


Summer 2012

# The Mediating Role of Emotion Regulation in the Relations of Between Somatization and Internalizing Disorders in Children

Priscilla A. Khuanghlawn  
*Old Dominion University*

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THE MEDIATING ROLE OF EMOTION REGULATION IN THE RELATIONS  
BETWEEN SOMATIZATION AND INTERNALIZING DISORDERS IN CHILDREN

by

Priscilla A. Khuanghlawn  
B.A. 2007, University of Virginia  
M.A. 2010, Norfolk State University

A Dissertation Submitted to the Faculties of The College of William and Mary,  
Eastern Virginia Medical School, Norfolk State University, Old Dominion University  
in Partial Fulfillment of the Requirements for the Degree of

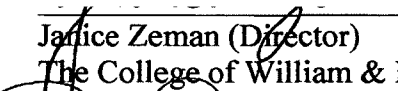
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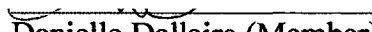
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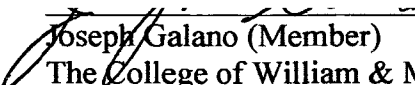
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August 2012

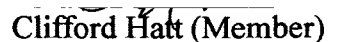
Approved by:

  
Janice Zeman (Director)  
The College of William & Mary

  
Danielle Dallaire (Member)  
The College of William & Mary

  
Joseph Galano (Member)  
The College of William & Mary

  
Desideria Hacker (Member)  
Norfolk State University

  
Clifford Halt (Member)  
Norfolk State University

## ABSTRACT

### THE MEDIATING ROLE OF EMOTION REGULATION IN THE RELATIONS BETWEEN SOMATIZATION AND INTERNALIZING DISORDERS IN CHILDREN

Priscilla A. Khuanghlawn  
Virginia Consortium Program in Clinical Psychology, 2012  
Director: Dr. Janice Zeman

Somatic symptoms are a common experience of childhood and research suggests that specific populations, including girls and children who are African-American, may be more likely to experience and report somatic complaints. Although seen in developmentally typical populations, somatic symptoms are also often strongly linked with general psychopathology, especially internalizing disorders. The etiology of somatic symptoms is unclear, with the current literature suggesting various contributing causes. One such contributing factor includes emotional factors such as the management of emotional arousal through emotion inhibition, coping, and dysregulation. Using an African-American sample of 136 elementary school-aged children (47% boys) and their parents (86% mothers), this study examined the relations between three methods of emotion regulation (i.e., coping, inhibition, dysregulation) of three types of emotion (i.e., anger, sadness, worry), somatic symptoms, and internalizing symptoms to determine if emotion regulation mediates the relations between somatic symptoms and internalizing symptoms. Data were analyzed following the steps of Baron and Kenny's (1986) specified for mediational analyses. Only one mediation model was significant. Specifically, for girls, worry dysregulation mediated the relation between somatic symptoms and internalizing symptoms. Support for several direct links between somatic

symptoms, methods of emotion regulation, and internalizing symptomatology were also found. Specifically, the experience of somatic symptoms was related to certain methods of regulating emotion, including girls' inhibition of anger and sadness, and managing emotion regulation in certain ways, such as boys' dysregulating sadness, was predictive of internalizing symptoms. The results suggest that examination of separate emotions is important since differences were found based on type of emotion and specific method of emotion regulation. Additionally, by using a multi-reporter method, the study demonstrated that parent and child reports differed regarding perceptions of symptomatology. Future research should include longitudinal methodology to further examine the mediating role of other aspects of emotion regulation in the relations between somatic and internalizing symptoms and provide more focus on low SES, African-American samples.

## ACKNOWLEDGMENTS

I would like to extend my gratitude to the many people who helped to make this dissertation possible. First, I would like to thank my advisor, Janice Zeman, for her academic and emotional support throughout grad school and specifically during this dissertation process. It has been a sincere pleasure to have had her as my mentor, and future students will be very lucky to learn from her knowledge and demeanor. I would also like to thank the members of my committee for their time, expertise, and feedback. I am grateful for my parents and sisters for their persistent belief in me and genuine cheer for my accomplishments. Thank you to my boyfriend for his unfaltering encouragement when doubts started to surface, and for providing uplifting company, particularly on those long writing days. Finally, I would like to thank my professors, supervisors, and friends through the Virginia Consortium Program and my internship with the Virginia Beach Schools Psychological Services, for their help and truly heartening moral support.

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## **CHAPTER I**

### **INTRODUCTION**

#### **Somatic symptoms**

Somatic symptoms may be defined as medically unexplained, physical symptoms without a known pathology (Dhossche, Ferdinand, van der Ende, & Verhulst, 2001).

Somatic complaints may consist of various ailments, with the most commonly reported symptoms by children being headaches, stomachaches, and musculoskeletal pains (Eminson, 2007). Other reported somatic symptoms have included low energy, nausea, back pain, blurred vision, weakness, and food intolerance (Garber, Walker, & Zeman, 1991).

Research suggests that 10-30% of children and adolescents in the United States experience somatic complaints (Campo & Fritsch, 1994). In a community sample of 540 children and adolescents (73% Caucasian, 23% African-American), 56% reported experiencing at least one somatic symptom in the past two weeks, with headaches as the most commonly reported symptom (Garber et al., 1991). The global occurrence of somatic complaints and pain related to physical ailments in children is also demonstrated through studies from other countries. One study examined the prevalence of pain in a Dutch sample of over 5,000 children, ages 1 month to 18 years (Perquin et al., 2000). Results indicated that more than half the sample experienced pain in the last three months. Additionally, headache, abdominal pain, and limb pain were the most frequently reported somatic complaints (Perquin et al., 2000). Thus, it may be surmised that somatic symptoms are relatively common experiences for children.

Findings from research have suggested that there are differences in somatic complaints within different populations, as a function of gender, socioeconomic status, and race. Gender differences have been demonstrated regarding the prevalence of somatic symptoms. A national cross sectional survey that studied changes in back, neck, and shoulder pain of Finnish adolescents, ages 12 to 18, found that girls in the sample were more likely to experience and report musculoskeletal pain than boys (Hakala, Rimpela, Salminen, Virtanen, & Rimpela, 2002). Students in Chicago public schools, in third to eighth grades, completed questionnaires regarding the presence and severity of somatic symptoms (Saps, Seshadri, Sztainberg, Schaffer, Marshall, & DiLorenzo, 2009). Within this mixed ethnicity sample (33% African-American, 22% Latino, 21% Caucasian), an average of 72% of children reported at least one somatic symptom each week, with headaches as the most commonly reported symptom. Out of the 237 participants, significantly more girls than boys reported symptoms of nausea, constipation, and headache. Higher female endorsement of somatic complaints was also seen in a community sample of African-American adolescents ages 14 to 19 (Kingery, Ginsburg, & Alfano, 2007). In this study examining the association between somatic and anxiety symptoms, girls endorsed significantly more somatic symptoms than did boys, including feeling tense or uptight, getting shaky or jittery, and feeling sick to the stomach. Additionally, girls have been demonstrated to have more reports of chronic pain (Perquin et al., 2000).

Somatic symptoms have also been found to vary as a function of racial/ethnic status. Many studies examining somatic complaints in children have utilized a sample consisting of mostly Caucasian participants. To address this lack of research regarding

minority racial groups and low-income groups, researchers have begun to focus on such populations. Research with adults that has examined the prevalence of somatic symptoms has indicated that African-Americans may be more likely to express mental health problems in the form of somatic symptoms (Das, Olfson, McCurtis, & Weissman, 2006; Heurtin-Roberts, Snowden, & Miller, 1997). The prevalence of somatic symptoms was examined in an African-American adolescent population (Kingery et al., 2007). The sample consisted of 114 African-American adolescents (50% boys) from an urban high school, with 83% of adolescents reported experiencing at least one somatic symptom occurring “sometimes” or “often” in the past two weeks. These results suggest that adolescents in this study reported comparable, if not higher rates, of somatic complaints than other community youth samples that did not share the racial makeup of the sample. In a sample of 502 predominantly African-American adolescents, ages 11.0 to 14.4 years (96% African-American) in an urban school system, there were higher and more severe rates of somatic complaints than other studies examining majority group populations (White & Farrell, 2006). Specifically, 40% of the minority sample self-reported experiencing weekly headaches and 36% reported experiencing weekly stomachaches.

### **Somatization and psychopathology**

Somatization may be defined as the “manifestation of psychological difficulty or distress through somatic symptoms” (Garralda, 1996, p. 1). This presence of multiple physical complaints is unable to be fully explained by known medical conditions (Zwaigenbaum, Szatmari, Boyle, & Offord, 1999). The existing literature has demonstrated that somatic complaints are seen in developmentally typical populations; however, somatic symptoms are often associated with general psychopathology.

Depending on the duration, severity, and number of somatic symptoms reported by the individual, such somatization may be classified as a somatoform diagnosis, according to the DSM-IV-TR (1994). This category of somatoform disorders includes complaints that are characterized by symptoms of somatic illness that cannot be accounted for by identifiable physical pathology, and may include the subcategories of conversion disorders and dissociative disorders (See Appendix G). Although not based on medically unexplained symptoms, hypochondria and body dysmorphic disorder are also classified in this category in the DSM-IV (Brown, 2004).

A prospective study with a sample of 31 children and adolescent patients of a pediatric neurology outpatient clinic (7 boys), ages 7 to 17, examined the relation between neurologic somatic symptoms, such as headaches, dizziness, and fainting, and the presence of a psychiatric disorder (Emiroglu, Kurul, Akay, Miral, & Dirik, 2004). Patients were examined for underlying medical reasons regarding their somatic symptoms. A psychiatrist also evaluated the patients for existing psychiatric diagnoses. Results of the study revealed that the patients with medically unexplained neurologic somatic symptoms had a high comorbidity rate of psychiatric disorders. Within this sample, 93.5% of patients were reported to have at least one DSM-IV diagnosable mental disorder, with depressive disorders as the most frequent (Emiroglu et al., 2004). Longitudinal research has also demonstrated that adolescents who reported somatic symptoms in adolescence tended to report the same symptoms eight years later, as young adults (Dhossche et al., 2001). In addition, those young adults with somatic complaints were diagnosed more often with psychiatric disorders than members in a control group (Dhossche et al., 2001).

A study examining somatic symptoms in a sample of 162 Italian children referred for emotional and behavioral disorders (96 boys), ages 8-18, found that 69.2% had at least one physical symptom that impaired functioning (Masi, Favilla, Millepiedi, & Mucci, 2000). Headaches were the most frequently reported physical symptom and patients diagnosed with depression suffered from headaches more frequently (Masi et al., 2000). Thus, since children and adolescents may express psychiatric or emotional problems through physical symptoms, internalizing disorders may be a consideration in assessing the pathology of somatization (Stewart, 2003).

### **Somatization and internalizing disorders**

Besides general maladaptive functioning, somatization is also often specifically associated with internalizing disorders, such as anxiety and depression. The DSM-IV-TR (1994) lists specific somatic symptoms as diagnostic criteria for anxiety disorders and depression. The criteria for a Panic Attack, for example, is classified under Anxiety Disorders and is identified by cognitive and somatic complaints, such as palpitations, sweating, trembling, and chest pain (DSM-IV-TR, 1994). The criteria for Major Depressive Disorder require the presence of such somatic symptoms as insomnia and fatigue (DSM-IV-TR, 1994).

Research demonstrates that children with existing anxiety have been found to report more somatic complaints. Research with a sample of 190 children (90 boys) from the Netherlands, ages 8 to 13, found that those children who scored higher on measures of trait anxiety and anxiety sensitivity also had higher levels of somatization (Muris & Meesters, 2004). Research has also examined the relationship between existing anxiety diagnoses and somatic complaints in a sample of children, ages 7-14 (85% Caucasian,



9% African-American), who met DSM-IV criteria for an anxiety disorder (Hofflich, Hughes, & Kendall, 2005). Children with principal diagnoses of Generalized Anxiety Disorder, Social Phobia, Separation Anxiety Disorder, or who were not diagnosed with any anxiety disorder completed self-reported measures of anxiety, including the Multidimensional Anxiety Scale for Children (MASC) and the Anxiety Disorders Interview Schedule for Children (ADIS-C). Children with diagnoses of Generalized Anxiety Disorder, Separation Anxiety Disorder, or a Social Phobia reported more frequent somatic complaints, such as heart racing and feeling shaky and jittery, compared to the children who did not have a diagnosis of an anxiety disorder (Hofflich et al., 2005). Overall, researchers did not find significant differences regarding frequency of somatic complaints within the specific anxiety disorders, suggesting that somatic complaints are related to anxiety disorders generally (Hofflich et al., 2005).

Children with existing somatic complaints have also been found to report more anxious and depressive symptoms. Research has demonstrated that children with pediatric recurrent abdominal pain (RAP), defined as three episodes of severe abdominal pain occurring over the course of three months, are more likely to meet criteria for anxiety or depressive disorders (Campo et al., 2004). A group of 42 children with RAP were compared with 38 pain-free comparison subjects. The children were aged 8-15 (mean age = 11.8), with 77% Caucasian and 43% girls. A series of questionnaires were completed to assess for psychiatric symptomatology, including the parent-reported Child Behavior Checklist (CBCL), children's self-reported Children's Depression Inventory (CDI), and the parent and child report versions of the Screen for Child Anxiety Related Emotional Disorders. A current anxiety disorder, such as Separation Anxiety or General

Anxiety Disorder, was identified in 79% of the RAP patients. A depressive disorder, such as Major Depressive Disorder or Dysthymia, was diagnosed in 43% of RAP patients. In total, 81% of children met criteria for either an anxiety and/or a depressive disorder (Campo et al., 2004).

Finally, research has also explored the relation between levels of reported somatization symptoms and the risk of major depression and other psychiatric disorders four years later (Zwaigenbaum et al., 1999). In a sample of children and adolescents in a community of Ontario, Canada in 1983, ages 12-16, researchers collected information concerning somatic complaints and concerns, in addition to baseline psychiatric problems. Baseline emotion disorder was a composite measure of dysphoric mood, anxiety, and obsessive-compulsive behavior, including DSM-III diagnostic criteria from each area. During the follow-up, psychiatric disorders were measured using a modified version of the Diagnostic Interview Schedule (DIS). Findings from this cohort revealed that highly somatizing adolescents were at increased risk of major depression four years later and were more likely to describe experiencing panic attacks at the follow-up. Findings also demonstrated an interaction between somatization and emotional disorder such that high somatizers had a higher risk of later depression than low somatizers, when an emotional disorder was not detectable at baseline (Zwaigenbaum et al., 1999).

### **Etiology of somatization**

The etiology of somatic complaints is not always straightforward. Research has suggested a variety of contributing causes to somatization. For example, the literature suggests familial influences, with children frequently sharing somatic symptoms with family members (Campo & Fritsch, 1994). The process of learning, through social

learning or modeling or various forms of conditioning, has been implicated in the development and maintenance of somatization (Campo et al., 1994). A number of authors have emphasized the importance of health beliefs and practices of family members for the patient's physical symptoms (e.g., Campo et al., 1994). Parent factors have been examined, regarding parental anxiety or depression or stressors (Wolff et al., 2010). Researchers examined parental reports of their child's somatic complaints in a sample of over 5,000 young children (mean age = 18.4 months) (Wolff et al., 2010). They found that factors such as temperament, maternal stress, and maternal somatic symptoms were determinants for child somatic symptoms (Wolff et al., 2010). The sample size consisted of 49.6% boys, with national origin of children as 66.7% Dutch, 9.0% other Western, and 24.3% other non-Western such as Moroccan, Turkish, or Surinamese. Maternal somatic symptoms and anxiety symptoms increased the likelihood of reported somatic complaints of children at 18 months. Parenting stress was also found to be associated with child somatic symptoms, with parents of children with somatic complaints experiencing more stress (Wolff et al., 2010).

Other factors implicated in somatization have included temperament features (Garralda, 1996). Child temperament was found to be a determining factor for child somatic symptoms, with children reacting with fear to new persons or situations being more prone to the experience of somatic symptoms (Wolff et al., 2010). Higher levels of anxious temperament were also documented in children with RAP in comparison to pain-free control participants (Campo et al., 2004). Finally, psychological processes, such as dissociation and cognitive styles of appraising physical symptoms, have been examined in relation to somatic complaints (Garralda, 1996). Alexithymia is defined as a "specific

disturbance in emotional processing that is manifested clinically by difficulties in identifying and describing feelings, an impoverished imaginative life, and a thought content characterized by a preoccupation with bodily symptoms and/or the details of external events” (Bourke, Taylor, Parker, & Bagby, 1992, p. 1). This process has been examined in the adult literature in relation to somatization and will be discussed later in this review.

In sum, the existing psychological literature indicates that somatic complaints are a common experience of childhood in typically-developing populations. However, somatization has also been found to be correlated with psychopathology, particularly internalizing disorders such as anxiety and depression, indicating a potentially complex process particularly when making determinations about normative versus clinical level somatic symptoms. Research demonstrates that there are conflicting mechanisms underlying the etiology of somatic complaints, which include social learning through family members, temperament, parenting stress, or psychological processes. Thus, based on the relations between somatic complaints and internalizing disorders and the potential negative effects of somatization, it is of importance to examine additional factors that may mediate this relationship including the ability to manage or regulate emotions.

### **Emotion Regulation**

#### **Definition**

One potential mediating factor of the relation between somatic complaints and internalizing disorders may be through emotional factors. Emotions are foundational to the human experience. They provide individuals with information about themselves, their environment, and their relationship with the environment (Zeman, Cassano, Perry-Parrish, & Stegall, 2006). The ability to manage emotions allows individuals to balance

their own internal emotional experiences with their selected exhibition of such feelings in accord with their social goals. It is essential for individuals, therefore, to effectively learn to regulate their emotions in order to successfully interact with others in a social arena.

Psychological research, however, does not converge on one specific theory of emotion, (Cole, Martin, & Dennis, 2004). Therefore, since emotion research lacks a “gold standard” in its methods, it is important for emotion regulation researchers to identify a conceptual approach and provide definitions of constructs (Cole et al., 2004). Thompson (1994) defines emotion regulation as consisting of the “extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goals” (p. 27).

Thompson does not specify that one method of regulation, such as inhibition, is always appropriate; thus, this definition allows for both universal and cultural theories of emotional behavior (Zeman et al., 2006). There is universality in different features of emotional behavior; however, appropriate emotional displays may differ based on the display rules and norms of one’s culture (Safdar, Friedlmeier, Matsumoto, HeeYoo, Kwantes, Kakai, & Shigemasu, 2009). Thompson’s definition also identifies external processes other than self-management that operate in emotion regulation (Zeman et al., 2006). The child may not be the only individual involved in the regulation of his or her own emotion. For example, parents may directly or indirectly socialize their child and engage in behaviors that affect their child’s experience, expression, and modulation of emotion (Eisenberg, Spinrad, & Cumberland, 1998). Thompson’s definition also posits that emotion regulation not only includes the suppression and inhibition of emotional arousal, but also the enhancement and maintenance of emotional states (Zeman et al.,

2006). Thus, emotional regulation depends on various situational factors and does not simply entail the removal, or suppression, of an emotion. Finally, the definition conceptualizes emotion regulation on multidimensional levels. Not only is emotion regulation organized and analyzed at varying levels, but the end result is ultimately viewed to be adaptive or maladaptive based on the situational or social demands and desired goals of the individual (Zeman et al., 2006).

Overall, the definition purports that emotion regulation is not a mere skill that one learns, based on a single component. Rather, emotion regulation is complex, consisting of an integration of many systems and influences that children must learn to balance in order to effectively develop and hone these skills. Additionally, emotion regulation consists of a variety of processes. Research has identified many such processes but the current study focuses on three facets including coping, inhibition, and dysregulation of emotional expression.

### **Specific facets of emotion regulation**

One method of managing emotional arousal is through emotion regulation coping, aimed at regulating the expression of emotion consistent with the goals of the person and the situation. Coping is defined by Lazarus and Folkman (1984) as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 141). Thus, coping is viewed as a process that is ongoing, changing in response to the demands of a stressful encounter or event (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001). What an individual does when faced with negative feelings and distressing circumstances represents emotional coping attempts (Saarni, 1999). Coping strategies that are utilized

may vary by individual due to emotion socialization. In North America, common emotional coping strategies include distancing oneself from one's feelings and expressing feelings to avoid a stronger and more intense reaction (Saarni, 1999).

Another method of regulating emotions is through emotional inhibition. Inhibition refers to the suppression of overt emotional expression (Lok & Bishop, 1999). This includes an active holding back of thoughts, emotions, or behaviors (Pennebaker, Kiecolt-Glaser, & Glaser, 1988). Such inhibition has been associated with stress and disease in adults (Pennebaker et al., 1988) and can have consequences regarding enhanced sympathetic activation of the cardiovascular system in adults (Gross & Levenson, 1997). Inhibition may not always be maladaptive, however, as optimal regulation may differ based on the demands of the environment (Eisenberg, Fabes, Guthrie, & Reiser, 2000).

A third facet of emotion regulation is through the dysregulation of emotional expression. Emotion dysregulation may be defined as an "inability to respond to stimuli with well-maintained control" (Keenan, 2000, p. 420). Dysregulated expression may be characterized as culturally inappropriate expressions of emotions such as of anger, sadness, and worry (Zeman, Cassano, Suveg, & Shipman, 2010; Zeman, Shipman, & Suveg, 2002).

Because emotion regulation is defined as involving adjustable and dynamic emotional behavior, it does not refer to a control of emotional processes or the simple stopping or suppressing of emotion (Suveg, Southam-Gerow, Goodman, & Kendall, 2007). Thus, emotion dysregulation is not viewed as a lack of regulation but, instead, regulation "operating in a dysfunctional manner" (Cole, Michel, & Teti, 1994, p. 80). In

such a situation, certain emotions are experienced too often or too strongly by the individual (Plutchik, 1993). Responses such as emotional outbursts may result, which are related to under-regulation or under-control of emotion.

### **Importance of discrete emotion analysis**

Many studies do not make a distinction among the types of emotions, positive or negative, that are investigated (Eisenberg et al., 2000). Instead, researchers examining negative emotions may group all negative affect together, referring to this as general negative mood or negative emotionality. The Positive and Negative Affect Schedule (PANAS), for example, is a widely used self-report measure that examines general positive and negative affect (Watson, Clark, & Tellegen, 1988). Negative affect was described as being “a general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness (Watson et al., 1988, p. 1).” Emotions are thus often categorized together by their overarching valence of positive or negative, with emotion regulation research studying how individuals manage this general affectivity.

The functionalist approach to emotions, however, would suggest the examination of individual emotions instead, positing that emotions are organized based on the functions they serve, not simply by facial expressions or physiological patterns (Witherington & Crichton, 2007). This organization is achieved by examining both an individual and the eliciting environmental event in order to understand the function of the emotion (Campos, Mumme, Kermoian, & Campos, 1994). Because different emotions have different functions, they are associated with different characteristics. Thus, anger is distinguished from fear because anger functions to remove an obstacle to a goal, whereas



fear functions to avoid a threat (Witherington & Crichton, 2007). The social purpose of sadness, for example, is to elicit nurturance from others (Cole et al., 1994). It is also important to distinguish individual emotions because of the different social goals associated with each emotion. Thus, the functionalist perspective of emotion suggests that emotion regulation strategy may differ based on the function of the specific emotion, despite its general negative valence (Zeman et al., 2001). Therefore, emotions such as anger, sadness, and worry are to be examined separately.

It is also important for emotions to be examined separately since differing appraisals and action tendencies are related to different specific emotions. Appraisals are viewed as cognitive prerequisites and/or contents of an emotion (Frijda, Kuipers, & ter Schure, 1989). Action tendencies, on the other hand, are defined as “states of readiness to execute a given kind of action” (Frijda, 1986, p. 70). Emotions motivate an individual to act and researchers associate certain tendencies towards behavioral action with certain emotions (Skiffington, Fernandez, & McFarland, 1998). Emotions have been shown to be predicted and differentiated based on action readiness and appraisal variables (Frijda et al., 1989). This suggests that future research examining the regulation of emotion should examine separate emotions.

### **Population differences**

Research has demonstrated that there are differences in emotion regulation based on characteristics such as age, gender, socioeconomic status, and ethnicity.

#### **Age**

Research demonstrates that there are differences in the trajectory of the development of emotion regulation, with younger children having more difficulty

regulating their emotions than older children. Underwood, Hurley, Johanson, and Mosley (1999) examined gender and developmental differences in anger regulation and expression in school-aged children, ages 8-12, during a lab session involving a peer. The children (85.2% European American, 2.2% African-American; 198 boys) participated in a game play session with a matched confederate, and experienced two kinds of anger provocation in different trials. Results showed that older children were less demonstrative of negative emotions than the younger children, as documented by their showing fewer sad faces and making fewer negative comments in response to losing in comparison to their younger counterparts (Underwood et al., 1999). Findings suggest that, with age, children become better at controlling negative emotional displays.

A study by Zeman and Garber (1996) also found robust developmental differences indicating that younger children express more negative emotion to others than older children. Researchers examined 192 children (95% Caucasian) in first, third, and fifth grades, 32 boys and 32 girls from each grade. The children were read first-person narrative stories in which a scenario specified the protagonist experiencing emotions of anger, sadness, or pain in response to the vignette events. After hearing the stories, the children indicated whether they would express or “hide” the negative emotion from a friend, mother or father. The children in first grade reported expressing sadness and anger significantly more often to their social partners than did the older children. These results demonstrated that children reported higher levels of emotion regulation with increasing age that was sensitive to the cues of the social environment.

Another study examining 130 boys and girls from Berlin, Germany ages 9-13, asked children to report which strategies they would use from a list of nine strategies to

manage anger expression in the presence of a peer (von Salisch, 2001). These strategies included choices such as physical and verbal confrontation, relational aggression, revenge, or humor. Results indicated that older children engaged in strategies such as turning away from the anger-eliciting peer, giving the “silent treatment,” and redirecting their attention more often than younger children. Thus, older children reported the utilization of more coping or inhibitory emotion regulation strategies than younger children. These results provide further evidence for the development of more adaptive emotion regulation with age.

Developmental differences within specific emotions have also been examined. Researchers examined 137 children (64 boys, 98% Caucasian), consisting of 2<sup>nd</sup> and 5<sup>th</sup> graders (Zeman & Shipman, 1996). Building on the study by Zeman and Garber (1996), the children were presented with stories depicting a scenario with the protagonist experiencing emotions of anger, sadness, or pain in response to vignette events. Children were randomly assigned to 1 of 4 audience conditions—mother, father, best friend, or medium friend, a friend who the participant identified as another child whom they liked and played with but was not considered a best friend. After hearing the stories, the children indicated whether they would express or “hide” the negative emotion from their respective audience. The children in the 2<sup>nd</sup> grade reported using more verbal means of expression and crying to communicate sadness and pain than 5<sup>th</sup> graders, although there were no differences for expressions of anger (Zeman & Shipman, 1996). This research demonstrates the developmental differences of emotion regulation in children, such that younger children were more likely to engage in dysregulation as an emotion regulation method than older children. The study also continues to highlight the importance of the

examination of individual emotions, as posited by the functionalist perspective, since emotion regulation strategies varied based on the specific negative emotion.

Altogether, this research demonstrates present developmental trends in emotion regulation, with type of strategy varying as a factor of age. Findings indicate that younger children are more likely to engage in dysregulation as an emotion regulation strategy but are able to better utilize more adaptive coping or inhibition strategies as they grow older. Therefore, building on the extant research base, the current study also examined developmental differences.

### **Gender**

In addition to differences in emotion regulation based on age, research also suggests that differences emerge as a function of gender. Such differences may be due to socialization pressures from family, peers, and the general culture that differ towards girls versus boys (Saarni, 1999). Research has examined gender differences in children's expressions of anger, happiness, and sadness (Hubbard, 2001). A group of 111 second-grade, African-American boys and girls participated in a game paradigm with a child confederate in which the game was rigged for the child to lose. In one trial, the confederate engaged in fair play in one trial and blatantly unfair play in the second, in an effort to provide a frustrating situation for the child participant. Results found that the boys in the sample expressed more anger than girls through facial expression and that they also maintained their angry facial expressions for a longer time period. In addition, boys spoke with an angrier verbal intonation and engaged in angry nonverbal behavior more often than girls during the game play session (Hubbard, 2001).

Other studies have also found gender differences in emotion regulation. Zeman and Garber (1996) found that girls were more likely to report expressing sadness in the presence of their parent whereas boys reported being more likely to control or alter their expression of sadness. Underwood et al. (1999) found that girls displayed more sad facial expressions than boys when engaging in an anger-provocation game play session. The researchers also found that boys were more likely to make negative comments and gestures than girls, during these sessions, which suggested that the girls were better able to regulate their emotions than the boys.

Therefore, boys and girls may demonstrate differences in emotional expressions, which may result in differences in regulation of emotion. These resulting expressions influence the judgment of whether a child effectively regulates his or her emotion. It is likely that gender differences in emotion regulation are due to different socialization histories of boys and girls (Cassano & Zeman, 2010; Thompson & Meyer, 2007), but, it is important to continue to study the differences in emotion regulation as a function of gender to gain a more complete understanding.

### **Low-income**

Research has demonstrated that effective emotion regulation is associated with higher socioeconomic status (Cote, Gyurak, & Levenson, 2010). Poverty, in contrast, may increase the exposure of young children to various prenatal and perinatal factors that can potentially negatively influence their emotional development (Raver, 2004). Further, ecological stressors associated with poverty, including residential instability, increased levels of violence in the neighborhood and family, and psychological distress among the adult caregivers may place the emotional adjustment of children and infants at risk

(Raver, 2004). In comparison with middle-income children, low-income children are exposed to different home environments, including higher levels of family disruption and separation from their family, in addition to different social and education opportunities (Evans, 2004). Research has demonstrated that, in comparison to middle-class counterparts, low socioeconomic status children and adolescents are reported to have a higher prevalence of emotional and behavioral problems (McLoyd, 1998). Therefore, it is important to continue to examine low socioeconomic status populations because of the lack of research and the associated high risks of this population. Additionally, little research has examined the relations between socioeconomic status and emotion regulation.

### **Race**

Most research examining emotion regulation strategies has used primary European American, middle-class samples (Supplee, Skuban, Shaw, & Prout, 2009). This approach creates difficulties in drawing conclusions regarding other populations. Recent research on emotional processes has begun to focus on minority populations, however (Kliewer, Reid-Quinones, Shields, & Foutz, 2009), with some studies beginning to examine differences in emotion regulation based on ethnicity. One such study examined the emotion regulation strategies, such as self-soothing or physical comfort seeking, among a group of 120 mother-son dyads recruited from the Women, Infants, and Children (WIC) Nutritional Supplement Program (Supplee et al., 2009). The group consisted of 45% African-American mothers, 43% Caucasian-American, and 11.7% biracial, although the biracial dyads were later dropped from the sample. Mothers and sons completed a series of interaction tasks that were videotaped and later coded for the

child's emotion regulation strategies and the presence of negative emotions. Mother questionnaires were also utilized to measure the child's negative emotionality, through the Maternal Perceptions Questionnaire and the CBCL. Results demonstrated that specific emotion regulation strategies used by African-American children were positively related to later externalizing behavior although the same emotion regulation strategies had different outcomes for Caucasian-American children. Namely, the use of physical comfort seeking as an emotion regulation strategy was positively associated with externalizing behavior for African-American children versus Caucasian-American children but was negatively associated with externalizing behavior for Caucasian-American children. The results suggested that the use of the same emotion regulation strategy may have differential outcomes for children depending on race but that more research was necessary to validate the results. Further research examining emotion regulation outcomes in underrepresented racial groups based is needed.

### **Psychosocial outcomes**

Understanding differences in emotion regulation development is important because of the linkage between social and psychological functioning and different patterns of emotion regulation. For example, children who were better at regulating negative emotion were demonstrated to have higher social competence (Calkins, Gill, Johnson, & Smith, 1999) and academic achievement (Gumora & Arsenio, 2002). Research examined emotion regulation of predominantly children from low socioeconomic status families (61% African-American, 64% boys), ages 6-12, who attended a camp program for inner city children, with a one-year follow-up (Kim & Cicchetti, 2010). Researchers found that children who showed better emotion regulation

had higher peer acceptance over time and were more likely to exhibit fewer internalizing symptoms (Kim & Cicchetti, 2010).

Poor emotion regulation, on the other hand, has been linked to numerous negative outcomes, including internalizing symptoms. Research has demonstrated that difficulties in emotion regulation may be predictive of problematic behavior, such as later depressive symptoms (Feng et al., 2009). Using a 1-year longitudinal design, researchers examined a sample of 225, 9-year old girls and their mothers (52.6% African-American/multiracial) to examine whether there are any links between regulation of sadness and anger at age 9 and depression symptoms at age 10. At the two different time points, positive and negative emotions were measured during a conflict resolution task, sadness and anger regulation through maternal report, and depressive symptoms through self-report interview. Findings suggested that difficulties in emotion regulation predicted later depressive symptoms and that difficulty in regulating sadness was predictive of depressive symptoms, with level of parental acceptance toward the child moderating that association (Feng et al., 2009).

In addition, poor emotional awareness and inhibition of anger were found to be predictive of general internalizing symptoms (Zeman et al., 2002). These researchers used a predominantly Caucasian sample (95.6%) of 227 children (121 boys) in the fourth and fifth grade to examine how certain deficits in emotional regulation were predictive of internalizing and externalizing symptoms. Self-report and peer measures were used to examine emotion awareness, anger and sadness management, and internalizing and externalizing symptoms. The researchers found that poor emotional awareness and inhibition of anger were predictive of internalizing symptoms on measures of the Child



Depression Inventory and the State-Trait Anxiety Inventory for Children. Children who had internalizing symptoms were also reported to express their angry and sad emotions in ways that were nonconstructive and excessive. For example, they described being more likely to whine or fuss, cry and carry on, and slam doors when describing being sad or angry. Anger dysregulation, such as slamming doors or saying mean things when angry, was also found to predict aggression (Zeman et al., 2002).

Externalizing behaviors have been further demonstrated to be related to poor emotion regulation. Preschoolers who were either more inexpressive or more expressive had significantly more behavior problems and externalizing symptoms than preschoolers who were emotionally modulated (Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996). Research with a group of 214 children (118 boys, 74% Caucasian), ages 55 to 97 months, found that children with externalizing problems were more likely to demonstrate low regulation, anger expression, and impulsivity (Eisenberg, Cumberland, Spinrad, Fabes, Shepard, & Reiser, 2001). Children were divided into corresponding groups based on CBCL scores, with children with high scores on internalizing and externalizing behaviors in one group and children with scores in the non-clinical range in another. Children engaged in a puzzle and display rule task that were then evaluated for indices of emotion regulation. Children who had been classified with externalizing behavior problems alone or with both externalizing and internalizing problems were higher on parent and teacher rated anger expression than the children who were not reported to have problem behaviors (Eisenberg et al., 2001).

Finally, longitudinal research has examined the predictive association between child self-rated emotion regulation and later behaviors (Bowie, 2010). A sample of 126

children (60 boys, 36.5% Caucasian, 18.2% African-American) was drawn from a larger longitudinal study and data were collected at three time points over a span of five years. At Time 1, children's ages ranged from 5.7 to 12.3 years (mean age = 9 years) and at Time 3, children's ages ranged from 8.4 to 14.7 years (mean age = 11.5 years). Emotion regulation was measured with child self-reported Child Meta-Emotion Interview—Family Health project version. Behaviors were assessed with the Behavior Assessment System for Children (BASC), by child self-report, parent-report by both mother and father, and teacher-report. Results indicated that child emotion regulation ratings at Time 1 significantly predicted Time 3 ratings of internalizing disorders by fathers and teachers—children with lower emotion regulation at Time 1 were more likely to be rated as having internalized behavioral problems at Time 3 by their teachers and fathers. Children who reported difficulty regulating anger during Time 1 were more likely to report depressive symptoms at Time 3, 2.5 years later. Children with reported difficulty regulating sadness during Time 1 were more likely to be rated by their fathers and teachers as having depressive symptoms although not self-rated depressive symptoms (Bowie, 2010).

Thus, the literature demonstrates emotion regulation can consist of numerous strategies to manage emotional arousal and differs based on population factors such as age, gender, and race. Importantly, ineffective emotion regulation is related to later internalizing and externalizing symptoms and behaviors. The existing literature, however, currently lacks extensive research examining populations with low socioeconomic status. As demonstrated in the research, these populations are at-risk for a

variety of future problems and it would be of interest to study how emotion regulation strategies operate within this demographic.

### **Somatization and emotion regulation**

As discussed previously, research has demonstrated that somatization may be commonly reported by normally developing children. Nevertheless, somatic symptoms are also associated with psychopathology, including internalizing disorders. Since the etiology of somatization is unclear, it is important to examine variables that may help explain how a common childhood experience may result in more deleterious outcomes. Thus, it is important to explore the possible relation between emotion regulation and somatization as a possible contributing factor toward the development of internalizing disorders.

When examining the relation between somatization and emotion-related variables, research has demonstrated that poor emotion awareness, difficulty in recognizing and analyzing emotions, is related to more somatic complaints (Jellesma, Rieffe, Terwogt, & Kneepkens, 2006). The basis of the concept of alexithymia was developed from clinical observations to describe this phenomenon of difficulties in expressing feelings (Sifneos, 1973). A large body of research has examined the role of alexithymia in various clinical conditions, including somatoform disorders (Waller & Scheidt, 2006). Alexithymia research with adults has demonstrated that difficulties with identifying feelings were a predictor of self-reported somatization scores (Grabe, Spitzer, & Freyberger, 2004). Other literature has found that alexithymia variables were associated with reports of higher somatic symptoms (Mattila, Kronholm, Jula, Salminen, Koivisto, & Mielonen, 2008). In this nationally representative adult population in Finland, researchers used the

Toronto Alexithymia Scale (TAS-20) to measure the main facets of alexithymia construct including difficulties in identifying and describing feelings and a physical examination and comprehensive, structured mental health interview to verify depression, anxiety, and somatic diagnoses. The correlation between somatic symptoms and these features of alexithymia was significant (Mattila et al., 2008). Overall, the adult alexithymia literature demonstrates consistent evidence for a relationship between poor emotion awareness and somatization (Waller & Scheidt, 2006).

There is less research regarding alexithymia with children. Nevertheless, studies with this age group have also demonstrated that self-reported alexithymia is positively related to somatic complaints. A group of 740 children (ages 9-15, 380 boys) answered questionnaires assessing for alexithymia factors, including Difficulty Identifying Feelings, Difficulty Describing Feelings, and Externally-Oriented Thinking, somatic complaints, and mood (Rieffe, Oosterveld, & Meerum Terwogt, 2006). Two of the alexithymia factors, Difficulty Identifying Feelings and Difficulty Describing Feelings, were positively related to negative mood states including anger, fear, and sadness. These factors contributed positively to the prediction of self-reported somatic complaints with higher alexithymia scores related to more self-reported somatic complaints (Rieffe et al., 2006).

Research has also begun to examine the relation between somatization and emotion-related variables outside of alexithymia's poor emotion awareness. Research with adults demonstrates that negative affect emerged as the strongest predictor of self-reported medically unexplained symptoms (De Gucht, Fischler, & Heiser, 2004). Research with children has examined the relation between self-reported somatic

complaints and mood balance, referring to more negative moods and fewer happy moods, and found a direct relationship (Meerum Terwogt, Rieffe, Miers, Jellesma, & Tolland, 2006). In a study of 42 children (50% boys, 76.2% Caucasian), ages 7 to 12, the influence of parent somatization and child emotional functioning on child somatization was examined (Gilleland, Suveg, Jacob, & Thomassin, 2009). Parental variables were first examined as a potential predictor, based on the established relation between parental somatization and child somatization in the literature. Emotion-related variables, including emotional awareness and frequency of negative affect, were then examined. The child's emotion regulatory abilities were measured through parental report with the Emotion Regulation Checklist. Parents also completed frequency of child's experiences of emotions on the Positive and Negative Affect Scale for Children (PANAS). Anxiety symptomatology was examined with the MASC and internalizing and externalizing difficulties were examined through the CBCL. Results indicated that poor awareness of emotional experience and frequency of negative affect significantly predicted child report of somatization (Gilleland et al, 2009). Thus, children who were reported to experience more frequent negative emotions on the PANAS and those who had poorer emotional awareness through difficulty identifying and describing their own emotions were more likely to report a higher frequency of somatic experiences.

Although poor emotional awareness has been demonstrated to be related to more somatic symptoms in children, researchers have also shown that children with many somatic complaints are still able to identify emotions comparably to children with few or no somatic complaints (Rieffe, Meerum Terwogt, & Bosch, 2004). To further examine these findings and to compare children's observed abilities regarding identification,

differentiation, and communication of emotions with self-reported abilities, researchers examined a group of 34 children with few somatic complaints (21 boys, ages 8-13) and a group of 35 children with many somatic complaints (12 boys, ages 9-12) (Jellesma, Rieffe, Meerum Terwogt, & Westenberg, 2009). Children were assessed on self-reported somatic complaints, spontaneous attention for emotions, identification of own emotions, emotion identification in mixed emotion situations, and self-reported alexithymia. This was completed through a series of self-report questionnaires, picture cards, and stories depicting characters with emotions. Results also indicated that children with many somatic complaints do not appear to demonstrate deficiencies in their ability to identify emotions and verbally share them. However, compared to children with fewer somatic responses, children with many somatic symptoms identified more simultaneous negative emotions and more often acknowledged feeling sad and scared (Jellesma et al., 2009). Such results led researchers to suggest that future research may clarify whether the use of emotional coping strategies in children with many somatic complaints differs from those of children with fewer somatic complaints.

In sum, emotion variables such as negative affect and poor emotional awareness have been examined in the adult and child somatization and alexithymia literature, demonstrating a relationship between these emotion-related factors and number of reported somatic complaints. Other research, however, has indicated that children with many somatic symptoms have the ability to identify emotions; however, they demonstrate different emotional responses in comparison to children with fewer symptoms. Therefore, although research provides evidence that emotion regulation factors are related to somatic symptoms, there is limited research describing this relationship.

## CHAPTER II

### CURRENT STUDY

The purpose of this study is to build on the current literature base by examining the relation between internalizing symptoms and somatization with the role of emotion regulation included as a potential mediating factor. As previously described, research demonstrates that somatic symptoms are a common part of childhood. Nevertheless, somatic symptoms can also be related to deleterious outcomes such as general psychopathology, specifically internalizing disorders. The etiology of somatic symptoms is unclear and it is also unclear how somatic symptoms, which are common to childhood, are linked to psychopathology. Recent literature has explored the relations between somatic symptoms and emotion related variables. Research has demonstrated that emotion regulation strategies may differ as a function of age, gender, and race and that poor emotion regulation may lead to negative outcomes, including internalizing disorders. Current research examining emotion-related variables and somatic symptoms in children is scant and limited in scope. Based on the outcomes that can occur as a result of somatization and internalizing disorders, and the link with psychopathology, it is important to learn more about the potential contribution that emotion regulation may offer in the relation between somatic symptoms and psychological maladjustment.

Therefore, this research sought to examine the relations between internalizing disorders and somatization, as mediated by emotion regulation, using a multi-reporter (i.e., child, parent) design. Instead of examining general negative emotional valence, this study adopted a functionalist perspective that each emotion potentially contributes uniquely to the relation between somatization and internalizing symptoms and must be

examined as a distinct component. Thus, this study examined children's regulation of three discrete, commonly experienced emotions (anger, sadness, and worry) and also examined three different components of emotion regulation (coping, inhibition, and dysregulation). This study examined any existing gender differences, based on research documenting both differences in emotional responses and symptom outcomes as a function of gender (Chaplin, Gillham, & Seligman, 2009; Hubbard, 2001; Zeman & Garber, 1996). An elementary school-aged group, grades 2-5, was used due to the developing emotional and social differences that occur during this time of middle childhood. One of the unique aspects of this study was its use of a predominantly African-American sample from low socioeconomic status household environments, representing a population that is under-used in the current literature examining children's emotion regulation. In doing so, the results of this study add to the existing literature regarding factors that put this unique population at-risk for future problematic outcomes.

This proposed research examined internalizing symptoms based on both parent-report and self-report. The self-reported score is a global internalizing symptoms composite that combines the self-reported anxiety and depressive symptoms from two measures, since research indicates a high degree of comorbidity between anxiety and depression (Axelson & Birmaher, 2001).

### **Hypotheses**

Based on theory and the empirical literature, the following hypotheses and research questions were addressed:

1. The four main steps required to demonstrate mediation were tested:
  - a. There is a link between somatic symptoms and internalizing symptoms.



- b. Somatic symptoms will significant predict emotion regulation.
  - c. There is a significant relation between emotion regulation and internalizing symptoms.
  - d. The relation between somatic symptoms and internalizing symptoms is mediated by emotion regulation.
2. Secondary hypotheses based on different pathways between variables include:
- a. Somatic symptoms will significantly predict the inhibition of sadness, anger, and worry
  - b. Somatic symptoms will be negatively related to regulation coping.
  - c. Somatic symptoms will be positively related to sadness dysregulation.
  - d. Poor emotion regulation skills (higher dysregulation, higher inhibition) will be related to more internalizing symptoms
  - e. Children with many somatic symptoms will not experience internalizing symptoms if they use coping as an emotion regulation strategy
  - f. Girls who are better able to regulate their emotions of worry and sadness will report fewer internalizing symptoms, even if they report high somatic symptoms
  - g. Boys who have many somatic symptoms are hypothesized to have more internalizing symptoms, if they dysregulate their emotions
  - h. Older children will demonstrate better developed emotion regulation skills, and younger children will be more likely to utilize emotion dysregulation as a strategy

- i. Younger children who utilize emotion dysregulation will be more likely to report internalizing symptoms

## **Method**

### **Participants**

Participants were recruited through a larger study examining social and parental relationships among children from two public schools in southeastern Virginia. These elementary schools are located in neighborhoods that serve a mostly lower socioeconomic status and lower income population. School A is a nonprofit, extended day public school that was founded on the belief that children can learn and succeed regardless of socioeconomic background. As such, the school partners with the city and the business community to provide at-risk students with access to opportunities they may not have had otherwise, and character education is foundational and taught daily. School B's motto is to educate students and teach positive citizenship skills within a nurturing environment. The school partners with businesses in the community, who aid with provisions of school supplies for the students. This overall sample size of children consisted of 435 elementary school-age children, grades 2 through 5, with a distribution of 42% boys ( $n = 183$ ) and 58% girls ( $n = 252$ ). This sample included a racial breakdown of 79% African-American ( $n = 336$ ), 8% Caucasian ( $n = 33$ ), and 10% multiple races ( $n = 42$ ).

From this overall sample, a subsection was selected for use in this study. Inclusion criteria for this sample required parent participation and self-identification or identification of the child by parent as African-American or multiple ethnicities, including African-American. This sample consisted of 136 elementary school aged

children, with a distribution of 47% boys ( $n = 64$ ) and 53% girls ( $n = 72$ ), and their parent/guardian. Children ages 7 - 11 participated ( $M = 9.10$ ,  $SD = 1.02$ ) and were enrolled in grades 2 through 5 ( $M = 3.65$ ). The children either self-identified or were identified by parent as African-American (90%) or multiple ethnicities (10%). Annual family income was measured across income levels as followed, with a mean income level of \$35,000: < \$10,000 = 19.1%, \$10,000 to 20,000 = 19.9%, \$20,000 to \$30,000 = 20.6%, \$30,000 to \$40,000 = 10.3%, \$40,000 to \$50,000 = 8.8%, \$50,000 to \$60,000 = 10.3%, \$60,000 to \$70,000 = 4.4%, and >\$70,000 = 5.1%. Two families (1.5%) declined to report annual income.

## **Measures**

### **Somatization**

#### ***Child Behavior Checklist [Parent-Report Measure]***

The Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) is a parent-report measure designed to assess social competence and behavioral problems of children ages 6-18. There are 113 items which examine the child's thoughts and behaviors within a timeframe of six months that are rated on a 3-point scale (0 = *not true of child*, 1 = *sometimes true of child*, and 2 = *very or often true of child*). The CBCL provides three broad scores (Total Score, Internalizing Problems, Externalizing Problems) and eight syndrome scales (Aggressive Behavior, Anxious/Depressed, Attention Problems, Delinquent Rule-Breaking Behavior, Social Problems, Somatic Complaints, Thought Problems, Withdrawn). Internal consistency coefficients ranged from .78 to .97, with adequate content, criterion-related, and construct validity (Achenbach & Rescorla, 2001).

In this study, the Somatic Complaints syndrome scale examined children's somatic symptoms, as reported by parent. There are 11 items assessing for somatic symptoms such as physical pain and headaches (see Appendix D for specific items). The coefficient alpha for the CBCL Somatic Complaints scale of the current study was .71. See Table 1 for coefficient alphas of all measures.

Table 1

*Cronbach's Alpha Coefficients for All Measures Used*

<i>Measure</i>	<i>Overall Sample</i>	<i>Girls</i>	<i>Boys</i>
MASC Somatic Subscale	.78	.82	.65
MASC without Somatic Subscale	.81	.82	.76
CDI without somatic items	.86	.89	.81
Internalizing Composite	.85	.86	.79
CBCL Internalizing Scale	.84	.82	.86
CBCL Somatic Subscale	.71	.62	.76
CEMS-Anger			
Coping	.59	.54	.65
Inhibition	.53	.56	.48
Dysregulation	.50	.55	.46
CEMS-Sadness			
Coping	.37	.47	.21
Inhibition	.46	.44	.49
Dysregulation	.47	.40	.54
CEMS-Worry			
Coping	.24	.24	.28
Inhibition	.47	.37	.53
Dysregulation	.44	.49	.39

*Multidimensional Anxiety Scale for Children [Self-Report Measure]*

The Multidimensional Anxiety Scale for Children (*MASC*; March, 1997) is a

39-item self-report measure that assesses anxiety symptoms of children ages 8 to 19. The MASC utilizes a 4-point Likert scale format. Children are presented with statements and are asked to respond to the item with respect to their own experiences. Response options may be rated on a scale that ranges from 0 (*never true about the child*) to 3 (*often true about the child*), and are combined into scores which are converted into standard *T*-scores. The MASC provides items distributed across four basic scales measuring Physical Symptoms, Harm Avoidance, Social Anxiety, and Separation/Panic. There is also a scale that measures Total Anxiety and two major indexes (Anxiety Disorders and Inconsistency). The normative sample for the MASC included 2,698 children and adolescents, 53.3% of whom were Caucasian in origin. Test-retest coefficients ranged from .78 to .93 and internal reliability coefficients ranged from .61 to .89.

The Physical Symptoms Scale of the MASC is comprised of 12 items that describe physical symptoms of anxiety that are included in the Tense/Restless, Somatic/Autonomic subscales. The Physical Symptoms scale has been demonstrated to have an alpha coefficient of .78 with African-American youth (Kingery, Ginsburg, & Burstein, 2009). Item examples include “I feel sick to my stomach” and “I get dizzy or faint feelings.” High scores on this scale indicate higher levels of somatic symptoms experienced by a child. The Physical Symptoms scale was used as a self-report measure of somatic symptoms (see Appendix F). The coefficient alpha for the Physical Symptoms Scale of the MASC, hereby called the MASC Somatic scale, of the current study was .78.

## **Internalizing symptoms**

### ***Children's Depression Inventory [Self-Report Composite]***

The Children's Depression Inventory (*CDI*; Kovacs, 1997) is a widely used, 27-item self-report questionnaire measure that assesses depressive symptomatology of children ages 7 to 17. Each item contains three statements and the child is asked to choose which of the three statements best describes his or her own thoughts and behaviors over the past two weeks. Corresponding scores for the statements are 0 (indicates absence of symptoms), 1 (indicates presence of mild symptoms), and 2 (indicates definite symptoms). For example, a child may be presented with the following statements and asked to choose the most fitting description for himself: "I am sad once in a while," "I am sad many times," and "I am sad all the time." A higher score on the *CDI* reflects a higher level of symptoms of depression. The *CDI* provides an overall scale as well as Negative Mood, Interpersonal Difficulties, Negative Self-Esteem, Ineffectiveness, and Anhedonia.

The normative sample for the *CDI* included 1,266 public school students (592 boys, 674 girls), 23% of whom were African-American, American Indian, or Hispanic origin. Internal consistency coefficients ranged from .71 to .89 and test-retest coefficients ranged from .74 to .83. Many published research studies have utilized the *CDI* to evaluate child problem behavior (e.g. Helsel & Matson, 1984; Hodges & Craighead, 1990).

Scores from the *CDI* were incorporated into a composite self-reported Internalizing Symptoms score, which also consisted of items from the *MASC*. This composite Internalizing Symptoms score excluded somatic items from both the *CDI* and

the MASC. The specific excluded CDI somatic items included “I have trouble sleeping ever night/many nights/I sleep pretty well,” “I am tired once in awhile/many days/all the time,” “I do not worry about aches and pain/I worry about aches and pains many times/all the time.” The coefficient alpha for the CDI items, without somatic items, was .86.

***Multidimensional Anxiety Scale for Children [Self-Report Composite]***

See earlier section for description of the MASC (March, 1997) and its response format. As previously described, the MASC is composed of three subscales, Physical Symptoms, Harm Avoidance, and Social Anxiety. This study utilized items from the Harm Avoidance and Social Anxiety scales to measure internalizing symptoms. These scores were incorporated into a self-reported composite Internalizing Symptoms score that also included items from the CDI. The Physical Symptoms subscale was utilized as a measure of somatic symptoms; therefore, items from the Physical Symptoms subscale were excluded from this composite score. The coefficient alpha for the MASC items, minus the MASC Somatic items, was .81.

***Internalizing Symptoms Composite [Self-Report Measure].***

The coefficient alpha for the current study’s Internalizing Composite measure, consisting of 50 CDI and MASC items that do not include somatic items, was .85.

***Child Behavior Checklist [Parent-Report Measure]***

See earlier section for description of the CBCL (Achenbach & Rescorla, 2001) and its response format. For this study, items from the Internalizing Problems scale were examined for children’s symptoms, as reported by parent, for a collective measure of both anxious and depressive symptoms. The Internalizing Problems scale is comprised of the Withdrawn, Anxiety/Depression, and Somatic Complaints subscales. This portion

excluded items from the Somatic Complaints subscale and only included items from the Withdrawn and the Anxiety/Depression subscales. The parent-report CBCL internalizing symptoms score was a separate measure from the composite, self-report Internalizing Symptoms score. The coefficient alpha for the current study was .84.

### **Emotion regulation**

#### ***The Children's Emotion Management Scales [Self-Report]***

The Children's Emotion Management Scales (*CEMS: CSMS, CAMS*; Zeman, Shipman, & Penza-Clyve, 2001; *CWMS*, Zeman, Cassano, Suveg, & Shipman, 2010) is a self-report, questionnaire measure designed to assess methods of emotion regulation. The CEMS consists of three scales which differentiate between and examine the specific emotions of Anger (*CAMS*), Sadness (*CSMS*), and Worry (*CWMS*). The 11-item *CAMS*, 12-item *CSMS*, and the 10-item *CWMS* all use a 3-point Likert-type scale format (1 = *hardly ever*, 2 = *sometimes*, and 3 = *often*). Each scale is comprised of three subscales, Coping, Inhibition, and Dysregulation. The Coping scale includes items that demonstrate ways to manage the emotional experience in a constructive manner (i.e., "I try to calmly deal with what is making me sad, the "Inhibition scale includes items that demonstrate restraint or suppression of emotional expression (i.e., "I'm afraid to show my anger"), and the Dysregulation scale includes items that demonstrate inappropriate or exaggerated displays of emotion (i.e., "I keep whining about how worried I am").

Initial validation was conducted with a sample of Caucasian, middle class elementary school children, with the *CSMS* and *CAMS* measures demonstrating construct validity coefficients from .62 to .77 and test-reliability ranging from .61 to .80 (Zeman et al., 2001). The *CWMS* was initially validated with a sample of mostly



Caucasian, middle to upper class SES children ages 6-12 with internal consistencies ranging from .69 to .74 (Zeman et al., 2010).

Coefficient alphas for this study for coping, inhibition, dysregulation subscales, respectively, were as follows: anger, .59, .53, and .50; sadness, .24, .47, and .44; and worry, .24, .47, and .44. Based on the low reliability for the measures of Worry Coping ( $>.40$ ), this scale was not used in the analyses. When examining the coefficients for boys and girls separately, the reliability coefficient for Sadness Coping for girls was a .47, which was in acceptable parameters. Therefore, Sadness Coping was still examined but only for girls.

When examining the reliability for the Worry Inhibition scale, the coefficient was low for the original set of four items in the current study, at .34. When two items were removed, the coefficient alpha improved to .47. Thus, the final Worry Inhibition scale included the items “I hold my worried feelings in,” and “I show my worried feelings.”

### **Procedure**

Institutional review board approval from the College of William & Mary was first obtained. The faculty and administrators at the elementary schools were informed of the proposed plan for research and their approval for the study to be conducted was received. Children and their parent/guardian were recruited for participation through an informational letter and consent form that was sent home with the child from school. The letter provided information regarding the details of the study and asked parents/guardians to sign and return consent forms by a specified due date. The letter informed parents of the purpose of the study, which was to learn more about children’s thoughts, emotions, and behaviors, and that their child would participate in individual interviews at school

that would take approximately 30 minutes. The limits of confidentiality and any potential risks were explained and parents were informed that their child would receive a small gift (i.e. an activity book and pencil) for their participation. Parents were also informed of the opportunity to participate in questionnaires examining child and parent emotional and behavioral functioning and that they would receive a gift card for their participation.

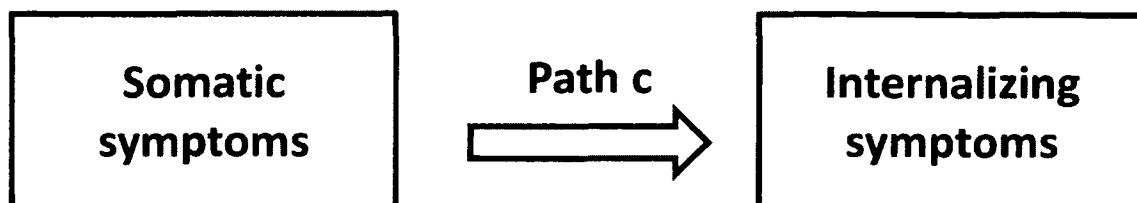
Interviews with the children were conducted with trained student research assistants from the College of William & Mary for approximately 30 minutes during a period of time that did not interfere with student class time, such as the homeroom period prior to classes or during the child's lunch period. The procedure for the data collection sections occurred as followed, with only measures relevant to this study being described. First, children provided verbal assent to participation after being informed about their role in the study, which included answering questions about their thoughts and feelings. The children were informed that they could skip any questions they did not feel comfortable answering and that they could stop at any time without penalty. In addition to their assent and their parent's permission and consent form, the child also signed a consent form. The research assistant then interviewed the child on the following measures: the CDI, the MASC, and the CEMS. The order of these questionnaires was based on previously determined random assignment. At the end of the data collection section, the children were presented with different gifts, including a book and a pencil, for their participation. Following their participation, the children were asked not to share what the activities of the study and what they had done during the data collection task with their classmates or friends.

Parent measures were also collected from the parents whose children had been interviewed. Parents who gave consent for their participation were then contacted by mail, email, or phone and were sent questionnaires to be returned via a pre-stamped return envelope. Parents who returned the questionnaires were then sent a \$15 Target gift card as a token of appreciation for their participation, as outlined in their permission form.

### **Data analysis plan**

Hypotheses of the study were evaluated through a series of mediation regression analyses, in accordance with Baron and Kenny's (1986) model. Four steps are necessary to establish mediation. First, the independent variable should be significantly associated with the dependent variable. Second, the independent variable should be related to the mediator. Third, the mediator should be related to the dependent variable. Fourth, the association between independent and dependent variables is reduced, when the mediator is controlled (Kenny, 2012).

Thus, first, internalizing symptoms was regressed on somatic symptoms, to establish an effect to be mediated (Path c, Fig. 1). Somatic symptoms were assessed separately, based on the potential difference in information gathered from multiple reporters of the specific measures. Therefore, somatic symptoms were first assessed by the parent-reported CBCL Somatic scale separately from the child-reported MASC Somatic scale. Internalizing symptoms were assessed in two ways: first, through the Internalizing Symptoms composite consisting of items from the MASC and CDI and then through the parent-reported CBCL Internalizing Problems scale.



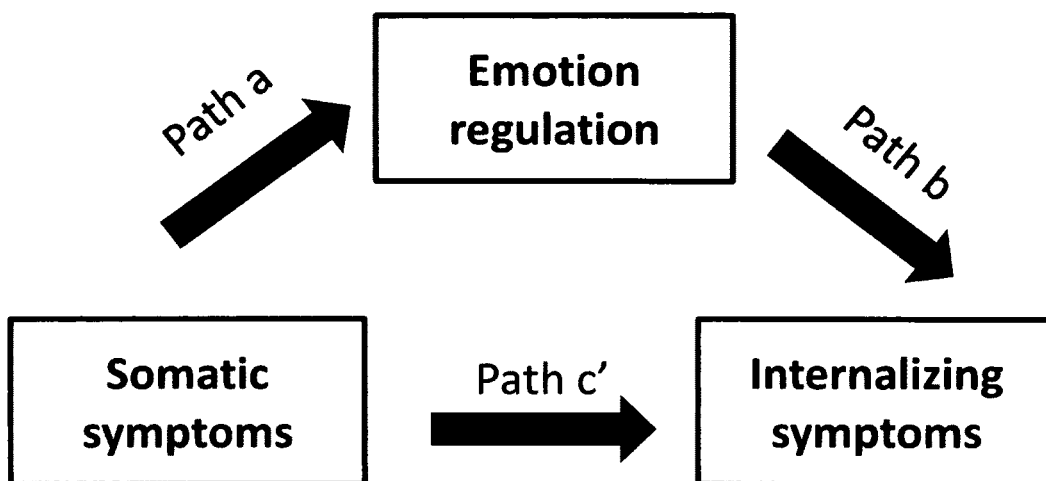
*Figure 1.* Path c: the initial variable predicting the outcome variable.

If Path c was established, and the initial variable of somatic symptoms was correlated with the outcome of internalizing symptoms, the second regression equation was then completed. In the second step, emotion regulation was regressed on somatic symptoms, to establish Path a (see Fig. 2). Scales were examined in the regression analyses separately by emotion facet (anger inhibition, sadness inhibition, worry inhibition, etc.). Emotion regulation consisted of children's self-report as measured by the CEMS Anger, Sadness, and Worry coping, inhibition, and dysregulation scales. Somatic symptoms were measured by the CBCL and MASC Somatic scales.

If Path a was established, and the initial variable of somatic symptoms was correlated with the mediator of emotion regulation, the third regression equation was then completed. In the third step, internalizing symptoms was regressed on emotion regulation to establish Path b (See Fig. 2).

If Path b was established, and the mediator, emotion regulation, affected the outcome variable, internalizing symptoms, the final regression equation was then completed. In the fourth step, internalizing symptoms was regressed on both somatic symptoms and emotion regulation. This provided an estimate of the relation between

somatic symptoms and internalizing symptoms, controlling for emotion regulation (Path  $c'$ , See Fig. 2).



*Figure 2.* Path a, b, and  $c'$ : the relations between initial and outcome variables and mediator.

Mediation is supported if the effect of the mediator, emotion regulation, (Path b) remains significant when controlling for somatic symptoms. Thus, the effect of the initial variable on the dependent variable is reduced when the mediator is added to the model. If somatic symptoms no longer significantly predict internalizing symptoms when emotion regulation is controlled, the findings support full mediation. If somatic symptoms still significantly predicted internalizing symptoms (both somatic symptoms and emotion regulation predict internalizing symptoms), findings supported partial mediation. The Sobel test is a post-hoc test that is used to test whether the mediation

effect is statistically significant, and determines whether the reduction in the effect of the independent variable on the dependent variable is significant, when the mediator is in the model (Preacher & Leonardelli, 2012).

Table 2

*Correlational Analyses for Boys*

<i>Measure</i>	1	2	3	4	5	6	7	8	9	10	11
1. MASC Somatic	-	.05	.36**	.17	.06	.01	.12	.12	.11	-.07	.24
2. CBCL Somatic	-	-	.08	.43**	-.06	-.29*	.13	-.04	.09	.01	-.03
3. Internalizing Composite	-	-	-	.41**	.09	.12	.09	-.12	.27*	.00	.05
4. CBCL Internalizing	-	-	-	-	.05	.03	-.10	-.11	.09	.16	-.21
5. Anger Inhibition	-	-	-	-	-	.26*	-.03	.55**	.12	.09	.14
6. Anger Coping	-	-	-	-	-	-	-.21	.19	-.21	.23	-.06
7. Anger Dysregulation	-	-	-	-	-	-	-	.08	.23	-.10	.33**
8. Sadness Inhibition	-	-	-	-	-	-	-	-	.02	.10	.18
9. Sadness Dysregulation	-	-	-	-	-	-	-	-	-	-.06	.39**
10. Worry Inhibition	-	-	-	-	-	-	-	-	-	-	-.35**
11. Worry Dysregulation	-	-	-	-	-	-	-	-	-	-	-

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

**Preliminary analyses**

First, preliminary analyses were performed to assess (a) internal consistencies of each measure to determine appropriateness for inclusion, (b) correlational analyses for boys (See Table 2) and girls (See Table 3), (c) the demographics of the research participants, (d) potential differences between students from the two schools, (e) potential

differences in the final sample used for this study in comparison to the original, larger sample, and (f) gender differences.

Table 3

*Correlational Analyses for Girls*

<i>Measure</i>	1	2	3	4	5	6	7	8	9	10	11
1. MASC Somatic	-	-.08	.70**	.06	.34**	.13	.29*	.30**	.09	-.19	.34**
2. CBCL Somatic	-	-	.07	.66**	-.13	-.01	.21	.13	.12	.19	.10
3. Internalizing Composite	-	-	-	.14	.32**	.25*	.09	.25*	.18	.01	.46**
4. CBCL Internalizing	-	-	-	-	-.03	.05	.16	.11	-.05	.24*	.14
5. Anger Inhibition	-	-	-	-	-	.04	-.09	.42**	.09	-.11	.23
6. Anger Coping	-	-	-	-	-	-	-.24*	.23*	-.03	.09	.01
7. Anger Dysregulation	-	-	-	-	-	-	-	.11	.39*	-.08	.36**
8. Sadness Inhibition	-	-	-	-	-	-	-	-	.22	.12	.25*
9. Sadness Dysregulation	-	-	-	-	-	-	-	-	-	-.22	.47**
10. Worry Inhibition	-	-	-	-	-	-	-	-	-	-	-.33**
11. Worry Dysregulation	-	-	-	-	-	-	-	-	-	-	-

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

**School-based differences for final sample**

To examine whether differences on the dependent variables were present for the students of the two schools, a series of independent t-tests were conducted to compare measures between the two schools. However, because 15 t-tests were run, concerns about an increase in Type 1 error emerged. Thus, a Bonferroni correction was applied in which an adjusted  $p$ -value was set at .0033 (.05/15). Of the 15 analyses conducted, there

were no significant differences found between School A and School B. Given the lack of differences found, it was decided that both samples would be treated as one unified sample. See Table 4 for t-test results.

Table 4

*Independent t-test Measures for Outcome Measures Between School A and B of Final Sample*

Variable	Mean (SD)		<i>t</i>	<i>df</i>	<i>p</i>
	School A	School B			
MASC					
Somatic	11.84 (7.66)	9.20 (4.92)	2.44	127.02	.016
Without Somatic	38.30 (12.00)	31.61 (12.38)	3.05	134	.003
CBCL					
Somatic	1.64 (2.20)	1.70 (2.32)	-0.13	134	.900
Internalizing	4.74 (4.70)	3.07 (4.42)	2.01	134	.046
CDI	7.21 (6.89)	5.74 (5.34)	1.27	134	.207
Internalizing Composite	0.26 (1.68)	-.51 (1.35)	2.68	134	.008
CEMS-Anger					
Coping	8.63 (1.89)	8.56 (2.08)	0.22	133	.828
Inhibition	8.09 (1.86)	7.84 (1.80)	0.73	133	.468
Dysregulation	4.44 (1.48)	4.96 (1.74)	-1.78	133	.078
CEMS-Sadness					
Coping	8.71 (1.72)	8.32 (1.84)	1.21	132	.228
Inhibition	8.02 (1.82)	7.98 (2.02)	0.13	132	.897
Dysregulation	5.20 (1.57)	5.80 (1.717)	-2.00	132	.047
CEMS-Worry					
Coping	6.56 (1.20)	6.53 (1.65)	0.08	68.13	.936
Inhibition	4.13 (1.26)	4.02 (1.20)	0.49	133	.625
Dysregulation	4.99 (1.66)	5.11 (1.53)	-0.41	133	.679

*Note.* Multidimensional Anxiety Scale for Children = MASC; Children's Depression Inventory = CDI; CEM = Children's Emotion Management Scale



### **Final sample vs. remaining sample**

To examine if there were potential differences between students of the final sample whose parents returned questionnaires and those in the remaining sample, analyses were conducted addressing the question of differences between groups. A series of 13 independent *t*-tests were conducted to examine potential differences between the scores of students of the final sample ( $N = 136$ ) and the remaining similar sample (African-American or mixed with African-American only ( $N = 244$ )) on the measures. Due to the concerns about an increase in Type I error because of the 13 *t*-tests, a Bonferroni correction was applied and the adjusted *p*-value was set at 0.0038 (0.05/13). There was a significant difference in the scores on the CEMS Worry Dysregulation scale. Specifically, students in the final sample reported fewer emotion dysregulation symptoms on the Worry Dysregulation scale than students in remaining sample,  $t(376) = 3.00$ ,  $p = .003$ ,  $d = 0.33$ . There were no significant differences between the final sample and remaining sample for the other outcome measure scales (see Table 5).

### **Gender differences**

A series of 15 independent *t*-test measures were conducted to examine gender differences for the dependent variables using the final sample. A Bonferroni correction was applied with the resultant *p* value set at .003 (0.05/15). There was a significant difference in the scores for boys and girls on several scales, such that girls reported higher scores than boys on the MASC overall scale that did not include somatic symptoms,  $t(133.76) = -3.69$ ,  $p < .001$ ,  $d = .63$ . Girls also reported higher scores on the Internalizing Composite scale than boys,  $t(129.95) = -3.07$ ,  $p = .003$ ,  $d = .52$ . There were no significant differences in the scores on the remaining dependent variables (see Table

6). Because of the significant gender differences on the self-reported somatic scale, which contributes to a central mediation step, analyses were conducted separately by child gender for each scale.

Table 5

*Independent t-test Measures for Outcome Measures Between Final Sample and Remaining Sample*

Variable	Mean (SD)		<i>t</i>	<i>df</i>	<i>p</i>
	Final Sample	Others			
MASC					
Somatic (SS)	10.95 (6.96)	10.52 (7.53)	-0.51	308	.610
Without SS	36.04 (12.49)	37.16 (13.58)	0.74	292	.462
CDI without somatic	6.71 (6.42)	6.95 (6.12)	0.35	356	.727
Internalizing Composite	-0.07 (1.60)	0.06 (1.60)	0.69	284	.491
CEM-Anger					
Coping	8.58 (1.99)	8.70 (1.86)	0.61	375	.543
Inhibition	8.02 (1.83)	8.28 (2.00)	1.21	373	.227
Dysregulation	4.56 (1.58)	4.88 (1.60)	1.87	372	.063
CEM-Sadness					
Coping	10.45 (1.92)	10.59 (1.77)	0.69	375	.492
Inhibition	6.10 (1.54)	6.19 (1.60)	0.57	376	.567
Dysregulation	5.88 (1.29)	5.95 (1.41)	0.44	375	.660
CEM-Worry					
Coping	6.55 (1.36)	6.64 (1.39)	0.59	377	.557
Inhibition	4.08 (1.24)	4.02 (1.31)	-0.41	376	.681
Dysregulation	5.03 (1.61)	5.56 (1.64)	3.00	376	.003*

Note. \* indicates significance at  $p < .0038$ .

Table 6

*Independent t-test Measures for Dependent Variables as a Function of Child Gender*

Variable	Mean (SD)		<i>t</i>	<i>df</i>	<i>p</i>
	Girls ( <i>N</i> = 72)	Boys ( <i>N</i> = 64)			
MASC Somatic	12.19 (7.85)	9.54 (5.52)	-2.30	127.49	.026
MASC without SS	39.57 (12.82)	32.06 (10.91)	-3.69	133.76	.001*
CDI without somatic	7.35 (7.23)	6.00 (5.34)	-1.25	129.83	.215
CBCL Somatic	1.49 (1.83)	1.86 (2.61)	0.95	111.23	.332
CBCL Internalizing	4.07 (4.23)	4.30 (5.13)	0.28	134	.777
Internalizing Composite	0.38 (1.76)	-.43 (1.31)	-3.07	129.95	.003*
CEM-Anger					
Coping	8.46 (1.96)	8.78 (1.94)	0.95	133	.345
Inhibition	8.28 (1.78)	7.70 (1.86)	-1.85	133	.067
Dysregulation	4.54 (1.62)	4.70 (1.56)	0.57	133	.569
CEM-Sadness					
Coping	8.53 (1.91)	8.65 (1.60)	0.38	132	.703
Inhibition	7.97 (1.88)	8.05 (1.89)	0.23	132	.816
Dysregulation	5.46 (1.56)	5.32 (1.73)	-0.48	132	.634
CEM-Worry					
Coping	6.64 (1.31)	6.44 (1.41)	-0.83	133	.409
Inhibition	3.88 (1.17)	4.35 (1.27)	2.25	133	.026
Dysregulation	5.24 (1.72)	4.79 (1.45)	-1.60	133	.112

Note. \* indicates significance at  $p < .003$ .

### Age correlations

To examine the potential relationship between age and the outcome measures, a series of Pearson product-moment correlation coefficients were conducted. Age did not have a significant correlation with any of the outcome measures (see Table 7). Research has shown, however, that there are differences on the outcome measures based on age. Therefore, this variable was still treated as a covariate and controlled for in the analyses.

Table 7

*Pearson Product-moment Correlation Coefficients Between Age and Outcome Measures*

<i>Variable</i>	<i>Age</i>
CBCL	
Somatic Subscale	.07
Internalizing Subscale	.03
CDI without somatic items	-.08
MASC Somatic Subscale	-.09
MASC without Somatic Subscale	-.06
Internalizing Composite	-.09
CEM-Anger	
Coping	-.05
Inhibition	-.14
Dysregulation	-.15
CEM-Sadness	
Coping	-.12
Inhibition	-.15
Dysregulation	-.09
CEM-Worry	
Coping	.09
Inhibition	-.00
Dysregulation	-.05

*Note.* \* $p < .05$

## CHAPTER III

### RESULTS

#### **Parent Report for Independent Variable and Child Report for Dependent Variable**

The first step of mediational analyses, according to the model by Baron and Kenny (1986), indicates that the initial variable must be correlated with the outcome. Therefore, the first analysis for parent- to child-report measures examined the relation between the predictor variable, CBCL Somatic scale score, and the criterion variable, the Internalizing Composite scale score. For these analyses, and all further analyses, the data were examined separately by gender and controlled for age in months. The potential effect of age (in months) was controlled for in the first step of the model. CBCL Somatic scale score was entered in Step 2. Scores on Internalizing Composite scale were entered as the criterion variable.

Overall, the model was not statistically significant for boys,  $F(2, 61) = .21, p = .810, ns$ . The regression model described only 0.7% of the variance of the Internalizing Composite scale ( $R^2 = .007$ ). The predictor, parent-reported somatic symptoms, was not significantly related to the outcome, self-reported internalizing symptoms for boys ( $B = .04, \beta = .08, p = .545, ns$ ). For girls, the model was not statistically significant,  $F(2, 69) = .45, p = .639, ns$ . The regression model described only 1.3% of the variance of the Internalizing Composite scale ( $R^2 = .013$ ). Parent-reported somatic symptoms were not significantly related to self-reported internalizing symptoms for girls ( $B = .08, \beta = .08, p = .507, ns$ ).

Due to nonsignificant associations between CBCL Somatic scale scores and Internalizing Composite scale scores, further analyses examining possible mediation for parent to child measures were not completed. See Table 8.

Table 8

*Regression for Internalizing Composite Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 136)	
		$\beta$	$\Delta R^2$
Boys			
Step 1			.001
Age in months	.00 (.01)	.03	
Step 2			.006
Age in months	.00 (.02)	.03	
CBCL Somatic	.04 (.06)	.08	
Girls			
Step 1			.007
Age in months	-.01 (.02)	-.08	
Step 2			.006
Age in months	-.01 (.02)	-.09	
CBCL Somatic	.08 (.12)	.08	

Note. Total boys  $R^2 = .007$ ; Total girls  $R^2 = .013$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

### **Child Report for Independent Variable and Parent Report for Dependent Variable**

The first analysis for child- to parent-report measures examined the relation between the predictor variable, MASC Somatic Score, and the criterion variable, the CBCL Internalizing scale score.

The overall model was not statistically significant for boys,  $F(2, 61) = 1.56, p = .218, ns$ , and only described 4.9% of the variance of the CBCL Internalizing scale ( $R^2 = .049$ ). The predictor variable, self-reported somatic symptoms, was not significantly related to the criterion variable, parent-reported internalizing symptoms for boys ( $B = .14,$

$\beta = .15, p = .228, ns$ ). For girls, the overall model was also not statistically significant,  $F(2, 69) = 2.36, p = .103, ns$ , and described 6.4% of the variance ( $R^2 = .064$ ). Self-reported somatic symptoms were not significantly related to parent-reported internalizing symptoms for girls ( $B = .05, \beta = .09, p = .460, ns$ ).

Due to nonsignificant correlations between MASC Somatic scale scores and CBCL Internalizing scale scores, further regression analyses examining possible mediation for child to parent measures were not completed. See Table 9.

Table 9

*Regression for CBCL Internalizing Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 136)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.026
Age in months	-.08 (.06)	-.16	
Step 2			.023
Age in months	-.07 (.06)	-.15	
MASC Somatic	.14 (.12)	.15	
<b>Girls</b>			
Step 1			.056*
Age in months	.08 (.04)	.24	
Step 2			.007
Age in months	.08 (.04)	.25	
CBCL Somatic	.05 (.06)	.09	

*Note.* Total boys  $R^2 = .049$ ; Total girls  $R^2 = .064$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

**Child Report for Dependent and Independent Variables**

The first analysis for child- to child-report measures examined the relation between the predictor variable, MASC Somatic score, and the criterion variable, the Internalizing Composite scale score. The potential effect of age (in months) was

controlled for in the first step of the model. MASC Somatic scale score was entered in Step 2. Scores on the Internalizing Composite scale were entered as the criterion variable.

For boys, the overall model was statistically significant,  $F(2, 61) = 4.66, p = .013$ . The regression model described 13.2% of the variance of the Internalizing Composite scale ( $R^2 = .132$ ). The predictor variable, self-reported somatic symptoms, was significantly associated with the criterion variable, self-reported internalizing symptoms for boys ( $B = .09, \beta = .36, p = .003$ ). For girls, the overall model was also statistically significant,  $F(2, 69) = 33.29, p = .001$ . The regression model described 49.1% of the variance ( $R^2 = .491$ ). Somatic symptoms were significantly associated with internalizing symptoms for girls ( $B = .16, \beta = .70, p = .000$ ). See Table 10.

Table 10

*Regression for Internalizing Composite Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 136)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.001
Age in months	.00 (.02)	.03	
Step 2			.132**
Age in months	.01 (.02)	.06	
MASC Somatic	.09 (.03)	.36**	
<b>Girls</b>			
Step 1			.007
Age in months	-.01 (.02)	-.08	
Step 2			.485***
Age in months	.00 (.01)	-.00	
MASC Somatic	.16 (.02)	.70***	

Note. Total boys  $R^2 = .132$ ; Total girls  $R^2 = .491$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$



Since the initial variable of self-reported somatic symptoms was correlated with the outcome, self-reported internalizing symptoms, the results demonstrated that the first step of the mediational model was fulfilled. Thus, the second step of mediational analyses, according to the model by Baron and Kenny (1986), indicates that the initial variable must be correlated with the mediator. In this model, the mediator is emotion regulation. Therefore, the second set of analyses for child report measures examined the relation between the predictor variable, self-reported somatic symptoms, and the criterion variable, the emotion regulation scores.

### **Anger**

#### ***Anger – Coping***

The potential effect of age (in months) was controlled for in the first step of the model. MASC Somatic scale score was entered in Step 2. Scores on the Anger Coping scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 60) = 1.87, p = .16, ns$  (see Table 11). The regression described 5.9% of the variance of the Anger Coping scale ( $R^2 = .059$ ). The predictor variable, self-reported somatic symptoms, was not significantly associated with the criterion variable, anger coping, for boys ( $B = -.01, \beta = -.02, p = .872, ns$ ). For girls, the overall model was also not statistically significant,  $F(2, 69) = 1.90, p = .16, ns$ , and described 5.2% of the variance ( $R^2 = .052$ ). Self-reported somatic symptoms were not significantly associated with anger coping for girls ( $B = .04, \beta = .15, p = .199, ns$ ).

Because of the non-significant correlation between MASC Somatic scale score and Anger Coping scale emotion regulation score for boys and girls, the second step of the mediational analysis was not fulfilled and no further analyses examining potential mediation were completed.

Table 11

*Regression for Anger Coping Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 135)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.058
Age in months	-.04 (.02)	-.24	
Step 2			.000
Age in months	-.05 (.02)	-.24	
MASC Somatic	-.01 (.05)	-.02	
<b>Girls</b>			
Step 1			.029
Age in months	.03 (.02)	.17	
Step 2			.023
Age in months	.03 (.02)	.19	
MASC Somatic	.04 (.03)	.15	

Note. Total boys  $R^2 = .059$ ; Total girls  $R^2 = .052$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

***Anger – Inhibition***

The potential effect of age (in months) was controlled for in the first step of the model. MASC Somatic scale score was entered in Step 2. Anger Inhibition scale score was entered as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 60) = .40, p = .670, ns$  (see Table 12). The regression described 1.3% of the variance of the Anger Inhibition scale ( $R^2 = .013$ ). The predictor variable, self-reported somatic symptoms, was not significantly related to the criterion variable, anger inhibition for boys ( $B = .02, \beta =$

.05,  $p = .706$ , *ns*). For girls, the overall model was statistically significant,  $F(2, 69) = 4.62$ ,  $p = .013$ , and described 11.8% of the variance ( $R^2 = .118$ ). For girls, self-reported somatic symptoms was significantly related to anger inhibition ( $B = .08$ ,  $\beta = .34$ ,  $p = .004$ ).

Table 12

*Regression for Anger Inhibition Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( $n = 136$ )	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.011
Age in months	-.02 (.02)	-.10	
Step 2			.002
Age in months	-.02 (.02)	-.10	
MASC Somatic	.02 (.04)	.05	
<b>Girls</b>			
Step 1			.007
Age in months	-.01 (.02)	-.09	
Step 2			.111**
Age in months	-.01 (.03)	-.05	
MASC Somatic	.08 (.03)	.34**	

*Note.* Total boys  $R^2 = .013$ ; Total girls  $R^2 = .118$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Since MASC Somatic scale score and Anger Inhibition scale emotion regulation score were correlated for girls, the third step of Baron and Kenny's model, which indicates that the mediator affects the outcome variable, was examined. For girls, anger inhibition was significantly associated with self-reported internalizing symptoms ( $B = .32$ ,  $\beta = .32$ ,  $p = .007$ ), and described 10.7% of the variance ( $R^2 = .107$ ).

Finally, to test whether the hypothesized mediator, anger inhibition, was related to the outcome, self-reported internalizing symptoms, during the fourth step internalizing

symptoms was simultaneously regressed on both somatic symptoms and anger inhibition. The final model for girls was significant,  $F(3, 68) = 22.59, p = .001$ , and explained 49.9% of the variance ( $R^2 = .499$ ). However, anger inhibition was not significantly associated with self-reported internalizing symptoms, when controlling for somatic symptoms ( $B = .09, \beta = .10, p = .300, ns$ ). See Table 13. Since there were four regression steps, concerns about an increase in Type 1 error emerged. Thus, a Bonferroni correction was applied, in which the adjusted  $p$ -value was set at .013 (.05/4). The first three mediation steps for anger inhibition continued to be significant, with the Bonferroni correction.

Table 13

*Regression for Internalizing Composite with MASC Somatic and Anger Inhibition as Predictors*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( $n = 72$ )	
		$\beta$	$\Delta R^2$
Girls			
Step 1			.007
Age in months	-.01 (.02)	-.08	
Step 2			.100**
Age in months	.00 (.01)	-.00	
Anger Inhibition	.32 (.11)	.32**	
Step 3			.392***
Age in months	.00 (.01)	.00	
MASC Somatic	.15 (.02)	.67***	
Anger Inhibition	.09 (.09)	.10	

Note. Total girls  $R^2 = .499$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### ***Anger – Dysregulation***

The potential effect of age (in months) was controlled for in the first step of the model. MASC Somatic scale score was entered in Step 2. Scores on the Anger Dysregulation scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 60) = 2.62, p = .081, ns$  (see Table 14). The regression described 8.0% of the variance of the Anger Dysregulation scale ( $R^2 = .089$ ). The predictor variable, self-reported somatic symptoms, was not significantly related to the criterion variable, anger dysregulation ( $B = .02, \beta = .08, p = .533, ns$ ). For girls, the overall model was statistically significant,  $F(2, 69) = 3.35, p = .041$ , and described 8.9% of the variance ( $R^2 = .089$ ). Self-reported somatic symptoms were significantly related to anger dysregulation for girls ( $B = .06, \beta = .28, p = .017$ ).

Table 14

*Regression for Anger Dysregulation Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( $n = 135$ )	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.074
Age in months	-.04 (.02)	-.27	
Step 2			.006
Age in months	-.04 (.02)	-.26	
MASC Somatic	.02 (.04)	.08	
<b>Girls</b>			
Step 1			.010
Age in months	-.01 (.02)	-.10	
Step 2			.079*
Age in months	-.01 (.02)	-.07	
MASC Somatic	.06 (.02)	.28*	

Note. Total boys  $R^2 = .080$ ; Total girls  $R^2 = .089$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Since MASC Somatic scale score and Anger Dysregulation emotion regulation score were not correlated for boys, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for boys. Since MASC Somatic scale score and Anger Dysregulation emotion

regulation score were correlated for girls, the third step of Baron and Kenny's model, which indicates that the mediator affects the outcome variable, was examined. For girls, the model was not statistically significant,  $F(2, 69) = 0.46, p = .635, ns$ , and described only 1.3% of the variance ( $R^2 = .013$ ). Anger dysregulation, was not significantly associated with self-reported internalizing symptoms, ( $B = .09, \beta = .08, p = .501, ns$ ). No further analyses examining potential mediation were completed for girls. See Table 15.

Since there were three steps run, concerns about an increase in Type 1 error emerged. Thus, a Bonferroni correction was applied, in which the adjusted  $p$ -value was set at .017 (.05/3). The first three mediation steps for anger dysregulation continued to be significant, with the Bonferroni correction.

Table 15

*Regression for Internalizing Composite with Anger Dysregulation as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( $n = 72$ )	
		$\beta$	$\Delta R^2$
Girls			
Step 1			.007
Age in months	-.01 (.02)	-.08	
Step 2			.007
Age in months	-.01 (.02)	-.08	
Anger Dysregulation	.09 (.13)	.08	

*Note.* Total girls  $R^2 = .013$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### **Sadness**

#### ***Sadness - Coping***

The potential effect of age (in months) was controlled for in the first step of the model. MASC Somatic scale score was entered in Step 2. Scores on the Sadness Coping scale were examined as the criterion variable.

For girls, the overall model was also not statistically significant,  $F(2, 69) = .75, p = .478$ , and described 2.1% of the variance ( $R^2 = .021$ ). Self-reported somatic symptoms were not significantly related to sadness coping for girls ( $B = .00, \beta = .01, p = .941$ ). Because of the nonsignificant correlation between MASC Somatic scale score and Sadness Coping emotion regulation score for boys and girls, the second step of the mediational analysis was not fulfilled and no further analyses examining potential mediation were completed. See Table 16.

Table 16

*Regression for Sadness Coping Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( $n = 134$ )	
		$\beta$	$\Delta R^2$
Girls			
Step 1			.021
Age in months	-.02 (.02)	-.15	
Step 2			.000
Age in months	-.02 (.02)	-.14	
MASC Somatic	.00 (.03)	.01	

*Note.* Total boys  $R^2 = .073$ ; Total girls  $R^2 = .021$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

***Sadness – Inhibition***

The potential effect of age (in months) was controlled for in the first step of the model. MASC Somatic scale score was entered in Step 2. Scores on the Sadness Inhibition scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 59) = 0.67, p = .514, ns$  (see Table 17). The regression described 2.2% of the variance of the Sadness Inhibition scale ( $R^2 = .022$ ). The predictor variable, self-reported somatic symptoms, was not significantly related to the criterion variable, sadness inhibition ( $B = .04, \beta = .11, p =$

.418, *ns*). For girls, the overall model was statistically significant,  $F(2, 69) = 3.94$ ,  $p = .024$ , and described 10.3% of the variance ( $R^2 = .103$ ). Self-reported somatic symptoms were significantly related to sadness inhibition ( $B = .07$ ,  $\beta = .29$ ,  $p = .013$ ).

Table 17

*Regression for Sadness Inhibition Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( $n = 134$ )	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.011
Age in months	-.02 (.02)	-.11	
Step 2			.011
Age in months	-.02 (.02)	-.09	
MASC Somatic	.04 (.05)	.11	
<b>Girls</b>			
Step 1			.004
Age in months	-.02 (.02)	-.14	
Step 2			.077*
Age in months	-.02 (.02)	-.10	
MASC Somatic	.07 (.03)	.29	

*Note.* Total boys  $R^2 = .022$ ; Total girls  $R^2 = .103$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Since MASC Somatic scale score and Sadness Inhibition emotion regulation score were not correlated for boys, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for boys. For girls, however, the third step of the mediation model was conducted, which indicates that the mediator affects the outcome variable. For girls, the model described 6.7% of the variance ( $R^2 = .067$ ). Sadness inhibition was associated with self-reported internalizing symptoms ( $B = .23$ ,  $\beta = .25$ ,  $p = .039$ ). Since there were three steps run, concerns about an increase in Type 1 error emerged. Thus, a Bonferroni



correction was applied, in which the adjusted  $p$ -value was set at .017 (.05/3). With the Bonferroni correction, sadness inhibition was not significantly associated with self-reported internalizing symptoms.

### ***Sadness – Dysregulation***

The potential effect of age (in months) was controlled for in the first step of the model. MASC Somatic scale score was entered in Step 2. Scores on the Sadness Dysregulation scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 59) = 1.22, p = .304, ns$  (see Table 18). The regression described 4.0% of the variance of the Sadness Dysregulation scale ( $R^2 = .040$ ). The predictor variable, self-reported somatic symptoms, was not significantly related to the criterion variable, sadness dysregulation ( $B = .03, \beta = .09, p = .505, ns$ ). For girls, the overall model was also not statistically significant,  $F(2, 69) = .26, p = .772$ , and described 0.7% of the variance ( $R^2 = .007$ ). Self-reported somatic symptoms were not significantly related to sadness dysregulation ( $B = .02, \beta = .09, p = .475, ns$ ). Because of the nonsignificant correlation between MASC Somatic scale score and Sadness Dysregulation emotion regulation score for boys and girls, the second step of the mediational analysis was not fulfilled and no further analyses examining potential mediation were completed.

### **Worry**

#### ***Worry – Inhibition***

The potential effect of age (in months) was controlled for in the first step of the model. MASC Somatic scale score was entered in Step 2. Scores on the Worry Inhibition scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 60) = 0.14, p = .871, ns$  (see Table 19). The regression described 0.5% of the variance of the Worry Inhibition scale ( $R^2 = .005$ ). The predictor variable, self-reported somatic symptoms, was not significantly related to the criterion variable, worry inhibition ( $B = -.02, \beta = -.07, p = .602, ns$ ). For girls, the overall model was also not statistically significant,  $F(2, 69) = 1.32, p = .275$ , and described 3.7% of the variance ( $R^2 = .037$ ). Self-reported somatic symptoms were not significantly related to the worry inhibition ( $B = -.03, \beta = -.19, p = .110, ns$ ). Because of the nonsignificant correlation between MASC Somatic scale score and Worry Inhibition emotion regulation score for boys and girls, the second step of the mediational analysis was not fulfilled and no further analyses examining potential mediation were completed.

Table 18

*Regression for Sadness Dysregulation Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 134)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.032
Age in months	-.03 (.02)	-.18	
Step 2			.007
Age in months	-.03 (.02)	-.17	
MASC Somatic	.03 (.04)	.09	
<b>Girls</b>			
Step 1			.000
Age in months	.00 (.02)	.01	
Step 2			
Age in months	.00 (.02)	.02	
MASC Somatic	.02 (.02)	.09	

Note. Total boys  $R^2 = .040$ ; Total girls  $R^2 = .007$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table 19

*Regression for Worry Inhibition Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 135)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.000
Age in months	.00 (.012)	-.00	
Step 2			.005
Age in months	-.00 (.02)	-.01	
MASC Somatic	-.02 (.03)	-.07	
<b>Girls</b>			
Step 1			.000
Age in months	.00 (.01)	.01	
Step 2			
Age in months	-.00 (.01)	-.01	
MASC Somatic	-.03 (.02)	-.19	

Note. Total boys  $R^2 = .005$ ; Total girls  $R^2 = .037$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### ***Worry – Dysregulation***

The potential effect of age (in months) was controlled for in the first step of the model. MASC Somatic scale score was entered in Step 2. Scores on the Worry Dysregulation scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 60) = 2.21, p = .118, ns$  (see Table 20). The regression described 6.9% of the variance of the Worry Dysregulation scale ( $R^2 = .069$ ). The predictor variable, self-reported somatic symptoms, was not significantly related to the criterion variable, worry dysregulation ( $B = .06, \beta = .23, p = .072, ns$ ). For girls, the overall model was statistically significant,  $F(2, 69) = 4.56, p = .014$ , and described 11.7% of the variance ( $R^2 = .117$ ). Self-reported somatic symptoms were significantly related to worry dysregulation ( $B = .08, \beta = .34, p = .004$ ).

Table 20

*Regression for Worry Dysregulation Scale, with MASC Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 135)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.017
Age in months	-.02 (.02)	-.13	
Step 2			.052
Age in months	-.01 (.02)	-.10	
MASC Somatic	.06 (.03)	.23	
<b>Girls</b>			
Step 1			.000
Age in months	-.00 (.02)	-.02	
Step 2			.116**
Age in months	.00 (.02)	.02	
MASC Somatic	.08 (.03)	.34**	

*Note.* Total boys  $R^2 = .069$ ; Total girls  $R^2 = .117$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Since MASC Somatic scale score and Worry Dysregulation emotion regulation score were not correlated for boys, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for boys. For girls, however, the third step of the mediation model was conducted, examining the relation between the hypothesized mediator and outcome. For girls, the model was statistically significant,  $F(2, 69) = 9.45, p = .001$ , and described 21.5% of the variance ( $R^2 = .215$ ). Worry dysregulation, was significantly associated with the self-reported internalizing symptoms, ( $B = .47, \beta = .11, p = .001$ ).

To test for the fourth step, internalizing symptoms was regressed simultaneously on both somatic symptoms and worry dysregulation. For girls, both MASC Somatic scale and Worry Dysregulation scale scores were entered as predictors, with Internalizing

Composite scale score as the criterion variable to examine if the mediator affects the outcome variable.

The final model for girls was significant,  $F(3, 68) = 27.21, p = .001$ , and explained 54.6% of the variance ( $R^2 = .546$ ). Worry dysregulation was significantly associated with self-reported internalizing symptoms when controlling for somatic symptoms ( $B = .25, \beta = .25, p = .006$ ). Worry Dysregulation partially mediated the relation between self-reported internalizing symptoms and somatic symptoms (Sobel test = 2.07,  $p = 0.04$ ). See Table 21. Since there were four regression steps run, concerns about an increase in Type 1 error emerged. Thus, a Bonferroni correction was applied, in which the adjusted  $p$ -value was set at .0125 (.05/4). The four mediation steps for worry dysregulation continued to be significant, with the Bonferroni correction.

Table 21

*Regression for Internalizing Composite with MASC Somatic, Worry Dysregulation as Predictors*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( $n = 72$ )	
		$\beta$	$\Delta R^2$
Girls			
Step 1			.007
Age in months	-.01 (.02)	-.08	
Step 2			.209***
Age in months	.00 (.01)	-.00	
Worry Dysregulation	.47 (.11)	.46***	
Step 3			.330***
Age in months	-.00 (.01)	-.01	
MASC Somatic	.14 (.02)	.62***	
Worry Dysregulation	.25 (.09)	.25**	

Note. Total girls  $R^2 = .546$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### Parent Report for Independent and Dependent Variables

The first analysis for parent- to parent-report measures was examining the relation between the predictor variable, CBCL Somatic Score, and the criterion variable, the CBCL Internalizing scale score.

The overall model was statistically significant for boys,  $F(2, 61) = 7.90, p = .001$  and described 20.6% of the variance of the CBCL Internalizing scale ( $R^2 = .206$ ). The predictor variable, parent-reported somatic symptoms, was significantly related to the criterion variable, parent-reported internalizing symptoms ( $B = .83, \beta = .43, p = .001$ ). For girls, the overall model was also statistically significant,  $F(2, 69) = 28.61, p = .001$ , and described 45.3% of the variance ( $R^2 = .453$ ). Parent-reported somatic symptoms were significantly related to internalizing symptoms for girls ( $B = 1.47, \beta = .64, p = .001$ ). See Table 22.

Table 22

#### *Regression for CBCL Internalizing Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 133)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.026
Age in months	-.08 (.06)	-.16	
Step 2			.180***
Age in months	-.08 (.06)	-.16	
MASC Somatic	.83 (.22)	.43	
<b>Girls</b>			
Step 1			.056*
Age in months	.08 (.04)	.24	
Step 2			.397***
Age in months	.05 (.03)	.15	
CBCL Somatic	1.47 (.21)	.64	

*Note.* Total boys  $R^2 = .206$ ; Total girls  $R^2 = .453$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Since the initial variable of CBCL Somatic score was correlated with the outcome, CBCL Internalizing scale score, the results demonstrated that the first step of the mediational model was fulfilled. Thus, the second step of mediational analyses, according to the model by Baron and Kenny (1986), indicates that the initial variable must be correlated with the mediator. In this model, the mediator is emotion regulation. Therefore, the second set of analyses for child report measures examined the relation between the predictor variable, parent-reported somatic symptoms, and the criterion variable, the nine emotion regulation scores.

### **Anger**

#### ***Anger - Coping***

The potential effect of age (in months) was controlled for in the first step of the model. CBCL Somatic scale score was entered in Step 2. Scores on the Anger Coping scale were examined as the criterion variable.

For boys, the overall model was statistically significant,  $F(2, 60) = 4.86, p = .011$ . The regression described 13.9% of the variance of the Anger Coping scale ( $R^2 = .139$ ). The predictor variable, parent-reported somatic symptoms, was significantly related to the criterion variable, anger coping ( $B = -.21, \beta = -.29, p = .021$ ). For girls, the overall model was not statistically significant,  $F(2, 69) = 1.07, p = .350, ns$ , and described 3.0% of the variance ( $R^2 = .030$ ). Parent-reported somatic symptoms was not significantly related to anger coping ( $B = -.03, \beta = -.03, p = .794, ns$ ). See Table 23.

Table 23

*Regression for Anger Coping Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 133)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.058
Age in months	-.04 (.02)	-.24	
Step 2			.081*
Age in months	-.04 (.02)	-.24	
CBCL Somatic	-.21 (.09)	-.29*	
<b>Girls</b>			
Step 1			.029
Age in months	.03 (.02)	.17	
Step 2			.001
Age in months	.03 (.02)	.18	
CBCL Somatic	-.03 (.13)	-.03	

Note. Total boys  $R^2 = .139$ ; Total girls  $R^2 = .030$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Table 24

*Regression for CBCL Internalizing with Anger Coping as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 62)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.033
Age in months	-.09 (.06)	-.18	
Step 2			.034
Age in months	-.09 (.06)	-.18	
Anger Coping	-.03 (.35)	-.01	

Note. Total boys  $R^2 = .235$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Since CBCL Somatic scale score and Anger Coping emotion regulation score were not correlated for girls, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for girls.



For boys, however, Anger Coping scale scores were entered as a predictor, with CBCL Internalizing scale score as the criterion variable. The model was not significant,  $F(2, 60) = 1.04, p = .359$ , and only explained 3.4% of the variance ( $R^2 = .034$ ). Anger coping was not significantly related to parent-reported internalizing symptoms ( $B = -.03, \beta = -.01, p = .923, ns$ ). See Table 24.

### ***Anger - Inhibition***

The potential effect of age (in months) was controlled for in the first step of the model. CBCL Somatic scale score was entered in Step 2. Scores on the Anger Inhibition scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 60) = 0.45, p = .640, ns$  (see Table 25). The regression described 1.5% of the variance of the Anger Inhibition scale ( $R^2 = .015$ ). The predictor variable, somatic symptoms, was not significantly related to the criterion variable, anger inhibition ( $B = -.04, \beta = -.06, p = .629, ns$ ). For girls, the overall model was also not statistically significant,  $F(2, 69) = 0.76, p = .459, ns$ , and described 2.2% of the variance ( $R^2 = .022$ ). Somatic symptoms were not significantly related to anger inhibition ( $B = -.12, \beta = -.12, p = .307, ns$ ).

Since CBCL Somatic scale score and Anger Inhibition emotion regulation score were not correlated, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for boys or girls.

Table 25

*Regression for Anger Inhibition Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 133)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.011
Age in months	-.02 (.02)	-.10	
Step 2			.004
Age in months	-.02 (.02)	-.10	
CBCL Somatic	-.04 (.09)	-.06	
<b>Girls</b>			
Step 1			.007
Age in months	-.01 (.02)	-.09	
Step 2			.015
Age in months	-.01 (.02)	-.07	
CBCL Somatic	-.12 (.12)	-.12	

Note. Total boys  $R^2 = .015$ ; Total girls  $R^2 = .022$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

***Anger – Dysregulation***

The potential effect of age (in months) was controlled for in the first step of the model. CBCL Somatic scale score was entered in Step 2. Scores on the Anger Dysregulation scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 60) = 3.05, p = .055, ns$ . The regression described 9.2% of the variance of the Anger Dysregulation scale ( $R^2 = .092$ ). The predictor variable, somatic symptoms, was not significantly related to the criterion variable, anger dysregulation ( $B = .08, \beta = .13, p = .279, ns$ ). For girls, the overall model was also not statistically significant,  $F(2, 69) = 2.13, p = .126, ns$ , and described 5.8% of the variance ( $R^2 = .058$ ). Somatic symptoms was not significantly related to anger dysregulation ( $B = .20, \beta = .22, p = .064, ns$ ). See Table 26.

Table 26

*Regression for Anger Dysregulation Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 133)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.074*
Age in months	-.04 (.02)	-.27	
Step 2			.018
Age in months	-.04 (.02)	-.27	
CBCL Somatic	.08 (.07)	.13	
<b>Girls</b>			
Step 1			.010
Age in months	-.01 (.02)	-.10	
Step 2			.048
Age in months	-.02 (.02)	-.14	
CBCL Somatic	.20 (.10)	.22	

Note. Total boys  $R^2 = .092$ ; Total girls  $R^2 = .058$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Since CBCL Somatic scale score and Anger Dysregulation emotion regulation score were not correlated, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for boys or girls.

### **Sadness**

#### ***Sadness – Coping***

For girls, the potential effect of age (in months) was controlled for in the first step of the model. CBCL Somatic scale score was entered in Step 2. Scores on the Sadness Coping scale were examined as the criterion variable.

For girls, the overall model was also not statistically significant,  $F(2, 69) = 1.17, p = .315, ns$ , and described 3.3% of the variance ( $R^2 = .033$ ). Somatic symptoms were not significantly related to sadness coping ( $B = -.11, \beta = -.11, p = .363, ns$ ). See Table 27.

Table 27

*Regression for Sadness Coping Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 133)	
		$\beta$	$\Delta R^2$
Girls			
Step 1			.021
Age in months	-.02 (.02)	-.15	
Step 2			.012
Age in months	-.02 (.02)	-.13	
CBCL Somatic	-.11 (.12)	-.11	

Note. Total girls  $R^2 = .033$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

***Sadness – Inhibition***

The potential effect of age (in months) was controlled for in the first step of the model. CBCL Somatic scale score was entered in Step 2. Scores on the Sadness Inhibition scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 59) = 0.39$ ,  $p = .680$ , *ns*. The regression described 1.3% of the variance of the Sadness Inhibition scale ( $R^2 = .013$ ). The predictor variable, somatic symptoms, was not significantly related to the criterion variable, sadness inhibition ( $B = -.03$ ,  $\beta = -.04$ ,  $p = .750$ , *ns*). For girls, the overall model was also not statistically significant,  $F(2, 69) = 1.48$ ,  $p = .235$ , *ns*, and described 4.1% of the variance ( $R^2 = .041$ ). Somatic symptoms was not significantly related to sadness inhibition ( $B = .16$ ,  $\beta = .15$ ,  $p = .207$ , *ns*). See Table 28.

Since CBCL Somatic scale score and Sadness Inhibition emotion regulation score were not correlated, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for boys or girls.

Table 28

*Regression for Sadness Inhibition Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 134)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.011
Age in months	-.02 (.02)	-.11	
Step 2			.002
Age in months	-.02 (.02)	-.11	
CBCL Somatic	-.03 (.09)	-.04	
<b>Girls</b>			
Step 1			.019
Age in months	-.02 (.02)	-.14	
Step 2			.023
Age in months	-.02 (.02)	-.16	
CBCL Somatic	.16 (.12)	.15	

Note. Total boys  $R^2 = .013$ ; Total girls  $R^2 = .041$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

### ***Sadness – Dysregulation***

The potential effect of age (in months) was controlled for in the first step of the model. CBCL Somatic scale score was entered in Step 2. Scores on the Sadness Dysregulation scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 59) = 1.25, p = .293, ns$ . The regression described 4.1% of the variance of the Sadness Dysregulation scale ( $R^2 = .041$ ). The predictor variable, parent-reported somatic symptoms, was not significantly related to the criterion variable, parent-reported internalizing symptoms ( $B = .06, \beta = .09, p = .472, ns$ ). For girls, the overall model was also not statistically significant,  $F(2, 69) = 0.49, p = .613, ns$ , and described 1.4% of the variance ( $R^2 = .014$ ). Somatic symptoms was not significantly related to internalizing symptoms ( $B = .10, \beta = .12, p = .325, ns$ ). See Table 29.

Table 29

*Regression for Sadness Dysregulation Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 134)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.032
Age in months	-.03 (.02)	-.18	
Step 2			.009
Age in months	-.03 (.02)	-.18	
CBCL Somatic	.06 (.08)	.09	
<b>Girls</b>			
Step 1			.000
Age in months	.00 (.02)	.01	
Step 2			.014
Age in months	-.00 (.02)	-.01	
MASC Somatic	.10 (.10)	.12	

Note. Total boys  $R^2 = .041$ ; Total girls  $R^2 = .014$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Since CBCL Somatic scale score and Sadness Dysregulation emotion regulation score were not correlated, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for boys or girls.

### **Worry**

#### ***Worry – Inhibition.***

The potential effect of age (in months) was controlled for in the first step of the model. CBCL Somatic scale score was entered in Step 2. Scores on the Worry Inhibition scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 60) = .002$ ,  $p = .998$ , *ns*. The regression described 0.0% of the variance of the Worry Inhibition scale ( $R^2 = .000$ ). The predictor variable, parent reported somatic symptoms, was not significantly

related to the criterion variable, worry inhibition ( $B = .00, \beta = .01, p = .956, ns$ ). For girls, the overall model was also not statistically significant,  $F(2, 69) = 1.33, p = .270, ns$ , and described 3.7% of the variance ( $R^2 = .037$ ). Somatic symptoms were not significantly related to worry inhibition ( $B = .13, \beta = .19, p = .108, ns$ ). See Table 30.

Table 30

*Regression for Worry Inhibition Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( $n = 134$ )	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.000
Age in months	.00 (.02)	-.00	
Step 2			.000
Age in months	-.00 (.02)	-.00	
CBCL Somatic	.00 (.06)	.01	
<b>Girls</b>			
Step 1			.000
Age in months	.00 (.01)	.01	
Step 2			.037
Age in months	-.00 (.01)	-.01	
MASC Somatic	.13 (.08)	.19	

Note. Total boys  $R^2 = .000$ ; Total girls  $R^2 = .037$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Since CBCL Somatic scale score and Worry Inhibition emotion regulation score were not correlated, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for boys or girls.

**Worry – Dysregulation.**

The potential effect of age (in months) was controlled for in the first step of the model. CBCL Somatic scale score was entered in Step 2. Scores on the Worry Dysregulation scale were examined as the criterion variable.

For boys, the overall model was not statistically significant,  $F(2, 60) = 0.52, p = .595, ns$ . The regression described 1.7% of the variance of the Worry Dysregulation scale ( $R^2 = .017$ ). The predictor variable, somatic symptoms, was not significantly related to the criterion variable, worry dysregulation ( $B = -.01, \beta = -.03, p = .844, ns$ ). For girls, the overall model was also not statistically significant,  $F(2, 69) = 0.37, p = .691, ns$ , and described 1.1% of the variance ( $R^2 = .011$ ). Somatic symptoms were not significantly related to worry dysregulation ( $B = .10, \beta = .10, p = .403, ns$ ). See Table 31.

Table 31

*Regression for Worry Dysregulation Scale, with CBCL Somatic Scale as Predictor*

	<i>B</i> (SE <i>B</i> )	Overall Accuracy ( <i>n</i> = 134)	
		$\beta$	$\Delta R^2$
<b>Boys</b>			
Step 1			.017
Age in months	-.02 (.02)	-.13	
Step 2			.001
Age in months	-.02 (.02)	-.13	
CBCL Somatic	-.01 (.07)	-.03	
<b>Girls</b>			
Step 1			.000
Age in months	-.00 (.02)	-.02	
Step 2			.010
Age in months	-.01 (.02)	-.04	
MASC Somatic	.10 (.11)	.10	

Note. Total boys  $R^2 = .017$ ; Total girls  $R^2 = .011$ .

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .



Since CBCL Somatic scale score and Worry Dysregulation emotion regulation score were not correlated, this indicated that the second step of the mediational analysis was not fulfilled. No further analyses examining potential mediation were completed for boys or girls.

## CHAPTER IV

### DISCUSSION

The primary purpose of this study was to examine whether different methods of emotion regulation mediated the relation between somatic symptoms and internalizing symptoms in a sample of African American children using a multi-reporter method. There were several goals that this study addressed. First, mediating effects of emotion regulation were examined through the completion of the four necessary mediation steps using any combination of the three child- and parent-reported variables (i.e. somatic symptoms, emotion regulation, internalizing symptoms). Second, potential gender differences regarding the different methods of managing emotions were evaluated. Finally, the individual pathways between the three variables (i.e., somatic symptoms, emotion regulation, internalizing symptoms) were evaluated more extensively to address hypotheses concerning different effects of individual emotions and emotion regulation methods on the outcome variables.

The results of this study provided interesting insights on the mediating role of emotion regulation, demonstrating that, for girls, the relation between self-reported somatic and self-reported internalizing symptoms was partially mediated by the dysregulation of worry.

All four required steps for mediation were satisfied. First, as predicted, the present findings demonstrated that higher levels of self-reported somatic symptoms were predictive of higher self-reported internalizing symptoms. This is consistent with current literature, which indicates that children with somatic complaints are likely to experience internalizing symptoms (Campo et al., 2004; Zwaigenbaum et al., 1999) and that children

with internalizing symptoms are likely to experience somatic symptoms (Hofflich et al., 2005; Masi et al., 2000).

The second step of the mediational model demonstrated that self-reported somatic symptoms predicted self-reported dysregulation of worry. Research has demonstrated that children diagnosed with anxiety disorders report more frequent complaints of somatic symptoms (Hofflich et al., 2005), so it makes intuitive sense that children with high somatic symptoms in this sample would demonstrate difficulty with controlling their worry specifically. The fact that high levels of self-reported somatic symptoms predicted the girls' dysregulated responses to worry experience is not quite as clear cut. However, research has shown that children with somatic symptoms report high levels of poor emotion awareness (Gilleland et al., 2009). Children who have difficulty labeling their emotional experiences may not be able to share emotional difficulties they are having with others. Thus, the emotion may become overwhelming for the child who, in turn, dysregulates the emotion, as demonstrated in the present findings.

The third step of mediation demonstrated that the girls' dysregulation of worry predicted higher levels of self-reported internalizing symptoms. This is consistent with research that has linked poor emotion regulation to negative outcomes, including depressive symptoms, internalizing symptoms, and behavior problems (Cole et al., 1996; Feng et al., 2009; Zeman et al., 2002), and dysregulation is considered to be a less constructive way to manage emotion than other types of responses.

Finally, the fourth step of mediation demonstrated the girls' dysregulation of worry persisted in contributing to the outcome of internalizing symptoms, when controlling for the experience of somatic symptoms. Thus, girls with high somatic

symptoms who dysregulated their worry were more likely to experience higher internalizing symptoms.

The present findings demonstrated that girls who report a high level of somatic symptoms and who dysregulate their worry are unable to control their worry behaviors, which then influences their experience of internalizing symptoms. As mentioned before, when describing the pathway between somatic symptoms and dysregulation, the inability to control worry behaviors may occur because these girls are unable to articulate the cause of their anxiety to others. Research has demonstrated that worry dysregulation in particular is associated with a lack of emotional awareness (Zeman et al., 2010). Children who are unable to understand why they are anxious or even independently identify that they are anxious may not be able to explain their feelings to an adult, who may in turn incorrectly interpret their behaviors. If girls are unable to gain assistance for the cause of their worrying, this may result in their experiencing more internalizing symptoms.

The present study examined emotion type and methods of emotion regulation separately, based on the functionalist perspective which posits that emotions and the strategies for managing them should be assessed within the context of goals and circumstances (Thompson, 2011). As such, the present study examined three distinct types of regulation strategies (e.g., coping, inhibition, dysregulation) and three specific emotions (e.g., anger, sadness, worry). Although dysregulation of worry partially mediated the relation between somatic symptoms and internalizing symptoms, dysregulation of sadness and anger did not, demonstrating the difference in findings based on type of emotion. It may be that girls who cannot control their sadness or anger

are better able to articulate their reason for experiencing sadness or anger, or it may be easier for outsiders to detect a reason, so they subsequently are able to have their emotions addressed with assistance from others. In such scenarios, these girls then may be less likely to experience internalizing symptoms, since the cause for their sadness or anger is able to be recognized and perhaps addressed.

Closer examination of the different pathways for anger and sadness dysregulation provides more information regarding the lack of mediation for these factors. For girls, somatic symptoms were related to anger dysregulation; in contrast, somatic symptoms were not related to sadness dysregulation. This relation between somatic symptoms and anger dysregulation may be related to the notion that girls who are angry and dysregulate their anger may continue to talk about and ruminate on their feelings. Managing anger in this way has been demonstrated to sustain the angry mood, and has been associated with the subsequent experience of somatic symptoms (Miers, Rieffe, Terwogt, Cowan, & Linden, 2007).

Neither anger nor sadness dysregulation were related to internalizing symptoms. The lack of mediation from the dysregulation of sadness and anger may be due to the use of the particular outcome used in this study (i.e., internalizing composite score). That is, in the literature, anger dysregulation is typically related to negative outcomes such as externalizing problems (Eisenberg et al., 2001; Zeman et al., 2002). Therefore, girls who reported dysregulating their anger might not have reported internalizing problems but may have still experienced negative outcomes, such as externalizing problems, which were not measured or examined by the study. It is also possible that externalizing feelings of anger helped to reduce the intensity of the internalizing symptoms for girls in

this sample. Indeed, in this study, somatic symptoms predicted anger dysregulation, but anger dysregulation did not predict internalizing symptoms. Sadness dysregulation, on the other hand, is not typically related to externalizing problems (Zeman et al., 2002) but has been linked negatively to peer acceptance (Smith, 2001) which was not evaluated in this study. Thus, it is possible that if a different outcome measure had been used such as peer acceptance or popularity, girls who dysregulate their sadness might have received poorer sociometric ratings on this measure. Although the literature does suggest that sadness dysregulation is linked to internalizing disorders, including in a mostly African-American female sample (Feng et al., 2009), it is uncertain why sadness dysregulation was not linked to internalizing symptoms for girls in the present findings. However, in the aforementioned study, the link was not present at age 9 for girls although it became present at age 10. The mean age of the girls of this current study was 9.08; therefore, it is possible that there was no current significant link between sadness dysregulation and internalizing symptoms because of the relation is not yet significant at this age.

Additionally, the findings demonstrated that dysregulation but not coping or inhibition was the mediating factor for girls. A possible reason for the lack of mediation for the constructive coping with negative emotions may be due in part to low reliability with the coping measurement scales, with worry coping unable to be evaluated. Also, in the present findings, examination of the pathways indicated that somatic symptoms did not predict anger or sadness coping for girls, which eliminated a crucial step to mediation. Children with somatic symptoms have been demonstrated to have poor emotion awareness (Gilleland et al., 2009; Jellesma et al., 2006); however, a child who reports being able to cope with negative emotions demonstrates that he or she is aware of

and able to identify the emotion. Thus, the children who are unaware of their emotions and experience somatic symptoms would not be likely to report coping effectively with their anger or sadness.

An explanation for the lack of mediation with respect to the inhibition of emotions is unclear. Examination of direct pathways in the current findings demonstrated that the first two necessary steps for mediation were satisfied for anger and sadness inhibition: self-reported somatic symptoms predicted internalizing symptoms and self-reported somatic symptoms predicted the inhibition of anger and sadness. For anger inhibition, the inhibition of anger predicted internalizing symptoms. However, neither anger nor sadness inhibition fulfilled the fourth step of continuing to contribute to internalizing symptoms, when controlling for somatic symptoms. Thus, it is possible that the significant relation between somatic symptoms and anger and sadness inhibition was the reason for the significant relation between emotion regulation and internalizing symptoms. The strong relation between somatic symptoms and inhibition may have been due to overarching weakness in poor emotion awareness. Children with somatic symptoms often have poor emotion awareness (Gilleland et al., 2010) and inhibition is also related to lack of internal emotional awareness (Zeman et al., 2010). In addition to anger and sadness, worry inhibition was also not a mediating factor. It may be that the girls who worry in this sample were more likely to express their worry in a dysregulated way rather than dampen or suppress it. Overall, by examining the emotions and regulation strategies separately, this study was able to discern the specific type of emotion regulation strategy that did mediate the relation.

It is notable that only one mediation model emerged for this data set, which was unexpected. This lack of findings may have been due to the fact that somatic symptoms have been shown to be more common for girls than boys (Haughland, Wold, Stevenson, Aaroe, & Woynarowska, 2001; Kingery et al., 2007). Indeed, in the present study, girls reported more somatic symptoms than boys. The difference in report suggests girls may be more sensitive to somatic symptoms, or may be more willing to acknowledge and discuss those symptoms than boys (Kelly, Molcho, Doyle, & Gabhainn, 2010). Research has shown that, in addition to reporting more somatic symptoms, girls also report more internalizing symptoms than boys, who report more externalizing symptoms (Leadbeater, Kuperminc, Blatt, & Hertzog, 1999). Given the documented differences in the socialization of boys and girls, boys may be more reluctant to report somatic symptoms or internalizing symptoms because they are not consistent with socialization pressures from parents and peers.

In addition to the examination of the four central steps of mediation, there were several hypotheses that focused on the direct pathways between the three variables. Although there were significant findings for different direct pathways, it is important to remember that all the central steps for mediation were not completely fulfilled for any method of regulating emotion other than for worry dysregulation. Thus, despite there being several significant pathway findings for other methods of emotion regulation, the other ways to manage emotion regulation did not demonstrate mediation.

### **Somatic Symptoms Predict Methods of Emotion Regulation**

Three hypotheses were offered for the pathway between somatic symptoms and methods of emotion regulation. The first hypothesis was that somatic symptoms would



predict the inhibition of sadness, anger, and worry. This hypothesis was supported for girls for anger and sadness inhibition, but not for worry inhibition. Research has demonstrated that children who are socially inhibited and report experiencing high levels of negative affect are also likely to experience somatic symptoms (Jellesma, 2008). Although social and emotional inhibition are not the same construct, it is possible that children who avoid social situations may also demonstrate a pattern of avoiding emotion-tinged interactions. Thus, particular girls in this study might be likely to inhibit sadness or anger because the expression of those emotions may be viewed negatively by others.

The second hypothesis examining the pathway between somatic symptoms and emotion regulation method predicted that somatic symptoms would be negatively related to regulation coping. There was no significant relation between self-reported somatic symptoms and anger coping; however, there was a significant relation between parent-reported somatic symptoms and anger coping for boys. Worry and sadness coping were not assessed for boys due to low reliability on those measures. Although somatic symptoms are related to more problematic outcomes such as diagnoses of future psychiatric disorders (Dhossche et al., 2001), they are also a common feature of childhood (Campo & Fritsch, 1994; Garber et al., 1991). As such, the presence of frequent somatic symptoms may not mean that a child will always report poor emotion regulation strategies, and the use of appropriate emotion regulation skills does not mean that a child does not experience somatic symptoms. It is possible that the significant, negative relation between parent-reported somatic symptoms and anger coping for boys further demonstrates what was suggested earlier in this discussing, when referring to relations between those variables. Boys whose parents report them to experience few

somatic symptoms may be able to identify and effectively address their emotions of anger.

The third hypothesis of this pathway predicted that somatic symptoms would be positively related to sadness dysregulation. These results were not found for either self or parent-reported somatic symptoms. When explaining the significant findings regarding the prediction of somatic symptoms to worry dysregulation earlier, it was noted that children with somatic symptoms may dysregulate because they have poor emotion awareness (Gilleland et al., 2009). Although a child may not have been able to identify and explain his or her worry, it is possible that children are better able to identify their sadness or that their parents are better able to detect those emotions. If someone else is then able to address the reason for the sadness with the child, there would be no need for a child to have to dysregulate his or her sadness to gain social support or meet other goals.

### **Emotion Regulation Methods Predict Internalizing Symptoms**

The second direct pathway, which examined the relations between emotion regulation and internalizing symptoms, contained four hypotheses. First, the management of emotion through inhibition and dysregulation was hypothesized to be related to more internalizing symptoms. As mentioned in the main mediation findings, worry dysregulation was related to self-reported internalizing symptoms for girls, which occurred as predicted. Additionally, for girls, the emotion regulation strategy of anger inhibition did predict self-reported internalizing symptoms, and worry inhibition predicted parent-reported internalizing symptoms. Inhibition of anger has been specifically demonstrated to be predictive of general internalizing symptoms (Zeman et

al., 2002), so it would make sense that this strategy was related to internalizing symptoms for the present findings. Girls who inhibit their emotions and do not express them may internalize these negative feelings because they are not being addressed. For example, a girl who feels sad but inhibits that sadness may, in turn, internalize these feelings which build up resulting in increased intensity and duration of sadness. In addition to the inhibition findings for girls, sadness dysregulation was related to self-reported internalizing symptoms for boys. Research demonstrates sadness dysregulation was also found to be predictive of internalizing symptoms (Zeman et al., 2002). This may be because boys are typically less likely to demonstrate public exhibitions of sadness (Underwood et al., 1999). Since the emotion regulation measures were based on self-report, it is possible that a boy who demonstrates a gender-atypical response of displaying sadness may actually be incorrectly identifying himself as dysregulating his emotion, because he believes what he is doing is not consistent with those emotions displayed by his peers. Or, if a boy is indeed demonstrating dysregulated sadness (i.e., crying and carrying on), he may not receive much acceptance from peers or adults because of it, since it is not as socially appropriate to do so, which could lead to frustration and other internalizing symptoms. Research has indeed demonstrated that boys who inhibit their sadness are more readily accepted by their peers, but violating this norm affects their peer acceptance and perceptions of healthy social functioning by their parents (Perry-Parish & Zeman, 2011).

The second hypothesis examining the pathway between emotion regulation and internalizing symptoms indicated that regulation coping would be related to fewer internalizing symptoms. For girls, anger coping was related positively to self-reported

internalizing symptoms. Thus, girls who reported being able to manage their anger in constructive ways still reported increased internalizing symptoms. This is a somewhat perplexing finding as one would think that the ability to cope with anger would be related to fewer internalizing symptoms, as has been demonstrated in the literature (Zeman et al., 2002). However, based on the general low reliability of the emotion regulation coping scales in this study, it is possible that the measure did not adequately reflect regulation coping for African-American, low income children from this sample. Therefore, the girls in this sample may not have been responding to their anger constructively, which could then still be related to internalizing problems. It would be important for future research to better understand what constitutes effective emotion coping for girls of this demographic.

The third hypothesis examining the pathway between emotion regulation and internalizing symptoms stated that girls who reported constructive coping for worry and sadness would have lower internalizing symptoms. This was unable to be tested, however, due to the low reliability of the worry and sadness coping scales. Finally, the fourth hypothesis for this pathway was that boys would have more internalizing symptoms if they dysregulated their emotions. For the most part, boys' report of their dysregulation was not related significantly to internalizing symptoms except for sadness dysregulation which was associated with self-reported internalizing symptoms, as discussed previously.

Several additional hypotheses focused on developmental differences regarding the pathways including emotion regulation. Originally, the present study had hypothesized that a pattern of age differences would emerge such that older children would

demonstrate better developed emotion regulation skills than younger children. Younger children were hypothesized to report more emotion dysregulation than older children, and those younger children using emotion dysregulation would report more internalizing symptoms. Analyses demonstrated, however, that there was a lack of differences on the primary variables based on age, so age was not included as an independent variable in further analyses.

Age differences may not have occurred as expected because of the uneven distribution of ages in the present sample. Although there were a high number of children who were 9 years of age ( $n = 50$ ), there were considerably fewer children who were 7 ( $n = 11$ ) or 11 ( $n = 8$ ). It is possible then, that the low representation on either end of the age range contributed to a lack of significant developmental results due to restricted range.

The specific sample used in this study consisted of children who are African-American, so further consideration of the results is examined with attention to race. Within this population, the literature has shown differences in reporting of symptoms based on gender. Research has demonstrated that African-American adolescent females report more depressive symptoms (Repetto, Caldwell, & Zimmerman, 2004) and higher levels of anxiety than African-American adolescent males (Kingery et al., 2009); results that were also seen with the children in the present study. Once again, girls may have reported more symptoms because they experienced more internalizing symptoms; however, this finding may have occurred because socialization differs not only based on gender but also based on ethnicity. Within the African-American community, research suggests that girls are socialized more on racial and ethnic issues than boys, with parents

better preparing girls for coping with racial discrimination or challenging social interactions (Brown, Linver, & Evans, 2010). Within the African-American community, beliefs may continue to tout the stereotype of strength and masculinity for African-American males (Ornelas, Amell, Tran, Royster, Armstrong-Brown, & Eng, 2009). If boys are not taught to be as prepared as girls to deal with prevalent racial and cultural stereotypes, this may particularly lead to an under-reporting of symptoms that could reflect weakness for boys who are African-American.

### **Strengths**

There were several notable strengths for the current study. First, the present study examined a sample that is often underrepresented in the current literature. By focusing on a group of African-American students, this study adds to the existing literature regarding emotion regulation. Second, the study examined specific types of emotions and regulation strategies as a mediating factor. Consistent with the tenets of the functionalist perspective, the findings demonstrated the value of examining specific emotions separately instead of examining global negative emotionality given that the results differed based on emotion type. Finally, this study added to the current literature in the study of emotion factors and somatization for children, indicating that emotion regulation is related to somatic symptoms.

One of design strengths of the present study was the use of multiple reporters in which both child and parent reports of symptomatology were used to test the hypotheses. Utilization of this multi-reporter methodology revealed differences in the perceptions of child and parent on the key variables. There was significant agreement between child and parent in regards to internalizing symptomatology in the present study, and research

has demonstrated that mothers rate depressive symptomatology similarly to their daughters and over-report for their sons (Kiss, Gentzler, George, Kapornai, Tamas, Kovacs, & Vetro, 2007). On the other hand, there was little agreement between child and parent for somatic symptomatology. Research examining concordance rates has demonstrated poor agreement between parent and child when measuring perceptions of an adolescent's health, including somatic symptoms (Waters, Stewart-Brown, & Fitzpatrick, 2003). Differences in the report of the level of severity and frequency of somatic symptoms between child and parent are often due to the child reporting more severe and frequent symptoms (Kroner-Herwig, Morris, Heinrich, Gassmann, & Vath, 2009). Thus, in the present study, it is likely that the difference in report of symptoms was also due to children reporting more somatic symptoms than their parents. It is possible that parents did not report the same number or levels of somatic symptoms as their child because they were unaware of them. With internalizing symptomatology, which parents and children similarly reported, parents may still notice and can report behaviors such as crying or seeming sad even if a child does not actively report these behaviors. However, a parent may not know a child is experiencing somatic symptoms if the child does not explicitly tell the parent. Or, it is possible that parents in this sample also over-reported their perception of internalizing symptoms, which led to similar reports by the children.

Due to the resulting differences in reporter identity, some of the hypotheses for this study were supported by use of only the parent report, and all of the hypotheses received support by sole use of child report. However, the hypotheses were not supported by a multi-reporter combination. Utilizing a multi-reporter methodology did,

however, provide a more rigorous evaluation of the relations among the variables. After all, research examining emotion regulation variables has demonstrated inconsistencies between parent and child report, including children reporting different methods of regulating emotions than their parents (Hourigan, Goodman, & Southam-Gerow, 2011) and parents demonstrating poor reliability with their child in describing attributions of their child's emotions (Thompson, 2011). By incorporating self and parent ratings, the results demonstrated that perceptions of child and parent differed, depending on the type of symptomatology. This provides further evidence that children and parents provide differing accounts, and suggests that it is useful to obtain information from multiple sources in order to understand the complexity underlying some of the associations between variables.

### **Limitations**

In addition to the strengths of this study, there were also several limitations. It will be important to examine and consider these limitations when considering the applicability or generalization of these findings.

A potential issue contributing to the lack of findings in this study may have been due to how the different constructs were measured. In the present study, somatic symptoms were measured by items from the physical and somatic symptom scales of the MASC and CBCL. Research has demonstrated that African-American youth report higher levels of somatic symptoms than their Caucasian counterparts (Kingery et al., 2007; White & Farrell, 2006), which was one of the reasons this study sought to better understand somatic symptoms in this population. However, because African-Americans may be more likely to express mental health problems in the form of somatic symptoms



(Das et al., 2006; Heurtin-Roberts et al., 1997), it has been suggested that current anxiety measures, such as the MASC, may not wholly depict how anxiety manifests in an African-American adolescent population. Instead, there may be additional somatic symptoms that are not identified in current measures and African-American youth may express their anxiety in other ways, such as externalizing symptoms (Kingery et al., 2009). Thus, the present study and present measures may not have been tapping into the most relevant construct of internalizing symptoms, as manifested by children who are African-American. If some African-American children have a tendency to express their anxiety as somatic symptoms, this suggests that taking physical and somatic symptoms out of the internalizing composite measure may have eliminated a crucial component of measuring anxious or depressive symptomatology. Therefore, it would be important to better understand how and why anxiety may manifest differently for children who are African-American.

Additionally, the reliability of the emotion regulation scales was low within this present study. Out of the nine emotion regulation scales two scales (Worry Coping and Sad Coping) were not utilized because their reliability coefficients were inadequate. Even the remaining seven emotion regulation scales had varying levels of reliability; the highest coefficient was only .59. These scores are lower than the demonstrated construct validity coefficients of the CEM-scales, which ranged from .62 to .80 (Zeman et al., 2001; Zeman et al., 2010).

The initial validation of these scales used a predominantly middle class, Caucasian sample. It is possible that this level of reliability did not transfer when examining the current sample, which differs from the original scale validation samples in

race and socioeconomic status. Although the CEM scales were able to adequately measure coping as a construct for children who are Caucasian, it is possible that the statements describing coping do not mean the same thing for children of the present sample. Therefore, future research may consider examination of what defines constructive coping of emotion and how such strategies are demonstrated by children in an African-American, low income sample. It is also possible that children in this sample were unable to grasp or describe different emotions, which led to the general low reliability on the CEM-scales. Additionally, the reliability may have suffered because of the numerous interviewers used to collect the data. This may have led to variability in interviewer style in the individual interviews conducted, since the standardization sample used small group administrations with just 2-3 interviewers.

Another limitation of the study relates to the validity of the responses for the various measures. For self-report, steps were taken during the administration of the questionnaires to attempt to ensure comprehension of the child participants. However, it is possible that not all of the children fully understood the items. For parent-report, it is also possible that parents did not answer questions correctly regarding symptomatology since there was no follow-up to check on validity. Because the interviews were mailed to parents, the context and atmosphere in which the parents completed the measures could not be controlled. Thus, it is possible that parents may have completed the questionnaire in a less careful manner or were distracted by their home environment when completing the questions.

Finally, the sample was restricted to children of only African-American descent or mixed descent including African-American. Children of Caucasian descent were in the

minority and were excluded from the sample. If the sample had been larger overall, analyses may have been conducted for groups based on race which could have provided answers about some of the questions posed above concerning the basis for the poor reliability. The current generalizability of the results is, therefore, limited. It is uncertain whether the results would generalize based on race, such that African-American children would show similarities to the current findings regardless of SES, or based on socioeconomic status, such that Caucasian children from low SES backgrounds would show similarities.

### **Future Directions**

This study represents a first step in examining a potential mediator of the relation between somatic symptoms and internalizing problems. The findings raise many more questions than answers and thus, this area is ripe for further research efforts. One avenue for investigation involves examining what strategies may aid girls who dysregulate their worry and report a high level of somatic symptoms. Since the results of the present study demonstrated that worry dysregulation mediated the relation between somatic and internalizing symptoms, it would be important to help girls who report high somatic symptoms learn adaptive coping skills to deal with negative emotions, particularly worry, to minimize the risk of the development of internalizing problems. Thus, it would be beneficial to examine what strategies work within a longitudinal design. Following a group longitudinally would provide further information regarding whether there are developmental changes for symptomatology, and provide evidence regarding the effectiveness of interventions.

Further research may also choose to examine the mediating role of emotion regulation for internalizing and somatic symptoms in a longitudinal design. Although this specific study did not demonstrate age differences within the sample, it is possible that these same children may still show different emotion regulation strategies as they grow older, particularly as the children transition into adolescence. For girls, the beginning of puberty may affect this relation. It would be of interest to learn more about how the relation between the symptoms is affected, and if the use of particular methods of emotion regulation changes with age. A longitudinal sample would also allow further examination of causality and directionality of effects.

Future research needs to include further examination of low socioeconomic status, African-American samples. In general, children who are African-American are at risk for experiencing various life stressors that may affect their psychological functioning and health (Kliewer et al., 2009). The multiple risk factors associated with the low resources linked with living in urban settings, such as low socioeconomic status, exposure to community violence, and single parent status, is linked to negative outcomes such as internalizing and externalizing problems, lower academic achievement, and substance use (Kliewer et al., 2009). Because children with emotion regulation difficulties are more likely to develop internalizing and externalizing problems (Cole et al., 1996), it would be beneficial to continue to better understand the emotion regulation efforts of these children. Replication of this study using more refined measures would be helpful, as would examination of additional factors, that may influence emotion regulation strategies, such as the potential influence of parental or teacher beliefs.

Future research should also further examine specific constructs, such as anxiety and coping. Based on the low reliability regarding the construct of coping, future research may include examining what defines emotion regulation coping for children similar to this sample. The possibility that African-American children may express symptomatology as somatic complaints suggests that further research should examine what factors may contribute to children doing so. Such research on these constructs should be done with a similar sample as the study, in addition to both an African-American sample, and a low socioeconomic status, mixed race sample. This could help to clarify if coping strategies and anxiety manifestations are different based on culture or socioeconomic status.

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**APPENDIX A**  
**CHILDREN'S EMOTION MANAGEMENT SCALE: ANGER**

**Instructions:** Please circle the response that best describes your behavior when you are feeling mad.

	Hardly-Ever	Sometimes	Often
1. When I am feeling mad, I control my temper.	1	2	3
2. I hold my anger in.	1	2	3
3. I stay calm and keep my cool when I am feeling mad	1	2	3
4. I do things like slam doors when I am mad.	1	2	3
5. I hide my anger.	1	2	3
6. I attack whatever it is that makes me mad.	1	2	3
7. I get mad inside but I don't show it.	1	2	3
8. I can stop myself from losing my temper.	1	2	3
9. I say mean things to others when I am mad.	1	2	3
10. I try to calmly deal with what is making me feel mad	1	2	3
11. I'm afraid to show my anger.	1	2	3

**APPENDIX B**  
**CHILDREN'S EMOTION MANAGEMENT SCALE: SADNESS**

**Instructions:** Please circle the response that best describes your behavior when you are feeling sad.

	Hardly-Ever	Sometimes	Often
1. When I am feeling sad, I control my crying and carrying on.	1	2	3
2. I hold my sad feelings in.	1	2	3
3. I stay calm and don't let sad things get to me.	1	2	3
4. I whine/fuss about what's making me sad.	1	2	3
5. I hide my sadness.	1	2	3
6. When I'm sad, I do something totally different until I calm down.	1	2	3
7. I get sad inside but don't show it.	1	2	3
8. I can stop myself from losing control of my sad feelings.	1	2	3
9. I cry and carry on when I'm sad.	1	2	3
10. I try to calmly deal with what is making me feel sad.	1	2	3
11. I do things like mope around when I'm sad.	1	2	3
12. I'm afraid to show my sadness.	1	2	3

**APPENDIX C**  
**CHILDREN'S EMOTION MANAGEMENT SCALE: WORRY**

Instructions: Please circle the response that best describes your behavior when you are feeling **worried**.

	Hardly-ever	Sometimes	Often
1. I keep myself from losing control of my worried feelings.	1	2	3
2. I show my worried feelings.	1	2	3
3. I hold my worried feelings in.	1	2	3
4. I talk to someone until I feel better when I'm worried.	1	2	3
5. I do things like cry and carry on when I'm worried.	1	2	3
6. I hide my worried feelings.	1	2	3
7. I keep whining about how worried I am.	1	2	3
8. I get worried inside by don't show it.	1	2	3
9. I can't stop myself from acting really worried.	1	2	3
10. I try to calmly settle the problem when I feel worried.	1	2	3

### APPENDIX D CHILD BEHAVIOR CHECKLIST (CBCL)

Below is a list of items that describe children and youths. For each item that describes your child *now or within the past 6 months*, please circle the 2 if the item is *very true or often true* of your child. Circle the 1 if it is *somewhat or sometimes true* of your child. If the item is *not true* of your child, circle the 0. Please answer all items as well as you can, even if some do not seem to apply to your child.

0 = Not True (as far as you know) 1 = Somewhat or Sometimes True 2 = Very True or Often True

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**Internalizing Subscale**

5.	There is still very little he/she enjoys.....	0	1	2
14.	Cries a lot .....	0	1	2
29.	Fears certain animals, situations, or places, other than school (describe): _____	0	1	2
30.	Fears going to school.....	0	1	2
31.	Fears he/she might think or do something bad.....	0	1	2
32.	Feels he/she has to be perfect.....	0	1	2
33.	Feels or complains that no one loves his/her.....	0	1	2
35.	Feels worthless or inferior.....	0	1	2
42.	Would rather be alone than with others.....	0	1	2
45.	Nervous, high-strung, or tense.....	0	1	2
47.	Nightmares.....	0	1	2
49.	Constipated, doesn't move bowels.....	0	1	2
50.	Too fearful or anxious.....	0	1	2
51.	Feels dizzy or lightheaded.....	0	1	2
52.	Feels too guilty.....	0	1	2
54.	Overtired without good reason.....	0	1	2
56.	Physical problems without known medical causes:			
a.	Aches or pains (not stomach or headaches).....	0	1	2
b.	Headaches.....	0	1	2
c.	Nausea, feels sick.....	0	1	2
d.	Problems with eyes (not if corrected by glasses) (describe): _____	0	1	2
e.	Rashes or other skin problems.....	0	1	2
f.	Stomachaches.....	0	1	2
g.	Vomiting, throwing up.....	0	1	2
h.	Other (describe): _____	0	1	2
65.	Refuses to talk.....	0	1	2
69.	Secretive, keeps things to self .....	0	1	2
71.	Self-conscious or easily embarrassed.....	0	1	2
75.	Too shy or timid.....	0	1	2
91.	Talks about killing self.....	0	1	2
102.	Underactive, slow moving, or lacks energy.....	0	1	2
103.	Unhappy, sad, or depressed.....	0	1	2
111.	Withdrawn, doesn't get involved with others.....	0	1	2
112.	Worries.....	0	1	2

0 = Not True (as far as you know) 1 = Somewhat or Sometimes True 2 = Very True or Often True

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## Externalizing Subscale

2.	Drinks alcohol without parents' approval (describe): _____	0	1	2
.	Argues a lot.....	0	1	2
16.	Cruelty, bullying, or meanness to others.....	0	1	2
17.	Daydreams or gets lost in his/her thoughts.....	0	1	2
18.	Deliberately harms self or attempts suicide.....	0	1	2
19.	Demands a lot of attention.....	0	1	2
20.	Destroys his/her own things.....	0	1	2
21.	Destroys things belonging to his/her family or others.....	0	1	2
22.	Disobedient at home.....	0	1	2
23.	Disobedient at school.....	0	1	2
26.	Doesn't seem to feel guilty after misbehaving.....	0	1	2
28.	Breaks rules at home, school, or elsewhere.....	0	1	2
37.	Gets in many fights.....	0	1	2
39.	Hangs around with others who get in trouble.....	0	1	2
43.	Lying or cheating.....	0	1	2
57.	Physically attacks people.....	0	1	2
63.	Prefers being with older kids.....	0	1	2
67.	Runs away from home.....	0	1	2
68.	Screams a lot.....	0	1	2
72.	Sets fires.....	0	1	2
73.	Sexual problems (describe): _____	0	1	2
81.	Steals at home.....	0	1	2
82.	Steals outside the home.....	0	1	2
86.	Stubborn, sullen, or irritable.....	0	1	2
87.	Sudden changes in mood or feelings.....	0	1	2
88.	Sulks a lot.....	0	1	2
89.	Suspicious.....	0	1	2
90.	Swearing or obscene language.....	0	1	2
94.	Teases a lot.....	0	1	2
95.	Temper tantrums or hot temper.....	0	1	2
96.	Thinks about sex too much.....	0	1	2
97.	Threatens people.....	0	1	2
99.	Smokes, chews, or sniffs tobacco.....	0	1	2
101.	Truancy, skips school.....	0	1	2
104.	Unusually loud.....	0	1	2
105.	Uses drugs for nonmedical purposes (don't include alcohol or tobacco) (describe): _____	0	1	2

0 = Not True (as far as you know) 1 = Somewhat or Sometimes True 2 = Very True or Often True

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## Other Items

1.	Acts too young for his/her age.....	0	1	2
4.	Fails to finish things he/he starts.....	0	1	2
6.	Bowel movements outside toilet.....	0	1	2
7.	Bragging, boasting.....	0	1	2
8.	Can't concentrate, can't pay attention for long.....	0	1	2
9.	Can't get his/her mind off certain thoughts; obsessions (describe): _____	0	1	2
10.	Can't sit still, restless, are hyperactive.....	0	1	2
11.	Clings to adults or too dependent.....	0	1	2



12.	Complains of loneliness.....	0	1	2
13.	Confused or seems to be in a fog.....	0	1	2
15.	Cruel to animals.....	0	1	2
24.	Doesn't eat well.....	0	1	2
25.	Doesn't get along with other kids.....	0	1	2
27.	Easily jealous.....	0	1	2
34.	Feels others are out to get him/her.....	0	1	2
36.	Gets hurt a lot, accident-prone.....	0	1	2
38.	Gets teased a lot.....	0	1	2
40.	Hear sounds or voices that aren't there (describe): _____	0	1	2
41.	Impulsive or acts without thinking.....	0	1	2
44.	Bites fingernails.....	0	1	2
46.	Nervous movements or twitching (describe): _____	0	1	2
48.	Not liked by other kids.....	0	1	2
53.	Overeating.....	0	1	2
55.	Overweight.....	0	1	2
58.	Picks nose, skin, or other parts of body (describe): _____	0	1	2
59.	Plays with own sex parts in public.....	0	1	2
60.	Plays with own sex parts too much.....	0	1	2
61.	Poor school work.....	0	1	2
62.	Poorly coordinated or clumsy.....	0	1	2
64.	Prefers being with younger kids.....	0	1	2
66.	Repeats certain acts over and over; compulsions (describe): _____	0	1	2
70.	Sees things that aren't there (describe): _____	0	1	2
74.	Showing off or clowning.....	0	1	2
76.	Sleeps less than most kids.....	0	1	2
77.	Sleeps more than most kids during the day and/or night (describe): _____	0	1	2
78.	Inattentive or easily distracted.....	0	1	2
79.	Speech problem (describe): _____	0	1	2
80.	Stares blankly.....	0	1	2
83.	Stores up too many things he/she doesn't need (describe): _____	0	1	2
84.	Strange behavior (describe): _____	0	1	2
85.	Strange ideas (describe): _____	0	1	2
92.	Talks or walks in sleep (describe): _____	0	1	2
93.	Talks too much.....	0	1	2
98.	Thumb-sucking.....	0	1	2
100.	Trouble sleeping (describe): _____	0	1	2
106.	Vandalism.....	0	1	2
107.	Wets self during the day.....	0	1	2
108.	Wets the bed.....	0	1	2
109.	Whining.....	0	1	2
110.	Wishes to be of opposite sex.....	0	1	2
113.	Please write in any problems your child has that were not listed above: _____	0	1	2

---

0      1      2

*Somatic Complaints scale*

47 - Nightmares

49 - Constipated, doesn't move bowels

51 - Feels dizzy or lightheaded

54 - Overtired without good reason

56 - Physical problems without known medical causes:

a - Aches or pains (not stomach or headaches)

b - Headaches

c - Nausea, feels sick

d - Problems with eyes (not if corrected by glasses)

e - Rashes or other skin problems

f - Stomachaches

g - Vomiting, throwing up

**APPENDIX E**  
**CHILDREN'S DEPRESSION INVENTORY (CDI)**

Item 1

- I am sad once in a while
- I am sad many times.
- I am sad all the time.

Item 2

- Nothing will ever work out for me.
- I am not sure if things will work out for me.
- Things will work out for me O.K.

Item 3

- I do most things O.K.
- I do many things wrong.
- I do everything wrong.

Item 4

- I have fun in many things.
- I have fun in some things.
- Nothing is fun at all.

Item 5

- I am bad all the time.
- I am bad many times.
- I am bad once in a while.

Item 6

- I think about bad things happening to me once in a while.
- I worry that bad things will happen to me.
- I am sure that terrible things will happen to me.

Item 7

- I hate myself.
- I do not like myself.
- I like myself

Item 8

- All bad things are my fault.
- Many bad things are my fault.
- Bad things are not usually my fault.

Item 10

- I feel like crying every day.
- I feel like crying many days.
- I feel like crying once in a while.

Item 11

- Things bother me all the time.

- Things bother me many times.
- Things bother me once in a while.

## Item 12

- I like being with people
- I do not like being with people many times.
- I do not want to be with people at all.

## Item 13

- I cannot make up my mind about things.
- It is hard to make up my mind about things.
- I make up my mind about things easily.

## Item 14

- I look O.K.
- There are some bad things about my looks.
- I look ugly.

## Item 15

- I have to push myself all the time to do my schoolwork.
- I have to push myself many times to do my schoolwork.
- Doing schoolwork is not a big problem.

## Item 16

- I have trouble sleeping every night.
- I have trouble sleeping many nights.
- I sleep pretty well.

## Item 17

- I am tired once in a while.
- I am tired many days.
- I am tired all the time.

## Item 18

- Most days I do not feel like eating.
- Many days I do not feel like eating.
- I eat pretty well.

## Item 19

- I do not worry about aches and pains.
- I worry about aches and pains many times.
- I worry about aches and pains all the time.

## Item 20

- I do not feel alone.
- I feel alone many times.
- I feel alone all the time.

## Item 21

- I never have fun at school.
- I have fun at school only once in a while.

- I have fun at school many times.

Item 22

- I have plenty of friends.
- I have some friends but I wish I had more.
- I do not have any friends.

Item 23

- My schoolwork is alright.
- My school work is not as good as before.
- I do very badly in subjects I used to be good in.

Item 24

- I can never be as good as other kids.
- I can be as good as other kids if I want to.
- I am just as good as other kids.

Item 25

- Nobody really loves me.
- I am not sure if anybody loves me.
- I am sure that somebody loves me.

Item 26

- I usually do what I am told.
- I do not do what I am told most times.
- I never do what I am told.

Item 27

- I get along with people.
- I get into fights many times.
- I get into fights all the time.

**APPENDIX F**  
**MULTIDIMENSIONAL ANXIETY SCALE FOR CHILDREN**

This questionnaire asks you how you have been thinking, feeling, or acting recently. For each item, please circle the number that shows how often the statement is true for you. If a sentence is true about you a lot of the time, circle 3. If it is true about you some of the time, circle 2. If it is true about you once in a while, circle 1. If a sentence is not ever true about you, circle 0. Remember, there are no right or wrong answers, just answer how you have been feeling recently.

Here are two examples to show you how to complete the questionnaire. In Example A, if you were hardly ever scared of dogs, you would circle 1, meaning that the statement is rarely true about you. In Example B, if thunderstorms sometimes upset you, you would circle 2, meaning that the statement is sometimes true about you.

	Never true about me	Rarely true about me	Sometimes true about me	Often true about me
Example A: I'm scared of dogs	0	1	2	3
Example B: Thunderstorms upset me	0	1	2	3
1. I feel tense or uptight	0	1	2	3
2. I usually ask permission	0	1	2	3
3. I worry about other people laughing at me	0	1	2	3
4. I get scared when my parents go away	0	1	2	3
5. I keep my eyes open for danger	0	1	2	3
6. I have trouble getting my breath	0	1	2	3
7. The idea of going away to camp scares me	0	1	2	3
8. I get shaky or jittery	0	1	2	3
9. I try to stay near my mom or dad	0	1	2	3
10. I'm afraid that other kids will make fun of me	0	1	2	3
11. I try hard to obey my parents and teachers	0	1	2	3
12. I get dizzy or faint feelings	0	1	2	3
13. I check things out first	0	1	2	3
14. I worry about getting called on in class	0	1	2	3
15. I'm jumpy	0	1	2	3
16. I'm afraid other people will think I'm stupid	0	1	2	3
17. I keep the light on at night	0	1	2	3
18. I have pains in my chest	0	1	2	3
19. I avoid going to places without my family	0	1	2	3
20. I feel strange, weird, or unreal	0	1	2	3
21. I try to do things other people will like	0	1	2	3

22. I worry about what other people think of me	0	1	2	3
23. I avoid watching scary movies and TV shows	0	1	2	3
24. My heart races or skips beats	0	1	2	3
25. I stay away from things that upset me	0	1	2	3
26. I sleep next to someone from my family	0	1	2	3
27. I feel restless and on edge	0	1	2	3
28. I try to do everything exactly right	0	1	2	3
29. I worry about doing something stupid or embarrassing	0	1	2	3
30. I get scared riding in the car or on the bus	0	1	2	3
31. I feel sick to my stomach	0	1	2	3
32. If I get upset or scared, I let someone know right away	0	1	2	3
33. I get nervous if I have to perform in public	0	1	2	3
34. Bad weather, the dark, heights, animals, or bugs scare me	0	1	2	3
35. My hands shake	0	1	2	3
36. I check to make sure things are safe	0	1	2	3
37. I have trouble asking other kids to play with me	0	1	2	3
38. My hands feel sweaty or cold	0	1	2	3
39. I feel shy	0	1	2	3

*Physical Symptoms Scale*

Tense/Restless

1 – I feel tense or uptight.

8 – I get shaky or jittery.

15 – I'm jumpy.

20 – I feel strange, weird, or unreal.

27 – I feel restless and on edge.

35 – My hands shake.

Somatic/Autonomic

6 – I have trouble getting my breath

12 – I get dizzy or faint feelings

18 – I have pains in my chest

24 – My heart races or skips beats

31 – I feel sick to my stomach

38 – My hands feel sweaty or cold

**APPENDIX G**  
**DIAGNOSTIC CRITERIA FOR 300.81 SOMATIZATION DISORDER**

A. A history of many physical complaints beginning before age 30 years that occur over a period of several years and result in treatment being sought or significant impairment in social, occupational, or other important areas of functioning.

B. Each of the following criteria must have been met, with individual symptoms occurring at any time during the course of the disturbance:

(1) four pain symptoms: a history of pain related to at least four different sites or functions (e.g., head, abdomen, back, joints, extremities, chest, rectum, during menstruation, during sexual intercourse, or during urination)

(2) two gastrointestinal symptoms: a history of at least two gastrointestinal symptoms other than pain (e.g., nausea, bloating, vomiting other than during pregnancy, diarrhea, or intolerance of several different foods)

(3) one sexual symptom: a history of at least one sexual or reproductive symptom other than pain (e.g., sexual indifference, erectile or ejaculatory dysfunction, irregular menses, excessive menstrual bleeding, vomiting throughout pregnancy)

(4) one pseudoneurological symptom: a history of at least one symptom or deficit suggesting a neurological condition not limited to pain (conversion symptoms such as impaired coordination or balance, paralysis or localized weakness, difficulty swallowing or lump in throat, aphonia, urinary retention, hallucinations, loss of touch or pain sensation, double vision, blindness, deafness, seizures; dissociative symptoms such as amnesia; or loss of consciousness other than fainting)

C. Either (1) or (2):

(1) after appropriate investigation, each of the symptoms in Criterion B cannot be fully explained by a known general medical condition or the direct effects of a substance (e.g., a drug of abuse, a medication)

(2) when there is a related general medical condition, the physical complaints or resulting social or occupational impairment are in excess of what would be expected from the history, physical examination, or laboratory findings

D. The symptoms are not intentionally feigned or produced (as in Factitious Disorder or Malingering).



## VITA

### Name:

Priscilla A. Khuanghlawn

### Department Address:

Virginia Consortium Program in Clinical Psychology  
Virginia Beach Higher Education Center  
1881 University Drive, Suite 239  
Virginia Beach, VA 23453

### Education:

- 2007 B. A., University of Virginia, Charlottesville, VA  
Major in Psychology and Economics
- 2010 M. A., Norfolk State University, Norfolk, VA  
Degree in Community/Clinical Psychology
- 2012 Psy.D., Virginia Consortium Program in Clinical Psychology, Virginia Beach, VA  
Degree in Clinical Psychology

### Clinical Experience:

- Predoctoral Internship (2011 – 2012), Virginia Beach City Public Schools Psychological Services, Virginia Beach, VA

### Papers and Presentations:

Derlega, V. J., Gamble, K., Winstead, B., Kelkar, K., & **Khuanghlawn, P.** (2010). Inmates with HIV, stigma, and disclosure decision-making. *Journal of Health Psychology, 15*(2), 258-268.

**Khuanghlawn, P.**, Brown, D., Zeman, J., & Dallaire, D. (2010, April). *Gender differences in the mediating role of emotion dysregulation in the relation between violence exposure and internalizing symptoms*. Poster presented at the biennial Conference on Human Development, New York City, NY.

### Honors and Awards:

- Eastern Virginia Medical School Health Professions Scholar, 2009 – 2011
- The College of William and Mary Arts and Sciences Graduate Research Grant, 2009, 2010