity was linked to internalizing behavior in both males and females (Eisenberg et al., 2009).

Regulation

Regulation is another individual factor that is often examined within the literature as a predictor of behavioral outcomes. Emotional regulation is defined as "those behaviors, skills, and strategies, whether conscious or unconscious, automatic or effortful, that serve to modulate, inhibit, and enhance emotional experiences and expressions" (Calkins, 2010). The development of emotion regulation skills begins during toddlerhood and is a result of the combination of neurobiological contributions, as well as socialization factors (Supplee, Skuban, Shaw & Prout, 2009). The management of emotions, therefore, occurs on physiological, cognitive, and behavioral levels and can be impacted by the self and others (Rydell, Berlin, & Bohlin, 2003). The appropriate development of emotion regulation is necessary for psychological well-being, as these skills, strategies, and behaviors allow one to process stimuli and react accordingly.

While reactivity and emotion regulation are related processes, researchers have posited that they be treated as separate phenomena (Yap, Allen & Sheeber, 2007). Emotional reactivity differs from regulation as the former refers to the initial emotional activation to a stimulus and the latter to the processes that control emotional responses

(Blair et al., 2004). For example, child A may be prone to sadness (high on reactivity) but can use an array of strategies to calm themselves (high on regulation); therefore her behavior may not appear maladaptive. Conversely, child B may rarely display sadness (low on reactivity) but when that emotion is presented, she is unable to effectively manage (low on regulation). Therefore child B may display maladaptive behavior.

These examples suggest that, despite being distinct constructs, reactivity and regulation operate in tandem. Thus, research has moved beyond examining the individual influences of reactivity and regulation towards models that incorporate both. Blair and colleagues (2004) state that understanding the contributions of both regulation and reactivity assists in the identification of what may cause a child to become maladjusted and contributes to the development of strategies to aid a child having emotional difficulties. For example, studies show high levels of emotional reactivity and low emotion regulation skills have been associated with elevated levels of behavioral problems (Calkins, 1994; Eisenberg, Fabes, Guthrie, et al., 1996; Eisenberg, Fabes, et al., 2000).

In addressing both these individual factors, studies linking regulation to behavioral outcomes should be discussed in terms of the specific reactivity component being regulated. This is because distinct regulatory processes can lead to differential outcomes. Research has demonstrated this, with the regulation of specifically anger being linked to externalizing behavior (Eisenberg et al., 2000; Supplee, Skuban, Shaw & Prout, 2009) and the regulation of specifically sadness/ fear being linked to internalizing behavior (Aldao, Nolen-Hoeksema & Schweizer, 2010; Eisenberg et al., 2001; Rydell,

Berlin & Bohlin, 2003). For example, Eisenberg and colleagues (2001) demonstrated that males and females high on externalizing behavior have poor regulation skills, and tend to act out when angry. Additionally, Hill and colleagues (2006) revealed that regulation of anger was a significant predictor for chronic externalizing behavior but only in females. In examining internalizing symptoms, it was found that poor regulation of fear (not poor regulation of anger or positive emotion) was predictive of internalizing problem behavior (Rydell *et al.*, 2003).

Considering the importance of both regulation and reactivity, researchers have proposed that individual differences in both factors may have interactive effects (Blair et al., 2004; Eisenberg & Fabes, 1992). In a longitudinal study of kindergarteners through fifth graders, Eisenberg and colleges (2000) revealed that reactivity moderated the relation between regulation and problem behavior. While interactive effects are intuitive, such findings have not always been demonstrated in the literature or when found, have been dependent on factors such as reporter or regulation strategy (Eisenberg, Fabes, Guthrie, et al., 1996; Eisenberg, Fabes, Shepard, et al., 1997). Rydell and colleagues (2003) examined relations between reactivity, emotion regulation, and children's behavioral adaptation and concluded that most consistently reactivity and regulation did not interact. The researchers, however, supported the theoretical argument for interactive effects and encouraged future research to examine the combined contribution of reactivity and regulation (Rydell, Berlin & Bohlin, 2003).

Calkins (in press) states that a greater understanding of specific dimensions of regulation is needed to arrive at more detailed models of development. In this vein,

attentional control, defined as the ability to shift and/or focus attention as needed (Derryberry & Rothbart, 1997), has emerged as a regulation strategy predictive of behavioral outcomes. Attentional control is a primary strategy that is used to alter both internal emotion-related processes, as well as overt behavior (Eisenberg et al., 2000). It emerges around twelve months, and individual differences in attentional ability become more detectable throughout the toddler and preschool years (Kochanska et al., 2000). Since this strategy involves properly organizing incoming stimuli and focusing attention away from distressing stimuli, attentional control is often used to maintain a calm state (Rothbart, Ellis & Posner, 2004). Furthermore, normative levels of attentional control allow one to tolerate change and delay gratification (Rothbart, Ellis & Posner, 2004) which may contribute to creating an appropriate cognitive and behavioral response as oppose to acting out. Poor attentional control has been associated with internalizing behavior (Muris, Mayer, Lint & Hofman, 2008; Derryberry & Rothbart, 1988; Kochanaska, Coy, Tjebkes & Husarek, 1998), and studies have linked attentional control to externalizing behavior, conduct disorder, and aggression (Muirs et al., 2008, Derryberry & Rothbart, 1988; Eisenberg, Fabes & Guthrie, 1996; Moffitt, 1993; Hart, Keller, Edelstein & Hofman, 1998). As mentioned, differences in the regulation strategy being measured may contribute to the lack of interactive findings (Rydell et al., 2003). In examining attentional control specifically, it has been found to consistently interact with global measures of reactivity to predict behavioral outcomes. For example, Eisenberg and colleges (2000) revealed that attentional control predicted externalizing only for those children highly reactive; this association was true across gender.

Contextual Variable

Some research has shown that reactivity and regulation can –both singly and in concert- predict behavioral outcomes; however, few studies have placed the link between individual factors and behavioral outcomes within a context. In particular, the social environment could influence how reactivity and regulation relate to behavioral outcomes and possibly influence internalizing and externalizing behavior differentially. Specifically, social preference, which is defined as a child's overall likability (Coie, Dodge & Coppotelli, 1982), could play a meaningful role. Social preference could serve as a mechanism to explain how individual factors relate to internalizing behavior; as reactivity and regulation influence social preference (Calkins *et al*., 1999; Rothbart, Ahadi & Hershey, 1994; Eisenberg, Fabes, Guthrie & Reiser, 2000), and low social preference is predictive of internalizing behavior (McDougall, Hymel, Vaillancourt & Mercer, 2001).

Children with appropriate levels of global reactivity typically display more socially competent behavior (Eisenberg *et al*., 2000). Conversely, excessive displays of global reactivity tend to restrict positive social interactions, since children limit their social interactions with peers who exhibit extreme affect (Blair *et al*., 2004). Fabes (2002) revealed that children rated high by teachers on global reactivity engaged in more solitary play, which served to further isolate them from peers over time. Moreover, children tend to want to be with those who express positive emotion as well as avoid those exhibiting excessive negative emotion (Eisenberg, Vaughan & Hofer, 2009); therefore, global reactivity is positively related to the negative peer nominations (e.g.

disliked) and inversely related to positive peer nominations (e.g. liked, prosocial) (Eisenberg, Vaughan & Hofer, 2009).

Regulation is also predictive of social behavior, with adaptive emotion regulation strategies being linked to better social functioning, popularity with peers, and better school adjustment (Eisenberg *et al*., 2000). Calkins and colleagues (1999) affirmed that the ability to regulate emotion allows a child to maintain a social relationship, even when conflict arises. Children with poor regulation skills, therefore, often lack close social ties, and poor emotion regulation has been linked to decreases in the number of reciprocated friendships (Walden, 1999). Examining attentional control specifically, Wilson (2003) found that popular and prosocial children had the least difficulty shifting attention and transitioning from negative to positive affect. Eisenberg and colleges (1996) also examined the role of attention control and found interactive effects, with attention control moderating the relation between reactivity and peer rated prosocial behavior.

Finally, McDougall, Hymel, Vaillancourt and Mercer (2001) assert that early peer rejection can result in an array of negative outcomes, specifically on an intrapersonal level. For example, depression, loneliness, poor self-concept, and psychopathology (characteristics of internalizing behavior) can all result from low social preference (McDougall et al., 2001).

Low social preference could also exacerbate the risk individual factors have on externalizing behavior. Negative peer experiences at an early age tend to increase children's feelings of anger and frustration (Eisenberg, Vaughan & Hofer, 2009); therefore psychosocial problems in kindergarten are powerful precursors of later

maladjustment. Early peer rejection has also been implicated in the development of interpersonal problems, such as aggression, school misbehavior, delinquency, and criminality (characteristics of externalizing behavior).

It is important to note that social preference may have differential roles relating to internalizing or externalizing behavior due to the significance of the social environment. Poorly regulated anger should most typically lead to acting out behavior and negative peer feedback may simply intensify that risk. Furthermore, research has demonstrated that social facets other than preference, such as association with deviant peers, may be a more salient factor that explains externalizing behavior (Fanti & Henrich, 2010). Conversely, disengagement from the social environment has been underscored as a risk factor for internalizing behavior. For example, Fanti and Henrich (2010) demonstrated that children exhibiting internalizing problems were more likely to be asocial with peers early in development.

Current Study

In summary, the individual factors of reactivity and regulation have emerged in the literature as predictors of behavioral outcomes. When examining these factors closer, specific components are linked differentially to externalizing and internalizing behavior. For example, anger reactivity and the regulation of anger leads to externalizing behavior and sadness/ fear reactivity and the regulation of those emotions are linked to internalizing behavior. Considering the importance of both components, interactive effects have been suggested in the literature; however, these findings are inconsistent. Specifying a particular regulation strategy could be an avenue to clarify if interactive

effects exist. In this vein, attentional control has emerged as a regulation strategy that most often produces interactive effects. Finally, the association between individual factors and behavioral outcomes should be examined within a context. Specifically, social preference is a psychosocial variable that could influence these relations differentially for internalizing and externalizing behavior.

The development of adaptive behaviors early in childhood helps children effectively handle distress; the basis of such adaptive behavior is the interplay of reactivity and regulatory strategies. The overall maladaptive handling of emotion often precedes the onset of psychological symptomology. The current study, therefore, examined early regulation strategies and reactivity in children at age four, as during this age, differences in individual factors become apparent. These individual factors were compared to internalizing and externalizing behavior in the same children at age ten. Furthermore, these associations were examined with males and females combined because few gender differences have been demonstrated in the literature for this development period (Janson & Mathiesen, 2008; Eisenberg et al., 2000, 2009).

As detailed previously, research has linked specific components of reactivity and regulation to behavioral outcomes. Intuitively, the anger component of reactivity has been linked to externalizing and fear/sadness to internalizing. The current study expanded on these associations by examining how the reactivity components interact with the regulatory strategy of attentional control to predict behavioral outcomes. It was thought that the interaction of anger X attentional control would predict externalizing behavior,

and the interaction of sadness/ fear X attentional control would predict internalizing behavior.

Failure to display appropriate emotional responses also leads to difficulties in areas such as social competence. Such difficulties become especially salient during school entry, as kindergarteners are required to adhere to greater social demands, such as participating in structured pre-academic tasks and following new rules and regulations (Ladd, Herald & Kochel, 2006). Additionally, difficulties in school, can impact later behavioral outcomes. Since children will typically limit interactions with children with inappropriate emotional displays, highly reactive and poorly regulated children should be generally disliked by their peers. This difficulty with peers would also influence later maladaptive behavior. Consequently, low social preference at kindergarten should at least partially explain why highly reactive and poorly regulated children have elevated levels of internalizing behavior. This is due to internalizing symptoms such as loneliness and poor self concept being directly influenced by peer acceptance. Since likability is not as salient of a social factor for the development of externalizing behavior, it should not explain the relation between individual factors and externalizing behavior. However, poor social interactions should exacerbate the risk high levels of reactivity and poor regulation have on externalizing behavior.

Using a sample of children between the ages of four and ten from an ongoing longitudinal study, four hypotheses were tested:

1. Children with high levels of anger reactivity and with low levels of attentional control at age four will display elevated levels of externalizing behavior at age ten.
2. Low social preference at kindergarten will moderate the relation between individual factors at age four and externalizing behavior at age ten.
3. Children with high levels of sadness/ fear reactivity and with low levels of attentional control at age four will display elevated levels of internalizing behavior at age ten.
4. Low social preference will mediate the relation between individual factors and internalizing behavior.

CHAPTER II

METHOD

Recruitment and Attrition

The current sample utilized data from three cohorts of children who are part of an ongoing longitudinal study. The goal for recruitment was to obtain a sample of children who were at risk for developing future externalizing behavior problems, and who were representative of the surrounding community in terms of race and socioeconomic status (SES). All cohorts were recruited through child day care centers, the County Health Department, and the local Women, Infants, and Children (WIC) program. Potential participants for cohorts 1 and 2 were recruited at 2-years of age (cohort 1: 1994-1996 and cohort 2: 2000-2001) and screened using the Child Behavior Checklist (CBCL 2-3; Achenbach, 1992), completed by the mother, in order to over-sample for externalizing behavior problems. Children were identified as being at-risk for future externalizing behaviors if they received an externalizing T-score of 60 or above. Efforts were made to obtain approximately equal numbers of males and females. A total of 307 children were selected. Cohort 3 was initially recruited when infants were 6-months of age (in 1998) for their level of frustration, based on laboratory observation and parent report, and were followed through the toddler period (see Calkins, Dedmon, Gill, Lomax, & Johnson, 2002, for more information). Children whose mothers completed the CBCL at 2-years of age were included in the current study (n = 140). Of the entire sample (N = 447), 37% of

the children were identified as being at risk for future externalizing problems and 15% (N = 447) were identified as being at risk for future internalizing problems. There were no significant demographic differences between cohorts with regard to gender, $\chi^2(2, N = 447) = .63$, $p = .73$, race, $\chi^2(2, N = 447) = 1.13$, $p = .57$, or 2-year SES, $F(2, 444) = .53$, $p = .59$. Cohort 3 had a significantly lower average 2-year externalizing T-score ($M = 50.36$) compared to cohorts 1 and 2 ($M = 54.49$), $t(445) = -4.32$, $p < .001$.

Of the 447 original screened participants, 6 were dropped because they did not participate in any 2-year data collection. At 4-years of age, 399 families participated. Families lost to attrition included those who could not be located, who moved out of the area, who declined participation, and who did not respond to phone and letter requests to participate. There were no significant differences between families who did and did not participate in terms of gender, $\chi^2(1, N = 447) = 3.27$, $p = .07$, race, $\chi^2(1, N = 447) = .70$, $p = .40$, 2-year SES, $t(424) = .81$, $p = .42$, or 2-year externalizing T-score, $t(445) = -.36$, $p = .72$. At 5-years of age, 365 families participated, including four that did not participate in the 4-year assessment. Again, there were no significant differences between families who did and did not participate in terms of gender, $\chi^2(1, N = 447) = .76$, $p = .38$, race, $\chi^2(1, N = 447) = .17$, $p = .68$, 2-year socioeconomic status, $t(424) = 1.93$, $p = .06$, and 2-year externalizing T-score, $t(445) = -1.73$, $p = .09$. At 7-years of age, 350 families participated, including 19 that did not participate in the 5-year assessment. Again, there were no significant differences between families who did and did not participate in terms of gender, $\chi^2(1, N = 447) = 2.12$, $p = .15$, race, $\chi^2(3, N = 447) = .60$, $p = .90$ and 2-year externalizing T-score, $t(445) = -1.30$, $p = .19$. Families with lower 2-year socioeconomic

status were less likely to continue participation at the 7-year assessment, t(432) = 2.61, p < .01. At 10-years of age, 358 families participated, and no significant differences were noted between families who did and did not participated in terms of race, χ^2 (3, N = 427) = 2.77, p = .43, 2-year socioeconomic status, t (413) = -.48, p = .64 or 2-year externalizing T-score, t (425) = -.98, p = .33. A significant difference was found for gender, χ^2 (1, N = 427) = 4.12, p < .05, with more females than males participating in the 10-year visit.

Participants

The sample size utilized was N= 403; it is representative of participants who had data for at least one time point. For the current study, 46% were male, 66.8% were Caucasian, 27.5% were African American, 3.5% were Mixed, and 2.2% were Other. The mean Hollingshead Score was M= 42.48; Range= 52.00. The current study focused on the 4-year temperament, 5.5 year school, and 10.5-year laboratory and school assessments. At 4 years of age, 378 families participated in the temperament visit. There were significant differences between families who did and did not participate in terms of gender, χ^2 (1, N = 447) = 4.190, p <.05, but no differences between families who did and did not participate in terms of race, χ^2 (1, N = 447) = 1.308, p = .52, 2-year SES, t (445) = -1.125, p = .261, or 2-year externalizing T-score, t (408) = .776, p = .438. At 5.5 years, 251 children participated in school data collection. There were no significant differences between families who did and did not participate in terms of gender, χ^2 (1, N = 447) = 2.173, p = .14, race χ^2 (1, N = 447) = 1.106, p = .575, 2-year SES, t (445) = -1.309, p = .163, or 2-year externalizing T-score, t (408) = .327, p = .744. At 10.5 years, data was

collected from fifth grade teachers of 272 children. There were no significant differences between families who did and did not participate in terms of gender, χ^2 (1, N = 447) = 2.305, p = .129, race, χ^2 (1, N = 447) = 1.540, p = .673, 2-year SES, t (432) = -.521, p = .611, or 2-year externalizing T-score, t (445) = 2.157, p = .141. Additionally, 10-years of age, 358 families participated in laboratory visits. No significant differences were noted between families who did and did not participated in terms of race, χ^2 (3, N = 427) = 2.77, p = .43, 2-year socioeconomic status, t (413) = -.48, p = .64 or 2-year externalizing T-score, t (425) = -.98, p = .33. A significant difference was found for gender, χ^2 (1, N = 427) = 4.12, p < .05, with more females than males participating in the 10-year visit.

Procedures

4.5 year Assessment. When the children were 4 years old, they were asked to come to the laboratory with their mothers for a 2-hour visit examining children's frustration tolerance, emotional regulation, compliance, impulsivity, as well as several tasks involving mother-child interactions. During this visit mothers were also asked to complete several questionnaires. Pertinent to the current study mother report of both regulation and reactivity was utilized from this visit.

5.5 year (Kindergarten) Assessment. Approximately one year later, consent from the families was obtained to complete an assessment in the child's kindergarten classroom. At this time, an assessment of the child's social status was obtained by interviewing peers in the classroom on a standard sociometric assessment. This assessment did not take place until the children had at least 8 weeks in the classroom to become acclimated to their peers, and only children with parental consent were

interviewed. Trained graduate and undergraduate students individually interviewed each child. The sociometric procedures used were a modified version of Coie, Dodge, and Coppotelli's (1982) original procedure. Instead of asking children to nominate three peers they "liked most" and "liked least," children were asked to give unlimited nominations for each category (Terry, 2000). This method allows for more reliable results and a reduction in measurement error. Furthermore, this increased precision can be achieved with fewer classmates than are needed for the limited-choice nominations. Furthermore, cross-gender nominations were permitted to increase the stability of measurement for the nominations to determine peer status. To ensure that the children had a good understanding of the questions, they were asked to go through several sample questions until they understood the task, and pictures of all of the participating children were provided as visual prompts. Interviewers were trained to provide further information and more examples if the child did not seem to grasp the questions being asked. From these sociometric interviews, the current study obtained a social preference index utilizing nominations of like and dislike.

10.5 year (5th Grade) Assessment. At 10.5 years, mothers were contacted by mail and telephone and asked to participate in a follow-up study. Families who agreed to participate in the follow-up came to the two laboratory visits. During laboratory visits, mothers completed a number of questionnaires and children participated in a battery of behavioral assessments assessing social, emotional and cognitive functioning as well as parent-child interaction. For the current study, selected questionnaires from the 10.5 year visit were used, pertaining to the child self-report of internalizing symptoms.

Additionally, as part of the 10.5 year visit, questionnaires were completed by fifth grade teachers assessing child functioning in the classroom, school adjustment/environment and peer relationships.

Measures

Reactivity. Reactivity was assessed through maternal report on the Child Behavior Questionnaire at age four (CBQ; Rothbart, Ahadi, & Hershey, 1994). The CBQ is a 195 item questionnaire, requiring mothers to rate their child's behavior on a 7-point Likert scale ranging from extremely untrue to extremely true. The subscales of anger (12 items), sadness (12 items), and fear (12 items) were utilized. Sample items include the following: "Is not afraid of large dogs and/or other animals", "Cries sadly when a favorite toy gets lost or broken.", and "Has temper tantrums when s/he doesn't get what s/he wants." Chronbach's alpha for the current sample on the anger, sadness, and fear subscales, as well as the sadness/ fear composite were $\alpha = .880$, $\alpha = .648$, $\alpha = .678$, and $\alpha = .846$, respectively.

Regulation. To assess children's behavioral display of regulation the CBQ was also utilized; specifically the attention focus and attention shifting subscales. The attention focus subscale consisted of 9 items. A sample item is "My child, when drawing or coloring in a book shows strong concentration." The attention shifting scale consisted of 5 items; a sample item is "My child can easily shift from one activity to another." Items for both subscales produce an attentional control score; higher scores indicate greater attentional control. Rothbart and colleagues (2001) indicated that the CBQ is a valid reliable measure ($\alpha = .74$ for the attentional control subscale).

Social Preference. Peer-rated preference scores were obtained from the sociometric procedures. The total number of nominations for "like most" and "like least" will be standardized to obtain two separate z scores, which will subsequently be subtracted to compose a Social Preference Index (z "like most" – z "like least" = social preference) (Coie et al., 1982). Lower social preference scores represent less likeability or overall peer status in the classroom, whereas higher social preference scores represent greater likeability.

Internalizing Behavior. A composite measure of internalizing behavior was obtained by combining self-reports of anxious and depressive symptoms across various scales.

Child self-report of internalizing behavior was obtained using the internalizing subscale of the Behavior Assessment Scale for Children Second Edition (BASC-PRS, BASC-TRS; Reynolds & Kamphaus, 1992). The BASC is a widely used 148-item measure (for children ages 6-11) that assesses a wide range of problem behaviors. Children were asked to rate the frequency of anxious and depressive behaviors described using a likert-type rating ranging from 1 (never) to 4 (almost always). Example items include the following: "I worry", "I say hate myself", and "I am nervous." The measure produces age and gender normed t-scores for each subscale assessment; the current study utilized age normed t-scores. The BASC is widely used across research domains and exhibits well established internal consistency, reliability, and validity. The alpha and test-retest reliability for the internalizing subscales have been reported at .70 and .78, respectively (Reynolds & Kamphaus, 1992; 2002).

Self-report of anxiety was also obtained using the Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, & Stallings, 1997). The MASC is a 39-item measure of physical symptoms of anxiety, social anxiety, harm avoidance, and separation anxiety for children between the ages of 8 and 19 years Each item is rated on a likert scale ranging from 0 (never true about me) to 3 (often true about me). Example items include the following: "I feel shy", "I have pains in my chest", and "I feel tense or uptight."An overall age-normed anxiety t-score is produced. Research examining the psychometric properties of the MASC has demonstrated strong support for its internal consistency, reliability, and validity (Baldwin & Dadds, 2007; March & Parker, 2004). Chronbach's alpha for the current sample was $\alpha = .885$.

The Child Depression Inventory (CDI; Kovas, 1985) is a 27-item global measure of depressive symptoms for children between the ages of 7 and 17 (Kovas, 1985). Items are presented as statements representing degrees of specific symptoms. Children rate each item by choosing the symptom statement that best describes them over the previous two weeks. Example items include the following: "I have fun in many things," "I have fun in some things," "Nothing is fun at all." An overall age-normed t-score is produced, with higher scores reflecting greater depressive symptoms. Chronbach's alpha for the current sample was $\alpha = .893$.

Externalizing Behavior. Parent and teacher reports on the Behavior Assessment Scale for Children (BASC-PRS, BASC-TRS; Reynolds & Kamphaus, 1992) were utilized as a measure of externalizing behavior. Reporters were asked to rate the frequency of problem behaviors that are focused outward and are highly disruptive using

a likert-type rating ranging from 1 (never) to 4 (almost always). Example items include the following: “Lies”, “Breaks the rules”, and “Bullies others.” As previously detailed, the BASC is widely used across research domains and exhibits well established internal consistency, reliability, and validity.

CHAPTER III

RESULTS

The data was first imputed to account for missing values using the missing value analysis (MVA) technique in SPSS. Little's (Little & Rubin, 2002) missing completely at random (MCAR) showed a Chi-square = 2425.12 ($p = 0.91$; $df = 2520$), indicating that the data was not systematically missing. An expectation-maximization (EM) algorithm was then used to generate values to fill in all the missing data. Analyses were conducted to examine normative distribution of the scales. The CDI and internalizing subscale of the BASC were positively skewed (skewness= 2.359 and 1.452, respectively); therefore log transformations were performed on the t-scores for the CDI, MASC, and internalizing subscale of the BASC. These scales were then averaged to create a composite measure for the internalizing outcome variable. Composite measures were also computed for the externalizing variable by averaging parent and teacher report on the externalizing subscale of the BASC, as well as for the sadness/ fear reactivity variable by averaging sadness and fear subscales of the CBQ. A weighted average was taken for the attention focus and attention shifting subscale to create the composite attentional control variable. Table 1 displays descriptive statistics of all study variables prior to creating composite measures. The mean T scores for the internalizing and externalizing variables were from 44.66 to 49.29. This indicates that while there was an adequate range of score for the normally distributed variables, most children exhibited subclinical symptomology (T

score < 65). Table 2 displays correlations of all study variables prior to creating composite measures. The MASC, CDI, and BASC were significantly correlated (ranging from r= .498 to r= .732). Parent and teacher report of externalizing behavior were significantly correlated, r= .503. Sadness and fear reactivity were significantly correlated, r= .301. Finally, the attention focusing and attention shifting subscales were significantly correlated, r= .242. Table 3 lists the descriptive information for all composite study variables. Table 4 displays correlations between all composite study variables. Significant correlations were found between all variables (ranging from r= .131 to r= -.473), except between sadness/ fear reactivity and social preference.

Anger reactivity/ attentional control as predictors of externalizing behavior

To test the hypothesis that children high on anger reactivity and low on attentional control have the most elevated levels of externalizing behavior hierarchical regression analysis was conducted. At the first step, the main effects for anger reactivity and attentional control were entered, and at the second step the interaction variable for anger reactivity X attentional control was entered. Table 5 shows the beta weights and significance levels for both steps. Contrary to the hypothesis, the interaction variable was not significant. However, main effects for both anger reactivity, $t(402)= 7.312$, $p<.01$, and attentional control, $t(402)= -7.694$, $p<.01$ were found. This indicates that children with high levels of anger reactivity, as well as children with low levels of attentional control have elevated levels of externalizing behavior at age 10, $R^2= .315$.

Social preference as a moderator of anger reactivity/ attentional control on externalizing behavior

To test the hypothesis that low social preference at kindergarten moderates the relation between individual factors and externalizing behavior hierarchical regression analysis was conducted. At the first step, the main effects for anger reactivity, attentional control, and social preference were entered, and at the second step the interaction variables for anger reactivity X attentional control, anger reactivity X social preference, and attentional control X social preference were entered. Finally, the three way interaction for attentional control X social preference X anger reactivity was entered in the final step. Table 6 shows the beta weights and significance levels for both steps. Contrary to the hypothesis, the interaction variables were not significant, meaning social preference did not moderate the relation between reactivity/ regulation and externalizing behavior. However, along with main effects for anger reactivity and attentional control, a main effect for social preference, $t(403)= -3.534$, $p<.01$, was found. This indicates that children with high levels of anger reactivity, children with low levels of attentional control, or children with low social preference among their peers have elevated levels of externalizing behavior, $R^2= .331$.

Sadness/fear reactivity/ attentional control as predictors of internalizing behavior

To test the hypothesis that children high on sadness/ fear reactivity and low on attentional control have the most elevated levels of internalizing behavior hierarchical regression analysis was conducted. At the first step, the main effects for sadness/ fear reactivity and attentional control were entered, and at the second step the interaction

variable for sadness/ fear reactivity X attentional control was entered. Table 7 shows the beta weights and significance levels for both steps. Confirming the hypothesis, the interaction variable was significant, $t(403)= -2.113$, $p<.05$. Figure 1 displays the sadness/ fear reactivity X attentional control interaction, where children with high levels of sadness/ fear reactivity and low levels of attentional control had the most elevated levels of self-reported internalizing behavior, $R^2= .120$. Simple slopes analyses were conducted to determine if the slope plotted was significantly different from zero using Preacher's online tool for assessing two-way interactions (Preacher, Curran, & Bauer, 2006). The region of significance for variables was set for $\alpha=.05$. The analysis revealed that the lines representing children who had high levels of sadness/ fear reactivity ($b=4.12$, $p=.05$) and children who had low levels of sadness/ fear reactivity ($b=.06$, $p=.05$) were significantly different from zero.

Social preference as a mediator of sadness/ fear reactivity/ attentional control and internalizing behavior

To test the hypothesis that low social preference at least partially mediates the relation between individual factors and internalizing behavior, a series of hierarchical regression analyses according to a procedure specified by Baron and Kenny (1986) were performed. Baron and Kenny (1986) state to test for mediation, the first regression must show that the predictor variable affects the outcome variable, the second that the predictor variable is related to the mediator, and the third that the mediator is related to the outcome variable. For full mediation, regression analyses must show that the predictor variable no longer significantly predicts the outcome variable after controlling

for the mediator. Partial mediation exists if the effect of the predictor variable on the outcome variable is reduced, but still significant (Baron & Kenny, 1986). The Sobel (1982) test was used to examine the reduction of the effect of the predictor variable on the outcome variable.

In the first regression analysis, the main effects for sadness/ fear reactivity and attentional control, as well as the interaction for sadness/ fear reactivity X attentional control was regressed on internalizing behavior. Results showed a main effect attentional control only, $t(403)= 5.212$, $p<.01$, where children with high levels of attentional control had high levels of social preference, $R^2= .063$. In the second regression analysis, social preference was regressed on internalizing behavior. Results showed a main effect for social preference, $t(403)= -3.778$, $p<.01$, where low levels of social preference among peers predicted elevated levels of internalizing behavior, $R^2= .034$.

Since regression analyses revealed that the main effect for sadness/ fear reactivity and the interaction variable for sadness/ fear reactivity X attentional control did not predict social preference, the final regression analysis examined social preference as a mediator between attentional control and internalizing behavior. Attentional control was regressed on internalizing behavior, while controlling for social preference in kindergarten. Social preference was entered at the first step, and attentional control was entered at the next step. A main effect for attentional control remained after controlling for social preference, $t(403)= -5.892$, $p<.01$. A subsequent analysis confirmed the hypothesis that social preference partially mediates the relation between the individual factor of regulation and internalizing behavior, Sobel $z = -4.1614$, $p<.01$. Figure 2 shows

the change in beta associated with attentional control when social preference is added to the model.

Post-hoc Analyses

Literature shows that reactivity and regulation have similar associations to behavioral outcomes for both males and females during this developmental period (Janson & Mathiesen, 2008; Eisenberg et al., 2000, 2009). However, to confirm this finding in the current sample, possible gender differences were examined. First, independent samples *t*-tests were conducted. There were significant mean differences between genders for externalizing behavior, where males (M= 49.87) exhibited significantly higher levels compared to females (M= 46.68), $t(403)= 4.835$, $p<.01$. Females (M= 4.10) exhibited significantly higher levels of sadness/ fear reactivity compared to males (M= 3.95), $t(403)= -2.563$, $p<.05$. Females (M= 4.30) exhibited significantly higher levels of attentional control compared to males (M= 4.06), $t(403)= -3.840$, $p<.01$. Finally, females (M= .033) exhibited significantly higher levels of social preference compared to males (M= -.129), $t(403)= -1.989$, $p<.05$. Table 8 displays descriptive statistics and differences by gender. Despite differences in mean levels for independent and dependent variables, there were no differences in associations between the variables. The results remained significant and the patterns remained the same as the initial results across genders.

The current study confirmed that the anger component of reactivity is linked to externalizing and fear/sadness to internalizing. However, to ensure that the reactivity of specific emotions leads to differential findings, the contribution of the alternative form of

reactivity was examined on each behavioral outcome. Sadness/ fear reactivity and the interaction variable for sadness/ fear reactivity X attentional control did not serve as significant predictors of externalizing behavior. Next, anger reactivity and the interaction variable for anger reactivity X attentional control were examined as possible predictors for internalizing behavior. At the first step, the main effects for anger reactivity and attentional control were entered, and at the second step the interaction variable for anger reactivity X attentional control was entered. Table 9 shows the beta weights and significance levels for both steps. The interaction variable was significant, $t(403) = -3.118$, $p<.01$, where children with high levels of anger reactivity and low levels of attentional control had the most elevated levels of self-reported internalizing behavior, $R^2 = .189$. The simple slope analysis revealed that the lines representing children who had high levels of anger reactivity ($b=.12$, $p=.05$) and children who had low levels of anger reactivity ($b=.04$, $p=.05$) were significantly different from zero.

The general aim of the current study was to provide specificity on individual and contextual factors that contribute to differential behavioral outcomes. Considering this aim of specificity, additional hierarchical regression analyses were conducted to examine pure versus co-occurring behavioral outcomes. First, the alternative behavioral outcome was controlled for in each model. When predicating externalizing behavior, anger reactivity and attentional control were entered at the first step, as well as internalizing behavior as a control variable. The interaction of anger reactivity X attentional control was entered at the second step. The results remained significant and the pattern remained the same as the initial results with the addition of internalizing behavior to the model. A

similar model was tested for internalizing behavior as the dependent variable, where sadness/ fear reactivity and attentional control were entered at the first step, as well as externalizing behavior as a control variable. The interaction of sadness/ fear reactivity X attentional control was entered at the second step. Once again, the results remained significant and the pattern remained the same as the initial results with the addition of externalizing behavior to the model. Co-occurring behavioral problems were also examined by identified children who had one standard deviation above the mean on each outcome. Sixteen children, or 4% of the sample, met this criteria (Males= 8; Caucasians= 10, African Americans = 5). Hierarchical regression analyses were conducted with these children removed from the sample. The results remained significant and the pattern remained the same as the initial results when predicting externalizing behavior. However, sadness/ fear reactivity, t(403)= 1.393, *ns*, and the interaction variable for sadness/ fear reactivity X attentional control, t(403)= -.308, *ns*, were no longer significant predictors of internalizing behavior with the 16 children removed from the sample. Table 10 shows the beta weights and significance levels for both steps.

Finally, it is reasonable to assert that high levels of reactivity and poor regulation in the context of the social environment could be differentially related to the components of internalizing behavior. Hierarchical regression analyses were, therefore, conducted to examine depressive versus anxious symptoms. When predicting depressive symptoms, the pattern remained the same as the initial results and most of the associations remained significant, except there was a trend for the interaction for sadness/ fear reactivity X attentional control, t(403)= -1.936, p= .054. Table 11 shows the beta weights and

significance levels for both steps. Additionally, social preference served as a significant partial mediator between attentional control and depressive symptoms, Sobel z = -4.112, $p < .01$. Attentional control was the only significant predictor of anxious symptoms, $t(403) = -2.242$, $p < .05$, See Table 12, and social preference did not serve as a mediator between attentional control and anxious symptoms. When examining symptoms specifically related to social anxiety, there was a trend for the interaction for sadness/ fear reactivity X attentional control, $t(403) = -1.839$, $p = .067$, See Table 13, and once again social preference did not serve as a mediator between attentional control and symptoms related to social anxiety.

CHAPTER IV

DISCUSSION

The current study sought to clarify the role of reactivity and regulation on behavioral outcomes by examining specific individual factors and establishing the presence of interactive effects. Additionally, social preference was examined as a possible mediator of the relation between individual factors and internalizing behavior and a moderator of the relation between individual factors and externalizing behavior. Results indicated that children who were prone to display anger, as well as children who are unable to shift and focus their attention effectively had high levels of acting out behavior. However, contrary to Hypothesis 1, there was no evidence for an interaction between anger reactivity and attentional control when predicting externalizing behavior. There was also no support Hypothesis 2, meaning social preference did not serve as a moderator for these relations. Although low social preference did not exacerbate the risk high anger reactivity and low attentional control had on externalizing behavior, it did serve as a predictor of externalizing behavior. These findings underscore the importance of the independent contribution of early individual and psychosocial factors on later acting out behavior.

When examining internalizing behavior, Hypothesis 3 was supported. Results showed that sadness/ fear reactivity and attentional control did interact, so that children who displayed more sadness/ fear and had poor attentional control had the highest levels

of internalizing behavior. Additionally, social preference did partially explain the relation between attentional control and internalizing behavior; thus, Hypothesis 4 was confirmed. Results indicated that children with an inability to control their attention were disliked by their peers. This negative peer feedback then led to more internalizing behavior.

These results are consistent with literature that shows direct effects of poor attentional regulation on internalizing and externalizing behavior (Muirs *et al*., 2008, Derryberry & Rothbart, 1988; Eisenberg, Fabes & Guthrie, 1996). It was also supported that various forms of emotional reactivity can lead to differential behavioral outcomes (Rydell, Berlin & Bohlin, 2003; Janson & Mathiesen, 2008; Betts, Gullone & Allen, 2009; Eisenberg *et al*., 2001). The link between sadness/ fear reactivity and internalizing behavior, as well as the link between anger reactivity and externalizing behavior has been well established in the literature. Interestingly, however, post-hoc analysis revealed that anger reactivity is also predictive of internalizing behavior. This association has been found by other researchers (Eisenberg et al., 2009), but it is far less documented. It is possible that children who eventually display internalizing behavior are generally more reactive; however this finding warrants further replication before substantial conclusions can be made.

There is also less conclusive evidence in the literature for the interactive effects of reactivity and regulation. These results generally support the theoretical argument that one individual factor can serve as a buffer to the other. This was substantiated by the finding that sadness/ fear and anger reactivity interact with attentional control to predict internalizing behavior. However, the lack of evidence for reactivity and regulation

interacting to predict externalizing behavior indicates that such effects could be outcome and predictor specific.

While previous work has established poor social functioning as an outcome of maladaptive levels of reactivity and regulation (Eisenberg *et al*., 1996), the results from the current study demonstrate that difficulties in the social environment can serve as a mechanism for how individual factors relate to internalizing behavior. Poorly regulated children tended to be excluded from peer networks, which then led to more internalizing behavior. This finding underscores the importance of social feedback in the development of problem behavior. Furthermore, the null finding of social preference moderating the relation between individual factors and externalizing behavior indicates that internal processes may be more susceptible to the effects of poor emotional and social functioning. The mediation of attentional control and internalizing behavior by social preference also highlights the need to examine the processes of how various associations manifest. Knowledge of "why" poorly regulated children go on to display internalizing behavior is more informative and provides better implications for treatment compared to simply knowing that such associations exist.

Achieving specificity, in reference to pure versus co-occurring behavioral outcomes, is also a noteworthy aim. By controlling for internalizing behavior and removing children that exhibited high levels of both behavioral outcomes, these results showed that anger reactivity and attentional control contribute to pure externalizing behavior. The results were less conclusive for internalizing behavior as an outcome. Direct and interactive effects remained for sadness/ fear reactivity and attentional control

predicting internalizing behavior when controlling for externalizing behavior. However, when children that exhibited high levels of both behavioral outcomes were removed from the sample, only attentional control remained a significant predictor. It is possible that attentional control serves as the best predictor of pure internalizing behavior, but a more likely explanation is that the decrease in variance contributed to null findings. Since the internalizing behavior variable was positively skewed, with most children not exhibiting such behavior, it is suggested to reexamine pure internalizing behavior in a more normally distributed sample before reaching substantial conclusions.

Post-hoc analyses revealed gender differences in mean levels of independent and dependent variables; however, the pattern and significant levels of the associations between the variables remained the same across gender. This indicates that reactivity and regulation contribute to the development of problem behavior of both males and females during this developmental period, which is consistent with the literature (Janson & Mathiesen, 2008; Eisenberg et al., 2000, 2009). At age ten, substantial differences in the expression of problem behavior are just beginning to emerge, with males exhibiting more externalizing behavior and females exhibiting more internalizing behavior. Prior to this divergence it is likely that internalizing and externalizing behavior are guided more by emotions. Conversely, after this divergence other factors may begin to substantially contribute to problem behavior by gender; for example, deviance may become goal directed in males, and female internalizing behavior may be guided more by the social environment.

These results indicate that reactivity and regulation better predicted depressive versus anxious symptoms, and social preference only explained the association between attentional control and depressive symptoms. This finding is intuitive considering depressive symptoms include facets such as self-esteem and loneliness. Negative peer feedback stemming from the inability to control ones emotions would likely impact a child's self-concept and should, therefore, be more related to depressive versus anxious symptoms. Additionally, being excluded from the peer network should evoke feelings of loneliness. There was a trend for highly reactive and poorly regulated children exhibiting higher levels of socially anxious symptoms. However, social preference did not serve as a mediator for individual factors and socially anxious symptoms. It is possible that more direct feedback from the social environment would be needed to evoke anxiety. For example, not being liked may not lead a highly reactivity and poorly regulated child to become socially anxious, but experiencing victimization may. Although the primary aim of the current study was not to examine anxious versus depressive symptoms, these results demonstrate the importance of separating internalizing behavior into components.

The current study is not without limitations. As previously mentioned, few children displayed elevated levels of internalizing behavior; thus most scores fell within the normative to subclinical range. This is likely due to recruitment techniques, where the aim was to over-sample children at early risk for externalizing behavior. Future research should, therefore, examine the impact of reactivity and regulation on internalizing behavior in a clinical sample or in a sample whose scores represent a wider range of internalizing behavior.

Another limitation of the study was the sole reliance on maternal report of reactivity and regulation. It is possible that mothers were more attune to reactions of anger, as oppose to sadness/ fear. This was substantiated by descriptive statistics indicating more variance in the anger reactivity variable compared to the sadness/ fear reactivity variable. A final limitation was the assessment of the attentional control variable. It was theoretically defined as a strategy used to maintain a calm state because attentional control involves properly organizing incoming stimuli and focusing attention away from distressing stimuli (Rothbart, Ellis & Posner, 2004). However, the items on the CBQ did not directly assess the use of attention to control emotions. Assessing shifting and focusing attention on novel tasks (e.g. "When drawing or coloring in a book, shows strong concentration") was the aim of the measure. Subsequently, children who exhibited symptoms of AD/HD at age four may have been captured as opposed to children with poor emotion regulation skills. It would be noteworthy to more accurately assess attentional control while accounting for the variance attributed to AD/HD. Furthermore, a multi-method approach to examining individual factors, such as utilizing parental report and behavioral observations, could serve as a better indicator of these concepts.

A number of future directions for research have been detailed above. As mentioned when discussing the null finding of mediation by social preference of attentional control and anxious symptoms, other psychosocial variables could contribute to the relation of reactivity and regulation to behavioral outcomes. In examining peer victimization, highly reactive and poorly regulated children may be picked on which

could then lead to harmful effects. It may also be worthwhile for future research to examine the impact of psychosocial variables across gender and developmental periods. Another noteworthy future direction is the inclusion of additional forms of reactivity and regulation to the models, as well as a focus on multi-method approaches. For example, physiological measures, such as vagal tone, could provide a more comprehensive depiction of regulation. It would also be beneficial to examine convergence among measures of reactivity and regulation; as such findings could implicate the most accurate measurement of these concepts.

Despite the limitations previously noted and need for future research to provide clarification on some associations, the current study offers important contributions to the literature. It was established that reactivity and regulation contribute singly to the development of externalizing behavior and operate in concert to predict internalizing behavior. Additionally, the role of the social environment as a contextual variable was highlighted, as social preference partially explained how poor attentional control leads to internalizing behavior. These findings contribute to the conceptualization of individual factors as a dyadic process, as well as to the understanding of the role of reactivity and regulation in the development of differential behavioral outcomes. Finally, the ability to identify early maladaptive emotions as risk factors for behavior problems provides important treatment and prevention implications. Support is given for the use of emotion centered interventions, such as emotion coaching, in early childhood. Specifically related to these findings, such interventions could directly address elevated levels of reactivity

and foster adaptive regulation skills to impede the development of internalizing and externalizing behavior.

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APPENDIX A: CHILD BEHAVIOR QUESTIONNAIRE SUBSCALES

Sadness
18. Cries sadly when a favorite toy gets lost or broken
39. Tends to feel "down" at the end of an exciting day
44. Tends to become sad if the family's plans don't work out
55. Seems to feel depressed when unable to accomplish some task
64. Becomes upset when loved relatives or friends are getting ready to leave following a visit
72. Does not usually become tearful when tired *
81. Her/ his feelings are easily hurt by what parents say
94. Becomes tearful when told to do something s/he does not want to do
109. Rarely cries when s/he hears a sad story*
112. Rarely becomes upset when watching a sad event in a TV show*
127. Sometimes appears downcast for no reason
149. Rarely becomes discouraged when s/he has trouble making something work*
Fear
15. Is not afraid of large dogs and/ or other animals*
40. Is afraid of burglars or the "boogie man"
50. Is afraid of loud noises
58. Doesn't worry about injections by the doctor*
70. Is not afraid of the dark*
80. Is afraid of fire
91. Is very frightened by nightmares
130. Is afraid of the dark
138. Is rarely frightened by "monsters" seen on TV or at movies*
161. Is not afraid of heights*
176. Is rarely afraid of sleeping alone in a room*
189. Gets nervous about going to the dentist
Anger
2. Gets angry when told s/he has to go to bed
19. Rarely get irritated when s/he makes a mistake*
34. Has temper tantrums when s/he doesn't get what s/he wants
62. Gets quite frustrated when prevented from doing something s/he wants to do
73. Gets mad when even mildly criticized
78. Gets angry when s/he can't find something s/he wants to play with
120. Rarely gets upset when told s/he has to go to bed*
128. Becomes easily frustrated when tired
140. Gets irritable about having to eat food s/he doesn't like
173. Easily gets irritated when s/he has trouble with some task (e.g. building, drawing, dressing)
181. Gets angry when called in from play before s/he is ready to quit

193. Gets mad when provoked by other children
Attention Shifting
6. Is hard to get his/ her attention when s/he is concentrating on something*
29. Can easily shift from one activity to another
95. Has a lot of trouble stopping an activity when called to do something else*
180. Has an easy time leaving play to come to dinner
184. Sometimes doesn't seem to hear me when I talk to her/ him*
Attention Focus
16. When picking up toys or other jobs, usually keeps at the task until it's done
38. When practicing an activity, has a hard time keeping her/ his mind on it*
47. Will move from one task to another without completing any of them*
125. When drawing or coloring in a book, shows strong concentration
144. When building or putting something together, becomes very involved in what s/he is doing, and works for long periods
160. Has difficulty leaving a project s/he has begun*
171. Is easily distracted when listening to a story*
184. Sometimes becomes absorbed in a picture book and looks at it for a long time
195. Has a hard time concentrating on an activity when there are distracting noises*

Note. *Item reverse coded

APPENDIX B: TABLES AND FIGURES

Table 1

Descriptive Statistics for Raw Scores of Independent and Dependent Variables

Measure	Mean	Standard Deviation	Min.	Max.	Variance	Kurtosis	Skewness
CDI T-score	44.66	8.28	32.22	100.00	68.50	9.23	2.36
MASC T-score	48.04	8.29	25.00	80.39	68.66	.88	.30
BASC Internalizing	46.35	7.80	35.00	89.00	60.85	3.56	1.45
BASC Externalizing Parent	47.04	7.44	34.00	77.00	55.31	1.47	.920
BASC Externalizing Teacher	49.29	8.06	33.16	83.00	65.03	1.89	1.33
CBQ Sadness	4.06	.67	1.33	5.70	.45	.60	-.26
CBQ Fear	4.01	.85	1.20	6.83	.72	.14	-.07
CBQ Anger	4.68	.83	1.92	6.58	.68	.46	-.44
CBQ Attention Shifting	3.80	.84	1.60	7.00	.71	.34	.21
CBQ Attention Focusing	4.40	.79	1.89	7.00	.62	.09	-.28

Table 2

Correlation Coefficients for Independent and Dependent Variables

Measure	1	2	3	4	5	6	7	8	9	10
1. MASC	--									
2. CDI[+]	.50**	--								
3. BASC Internalizing[+]	.58**	.73**	--							
4. BASC Teacher Externalizing	.00	.20**	.24**	--						
5. BASC Parent Externalizing	.12*	.33**	.31**	.50**	--					
6. Sadness	.15**	.21**	.13**	-.10*	.22**	--				
7. Fear	.06	.14**	.10	.08	.18**	.30**	--			
8. Anger	.33**	.33**	.28**	.31**	.50**	.51**	.20**	--		
9. Attention Focusing	-.13**	-.25**	-.30**	-.32**	-.36**	-.11*	-.19**	-.24**	--	
10. Attention Shifting	-.09	-.27**	-.26**	-.24**	-.39**	-.27**	-.06	-.44**	.24**	--
11. Social Preference	-.10	-.15**	-.25**	-.23**	-.26**	-.03	.02	-.18**	.23**	.15**

Note. *p<.05, **p<.01; [+] Log transformation of variable

Table 3

Descriptive Statistics for Independent and Dependent Composite Variables

Variable	Mean	SD	Min	Max	Variance
Internalizing [a]	1.66	.06	1.51	1.95	.004
Externalizing [b]	48.16	6.72	34.08	75.00	45.16
Sadness/ fear	4.03	.62	2.29	5.67	.38
Anger	4.68	.83	1.92	6.58	.68
Attentional Control	4.19	.65	1.86	6.21	.42
Social Preference	-.04	.82	-2.48	2.16	.67

Note. [a] Composite variable from the log transformation of the MASC, CDI, and Internalizing subscale of the BASC; [b] Composite variable from teacher and parent report on the Externalizing subscale of the BASC

Table 4

Correlation Coefficients for Independent and Dependent Composite Variables

Variable	1	2	3	4	5
1. Internalizing	--				
2. Externalizing	.26**	--			
3. Sadness/ fear	.18**	.13**	--		
4. Anger	.37**	.46**	.42**	--	
5. Attentional Control	-.31**	-.47**	-.24**	-.39**	--
6. Social Preference	-.19**	-.28**	-.00	-.18**	.25**

*Note. *p<.05, **p<.01.*

Table 5

Anger Reactivity, Attentional Control, and Anger Reactivity X Attentional Control Regressed onto Externalizing Behaviors

Variable	β	R^2	ΔR^2
Step 1		.32**	
Anger	.33 **		
Attentional Control	-.35**		
Step 2			.00
Anger X Attentional Control	-.16		

Note. *p<.05, **p<.01.

Table 6

Social Preference Moderating the Relation between Individual Factors and Externalizing Behaviors

Variable	β	R^2	ΔR^2
Step 1		.34**	
Anger	.31 **		
Attentional Control	-.31**		
Social Preference	-.15**		
Step 2			.01
Anger X Attentional Control	-.05		
Anger X Social Preference	-.21		
Attentional Control X Social Preference	.27		
Step 3			.00
Attentional Control X Social Preference X Anger	1.93		

Note. *p<.05, **p<.01.

Table 7

Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Internalizing Behaviors

Variable	β	R^2	ΔR^2
Step 1		.11**	
Sadness/ fear	.11*		
Attentional Control	-.29**		
Step 2			.01*
Sadness/ fear X Attentional Control	-.77*		

Note. *p<.05, **p<.01.

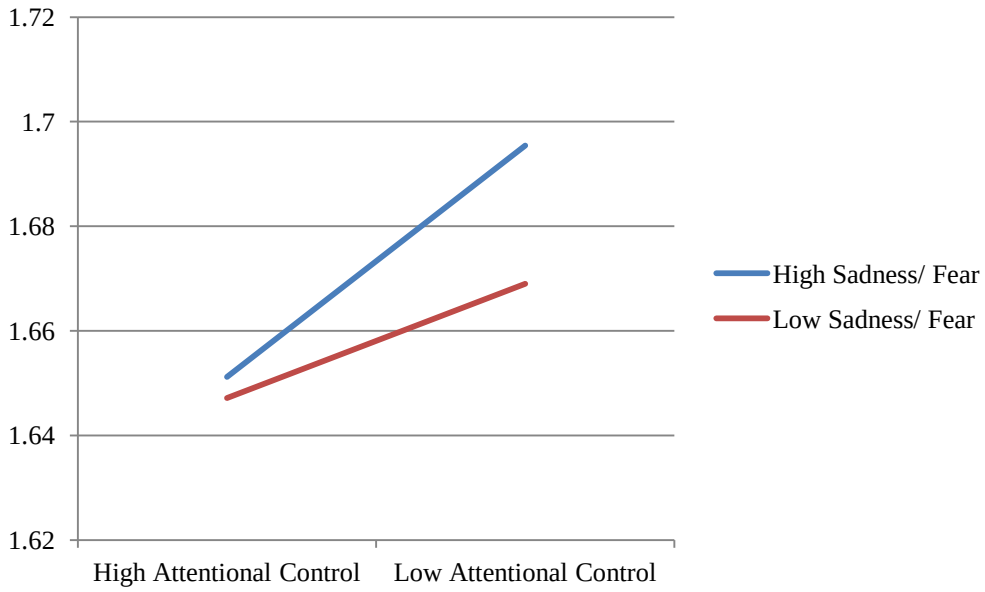

Figure 1. Interaction of Sadness/ Fear Reactivity and Attentional Control Predicting Internalizing Behavior

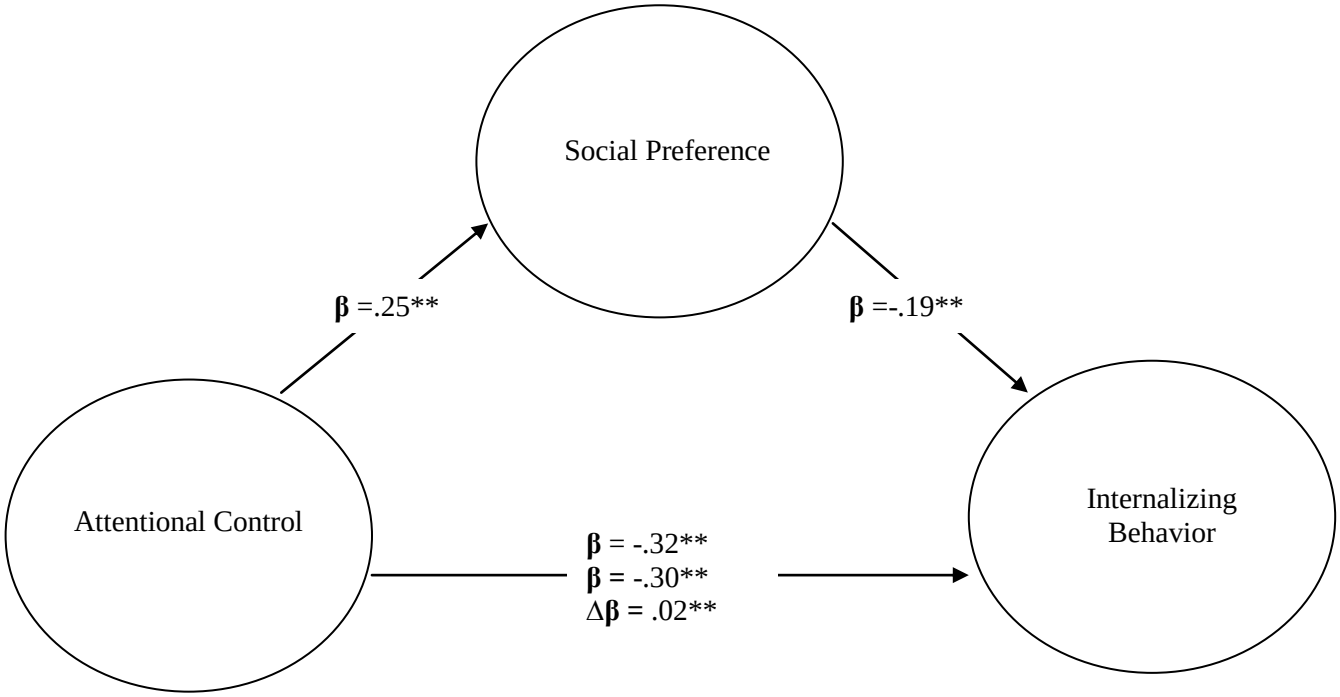

Figure 2. Mediation Model with Beta Weights and Significance Levels. Social Preference Mediating Attentional Control and Internalizing Behavior.

Table 8

Descriptive Statistics for All Study Variables by Gender and Differences

	Males (N= 188)		Females (N= 216)		
Variable	Mean	SD	Mean	SD	t
Internalizing	1.66	.05	1.66	.07	-.24
Externalizing	49.9	7.13	46.7	5.98	4.84**
Sadness/ fear	3.95	.63	4.10	.60	-2.56*
Anger	4.73	.79	4.64	.86	1.04
Attentional Control	4.06	.65	4.30	.63	-3.84**
Social Preference	-.12	.84	.03	.79	-1.99*

Note. *p<.05, **p<.01.

Table 9

Anger Reactivity, Attentional Control, and Anger Reactivity X Attentional Control Regressed onto Internalizing Behaviors

Variable	β	R^2	ΔR^2
Step 1		.17**	
Anger	.29**		
Attentional Control	-.20**		
Step 2			.02*
Anger X Attentional Control	-.84		

Note. *p<.05, **p<.01.

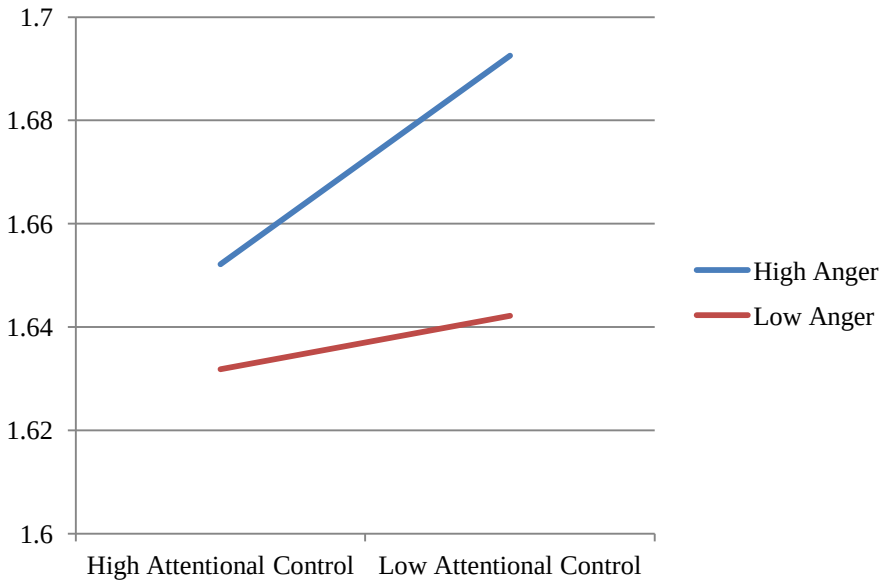

Figure 3. Interaction of Anger Reactivity and Attentional Control Predicting Internalizing Behavior.

Table 10

Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Internalizing Behaviors Excluding 16 Kids with Elevated Levels of Both Internalizing and Externalizing Behavior

Variable	β	R^2	ΔR^2
Step 1		.06**	
Sadness/ fear	.07		
Attentional Control	-.22**		
Step 2			.00
Sadness/ fear X Attentional Control	-.13		

Note. *$p<.05$, **$p<.01$.

Table 11

Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Depressive Symptoms (CDI)

Variable	β	R^2	ΔR^2
Step 1		.12**	
Sadness/ fear	.14**		
Attentional Control	-.29**		
Step 2			.01^{+}
Sadness/ fear X Attentional Control	-.70		

Note. *p<.05, **p<.01, $^{+}$ p=.054.

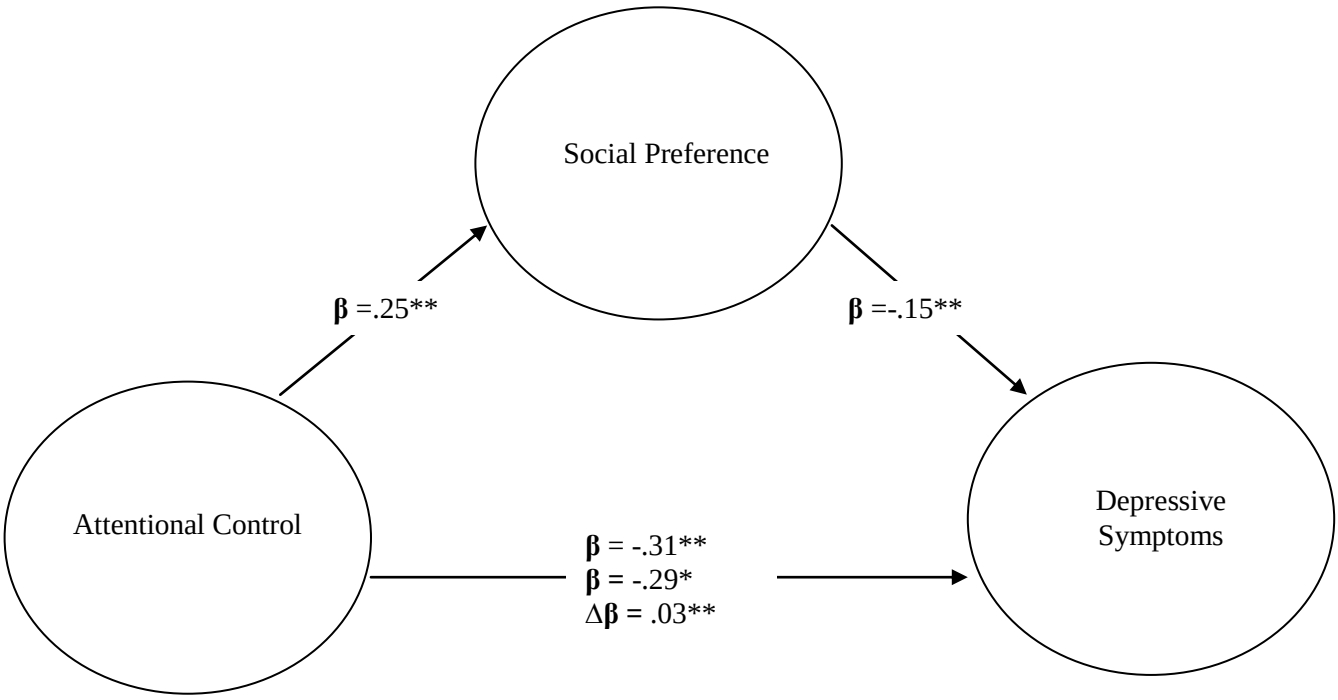

Figure 4. Mediation Model with Beta Weights and Significance Levels. Social Preference Mediating Attentional Control and Depressive Symptoms (CDI).

Table 12

Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Anxious Symptoms (MASC)

Variable	β	R^2	ΔR^2
Step 1		.02**	
Sadness/ fear	.08		
Attentional Control	-.11**		
Step 2			.01
Sadness/ fear X Attentional Control	-.59		

Note. *p<.05, **p<.01.

Table 13

Sadness/ Fear Reactivity, Attentional Control, and Sadness/ fear Reactivity X Attentional Control Regressed onto Socially Anxious Symptoms (MASC)

Variable	β	R^2	ΔR^2
Step 1		.04**	
Sadness/ fear	.05		
Attentional Control	-.19**		
Step 2			$.01^{+}$
Sadness/ fear X Attentional Control	-.84		

Note. *p<.05, **p<.01, $^{+}$p=.067