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# A Multimethod Assessment of Emotion Regulation and Associations with Anxiety Symptoms in a Clinical Sample of School-Age Youth

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UNIVERSITY OF MIAMI

A MULTIMETHOD ASSESSMENT OF EMOTION REGULATION AND  
ASSOCIATIONS WITH ANXIETY SYMPTOMS IN A CLINICAL SAMPLE OF  
SCHOOL-AGE YOUTH

By

Emily Laird Bilek

A DISSERTATION

Submitted to the Faculty  
of the University of Miami  
in partial fulfillment of the requirements for  
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Coral Gables, Florida

August 2015



UNIVERSITY OF MIAMI

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A Multimethod Assessment of Emotion Regulation  
and Associations with Anxiety Symptoms in a  
Clinical Sample of School-Age Youth

Abstract of a dissertation at the University of Miami.

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**Objective:** There is a large body of research demonstrating the relationship between emotion regulation deficits and anxiety symptoms (Zeman, Shipman & Suveg, 2002; Penza-Clyve & Zeman, 2002; Suveg & Zeman, 2004). However, rigorous investigations incorporating multimethod assessments of emotion regulation are rare (Adrian, Zeman & Viets, 2011; Thompson, 2011a). Examinations of convergence and divergence across assessments of emotion regulation may aid in examining the incremental validity of different reports, and could improve knowledge about relationships with anxiety symptoms in a clinical population (De Los Reyes et al., 2015; Hourigan, Goodman, & Southam-Gerow, 2011). **Method:** Participants were 153 children, ages 6-13 ( $M_{\text{age}} = 9.39$ , 51.6% male), diagnosed with a clinical anxiety disorder. Emotion regulation was assessed via parent-, self-, and observer-reports of inhibition, dysregulation, and coping. Anxiety symptoms were assessed via parent- and self-report measures. **Results:** ***Aim 1.*** Analyses indicated significant convergence between parent- and child-report of dysregulation ( $r=.31, p<.05$ ), and between informant and observer-reports of dysregulation ( $F(2,26) = 4.34, p<.05$ , adj.  $R^2=.19$ ), such that child-reported dysregulation was significantly associated with observer ratings of dysregulation. No other convergence was observed. Examinations of divergence across parent- and child-report of youth inhibition, dysregulation and coping indicated that all scales differed significantly by informant

(inhibition:  $t(59) = -4.55, p < .001$ , dysregulation:  $t(59) = 4.36, p < .001$ , coping:  $t(59) = -6.31, p < .001$ ), with children reporting higher levels of inhibition and coping than parents, and parents reporting higher levels of dysregulation than their children. Youth-report of anxiety symptom severity was significantly associated with the discrepancy between parent- and child-reports of dysregulation ( $F(2,26) = 4.34, p < .05$ , adj.  $R^2 = .19$ ), such that greater child-reported anxiety was associated with a smaller discrepancy across reporters.

**Aim 2.** The relationship between observations and reports of emotion regulation and anxiety symptoms was examined via a series of canonical correlations. Analyses revealed a significant association between youth dysregulation and youth anxiety (Wilks's  $\lambda = .56$  criterion,  $F(6,44) = 2.51, p < .05$ ) with observer- and parent-reports of dysregulation contributing most strongly to the model. Additionally, there was a significant relationship between multimethod emotion regulation assessment and youth anxiety (Wilks's  $\lambda = .18$  criterion,  $F(18,30) = 2.22, p < .05$ ), with parent-reported inhibition accounting for a substantial portion of the canonical effect. **Discussion:** Results reinforce evidence of the complex and varied nature of emotion regulation and its measurement. In general, inhibition and coping were found to be the most divergent scales. Dysregulation was found to have higher levels of convergence, both between informants and across assessment methods. These findings are consistent with research in youth mental health demonstrating greater convergence for more observable behaviors, and divergence for covert or internalized targets (e.g. Achenbach, 2011; De Los Reyes et al., 2015). Results also indicate that different measurements of emotion regulation (e.g. parent-reports of inhibition) provided incremental validity to the assessment of youth emotion regulation and anxiety. Overall, these results support the rationale for a multimethod assessment of

emotion regulation, both for better understanding the construct of emotion regulation, as well as for understanding its relationship with youth anxiety. In addition, results highlight the complexities and future challenges to consider in the measurement of emotion regulation in youth.

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## CHAPTER 1: INTRODUCTION

“Emotion is not a self-report of emotion...or a potentiated startle reflex, nor is it an appraisal of some event. Emotion must be conceived...as a theoretical construct to be inferred from multiple observables” (Larsen & Prismic-Larsen, 2006, p.338).

Emotion regulation is a relatively young field of research. As recently as 1989, studies examining emotion regulation and related constructs were rare (Adrian, Zeman & Veits, 2011). In the past twenty years, interest in this topic has skyrocketed; the emphasis on emotion research in recent decades has been referred to as the ‘affect revolution’ (Gross & Barrett, 2011; Adrian et al., 2011). As a result, research has provided insight into the relationships between adaptive emotion regulatory processes and a host of positive outcomes including: physical health, social functioning, cognitive and executive functioning, and psychological wellbeing (Spinrad et al., 2006; Geisler, Kubiak, Siewert & Weber, 2013; Salovey, Rothman, Detweiler, & Steward, 2000). Specifically, research has found emotion regulation deficits to be associated with internalizing symptoms and anxiety disorders (Folk, Zeman, Poon & Dallaire, 2014; Zeman, Shipman & Suveg, 2002; Penza-Clyve & Zeman, 2002; Suveg & Zeman, 2004). This research holds promising clinical implications beyond understanding the nature of anxiety disorders; examining key emotional mechanisms underlying anxiety could inform further developments in youth treatment for anxiety disorders (Hum, Manassis & Lewis, 2013a; Suveg, Sood, Comer & Kendall, 2009; Zeman, Cassano, Perry-Parrish & Stegall, 2006). However, to adequately address emotion regulation in treatment, the construct of emotion regulation and its measurement may require additional research.

The recent nascence of the field, and the far-reaching implications of research within this area spurred enthusiastic research that, in many ways, preceded the careful theoretical consideration of related constructs. This has yielded a field rife with conceptual ambiguity, definitional inconsistencies, and methodological shortcomings that render both the interpretation of research within the field, as well as directions for future research, unclear (Adrian et al., 2011; Suveg & Zeman, 2011; Thompson, 2011a). In this review, the state of emotion regulation research is considered, including difficulties with definitions of emotion regulation and related measurement difficulties. The importance of multimethod assessment within emotion regulation research is then examined. Next, the relationship between emotion regulation and anxious populations is discussed. Finally, rationale for the current study with clinically anxious youth is outlined.

### **Challenges to Research on Emotion Regulation in Youth**

As noted, despite the recent surge in research on emotion regulation, there remain fundamental barriers to parsimonious, reliable, and valid research in this area. Among the challenges within the field are conceptual ambiguities about both the definition and conceptualization of emotion concepts and difficulties operationalizing measurement for a multi-faceted construct (Thompson, 2011a; Cole & Deater-Deckard, 2009).

**Definitional issues.** Emotion and emotion regulation suffer from being both intuitive and abstract constructs. For example, a layperson might postulate that emotions are feelings experienced in response to an evocative stimulus, and regulation is how we cope with those feelings. Given the apparent face validity of emotion processes, emotion regulation researchers often rely on the reader having an implicit understanding of these constructs, and do not always supply explicit definitions themselves (Thompson, 2011a).

Unfortunately, despite the intuitive nature of emotion and emotion regulation, there is little agreement on the actual operationalization of these constructs (Cole, Martin & Dennis, 2004; Larsen & Prizmic-Larsen, 2006). For example, while there is some consensus that emotions consist of subjective, expressive, and physiological experiences (Gross & Barrett, 2011), there is less agreement about whether emotions and emotion regulation exist as distinct and separable processes, or if they are inseparable and mutually influential (Thompson, 2011b).

Given the varied definitions and operationalizations of emotion related constructs, it can be helpful to consider emotion regulation as a broader construct, inclusive of a variety of processes. To that end, Gross and Thompson (2007) outline a process model of emotion regulation that may be especially beneficial for use with a youth population. According to their model, emotion regulation incorporates a number of processes that work in tandem to modulate emotional intensity, duration, and expression. Specifically, Gross and Thompson (2007) describe five families of regulatory processes: *situation selection*, *situation modification*, *attention deployment*, *cognitive change*, and *response modulation*. Situation selection and modification refer to efforts by the individual to choose or alter situations to maximize the likelihood of experiencing preferred emotions. Attention deployment and cognitive change refer to efforts to monitor and optimize emotional experiences in the moment (or prior to it). Finally response modulation refers to efforts to regulate an emotion after an emotional response has been activated. Thus, in this model, regulation processes precede and help determine the experience of an emotion, and also follow the emotional response.

Research suggests that emotion and emotion regulation are difficult to separate: emotional arousal and regulation arise in tandem, share neural circuitry, and are mutually influential processes (Gross & Thompson, 2007; Ochsner & Gross, 2007; Thompson, Lewis & Calkins, 2008). As such, emotion regulation has been defined as “the set of automatic and controlled processes involved in the initiation, maintenance, and modification of the occurrence, intensity, and duration of feeling states” (Webb, Miles & Sheeran, 2012, pp. 775). Other similar, but distinct, definitions abound. Kerns, Comer and Zeman (2014) outline a definition of emotion regulation, based on work by Gross (2002) and Thompson (1994) that emphasizes the individual’s awareness of their experience, and the contextual demands. Specifically, they define emotion regulation as “individuals’ awareness of, responses to, and modulation of their emotional arousal, experience, and expression in an adaptive manner that is sensitive to the demands of the social context (Kerns et al., 2014, pp. 349).” While these definitions share common components (changes in emotional states), the emphases are different, which in turn, will likely result in different directions with regard to measurement.

**Measurement issues.** Partially due to problems with construct definition, the measurement of emotion regulation processes has also been plagued by ambiguity (Adrian et al., 2011). Without a widely accepted definition, researchers have struggled to assess and measure this construct (Thompson, 2011a). Furthermore, even operationalized definitions of regulatory processes present a multifaceted and complex picture of emotion regulation, such that measurement becomes a challenge. Indeed, common definitions of emotion regulation include the management of cognitive, physiological, and behavioral systems, as well as goals (Thompson, 1994; Thompson, 2011a). As a result, no single

measure can adequately assess the unique but interactive processes related to emotion regulation. Rather, a variety of assessment methods must be employed in order to tap into the full picture (Thompson, 2011a).

Common methods cited within the emotion regulation literature include: self-report, other-report, observational measures, and physiological measures of emotion regulation (Adrian et al., 2011). Computer-based information processing tasks are also implemented to examine attentional deployment, as well as other automatic cognitive regulation strategies (e.g. Waters, Mogg, Bradley & Pine, 2011). Each of these methods provides insight into a limited portion of the emotion regulatory process and each measurement tool is associated with advantages and disadvantages. A brief review of the strengths and limitations of these methodologies is outlined below (for a more thorough review of these methodologies in the emotion literature in general, and with children specifically, see Larsen & Prizmic-Larsen, 2006; Zeman, Klimes-Dougan, Cassano, & Adrian, 2007).

***Self-report.*** Self-report is a commonly employed methodology wherein an individual is either given a questionnaire or a structured interview to assess their emotion regulation strategies, styles, or related constructs (Larsen & Fredrickson, 1999). Given that emotion regulation is, at least partially, an internalized process that exists within a person, individuals have unique access to their own internal states that may not be assessed via other methodologies (Hourigan, Goodman, & Southam-Gerow, 2011; Larsen & Prizmic-Larsen, 2006; Morris, Robinson & Eisenberg, 2006). Consequently, self-report measures of emotion regulation appear to be potentially valuable (Durbin, 2010; Suveg & Zeman, 2011). For example, measures such as the self-report version of the

Children's Emotion Management Scale (CEMS; Zeman, Shipman & Penza-Clyve, 2001) have been used to examine a child's report of his or her typical style of responding to emotional situations (e.g. responding how frequently they experience the following: "I get mad inside but I don't show it").

A study conducted by Suveg and colleagues (2009), examined emotion regulation and internalizing symptoms within a community sample of 187 children, ages 8-12. Participants completed self-report questionnaires and a structured interview to assess emotion and affective processes including: emotion dysregulation, emotion coping, negative affect, positive affect and somatic arousal. Participants also completed self-report questionnaires of anxiety and depressive symptoms. Structural equation modeling revealed that emotion dysregulation, poor emotion coping, and high levels of negative affectivity were associated with both anxious and depressive symptoms. Alternatively, low levels of positive affect were most strongly associated with depressive symptoms, and high somatic responsiveness was most strongly related to anxiety (Suveg, Hoffman, Zeman & Thomassin, 2009).

These and similar results demonstrate the utility of using self-report to examine the relationship between symptomatology and youth emotion regulation. However, self-report methodologies are limited by the individual's insight into, and his ability to monitor, his affective processes, factors that may be especially relevant within research in youth populations (Ollendick & Hersen, 1993). Additionally, self-report methodologies place a burden on a child's memory and communication abilities, particularly at younger ages, and may be affected by participant biases, such as social desirability or self-serving biases (Larsen & Prizmic-Larsen, 2006; Morris et al., 2006; Zeman, Klimes-Dougan,

Cassano & Adrian, 2007). Thus, while self-report measures may provide the most insight into understanding an individual's subjective perceptions of emotion regulation, they may be better interpreted within the context of a larger, multimethod assessment of emotion regulation.

***Other-report.*** Within research on youth emotion regulation, it is also common for an investigator to include an additional informant's report of emotion regulation. Typically, the target child's parent or teacher provides this report, although peer-reports of emotion regulation have occasionally been included (Adrian et al., 2011). In addition to the parent version of the CEMS (Zeman et al., 2001), there are many other commonly used informant reports of child emotion regulation. For example, the Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997) is a 246-item measure assessing informant-report of child negativity and emotional lability in addition to emotion regulation (e.g. "X is a cheerful child"). Onchwari and Keengwe (2011) employed the ERC in a study examining the relationship between teacher-reported emotion regulation, and observed behaviors in 33 preschoolers (ages 3-5). Results indicated that higher levels of adaptive emotion regulation were associated with higher levels of adaptive observed behavior among participants. Informant reports may be especially valuable in studies such as this, where very young children, who typically cannot provide self-report data, are the target of investigation.

Parent and other informant reports of emotion regulation strategies and styles remove the demands placed on a young child's comprehension, insight, and, memory, and may provide a slightly more objective report (Morris et al., 2006). However, informant report is limited to assessing processes detectable by the observer. Given that



emotion regulation is primarily an internal process, parents may be unable to report on processes beyond observable behaviors (De Los Reyes & Kazdin, 2005). Moreover, children may exhibit different regulatory behaviors when they are not in the presence of a parent (Tobin & Graziano, 2011). Additionally, there is some evidence that parent- and teacher-reports of child behavior and symptoms are influenced by informant characteristics such as psychopathology or social desirability biases (Fergusson, Lynskey & Horwood, 1993; Morris et al., 2006). Thus, informant-reports provide insight into emotion regulation behaviors in one specific context, potentially providing incremental validity over reports from other contexts. However, they may be limited in their ability to tap into a child's generalized emotion regulation strategies, her subjective experience of emotion regulation, and may be further limited by informant biases.

***Observational measures.*** Within the domain of developmental research, observational methods of emotion regulation assessment are the most common (Adrian et al., 2011). This methodology varies by the age of the target child; however, it typically includes either a naturalistic observation period or observation during an emotionally evocative task (Zeman et al., 2007). Behaviors are later coded for emotional response styles related to regulatory processes (Adrian et al., 2011).

Naturalistic observation entails the observation, either within the lab or within a natural setting, of a child responding to typical tasks (e.g. free-play, circle-time, meeting a new person). This type of observation provides the most ecologically valid estimate of an individual's emotional responses (Zeman et al., 2007). In a study investigating the reliability and validity of a teacher-report of preschool behavior, one hundred children (ages 3 to 6) were observed during two naturalistic contexts: circle time and free play

(Bulotsky-Shearer & Fantuzzo, 2004). The children's behavior was coded across three categories during this period: appropriate/on task behavior, inappropriate/off task behavior, and noncompliant behavior. This observational coding within the context of a naturalistic environment allowed examiners to compare typical behavior across thirty minutes to teacher report of child classroom behavior over the course of one to two months (Bulotsky-Shearer & Fantuzzo, 2004). Within this context, a naturalistic observation provided ecologically valid opportunities for reporting on target behaviors.

However, naturalistic observation of emotion regulation may be more difficult if the context is unable to capture a range of emotional responses. Whereas 'on task' or 'off task' behavior is likely to be observed within a 'circle time' task, coping, inhibition, or other emotion management strategies and relevant behaviors are only likely to be observed if the situation elicits stronger emotions. To increase the salience of the task, and thus the likelihood of observing relevant behaviors and emotional correlates, non-naturalistic observational methodologies, or analogue tasks, typically evoke uncomfortable emotions within a laboratory setting (Zeman et al., 2007). For example, in a study examining child and parent attachment, preschoolers and their mothers engaged in a denied request task in the lab (Waters, Henry, Mogg, Bradley, & Pine, 2010). In this paradigm, the parent and child are momentarily separated. During the separation, an experimenter tells the child that he will be able to enjoy a snack or candy as soon as his mother returns, as long as his mother gives permission. The mother is independently instructed to deny the child's request to eat the snack, and instruct him to wait until later. Within this study, independent observers (along with the mother and the child) coded

both the child's emotional response and parent- and child-reported perceptions of the causes of that response during the interaction (Waters et al., 2010).

Such an observational approach allows for a relatively objective assessment of regulatory behaviors that is not limited by a reporter's insight, or a loved one's biases. It can also provide a snapshot of a child's regulatory processes within a context, rather than abstracting across typical experiences. However, this is also a drawback of this methodology: observational indicators can only provide information about a child's emotional response style within a specific context, and may not generalize across situations (Morris et al., 2006). Additionally, like informant reports, observational methods can only capture observable regulatory processes (e.g. behavior) and cannot tap into non-observable manifestations of related internal processes (Adrian et al., 2011). This is especially relevant for older children who may mask emotional experiences as part of their regulatory process (Zalewski, Lengua, Wilson, Trancik, Basinet, 2011). Thus, observations are necessarily limited to those behaviors that are elicited by a specific stimulus, usually within a laboratory, which may or may not be relevant for the child (Zeman et al., 2007).

Furthermore, in the case of analogue tasks, emotion induction potentially limits the generalizability of results, and may be associated with ethical concerns if the paradigm elicits strong emotional responses (Hubbard, 2005). Additionally, families engaging in treatment-relevant observational assessments may be biased by their awareness of the clinical relevance of the tasks, and may be motivated to 'fake good,' which could potentially obscure true deficits or concerns (Shortt, Barrett, Dadds & Fox, 2001). Thus, although observational methodologies are highly recommended within the

emotion regulation literature, the procedure for eliciting and observing emotional arousal should be considered carefully. Additionally, to increase generalizability and validity, observational methods should be considered in tandem with additional methods of assessment (Zeman et al., 2007).

***Physiological measures.*** Although not examined specifically in the current investigation, one methodology for examining emotion regulation is the assessment of physiological or biological indicators of regulation. As previously mentioned, physiological states comprise key indicators of emotions and their regulation (Bradley & Lang, 2000). Although individuals can report the degree to which they experience somatic arousal in response to emotional stimuli, much of the physiological response to emotion cues occurs outside of conscious awareness (Gross, 1998). From a basic science perspective, physiological measures of nervous system activity may provide fundamental insight into the properties of emotions and an individual's regulation style (Larsen & Prizmic-Larsen, 2006). For example, research on the hypothalamic-pituitary-adrenal (HPA) axis shows that cortisol reactivity is related to stress reactivity generally, and maladaptive emotion regulation techniques specifically (e.g. de Veld, Riksen-Walraven & de Weerth, 2012; Denson, Spanovic & Miller, 2009; Kern et al., 2008). Additionally, studies of the parasympathetic system have shown that baseline cardiac vagal tone, as well as vagal tone recovery are associated with emotion regulation (Geisler et al., 2013; Scott & Weems, 2014; Gottman & Katz, 2002; Santucci et al., 2008).

Recently, researchers have also begun investigating neural correlates of emotion regulation (e.g. Hum, Mannassis, & Lewis, 2013b; Swartz, Carrasco, Wiggins, Thomason & Monk, 2014). A study examining structural and functional connectivity and

internalizing symptoms in youth found an association between amygdala activation in response to sad faces and youth internalizing symptoms. Additionally, an EEG study found an association between increased cortical arousal (particularly within the P1 and frontal N2 components) and youth anxiety in response to a range of emotional faces (Hum et al., 2013b). Thus, physiological and neural examinations of emotional responding are unique in that they do not rely on observable behaviors; rather they tap into biological components of emotion regulation. This provides a strong advantage over informant- and observer-report, as measurement is not limited to external behaviors.

However, this methodology is also associated with significant limitations. Specifically, measurement of physiological arousal and response is dependent upon emotional arousal, which subjects this methodology to some of the same limitations associated with eliciting emotions in a laboratory setting as those seen in the observational literature (e.g. ability to successfully evoke the targeted emotional experience, ethical issues associated with inducing negative emotions, and ecological validity concerns). Additionally, physiological measures may be invasive to collect, and may alter the emotional experience that is being assessed (Larsen & Prizmic-Larsen, 2006).

***Computer-based measures.*** Computer-based tasks are also employed to assess cognitive correlates of emotion regulation, such as attentional deployment or interpretation bias (e.g. Simonds, Keiras, Rueda & Rotherbart, 2007; Vasey & MacLeod, 2001; Shechner et al., 2013). Given the automaticity and speed with which individuals deploy attention, computer-based assessments of information processing have the potential to provide more objective insight into these processes than self- or informant-

report questionnaires. Although a variety of tasks may be employed, computer-based measures of attentional deployment often consist of visual dot-probe tasks or Emotional Stroop paradigms (Avero, Corace, Endler, & Calvo, 2003; MacLeod, Mathews & Tata, 1986). In these tasks, participants are asked to respond to a non-emotional portion of the stimuli (either a target appearing behind a picture, or the color of an emotional word) after observing emotional stimuli in the same or in a different location (e.g. a spider, an angry face, etc.). Participant reaction times are measured to indicate whether the participant was deploying attention toward the emotional target (e.g. MacLeod et al., 1986). Although results are not unanimous, most dot-probe studies conducted with clinically anxious youth indicate that anxiety is associated with attentional bias towards threatening stimuli (e.g. Waters et al., 2010).

However, interpretation of these results is somewhat complicated. Individuals with higher discrepancy scores may demonstrate either an initial attentional bias toward emotional content, or alternatively, difficulty disengaging from emotional stimuli (Shechner et al., 2013; McKenna, & Sharma, 2004). Additionally, when using these methods to assess attention bias in youth, there are confounding factors related to motor development (Shechner et al., 2012; Shechner et al., 2013). Thus, recent studies have employed eye-tracking software to reduce confounds related to attention-engagement/disengagement and motor development. Shechner and colleagues (2013) tracked eye-movements of anxious and non-anxious youth (ages 8-17) while they viewed face pairs (emotional face paired with a neutral face, or two neutral faces). Results demonstrated that anxious youth deployed attention to angry faces more than did non-

anxious youth, providing further support for the hypothesis that anxious youth have a threat attention-bias.

Taken together, this research demonstrates the promise of computer-based tasks in parsing out different aspects of emotion regulation among typical and clinical samples. Given technological advances, computer-based assessments of cognitive processes have become more accessible; however, many of these tools require time-consuming testing sessions, which may present barriers when implemented with younger children. Additionally, although these tasks provide insight into an individual's cognitive response to emotional stimuli, they do not assess emotion directly, and need to be combined with assessments of subjective, behavioral, and physiological assessments of emotion.

### **Multimethod Assessment**

Research on emotion regulation indicates that each methodology has strengths and weaknesses, and that a single methodology for assessing emotional regulation is likely insufficient or, at the very least, only provides information about one aspect or perspective on emotional management (e.g. Larsen & Prizmic-Larsen, 2006). For example, each methodology examines slightly different components of emotional processes, such as the subjective experience of emotion, behavioral, expressive, and cognitive reactions to emotions and physiological arousal.

Given the potential incremental validity of including multiple assessment methods of emotion regulation, theorists have argued for the inclusion of multimethod assessment in emotion research (e.g. Larsen & Prizmic-Larsen, 2006; Suveg & Zeman, 2011). Adrian and colleagues (2011) conducted a meta-analysis reviewing the literature on

emotion regulation in youth populations over the course of two decades (1988-2010). Their review revealed that, out of 157 studies on the subject, 61.1% percent employed only a single method of emotion regulation assessment. Twenty-three point six percent implemented only two methods (e.g. self- and parent-reports), leaving only 15.3% employing more than two methods of emotion regulation assessment. Moreover, the use of multiple methods does not appear to have increased over time (Adrian et al., 2011). Thus, despite evidence for an “affect revolution” in youth literature and recommendations for researchers to focus on multimethod assessment, researchers do not typically employ such an approach.

When multimethod assessments of emotion regulation are conducted, one challenge that emerges is analyzing and interpreting results across methodologies. In the multimethod assessment literature, particular attention is often paid to whether reports across informants or methodologies converge (e.g. are consistent) or diverge (e.g. represent discrepancies; De Los Reyes et al., 2015). We will consider some of the emotion regulation literature here, along with evidence for convergence, divergence, and interpretation of these results.

**Convergent reports.** Several studies examining emotion regulation across informants and methodology have found convergence (e.g. Durbin, 2010; Levine, Stein & Liwag, 1999). In a study examining multimethod assessment within a community sample, children (ages 10-12) and their parents provided reports on the child’s emotion regulation. Dyads also engaged in an emotionally evocative interaction task, which was coded for child negative affect intensity (Siener & Kerns, 2012). Results indicated high levels of convergence between parent and observer ratings of emotion regulation.



Specifically, maternal report of the child's typical negative affect intensity was significantly correlated with observational ratings of negative affect intensity during the interaction task. However, observed and parent-reported negative affect did not converge with child self-reports of cognitive emotion regulation deficits (e.g. propensity for making cognitive errors). These results suggest that measures of both typical and context-specific emotion regulation styles may demonstrate convergence when the target variable is easily observed (e.g. affect intensity) and within a relatively narrow age range. However, less convergence may be observed across reporters and sampling methods when the target variable reflects a more covert behavior (e.g. use of cognitive errors, or inhibited expression of emotion; Hourigan et al., 2011; Keenan, Hipwell, Hinze & Babinski, 2009). These results are consistent with findings from youth mental health research that demonstrate much higher levels of convergence for observable rather than covert behaviors (De Los Reyes et al., 2015).

In another study investigating convergence across methods, subjective, behavioral and physiological indicators of emotional intensity were examined (Mauss, Levenson, McCarter, Wilhelm & Gross, 2005). Female undergraduates watched a five-minute film containing amusing and sad emotional content; during the course of the film, participants continuously rated the intensity of their emotional experience. Similarly, independent observers rated the participants' facial expressive responses over the course of the film. Ongoing physiological activity was assessed via cardiovascular activity, somatic arousal and skin conductance. Results indicated that self-report of emotional intensity was highly convergent with ratings of expressive behavior by a third party. However, convergence between these methods and physiological activity was less consistent. Specifically,

ratings of amusement were positively related to observed emotional experience and physiological arousal, but ratings of sadness intensity were only positively related to observed emotional experience. Experience of sadness was negatively correlated with some measures of physiological arousal (e.g., skin conductance level and somatic activity), and not related to others (e.g., cardiovascular activation). These results suggest that observer-report of emotional experience may demonstrate convergence with self-reports of emotional experience, but that physiological measures of emotion may have more inconsistent levels of convergence with other measures of emotion.

**Divergent reports.** While multimethod research shows some convergence, divergence is also commonly observed, especially when informants report on less observable behaviors or across contexts (Achenbach, 2011; De Los Reyes et al., 2015; Campos, Frankel & Camras, 2004). Although the subjective, behavioral, and physiological components of emotional processes are likely related, evidence suggests that they do not reliably converge (Larsen & Prizmic-Larsen, 2006; Reisenzein, Bördgen, Holtbernd, & Matz, 2006). For example, a multimethod study examining the relationship between emotion regulation and depressive symptoms in young girls revealed low convergence (Keenan et al., 2009). Participants were 232 nine-year-old girls and their mothers. During the course of the study, children provided reports of their typical emotional response styles and were observed discussing a conflict with their mothers. Results indicated that observed expressed emotion during a problem-solving task was not significantly correlated with self-reports of typical response styles. Moreover, self-reported responses regarding “typical behavior” were a stronger predictor of depressive symptoms in young girls than observational measures of emotion regulation during the

course of a single emotionally evocative task. These results suggest that measures of a child's typical style of emotional responding may not assess the same construct as other measures of context-specific patterns of responding.

Some research suggests that convergence across reporters may be low even when both methods assess the same discrete emotion variables. In a study examining convergence across parent- and child-report of emotional awareness and expression, 40 clinically anxious youth (ages 7-17) and their mothers completed measures assessing the child's emotional awareness and expressive reluctance (Kerns et al., 2014). Results indicated that children and their mothers demonstrated some convergence on reports of expressive reluctance ( $r=.43, p < .05$ ), but not awareness. The authors note that the emotional awareness scale required parents to have more insight into the child's internal state, whereas the reluctance scale requires reporting on behavior that may be more visible to the parent. This finding is also consistent with the informant discrepancy literature that finds higher convergence for observable behaviors as compared to internalized symptoms or feelings (e.g. De Los Reyes et al., 2015).

Similarly, in a study examining convergence between parent- and self-report of emotion regulation styles, a community sample of 61 school-age children and their mothers reported on the child's emotion management styles (e.g. inhibition and dysregulation) related to anger, worry, and sadness (Hourigan et al., 2011). Results indicated that parents and children demonstrated limited convergence across reporters. In general, children reported higher levels of inhibition than parents, whereas parents reported higher levels of dysregulation than their children. The authors investigated predictors of convergence and found that age and child psychopathology predicted

discrepancies across reporters. Specifically, older children reported higher levels of dysregulated anger expression relative to their parents, and parents reported higher levels of anger inhibition relative to older children's reports for themselves. With regard to psychopathology, parent-reported externalizing symptoms were associated with higher levels of parent-reported anger dysregulation relative to their children. Additionally, self-reported internalizing symptoms were associated with higher child-reported levels of sadness dysregulation relative to their parents. These results suggest that an informant's perspective on the target individual's psychopathology is associated with their report of emotional functioning (e.g. parent-report on externalizing symptoms and report on anger dysregulation, child-report on internalizing symptoms and report on sadness dysregulation).

This investigation was conducted with a community rather than a clinical sample, which may limit the generalizability of the findings to those with more significant emotion regulation concerns. Additionally, the authors only implemented two methods for assessing emotion regulation (self- and informant-report). Thus, the authors recommend extending these results with a clinical sample using multimethod assessment (Hourigan et al., 2011).

**Interpretation.** Multimethod assessments yield discrepant findings both within emotion literature as well as within youth mental health literature (e.g. Campos et al., 2004; Achenbach, 2011). De Los Reyes and colleagues (2015) note that, in addition to measurement error, discrepancies may be a result of informant perspectives (e.g. the observability of the target behavior), or the informant's context. The above review of convergence and divergence within emotion regulation research supports these findings.

Specifically, informants reporting on more observable behaviors demonstrated higher convergence (e.g. Siener & Kerns, 2012). Additionally, higher levels of convergence were observed when emotion was measured within the same context as compared to investigations across context (e.g. Mauss et al., 2005 versus Keenan et al., 2009).

Although the high prevalence of divergence can seem troubling, it is more interpretable when we are reminded that emotion regulation is not a unitary construct (Adrian et al., 2011). A single assessment method of emotion regulation is insufficient to capture the interaction between regulation systems (e.g. cognition, behavior, physiology). Moreover, it cannot sufficiently capture the dynamic, and fluid nature of emotional processes that are inconstant across context (e.g. Kerns et al., 2014). Indeed, the appeal of multimethod assessments is that they provide the opportunity to examine the incremental validity of each assessment tool, rather than a unitary picture that is constant across measurement (De Los Reyes et al., 2015). Thus, multimethod research should include measurements that are likely to diverge in meaningful ways, and research should examine these differences. The current study contributes to the emotion regulation literature by including a multimethod assessment of emotion processes across reporters and contexts. Specifically, the measurement includes self-report and parent-report of typical emotion management styles, as well as two observational tasks to assess context-specific emotion regulation across situations with varying levels of structure and task orientation. Convergence and divergence between observed emotion expression and reports of typical emotion response strategies are examined with particular attention paid to the incremental validity of reports.

## **Emotion Regulation and Psychopathology**

Despite the conceptual and methodological limitations within emotion regulation research, research in this field has yielded informative results regarding the relationship between emotion regulation deficits and youth psychopathology. Based on this research, deficits in emotion regulation appear to be associated with youth psychopathology in general, and internalizing symptoms more specifically (Zeman et al., 2002; Penza-Clyve & Zeman, 2002).

**Emotion regulation and internalizing symptoms.** There is a rich literature demonstrating the relationship between emotion regulation deficits and internalizing symptoms in youth (e.g. Siener & Kerns, 2012, Suveg, Hoffman, et al., 2009, etc.). For example, one study investigated components of emotion regulation and their relationships to internalizing and externalizing symptoms (Zeman et al., 2002). Specifically, the role of child-reported emotion awareness, emotion coping, and emotion management across both sadness and anger were examined. Emotion awareness refers to an individual's ability to correctly identify emotions. Emotion coping was defined as the ability to use effective strategies for dealing with negative emotions. Finally, emotion management was subdivided into two categories, emotional inhibition, or the suppression of emotional expression, and emotional dysregulation, which was defined as exaggerated or culturally inappropriate expressions of emotions. Results indicated that, in a community sample of 227 children ages 9-12, self-reported poor emotion management and coping, as assessed by subscales on the Children's Emotion Management Scale (CEMS, Zeman et al., 2001) were related to self-reported internalizing symptoms (Zeman et al., 2002). Specifically, anger inhibition, anger and sadness dysregulation, and poor anger coping were associated

with internalizing symptoms. Similarly, the study by Keenan and colleagues (2009) that examined a multimethod assessment of youth emotion regulation in young girls also examined the association to symptoms of depression. Results support the relationship between emotion regulation and internalizing symptoms within a community sample. Specifically, they found that youth-reported inhibition accounted for 24% of the variability in depressed symptoms (Keenan et al., 2009).

Folk and colleagues (2014) conducted a longitudinal study of emotion regulation and internalizing symptoms in at-risk youth. Results indicated that assessments of youth-reported emotion regulation at baseline significantly predicted symptoms of anxiety and depression approximately two years later. Specifically, child-reported anger, sadness, and worry dysregulation, and worry inhibition were associated with anxiety two years later. Alternatively, worry dysregulation and worry coping predicted depressive symptoms at the follow-up assessment (Folk et al., 2014). Similarly, McLaughlin, Hatzenbuehler, Mennin, and Nolen-Hoeksema (2011), conducted a longitudinal study of a community sample of 1065 youth (ages 11-14) and found that emotion dysregulation preceded the development of youth anxiety symptoms (McLaughlin et al., 2011). Results from these longitudinal studies suggest that less optimal emotion management strategies such as emotion inhibition and dysregulation, as well as lower levels of emotion coping may be a risk factor in the development of internalizing symptoms, and that dysregulation may be particularly linked to the development of anxiety symptoms.

Research has also found relationships between internalizing symptoms and other indicators of emotion regulation in youth such as: negative affect intensity, emotion expression and understanding, attentional deployment and cognitive biases, and neural

bases of emotion regulation such as amygdala connectivity (Tortella-Feliu, Balle & Sesé, 2010; Siener & Kerns, 2012; Southam-Gerow & Kendall, 2002; Keenan et al., 2009; Waters, Mogg, & Bradley, 2012; Zeman et al., 2002; Qin et al., 2014). However, most of the research on emotion regulation and internalizing symptoms has been conducted with community, rather than clinical samples (Southam-Gerow & Kendall, 2002). Although this body of research sheds light on the relationship between emotional processes and symptoms within normative samples, research on emotion regulation in children with emotional disorders is warranted to better understand child psychopathology and potentially inform treatment development (Trosper & Ehrenreich May, 2011).

**Emotion regulation and anxiety disorders.** Although sparse, there is some literature linking emotion regulation deficits to clinically anxious youth populations. Suveg and Zeman (2004) compared emotional processes in a sample of fifty-two children (ages 8-12), with and without anxiety diagnoses. Results demonstrated that children with anxiety disorders were more likely to report higher levels of dysregulated worry, as well as dysregulated sadness and anger, than the non-anxious group. Additionally, anxious children reported invoking lower levels of adaptive coping, or use of effective strategies for dealing with negative emotions, than the non-anxious group. Parents also reported higher levels of negativity and emotional lability among the anxious group as compared to their non-anxious peers. Overall, these results suggest that emotion regulation processes, such as self-reported dysregulation, coping and emotional intensity, as well as parent-reported negativity and lability are associated with clinical anxiety (Suveg & Zeman, 2004).



Trosper and Ehrenreich May (2011) also investigated emotion regulatory processes with a clinical anxious sample. Results indicated that negative emotionality, poor emotion expression, and negative familial affective expression all predicted symptoms of anxiety within a clinical sample of youth. A study by Southam-Gerow and Kendall (2000) found that children with anxiety disorders demonstrated lesser understanding of how to change and hide emotions than non-anxious youth. Similarly, Carthy, Horesh, Apter and Gross (2010) found that, as compared to non-anxious children, anxious children experienced higher and more frequent negative emotional intensity, and less frequent use of cognitive emotion regulation strategies such as reappraisal. Anxious individuals may also experience significant differences in cortisol reactivity (Yoon & Joorman, 2012). However, literature on this topic has demonstrated varying results in both adults and children, with some research indicating that baseline cortisol measures may not be predictive of anxiety in youth (Greaves-Lord et al., 2009).

Thus, despite the recent surge in research within the area of emotion regulation, and with regard to emotion regulation in youth populations specifically, the literature examining anxiety in clinical populations is limited and inconsistent. However, research with these populations may be vital to the development of comprehensive, efficient, and effective treatment options for anxious youth. The examination of emotional profiles and their unique relationship to emotional disorders, especially if informed by multiple assessment indices, could inform optimized treatment (Hannesdóttir & Ollendick, 2007; Zeman et al., 2007).

## Current Proposal

As noted, the emotion regulation literature as it relates to youth anxiety is fraught with methodological limitations. Specifically, the field has been plagued by a lack of a consensus definition for emotion regulation processes, a paucity of multimethod assessment of emotion regulation, and a dearth of research with clinical populations (Adrian et al., 2011; Southam-Gerow & Kendall, 2002; Thompson, 2011a). Given these methodological limitations, as well as growing awareness about the importance of considering both convergent and divergent reports of youth emotion regulation in understanding incremental validity of different reporters (De Los Reyes et al., 2015), there is rationale for investigating a multimethod assessment of emotion regulation processes and their relationship to anxiety symptoms in a clinical sample of school-aged youth. The current study proposes to further the field by examining the unique and shared variance of emotion regulation assessment methodologies, and further, the degree to which they are related to symptoms of anxiety among a clinical child sample. Specific aims and related hypotheses for the current study are outlined below.

**Specific aim 1.** To examine convergence and divergence of scores across a multimethod assessment of emotion regulation utilizing self-reports, informant-reports, and observational ratings in a clinical child sample.

***Specific aim, 1, hypothesis 1a.*** It is hypothesized that there will be some convergence across ratings of emotion regulation on similar tasks (e.g., observation tasks), such that ratings of inhibition, dysregulation and coping during a portion of a clinical interview will converge with ratings of inhibition, dysregulation and coping during a mildly frustrating observational paradigm (see the Etch-a-Sketch task, described

below). However, given that the Interview task is a naturalistic observational task, has never been investigated before, and was not developed in order to elicit frustration per se (as compared to the frustrating paradigm), we also predict (*hypothesis 1b*) some level of divergence between observer reports, with ratings of dysregulation being greater in the frustration task than in the Interview task. Additionally, because the two tasks are completed in different contexts and with different people (Interview task includes both a clinician and a parent, whereas the frustration task is completed only with the parent), it is anticipated (*hypothesis 1c*) that the child will demonstrate higher levels of emotional inhibition during the Interview task when they are introduced to a stranger, than they will on a frustrating task, when they are with a familiar parent.

*Specific aim 1, hypothesis 2a.* It is also anticipated that reports of emotion inhibition, coping, and dysregulation will demonstrate some convergence across parent- and self-report questionnaires of such. However, given previous research indicating that children and parents may differ in the types of emotion management styles that they report (Hourigan et al., 2011), it is hypothesized (*hypothesis 2b*) that parents will report higher levels of emotion dysregulation than children across emotions, and that children will report higher levels of emotional inhibition than their parents. Previous research has not examined convergence or divergence for parent and youth reports of coping on the CEMS scale, and thus no directional hypothesis is proposed. Age and child psychopathology are expected to moderate the discrepancies in parent and youth report of inhibition and dysregulation.

*Specific aim 1, hypothesis 3.* It is hypothesized that self- and parent-ratings of emotional inhibition, dysregulation, and coping will demonstrate some convergence with

observational ratings of inhibition, dysregulation and coping (respectively) on observational tasks. However, given that these indices are assessed across different contexts, it is anticipated that these methods may also assess unique features of emotion regulation, resulting in divergence.

**Specific aim 2.** To examine whether differing measures of emotion regulation, as assessed by self-report, parent-report, and behavioral observation, are associated with anxiety symptoms in a clinical sample of school-age youth.

**Specific aim 2, hypothesis 4.** It is hypothesized that informant and observer reports of elevated emotion inhibition will be associated with anxiety symptom severity, given evidence that this variable has been associated with internalizing symptoms more generally (McLaughlin et al., 2011; Troster & Ehrenreich May, 2011; Zeman et al., 2002).

**Specific aim 2, hypothesis 5.** It is anticipated that observational measures of emotional dysregulation, and informant-reports of emotion dysregulation will be associated with anxiety symptom severity, given prior evidence of such relations (e.g., Suveg, Hoffman et al., 2009).

**Specific aim 2, hypothesis 6.** It is hypothesized that informant and observer reports of poor emotion coping will be associated with anxiety symptom severity, given evidence that this variable has also been associated with internalizing symptoms (McLaughlin et al., 2011; Troster & Ehrenreich May, 2011; Zeman et al., 2002).

## CHAPTER 2: METHOD

### Participants

Data collected for use in the current study represents a sub-sample of a larger study examining clinical presentations and treatment responses of youth (children up to age 18) with anxiety and/or depression. Participants in the current study were 153 children, ages 6-13 (51.6% male,  $M_{age} = 9.39$ ), and their parents (or legal guardians), who received a diagnostic evaluation for anxiety and/or mood concerns. Participants included families primarily seeking assessment or treatment services for their child at a University clinic specializing in the treatment of anxiety and depressive disorders. All data utilized in the present study was collected at the time of this initial assessment. Data collection for this study began in the summer of 2009 and was completed in the spring of 2014. Youth participants came from diverse ethnic backgrounds: 55.6% were identified by parents as Hispanic, 33.3% Caucasian/Non-Hispanic, 3.9% African American, and .7% identified as Asian. An additional 3.9% identified as 'Other', and 1.3% left the question blank or identified as "Unspecified."

Inclusion criterion for the proposed study included a clinical diagnosis of any Axis I anxiety disorder as determined by a clinical severity rating of 4 or greater on any anxiety disorder domain (including Anxiety Disorder, Not Otherwise Specified) from the Anxiety Disorders Interview Schedule for the DSM-IV, Child Version, Child and Parent Report Forms (ADIS-IV-C/P; Albano & Silverman, 1996) at an initial baseline assessment. Exclusion criteria for the current study included families who were screened out prior to the assessment following an initial phone screen or those that did not show up for or complete the assessment after initially scheduling one. Participants may have been

excluded at the initial phone screen level if their parents reported a recent psychiatric hospitalization or very high levels of suicidal ideation or homicidal ideation.

Additionally, families may have been screened or referred out if they reported evidence of lifetime psychosis, moderate to severe developmental disorders, significant intellectual impairment, or concerns that did not appear to include anxiety or depression. Families were also excluded if the primary caregiver or child could not read or write sufficiently in English to complete study measures. Finally, families were excluded if the child did not meet criteria for a clinical anxiety diagnosis ( $n=8$ ).

### **Multimethod Assessment**

#### **Observational measures. *Etch-a-Sketch task (EaS; Ginsburg & Grover, 2009).***

During the EaS task, the child and parent dyad were seated next to each other, facing an examiner, with the parent seated to the examiner's left. The dyad was presented with an Etch-a-Sketch toy and told that they could each control only one of the toy's knobs (with the parent controlling only vertical functions and the child controlling only horizontal functions). The dyad was given a series of three designs and was instructed to copy the drawing onto the toy with high accuracy. The dyad was allowed a maximum of five minutes to copy each design, while the examiner stepped out of the room. Behaviors were only rated during the interval dedicated to copying the third, most difficult design.

Although previous research has demonstrated good reliability for the coding of parent behaviors ( $ICC = .61 - .88$ ; Ginsburg, Grover & Ialongo, 2005), to date no psychometric properties for child codes have been published. ICCs using codes from the present study are reported below.

**Interview task.** The Interview task refers to the portion of the diagnostic interview commencing when the clinician tells the parent to go to the waiting room to complete questionnaires, and ending five minutes after this separation, or after the child finishes answering the clinician's initial prompt "why do you think you are here today?", whichever comes first. Although the Interview task has not been previously investigated regarding child emotion regulation, this task was selected as a more 'naturalistic' task, given expectations that variability in child the inhibition, dysregulation and coping behavior would be present during this period.

**Informant reports. *Emotion regulation.*** *Children's Emotion Management Scales, Child and Parent Reports (CEMS; Zeman et al., 2001; Zeman, Cassano, Suveg & Shipman, 2010).* The CEMS is a 33-item scale asking children and their parents to report on the frequency with which the child engages in a range of emotion management strategies using a three-point Likert scale (ranging from 1 = never, 2 = sometimes, 3 = often). The measure consists of three emotional scales: sadness (12-items), worry (10-items), and anger (11-items). Each emotional scale contains three management subscales: inhibition (defined by the creators as emotional over-control, or suppression [Suveg & Zeman, 2004; J. Zeman, personal communication, September 9, 2013]; e.g., "I hold my sad feelings in"), emotion dysregulation (defined by the developers as the under-control of emotion expression, or culturally inappropriate displays of emotion [Suveg & Zeman, 2011; Suveg, Hoffman et al., 2009]; e.g., "I do things like slam doors when I am mad"; "My child attacks whatever it is that makes him/her very angry"), and coping (defined as appropriate control of emotions [J. Zeman, personal communication, September 9, 2013]; e.g., "I talk to someone to feel better when I'm worried."). The CEMS also provides

scores for total dysregulation, inhibition and coping scales, summing across emotional subscales. For optimal comparability, all subscales were calculated by taking the average of the relevant scores. Investigations of the child-report version of the CEMS have indicated good internal consistency ( $\alpha=.62-.77$ ) and test-retest reliability (ICCs=.61 to .80) for each scale (Zeman et al., 2001).

The parent-report version of the CEMS is identical to the child-report version, except that, rather than asking the parent to report on their own emotional management strategies, it references their child's strategies (i.e. "my child" replaces "I", "his/her" replaces "my", and "he/she" replaces "me"). Initial investigations of the parent-report of the CEMS have demonstrated good internal consistency ( $\alpha=.64-.81$ ; Hourigan et al., 2011). Internal consistency for the current sample was as follows: Self-Report CEMS (Inhibition  $\alpha= .917$ , Dysregulation  $\alpha= .832$ , Coping  $\alpha= .833$ ), Parent CEMS (Inhibition  $\alpha= .866$ , Dysregulation  $\alpha= .723$ , Coping  $\alpha= .798$ ).

***Anxiety symptoms.** Screen for Child Anxiety Related Emotional Disorders, Child and Parent-report (SCARED; Birmaher et al., 1997).* The SCARED is a 41-item measure designed to assess symptoms of anxiety in children. On the self-report form, the child is asked to read a series of phrases and indicate whether each item has been "not true or hardly ever true," "somewhat true or sometimes true" or "very true or often true" over the past three months. The SCARED is then scored on a 3-point Likert scale (0 = not true, 2 = very true) with a total score range of 0 – 82. The SCARED additionally contains 5 subscales: Panic, Generalized Anxiety, Separation Anxiety, Social Anxiety and School Avoidance. The SCARED has demonstrated strong validity for children ages 7-19 (Hale, Crocetti, Raaijmakers & Meeus, 2011). It has also demonstrated good internal



consistency ( $\alpha=.74$  to  $.93$ ), test-retest reliability (ICCs ranging from  $.70$  to  $.90$ ) and discriminant validity (Birmaher et al., 1997; Muris, Merckelbach, Van Brakel & Mayer, 1999). Initial investigations have also shown some support for the predictive validity of the Generalized Anxiety and Separation Anxiety subscales of the SCARED (Muris et al., 2001). Internal consistency for the self-report version of the SCARED with current sample was  $\alpha=.93$ .

The parent version of the SCARED includes the same items as the child version, simply replacing “you” with “your child” for each phrase. The SCARED parent-report form shows moderate agreement with child reports (Birmaher et al., 1999). Internal consistency for the parent-report version of the SCARED with current sample was  $\alpha=.91$ .

## **Procedure**

Approval for the current study was obtained from the Institutional Review Board (IRB) at the University of Miami. The current study includes data collected at a single time point, during an initial diagnostic evaluation lasting approximately four hours. Participants were recruited to the study via consecutive referrals from the community. Referrals to the specialty treatment clinic were facilitated via flyers placed in the community, a clinic website, referrals from local mental health and medical professionals, local presentations at schools, word of mouth from previous clients, and advertisements placed in online newsletters directed at parents. Families interested in receiving services or participating in research completed an initial phone screen with a clinic coordinator to assess the appropriateness of the referral. Those families who indicated concerns regarding anxiety or depressive disorders during this initial screen, and who did not report exclusionary criteria (e.g. history of psychiatric hospitalization,

low intellectual functioning, etc.), were then scheduled for an in-depth assessment with a doctoral student or post-doctoral level clinician, under the supervision of a clinical psychologist.

The procedure for the assessment was as follows: first the clinician introduced himself to the family and obtained written consent from the parent and child. The parent then separated from the child for the beginning of the child interview (the Interview task). Next, the clinician conducted a semi-structured clinical interview with the child, during which the parent completed a set of written questionnaires. Following this interview, the parent and child engaged in a frustrating task together (the EaS task). Finally, the clinician conducted the corresponding clinical interview with the parent while the child completed a set of written questionnaires. After the completion of this assessment, behavioral observational data were coded by graduate students and undergraduate research assistants at the University of Miami.

**Clinical interview.** The presence of anxiety disorders was determined through the administration of the ADIS-IV-C/P (Albano & Silverman, 1996). The ADIS-IV-C/P is a semi-structured, clinician-delivered, interview for children ages 6-17 that assesses the presence of anxiety and mood disorders, along with other common youth disorders (e.g. Oppositional Defiant Disorder) using DSM-IV criteria (American Psychiatric Association, 1994). The ADIS-IV-C/P also includes screening items for additional concerns (e.g. psychotic symptoms, eating disorders). The ADIS-IV-C/P has demonstrated excellent inter-rater reliability for principal and individual anxiety diagnoses ( $\kappa = .92; .80-1.0$  respectively; Lyneham, Abbott, & Rapee, 2007). Additionally, in a study using a clinical adolescent population ( $n = 51$ ) conducted at the

University of Miami, the ADIS-IV-C/P showed excellent inter-rater reliability for principal diagnoses ( $\kappa = .82$ ,  $p < 0.001$ ; Queen, Barlow & Ehrenreich-May, 2014).

**Coding.** The coding scheme employed in the current study was developed based on a scheme originally developed for rating both parent and child behaviors in the EaS paradigm (Ginsburg & Grover, 2009). The original coding scheme allows for the following behavioral codes for children: Overcontrol, Hostility/Negative Affect, Warmth/Positive Affect, Unresponsive/Off Task Behavior, Anxious Behavior, Self-Blame/Self-Criticism, Criticism/Blaming of the Parent, Problem Solving, Self-efficacy, and Noncompliant/Oppositional Behavior. For the purposes of the current study, codes were developed to assess youth inhibition, dysregulation, and coping. These codes were developed, in part, through email and phone conversations with one of creators of the similarly themed CEMS scales (J. Zeman, personal communications, July through September, 2013). Based on these communications, and in line with previous descriptions of the constructs (Zeman, et al., 2002), it was determined that the inhibition behavioral scale would capture indications of suppression, or emotional overcontrol (e.g. covering face, avoiding eye-contact, effortfully trying not to cry), dysregulation would capture emotional undercontrol (e.g. yelling, crying), and coping would capture appropriate control and positively dealing with emotions (e.g. smiling, laughing, verbal encouragement). The entire task was coded, unless the task exceeded five minutes, in which case only the first five minutes were coded. Frequency and intensity ratings for all three behaviors were given at one-minute intervals for five minutes total. Frequencies were tallied for each instance of the behavior that occurred within the prior minute. The intensity of behaviors observed during each one-minute interval was rated on a 5-point

Likert scale ranging from 0 (behavior was non-existent) to 4 (behavior was severe).

Intensity scores were calculated for each instance of a construct-related behavior. Minute intervals were rewatched as many times as necessary to gain confidence in the intensity scores for each behavior. A single intensity score for each minute was calculated by obtaining the average of all individual intensity scores for that minute. Additionally, raters assigned an overall rating for each scale at the end of the 5-minute task. Overall ratings were calculated in the same manner as minute intensity scores (e.g. the average of the codes for each minute). See Appendix A for a full copy of the coding scheme used in the current study, including example behaviors as well as coding instructions.

Two raters were trained on the coding scheme using the procedures outlined in the training manual by Ginsburg and Grover (2009). Specifically, raters first watched several non-protocol tapes in order to become familiar with the types of behaviors that are coded on the scale. Non-protocol tapes were tapes not included in the current analyses. These included training tapes provided by Ginsburg for coding the EaS task, and tapes from the present investigation that were otherwise ineligible for the current study (e.g. child was outside of target range, video for the other task was not available for that individual, etc). They then practiced rating tapes collaboratively, discussing discrepancies and convergence as they went. Finally, they rated tapes independently until they obtained 80% agreement with a gold-standard rater (the developer of the coding scheme) on the overall rating for all three scales. Approximately halfway through the coding, reliability was assessed. It was determined that one of the raters was demonstrating greater accuracy than the other (more than 40% of codes showing good inter-rater agreement as compared to 33% of codes). This more-accurate rater was then

assigned the remainder of the tapes, such that all tapes used in the current analyses were coded by this rater. To ensure accuracy, the gold-standard rater provided on-going training and consultation throughout the coding process. The gold-standard rater also coded 25% of all tapes.

**Coding Reliability.** Intraclass correlation analyses for the observational codes indicated a range in agreement across both codes and tasks. Some codes demonstrated poor agreement (Interview-Inhibition-Intensity ICC = .44, Interview-Dysregulation-Frequency ICC = .25, Interview Dysregulation-Intensity ICC = .16, Interview-Coping-Frequency ICC = .24, Interview-Coping-Intensity ICC = .33, EaS-Inhibition-Frequency = -.14, EaS-Inhibition-Intensity ICC = -.22, EaS Dysregulation-Intensity ICC = .33, and EaS-Coping-Frequency ICC = .48) and thus were dropped from further analyses. Further exploratory analyses were conducted to better understand the reasons for low agreement of several codes and will be discussed further below. However, several codes demonstrated adequate to good inter-rater agreement (Interview-Inhibition-Frequency ICC = .71, EaS-Dysregulation-Frequency ICC = .62, EaS-Coping-Intensity ICC = .81). Only codes demonstrating agreement above .60 were considered acceptable (e.g. Fleiss, 1981; Cicchetti & Sparrow, 1981), and thus other codes were not included in the main analyses.

Qualitative analyses were conducted to examine the low agreement among observational codes (see Table 1 for means and standard deviations for each code). Overall, slightly more EaS codes (two out of six possible codes) were reliable than codes from the Interview task (one of six), and slightly more frequency codes (two of six) were reliable than intensity codes (one of six). Frequency analyses of the codes for the

Interview task indicate that there was a much lower rate of both coping frequency and intensity scores than there were on the EaS task, with 37.2% of coping frequency and intensity scores on the Interview task being rated as zero, and 0% of corresponding scores on the EaS task being rated as zero. Similarly, there was a much lower rate of observed inhibition scores on the EaS task than on the Interview task, with 81.8% of inhibition frequency and intensity scores rated as zero on the EaS task, but only 16.3% of inhibition frequency and intensity scores rated as zero on the Interview task. Rates of endorsement for the dysregulation codes across the Interview and EaS tasks were more equivalent (11.4% and 9.3% of dysregulation inhibition frequency and intensity scores rated as zero on the EaS task and Interview tasks, respectively).

## CHAPTER 3: RESULTS

### Preliminary Analyses

**Missing Data.** Prior to conducting formal analyses, the database was examined for missing data. As this study includes partial data from an ongoing parent study, some participants were administered different questionnaires and tasks over time. For example, although parents were administered the CEMS since the beginning of recruitment, child-report CEMS questionnaires were not included in the battery until later in the investigation. Additionally, the EaS task was also introduced to the parent study at a later date. Given that this study investigates informant convergence and divergence, missing data was not imputed if a full measure (or a significant portion of a measure) was missing for an individual. Thus, participants were excluded *from relevant analyses* if data for a specific measure was unavailable, or if the participant failed to complete a significant portion of the measure (e.g. a full section of the CEMS or a page of the SCARED). As a result, some analyses have different sample sizes.

Comparison analyses revealed that individuals with complete data differed from those missing specific questionnaires in the following ways. Children who completed the CEMS ( $n=64$ ) were significantly older than children who did not complete the questionnaire ( $n=89$ ) ( $t(151)=-2.79, p<.01, d=.54$ ), and parents reported higher levels of anxiety symptoms for youth who completed the CEMS as compared to those who did not ( $t(133)=-3.48, p<.01, d=.60$ ). There were no differences in the severity of child-reported anxiety symptoms or clinician-reported principal diagnosis severity. Additionally, children who completed the SCARED ( $n=114$ ) had significantly higher clinician rated principal diagnosis severity than those who did not ( $n=39$ ) ( $t(145)=2.15, p<.05, d=.36$ ),

and were significantly older than children who did not ( $t(53.69)=-2.99, p<.01, d=.82$ ). There were no differences on the variables in question for individuals who completed the EaS or Interview tasks ( $n=40$ ), versus those who did not ( $n=113$ ). Similarly, no differences between groups were found for parent-report on the CEMS or the SCARED (parents who completed the CEMS = 144, parents who did not = 9; parents who completed the SCARED = 135, parents who did not = 18). These results suggest that, in general, children who completed the relevant child-report questionnaires were slightly older than those who did not, and may have been slightly more severe in terms of anxiety and related psychopathology than those who did not.

Missing items within existing measures were estimated by employing multiple imputation procedures using SPSS (Schafer & Graham, 2002). Pooled estimates are reported whenever they were provided. When pooled estimates were not provided by SPSS for a given statistic, the statistic was estimated from the available statistics from each imputation. For each instance, the pooled statistic was calculated by averaging the available statistics for each of the five imputations, unless otherwise specified (these statistics are denoted in tables by the following symbol: <sup>+</sup>). For most averaged statistics, the standard deviation of scores across imputations is reported in parentheses.

## **Main Analyses**

**Convergence and divergence. *Observational reports.*** Ratings on a single trait (inhibition, dysregulation, or coping) between methods (EaS task and Interview task) were anticipated to be significantly correlated. Pearson's  $r$  correlations were planned to examine the degree of convergence within and between methods on the relevant traits of the emotional subscales of: inhibition, coping and dysregulation. However, given that



none of the coded scales were reliable for both the Interview and EaS tasks, these analyses could not be conducted, and thus hypothesis 1a was not tested.

Ratings of dysregulation on the EaS task were predicted to be higher than ratings of dysregulation on the Interview task. Ratings of inhibition on the Interview task were predicted to be higher than ratings of inhibition on the EaS task. Paired-samples t-tests were planned to examine whether mean scores on the EaS task were significantly different than mean scores on the Interview task for the dysregulation and inhibition codes. Given that none of the coded scales were reliable for both the Interview and EaS tasks, these analyses could not be conducted and thus hypothesis 1b and 1c were not tested.

***Parent- and self-report.*** Pearson's  $r$  correlations were conducted to examine the degree of convergence between parent- and self-report on the relevant traits of: inhibition, coping and dysregulation (See Table 2). A Pearson's  $r$  correlation coefficient of .10-.20 indicates a small degree of association, correlations of .30-.50 indicate a medium sized association, and correlations greater than .50 indicate a high degree of association between variables (Cohen, 1992). Ratings of a single trait (inhibition, coping and dysregulation) between methods (self- and parent-report on the CEMS) were expected to be significantly correlated (hypothesis 2a). Partial support was found for this hypothesis.

Convergence in parent-child reports on the CEMS was observed for overall child dysregulation ( $r=.31, p<.05; n=60$ ), but not for child inhibition or coping. Among emotion subscales, convergence was observed for anger dysregulation ( $r=.34, p<.01$ ;

$n=60$ ) and worry dysregulation ( $r=.26, p<.05; n=60$ ), with an additional trend toward agreement on worry inhibition ( $r=.25, p=.059; n=60$ ). All other subscales were not significantly correlated.

Paired samples  $t$ -tests were conducted to examine differences between parent and child report of inhibition, dysregulation, and coping. Analyses employing Cohen's  $d$  were conducted to examine the effect size of the comparison. A Cohen's  $d$  score below .21 indicates a small effect, scores of .30-.50 indicate a medium effect, and scores greater than .50 indicate a large effect (Cohen, 1988). Hypothesis 2b held that children would report higher levels of emotional inhibition than parents. Additionally, parents were anticipated to report higher levels child emotion dysregulation than children. Results supported this hypothesis.

Children reported higher levels of inhibition than did their parents ( $t(59)=-4.55, p<.001, d= -.75(SD=.001); n=60$ ), parents reported higher levels of dysregulation than did children ( $t(59)=4.36, p<.001, d=.66(SD=.01); n=60$ ) and children reported higher levels of coping than did their parents ( $t(59)=-6.31, p<.001, d= -1.10(SD=.01); n=60$ ).

Additional paired-sample  $t$ -tests were conducted for each of emotional subscale scores (anger, sadness, and worry). Given that a total of twelve  $t$ -tests were conducted, a Bonferroni correction was implemented. Results demonstrated that all of the comparisons were significantly different at the  $p <.0042 (.05/12 =.0042)$  level except parent- and child-report of sadness dysregulation. See Table 3 for group means,  $t$  statistics, and effect-size estimations. These results indicate that parents and children demonstrated

significantly different reports on the total inhibition, total dysregulation and total coping scales (all with large effect sizes).

***Informant and observational reports.*** Exploratory analyses were conducted to examine the degree of convergence across observational and informant reports of emotion regulation. Hypothesis 3 indicated that self- and parent-ratings of emotional inhibition, dysregulation, and coping would demonstrate some convergence with observational ratings of inhibition, dysregulation and coping (respectively) on observational tasks. Limited support was found for this hypothesis.

To assess convergence on the relevant traits of: inhibition, dysregulation and coping across observer and informant reports, Pearson  $r$  correlations were conducted. In contrast to hypothesis 3, correlational analyses revealed that there was no significant correlation between observer-rated inhibition frequency on the Interview task and parent, or child-report of inhibition. Further, no significant correlation between observer-rated dysregulation frequency on the EaS task and parent, or child-report of dysregulation was found. Finally, no significant correlation between observer rated coping intensity on the Etch-a-Sketch task and parent or child-report of coping was found.

Initially, canonical correlations were planned to examine shared variance across parent/child-report and observations on two tasks. However, given that only one variable for each observational code (Interview-Inhibition-Frequency, EaS-Dysregulation-Frequency, and EaS-Coping-Intensity) was shown to be reliable, multiple regression analyses were conducted instead (Sherry & Henson, 2005). Parent- and child-report scores on the relevant CEMS subscale were entered in the regression as the independent

variables, while the observer reports were entered as the dependent variable for each analysis.

*Inhibition.* A multiple regression analysis was conducted to examine the association between parent- and child-reported inhibition on the CEMS questionnaires and the observer scores of inhibition frequency on the Interview task. In contrast to hypothesis 3, the overall model was not significant for examining the relationship between parent- and child-reported inhibition, and observer rated inhibition frequency on the Interview task.

*Dysregulation.* A multiple regression analysis was conducted to examine the association between parent- and child-reported dysregulation on the CEMS questionnaires and the observer scores of dysregulation frequency on the EaS task. The data was observed to be positively skewed. An inverse transformation was performed on the child-report of dysregulation; this transformation resulted in a linear relationship. Additionally, an outlier was detected (student deleted residual more than three standard deviations from the mean). This case was initially kept in the model. The model was not significant for either youth or parent-report being associated with observer report. The outlier was subsequently removed from the analysis, and the multiple regression was re-run. After removing this case, the regression was significant, indicating that parent- and child-report of dysregulation was associated with observer ratings of child dysregulation on the Etch-a-Sketch task, ( $F(2,26) = 4.34$  ( $SD=.510$ ),  $p < .05$  ( $SD=.010$ ), adj.  $R^2=.192$  ( $SD=.024$ );  $n=30$ ). Only child-report of dysregulation added statistically significantly to the prediction, ( $\beta=.55$  ( $SD=.025$ ),  $p < .05$ ). In support of hypothesis 3, higher self-reported

dysregulation was associated with higher observer reports of dysregulation frequency on the EaS task. Regression coefficients and standard errors can be found in Table 4.

*Coping.* A multiple regression analysis was conducted to examine the association between parent- and child-reported dysregulation on the CEMS questionnaires and the observer scores of dysregulation frequency on the EaS task. In contrast to hypothesis 3, the model was not significant, indicating that parent- and child-report of coping was not significantly associated with observer reports of youth coping intensity on the EaS task.

*Informant perspectives.* Multiple regression analyses were conducted to examine whether age and/or child psychopathology predicted discrepancies between parent and child report on the CEMS. In line with previous research, a discrepancy score was calculated for the relevant scales (parent-report scale score minus child self-report scale score; Hourigan et al., 2011). Age and child psychopathology (clinician report of total clinical severity, parent- and self-report SCARED Total scores) were entered as independent variables. The relevant discrepancy score (inhibition, dysregulation, or coping) was entered as the dependent variable for these regression analyses. Hypothesis 2b stated that age and psychopathology would be significant predictors of the discrepancies between reporters. Limited support was found for this hypothesis.

*Inhibition discrepancy.* A multiple regression analysis was conducted to examine the association between age, child psychopathology, and the discrepancy in parent- and child-report of inhibition. In contrast with previous research (Hourigan et al., 2011) and hypothesis 2b, the independent variables were not found to be significant predictors of the discrepancy.

*Dysregulation discrepancy.* A multiple regression analysis was conducted to examine the association between age, child psychopathology, and the discrepancy in parent -and child-report of dysregulation. Assumptions of linearity, independence of errors, homoscedasticity, normality of residuals were generally met; however, there was a single outlier detected (standardized residual and student deleted residual greater than 3 standard deviations from the mean), but upon further analysis, all the data appeared to be correctly entered for that individual, thus the outlier was initially not removed for the analyses. The overall model was not significant for examining the relationship between youth age, psychopathology, and the discrepancy in parent and child reported dysregulation. The regression was re-run with the omission of the identified outlier. After removing this case, the regression was significant, providing partial support for hypothesis 2b ( $F(3,50) = 3.87$  (SD = .21),  $p < .05$  (SD = .003), adj.  $R^2 = .140$  (SD = .009);  $n=54$ ). Inspection of the model revealed that only child-report of total anxiety added significantly to the prediction ( $\beta = -.45$  (SD = .007),  $p < .05$ ). Higher youth reported anxiety severity was associated with smaller discrepancies in parent and child-report of youth dysregulation. Regression coefficients and standard errors can be found in Table 4. Follow-up correlational analyses revealed that higher levels of youth-reported anxiety severity were associated with higher levels of youth reported dysregulation ( $r = .34$ ,  $p < .01$ ;  $n=60$ ). No significant correlation was found between youth-reported anxiety and parent-report of dysregulation.

*Coping discrepancy.* A multiple regression analysis was conducted to examine the association between age, child psychopathology, and the discrepancy in parent- and

child-report of coping. In contrast with hypothesis 2b, the independent variables were not found to be significant predictors of the discrepancy.

**Emotion regulation and youth anxiety.** Canonical correlation analyses were conducted to examine the shared variance among different measurements of emotion regulation (criterion variables) and youth anxiety (predictor variables). Canonical correlations allow for the examination of the association between variable sets such that convergence and divergence between the sets of variables may be investigated (Weiss, 1972). Aim 2 hypotheses suggested that elevated emotional inhibition (hypothesis 4) and emotional dysregulation (hypothesis 5) and low emotion coping (hypothesis 6) would be associated with anxiety. Partial support was found for these hypotheses.

***Inhibition.*** A canonical correlation analysis was conducted to examine the shared variance among three inhibition measures (criterion variables) and parent- and child-reported total anxiety scores (predictor variables). The analysis resulted in two successive functions. In contrast to previous research (e.g. Zeman et al., 2002) and hypothesis 4, the full model across functions was not significant (Wilks's  $\lambda=.66$  criterion, (SD=.01),  $F(6, 44)= 1.68$  (SD=.07),  $p = ns$ ;  $n= 27$ ), indicating that the measures of youth inhibition were not significantly related to measures of youth anxiety. Thus, the model was not further examined.

Given that this analysis may have been limited by the small sample available, follow-up correlational analyses were conducted to examine the relationship between individual variable pairs. Pearson's  $r$  correlations revealed that only one of the six planned analyses was significant. Specifically, there was a significant correlation of a

small magnitude between parent-reported child inhibition and child-reported anxiety ( $r=.19, p<.05; n=109$ ) indicating that, in partial support of hypothesis 4, higher parent-reported inhibition was associated with higher youth reports of anxiety. There were no significant correlations between observer coded inhibition frequency and parent- or child-reported anxiety, parent-reported inhibition and parent-reported anxiety, child-reported inhibition and parent- or child-reported anxiety. See Table 5 for the correlation matrix.

***Dysregulation.*** A canonical correlation analysis was conducted to examine the shared variance among three dysregulation measures and parent- and child-reported total anxiety scores. In support of previous research (e.g. McLaughlin et al., 2011; Suveg & Zeman, 2004) and hypothesis 5, the analysis resulted in a significant multivariate relationship between informant ratings of youth dysregulation and informant ratings of youth anxiety (Wilks's  $\lambda = .56$  criterion, (SD=.01),  $F(6, 44) = 2.51$  (SD=.04),  $p < .05$  (SD=.003);  $n=27$ ). However, only the first of two functions was statistically significant ( $R_c = .61, p < .05$ ) thus it is the only function that will be subsequently reviewed here. Wilks's  $\lambda$  estimates the variance that is not explained by the model. Thus, model effect size was estimated using the formula  $1-\lambda$ , yielding an  $r^2$  of .45, indicating that the full model accounts for 45% of the shared variance between the multimethod assessment of dysregulation and reports of anxiety. The first function has a squared canonical correlation coefficient ( $R_c^2$ ) of .367, indicating that it alone accounts for 36.7% of the shared variance.

An examination of structure coefficients indicates that, among the dysregulation variables, the EaS dysregulation code ( $r_s = .68$  (SD=.01)) and parent-report of child dysregulation ( $r_s = .70$  (SD=.01)) had the strongest weights. The squared structure



coefficients indicate the proportion of variance that each variable contributed from the observed variables to creating the canonical variate (45.8% and 49.1%, respectively). The child-reported dysregulation structure coefficient value ( $r_s = -.21$  ( $SD = .03$ )) was both negative and small, indicating that child-report of dysregulation was inversely related to parent-report and observational codes, and that it contributed only a small amount to the canonical variate.

Among the youth anxiety variables, the parent-report of total youth anxiety scores ( $r_s = .90$  ( $SD = .02$ )) was the primary contributing variable within the model. It was positively related to parent- and observer-report of youth dysregulation, and negatively related to child-report of dysregulation. The large squared structure coefficient indicates that parent-report of youth anxiety contributed 80.6% of the variance to the canonical variate. The child-report of youth anxiety had a smaller and negative structure coefficient ( $r = -.13$  ( $SD = .04$ )), again indicating a smaller contribution to the model, with an inverse relationship to the parent report. Table 6 displays the loadings for each variable within the variate pairs.

**Coping.** A canonical correlation analysis was conducted to examine the shared variance among the three coping measures (criterion variables) and parent- and child-reported total anxiety scores (predictor variables). The analysis resulted in two successive functions. In contrast to previous research (e.g. Zeman et al., 2002; Suveg & Zeman, 2004) and hypothesis 6, the full model across functions was not significant (Wilks's  $\lambda = .67$  criterion ( $SD = .01$ ),  $F(6,42) = 1.55$  ( $SD = .05$ ),  $p = ns$ ;  $n = 26$ ), indicating that the measures of youth inhibition were not significantly related to measures of youth anxiety. Thus, the model was not further examined.

Given that this analysis may have been limited by the small sample available, follow-up correlational analyses were again conducted to examine the relationship between individual variable pairs. Pearson's  $r$  correlations revealed that only one of the six planned analyses was significant. Specifically, there was a significant small negative correlation between parent-reported child coping and parent-reported anxiety ( $r = -.18$ ,  $p < .05$ ;  $n = 133$ ). This indicates that, in partial support of hypothesis 6, parent-reported child coping had a small inverse association with parent-reported anxiety. There were no significant correlations between observer coded coping intensity and parent- or child-reported anxiety, parent-reported coping and child-reported anxiety, child-reported coping and parent- or child-reported anxiety. See Table 7 for the correlation matrix.

***Overall emotion regulation.*** Finally, an inclusive canonical correlation analysis was conducted to examine the shared variance between youth emotion regulation (inhibition, dysregulation and coping) across methods (child-report, parent-report, and observer-report) and youth anxiety.

In support of aim 2 hypotheses, the analysis resulted in a significant multivariate relationship between informant ratings of youth emotion regulation and informant ratings of youth anxiety (Wilks's  $\lambda = .18$  criterion, (SD=.01),  $F(18,30) = 2.22$  (SD=.09),  $p < .05$  (SD = .01):  $n = 26$ ). However, only the first of two functions was statistically significant ( $R_c = .80$ ,  $p < .05$ ), thus it is the only function that will be presented. Model effect size was estimated using the formula  $1 - \lambda$ , yielding an  $r^2$  of .816 (SD=.01), indicating that the full model accounts for 81.6% of the shared variance between the multimethod assessment of emotion regulation and reports of anxiety. The first function

has an  $R^2_c$  of .641 ( $SD=.02$ ), indicating that it alone accounts for 64.1% of the variance between the canonical variate pair.

An examination of structure coefficients indicates that the emotion regulation variables that contributed the most to the canonical variate were: parent-reported inhibition ( $r_s=.54$ , ( $SD=.01$ )), child-reported coping ( $r_s=-.49$ , ( $SD=.02$ )), and child-reported inhibition ( $r_s=-.45$ , ( $SD=.01$ )). The squared structure coefficients indicate the proportion of variance that each variable contributed to the canonical variate (28.8%, 24.4%, and 20.5%, respectively). The negative structure coefficient values for child-reported coping and inhibition indicate that these scales were inversely related to parent-reported inhibition and the other criterion variables with positively valenced structure coefficients (e.g. lower child-reported coping was associated with higher levels of parent-reported inhibition, etc). Finally several variables had smaller structure coefficient values, indicating that they made smaller contributions to the emotion regulation variate (child-reported dysregulation, parent-reported dysregulation, EaS coping intensity, Interview inhibition frequency, parent-reported coping, and EaS Dysregulation Frequency).

Among the youth anxiety variables, parent-report of total youth anxiety scores ( $r_s=.98$  ( $SD=.01$ )) was the primary contributing variable within the model. However, child-reported anxiety ( $r_s=.52$  ( $SD=.067$ )) was also a significant contributor to the model. Both predictor variables were positively related to parent-reported inhibition, and negatively related to child-reported coping and child-reported inhibition. (Table 7 displays the loadings for each emotion regulation variable within the variate pairs.) The large squared structure coefficients indicate that they contributed 95.8% and 27.6% to the model, respectively. However, an analysis of the sum of the squared structure coefficients

(>100%) indicates multicollinearity between parent and youth reports of anxiety ( $r = .215, p < .05$ ), suggesting that some of these coefficients may not be the best estimates of the unique contributions to the model. A canonical commonality analysis was conducted to examine the unique and common contributions of the emotion regulation and youth anxiety variables to each canonical variate.

A canonical commonality analysis partitions the variance of each variable's unique contribution to the canonical variate, along with the common contribution of multiple variables to the canonical variate (Stellefson, Yannessa & Martel, 2012; Nimon, Henson & Gates, 2010). Results of the commonality analysis indicated that the ER variate was predominately explained by unique variance from the criterion variables. Specifically, parent-reported inhibition uniquely explained approximately 54% of the effect, observer ratings of coping intensity uniquely explained approximately 10% of the effect, child-reported coping uniquely explained approximately 9.4% of the effect, and observer ratings of dysregulation uniquely explained 6.7% of the effect (See Table 9 for unique contributions for each variable and the sum of all common contributions). The variance common to both child-reported inhibition and child-reported coping explained approximately 16.4% of the effect, thus child-reported inhibition only uniquely accounted for 2.9% of the effect. Among the predictor variables, child-reported anxiety uniquely explained 71.7% of the effect, parent-reported anxiety uniquely accounted for 10.7% variance to the anxiety variable, and variance common to both parent- and child-reported anxiety explained the remaining 17.6% of the effect.

## CHAPTER 4: DISCUSSION

### **Summary**

The first aim of this study was to examine the convergence and divergence across a multimethod measurement of emotion regulation in youth. This multimethod assessment included parent- and self-report of the child's general emotion management strategies, as well as observer-report of the child's emotion management strategies during specific tasks. It was hypothesized that there would be evidence observed of both convergence across reports, as well as divergence. Analyses provided minimal support for convergence across methods, with results demonstrating moderate convergence for parent- and child-report of youth dysregulation primarily. Additionally, some convergence was found when examining the relationship between observer and informant reports of dysregulation, with youth reported dysregulation being associated with observer-report of dysregulation on the Etch-A-Sketch task. No other areas of convergence were identified. Stronger support was found for divergence across reporters, with significant differences in parent- and self-reported inhibition, dysregulation, and coping found. Analyses examining divergence across informant and observer reports of inhibition and coping also had strong support.

The second aim of this study was to examine the relationship between reports of emotion regulation and reported youth anxiety. It was hypothesized that youth inhibition, dysregulation, and coping across reporters would be associated with parent- and youth-reported anxiety. Initially, the strongest support for this hypothesis was found within the domain of dysregulation, indicating that reports of youth dysregulation were significantly associated with reports of youth anxiety. Less initial support was found for the

relationship between youth inhibition and anxiety and the relationship between youth coping and anxiety. However, a follow-up omnibus analysis found a strong relationship between overall youth emotion regulation and youth anxiety, with parent-reported inhibition accounting for a large percentage of this effect.

### **Multimethod Assessment**

The current study examined the degree to which different reporters, across different contexts converged in their reporting of youth emotion management styles. Importantly, this study does not investigate the construct validity of emotion regulation per se. Examinations of a multi-informant and multimethod assessment of emotion regulation are rather an opportunity to examine whether different measurements provide convergent or divergent reports of types of emotion regulation. The current study yields insight into how different reporters view and report on emotion regulation, but does not yield insight into whether emotion regulation is a robust construct that is distinct from other emotional constructs. Results from this study demonstrated high divergence across reporters, with evidence for convergence limited to the construct of dysregulation. Factors associated with the observed pattern of convergence and divergence are discussed below.

**Convergence.** Although there is relatively little research on informant discrepancies within the field of emotion regulation, there is a complex and detailed literature on informant discrepancies within the field of youth mental health (e.g. Achenbach, McConaughy & Howell, 1987; Achenbach, 2011; De Los Reyes et al., 2015). This research, spanning more than half a century (e.g. Lapouse & Monk, 1958) has reliably found discrepancies between informant reports of youth mental health

(Achenbach et al., 1987; De Los Reyes et al., 2015). Patterns of discrepancies have been consistent over time as well, with observable symptoms demonstrating higher levels of convergence across reporters than covert behaviors and symptoms (Achenbach, 2011; De Los Reyes et al., 2015).

Although the current study did not investigate informant discrepancies within the domain of youth mental health per se, the findings that youth, parents, and observers demonstrated higher convergence on measures of dysregulation than on other measures may reflect the fact that dysregulation of emotions is a more observable construct than the inhibition or coping scales denote. Indeed, items from the dysregulation scale include: “I [my child] do [does] things like slam doors when I am [he/she is] mad” or “I keep [my child keeps] whining about how worried I am [he/she is].” This emotion management style is characterized by external behaviors indicating under controlled emotion. These behaviors are likely to be apparent to informants such as a parent, teacher, or clinician. Unlike items on the inhibition or coping scales which may require an observer to make inferences about the child’s internal state (e.g. “I get sad inside but I don’t show it [My child hides his/her sadness].”; “I try to [my child tries to] calmly deal with what is making me feel [him/her] mad.”), the assessment of dysregulation only requires observation and reporting on an external state. Results from this study support mental health research demonstrating that reporters demonstrate higher convergence when reporting on observable, external behaviors (e.g. De Los Reyes et al., 2015; Achenbach, 2011).

Additionally, these results support the very limited research on informant discrepancies within the emotion regulation literature (e.g. Siener & Kerns, 2012;

Hourigan et al., 2011; Kerns et al., 2014). Hourigan and colleagues (2011) found that the only subscale that demonstrated significant convergence across parent- and youth-report of emotion management was worry dysregulation. Anger, sadness, and worry inhibition, and anger and sadness dysregulation were not significantly correlated across reporters. Similarly, in an examination of parent- and youth-report of youth emotion expression, Kerns and colleagues (2014) found that parents and children demonstrated moderate agreement on a scale assessing informant observations of expressive behavior, but low agreement on youth emotional awareness, a scale that is less tied to behavioral manifestations of emotion, and instead requires reporters to make inferences about the individual's internal awareness of emotions.

**Divergence.** The natural flipside to the literature demonstrating higher convergence across reports of observable behaviors is that more covert processes tend to demonstrate poorer convergence (De Los Reyes et al., 2015). Across decades of research, reports of internalizing symptoms – which, by definition, are more covert and internal – demonstrate poorer convergence than externalizing symptoms (Achenbach, 2011). Similarly, within the present study, reports of internalized emotion management styles (inhibition and coping) demonstrated divergence across reporters. Emotion inhibition, or suppression of emotional expression (Suveg & Zeman, 2004), by definition, does not manifest as observable behavior, thereby limiting an informant's ability to report on the construct. Similarly, emotion coping, defined as the appropriate control of emotions (J. Zeman, personal communication, September 9, 2013), also likely requires the informant to make inferences about the child's internal experience and motivations. Thus, the lack of inherent observability of the inhibition and coping scales may explain the low levels of



convergence across reporters on these scales relative to the more observable dysregulation scales.

**Informant perspectives.** In addition to examining when informants agree or disagree on measures of youth regulation, it is worth examining factors that moderate the level of convergence across measures. In line with findings by Hourigan and colleagues (2011), the current results demonstrate that parents report higher levels of emotion dysregulation, and lower levels of inhibition and coping than do children. Among other interpretations, these discrepancies may reflect informant perspective and context (De Los Reyes & Kazdin, 2005).

**Attributional biases.** The discrepancy across informants on youth dysregulation may be considered within an informant attributional framework. From an actor-observer attributional bias perspective, we might expect children to attribute their behaviors to contextual triggers rather than internal emotional states (Jones & Nisbett, 1987). Within this framework, parents are more likely to attribute a child's negative behavior to the child, as compared to children who are more likely to attribute the same behavior to the context (De Los Reyes & Kazdin, 2005). This is consistent with research among clinical samples demonstrating that parents tend to report higher levels of externalizing symptoms than children (e.g. Waters, Stewart-Brown & Fitzpatrick, 2003). Similarly, dysregulated behaviors (e.g. "I do things like cry and carry on...") may be considered as responses to external events rather than more clearly internal emotional triggers ("...when I'm worried"). Thus, when children and parents have access to the same behaviors, they may attribute them to different triggers, resulting, as seen in the present study, in parents reporting higher levels of dysregulated behaviors than children.

Alternatively, when assessing internal constructs, such as coping and inhibition, the opposite trend is found; in the present study, children reported higher levels of coping and inhibition than did parents. As children have more access to their internal states than do their parents or other observers, they are better equipped to report on internal regulation strategies (De Los Reyes et al., 2015). Conversely, in the absence of having sufficient data to analyze youth inhibition, parents may underestimate their child's use of this strategy. For example, a parent may see a child responding calmly to a situation, but in the absence of knowledge that the child is anxious or worried, they may be unlikely to infer a coping reaction. Thus, rather than making inferences about inhibition and coping, informants may not report on covert processes to which they do not have access (Comer & Kendall, 2004).

***Youth psychopathology.*** In addition to study findings that parents reported higher levels of dysregulation and lower levels of coping and inhibition relative to children, youth reports of anxiety were associated with the discrepancy between parent- and child-reports of dysregulation such that higher levels of child anxiety were associated with higher levels of youth reported dysregulation, and thus smaller discrepancies between parent- and child-report of dysregulation. This suggests that youth who consider themselves to be more anxious also consider themselves to have higher levels of dysregulated behavior. This finding is consistent with research demonstrating that self-reported internalizing symptoms are associated with higher levels of youth-reported sadness dysregulation (Hourigan et al., 2011). It is possible that, as children experience greater emotional distress, they may be more able or willing to attribute their behaviors to internal emotional triggers, and thus may rate themselves as implementing more

dysregulated emotional management, bringing their report closer to the perspective provided via parent's report.

**Implications.** Ultimately, these results suggest that parents, youth, and observers typically do not demonstrate high levels of convergence on ratings of youth emotion management. Initially, it may be tempting to assume that this level of divergence is indicative of study limitations or measurement error. Indeed, much of the informant discrepancy literature notes that when discrepancies are observed, they are typically considered to be a nuisance, or reflective of error in measurement (De Los Reyes et al., 2015). While measurement error likely plays a role (see Limitations below for a discussion of possible measurement error related to the observational coding system), there are many additional interpretations that shed light on the discrepancies observed within this study. Specifically, we have highlighted the potential roles of behavioral context (with observability of behaviors demonstrating higher convergence than covert behaviors), and informant perspective (with attributional biases and youth psychopathology possibly informing discrepancies).

Ultimately these two variables, context and informant perspective, play a major role in our interpretation of discrepant findings across informant. Indeed, these variables are the foundation for the recommendation of multi-informant research within developmental psychology; it is assumed that different informants across different contexts will have access to different information about a target construct, such as youth psychopathology or emotion regulation, and thus, multi-informant reports are required in order to access different information about the construct of interest (De Los Reyes et al.,

2015; Adrian et al., 2011). Thus, although it may appear problematic for results to provide discrepant reports on a construct, it is ultimately both expected and illuminating.

This may be especially true for a construct like emotion regulation. By definition, emotion regulation is a complex, dynamic process that is determined by multiple systems (Adrian et al., 2011). Thus, measurement of this construct will necessarily reveal dynamic and variable manifestations across context, informant, and time. The question in emotion regulation measurement may be less about when measures converge, and more about what incremental validity different measurements of emotion regulation may provide. Results from the current study indicate that clinically anxious youth may provide higher levels of insight into internal emotion management styles, and observers may provide more information about externalized emotion management. A more complex consideration of the incremental validity of different assessments of emotion regulation emerges upon asking more specific questions about the utility of each report within the context of youth anxiety.

### **Emotion Regulation and Youth Anxiety**

Previous work has demonstrated a relationship between emotion regulation and youth anxiety (e.g. Trost & Ehrenreich May, 2011; Suveg & Zeman, 2004). The current study builds upon this work by examining the unique contributions of specific emotional management styles and specific methods in the relationship between youth emotion regulation and anxiety among a clinical sample.

Results further support the complex and multi-determined nature of emotion regulation, as measures of emotion regulation were differentially associated with

informant-reports of youth anxiety. Specifically, parent- and observer-report of dysregulation were associated with parent- and youth-report of youth anxiety; however, a more complex picture emerged when considering the entire emotion regulation battery and its relationship to youth anxiety. Rather than dysregulation providing the strongest predictor, it was parent-reported inhibition that was most strongly related to both parent- and child-reports of youth anxiety, with child-reported anxiety contributing most strongly to this association. These results suggest that, although parents tend to report lower levels of inhibition than do children (e.g. Hourigan et al., 2011), when they do report it, it is strongly associated with child-reports of anxiety.

These results shed additional light on the finding from the present study that youth-reported anxiety was associated with higher levels of youth-reported dysregulation. From an attributional bias perspective, perhaps when youth are anxious they may make externalized attributions (e.g. perceive themselves as experiencing higher levels of dysregulated emotions), while their parents make more internal attributions (e.g. perceive them as engaging in higher levels of inhibition). Alternatively, prior research suggests that *youth-reported* inhibition is a strong predictor of youth depressive symptoms (Keenan et al., 2009). Although it was outside of the scope of the current study, this finding suggests that further research might examine whether elevated reports of youth inhibition by different reporters reliably differentiate between anxious and depressive symptoms in youth.

These results provide support for a more nuanced conceptualization of the relationship between youth emotion regulation and youth internalizing symptoms that depend as much on the type of informant (e.g. parent, youth, or observer) as it does on

the method of regulation (e.g. inhibition, dysregulation or coping). Ultimately, these results suggest that different reporters and methods provide unique contributions to the conceptualization of emotion regulation, and are not simply redundant measurements of the same phenomena. This is not to say that these reports do not contribute to an assessment of a larger construct of emotion regulation, but rather these reports support a conceptualization of emotion regulation as dynamic and multi-determined. Rather than this conceptualization clouding and confusing emotion regulation as a construct, this nuanced definition can actually inform an understanding of how the construct can best be assessed and results can be interpreted depending on the question that is being asked.

In a conclusion to a special section on the assessment of emotion in youth, Thompson (2011a) likened the assessment of emotion to the Indian parable of the Blind Men and an Elephant. He states “if our metaphor is of blind men touching different parts of an elephant, we must recognize that one blind man has an infrared monitor, another has a tape recorder, and a third is interviewing others about the elephant” (Thompson, 2011a, pg. 284). This metaphor provides an apt conceptual framework for understanding not only the process of conducting multimethod assessment of emotion regulation, but also examining and making sense of convergence and divergence across reporters.

Consider emotion regulation as the large elephant that is made up of different components (e.g. ears, legs, trunk, body, tail) that fit together and in many ways work in concert, but also move and act independently. Different blind men examining different portions of the elephant (analogous to assessments of dysregulation, inhibition and coping) may initially determine that the parts are unique and unrelated to one another. Now, imagine that you have three men examining each part of the elephant in different

ways, using the infrared monitor, tape recorder, and interview (analogous to parent-, youth-, and observer-reports), the results become even more confusing and discrepant. However, just because the three men examining the movement, sound and report of the elephant's trunk do not cohere to each other, or to another group's assessment of the tail does not mean that they are not assessing the same construct. Rather, the unique assessments provide additional information about the nature of the whole elephant, and potentially, in what contexts the elephant, and assessments of particular components of the elephant, may be useful.

At the moment we do not have a single tool that allows us to examine all components of all manifestations of emotion regulation; however, we do have tools that allow us to examine some of these components independently. The current study examined several manifestations of emotion regulation using several different methods, and found high levels of convergence within the assessment of dysregulation, and low levels of convergence among assessments of inhibition and coping. However, this study did not examine the entire "elephant"; assessments of physiological, cognitive, neural manifestations would likely yield additional, different, and incrementally valid outcomes. Results help to understand what different components of emotion regulation contribute to the specific context of youth anxiety. This might be similar to understanding how an elephant uses its trunk and tail when drinking water; the tail may have less of a role than the trunk for this task; however, this does not mean that the tail is of no use outside of this context. Similarly, while parent-report of youth inhibition may be very important for understanding the role of emotion regulation in youth anxiety at a single time point, another component, or report of emotion regulation may be critical for understanding

change in youth anxiety over time, or the relationship between emotion regulation and assertiveness, avoidance, or depression (e.g. Keenan et al., 2009).

This study contributes to the literature by providing initial evidence for the role of specific measures of youth emotion regulation in youth anxiety, but more importantly speaks to the possibility of better understanding the specific components and measurements of youth emotion regulation that might be particularly relevant in different contexts, such as over the course of treatment.

**Implications.** Although estimates vary, research suggests that as many as 40% of children with anxiety disorders do not experience optimal treatment response to the most effective psychosocial treatment options for these disorders, such as cognitive behavioral therapy (Walkup et al., 2008). One potential avenue for improving treatment response is to examine key mechanisms underlying symptoms of anxiety (Suveg, Sood et al., 2009; Zeman, Cassano, Perry-Parrish & Stegall, 2006). By investigating underlying mechanisms and risk factors for anxiety, such as emotion regulation, researchers may be better able to understand the role emotion regulation plays in the maintenance of emotional disorder symptoms and how it could potentially be targeted to individualize treatment and improve response (Hannesdóttir & Ollendick, 2007; Southam-Gerow & Kendall, 2002; Trosper, Buzzella, Bennett & Ehrenreich, 2009). In other words, understanding emotional vulnerabilities could help researchers personalize treatment for youth anxiety.

The current study built on previous research to demonstrate the relationship between informant discrepancies, as well as specific components of emotion regulation



and anxiety symptom severity within a clinical sample of anxious youth. Future research should investigate whether specific regulatory deficits are associated with treatment outcome. The identification of emotion related treatment risk factors could inform targets for treatment optimization (e.g. Southam-Gerow & Kendall, 2002). For instance, if individuals with low levels of child-reported coping demonstrate less favorable treatment response to typical cognitive behavioral therapy for anxiety, developers might consider incorporating enhanced coping training for at-risk individuals. There is initial evidence that emotion regulation, as evidenced by specific neural activation profiles during an emotional task, may be predictive of treatment response in anxious youth (Hum et al., 2013a). Future research should confirm this work and also examine whether additional regulatory deficits are associated with treatment non-responder status.

Additionally, there is some evidence that discrepant reports of psychopathology predict worse treatment outcome among those with treatment-resistant depression (Rane et al., 2010). If specific emotion regulation discrepancy patterns also predict treatment outcomes with anxious youth, future research might investigate whether targeting discrepancy moderators, such as attributional biases, could improve treatment response. Thus, by examining components of emotion regulation and their associations with psychopathology as well as treatment outcome, algorithms could potentially be devised to provide personalized treatment recommendations based on observed risk factors. The current study provides a foundation indicating the association of a number of emotional deficits with youth anxiety, and provides a rationale for pursuing future research in this area.

## Limitations

**Sample size.** There were several limitations associated with the current study. Most notably, the study suffered from a small sample size. The study overall suffered from low power, which may have impacted the results. Replications with larger samples are warranted. Additionally, sample sizes differed across analyses. Given that data collection was completed over a number of years, different measures had different sample sizes. The observational codes suffered the most from small samples, as the EaS task was added to the assessment protocol at a later date. Analyses indicated that younger and possibly less severe children were less likely to complete their questionnaires. However, no differences between groups were found for those who did and did not have parent reports or observer reports. These results suggest that analyses that include child-report data may reflect a slightly older and more severe population. Given the interest in examining a clinically anxious population, the heightened severity is less concerning within the present study.

Additionally, the fact that younger children had more difficulty completing questionnaires is a barrier to youth assessment in general. Indeed, in their review of developmental psychology assessment, Morris and colleagues (2006) state “age is an obvious concern because most children under age 8 have difficulty completing paper-and-pencil measures” (Morris et al., 2006, page 372). This limitation of self-report in all youth samples provides further rationale for including a multi-informant multimethod assessment of emotion regulation in youth samples.

**Coding scheme.** The CEMS observational coding scheme was developed for this study and had not been previously examined. While several scales proved to be robust,

others demonstrated low inter-rater reliability. The CEMS coding scheme is somewhat distinct from other schemes examining emotion regulation. In general, observational tasks within the emotion regulation literature focus on younger participants (Adrian et al., 2011). Those coding schemes, along with others that include older children or even adult participants, tend to include more objective correlates of emotion regulation – such as the expression of positive affect, or the use of a specific emotion regulation strategy (e.g. problem-solving; Suveg et al., 2008; Blanchard-Fields, Stein & Watson, 2004). Indeed, the scheme on which the CEMS coding scheme was based (Ginsburg & Grover, 2009) assesses discrete emotional targets such as: display of negative affect, positive affect, or off-task behavior. These more objective behaviors likely demonstrate higher levels of reliability across coders for the same reasons that dysregulated emotion was shown to have the highest level of convergence in the current study, namely that observable behaviors are more likely to converge (De Los Reyes et al., 2015). The current study included the development of a novel coding scheme examining the constructs of inhibition, coping and dysregulation to better examine the same constructs across reporters and contexts (De Los Reyes et al., 2015). While this allowed for a more direct comparison across reporters, it resulted in much less objective determinations of behavior. Further exploration and development is needed to enhance the objectivity and operationalization of the codes across scales, and additional rater training procedures are likely warranted.

***Emotion subscales.*** Overall, qualitative analyses suggest that coping behavior was observed infrequently during the Interview task and, as predicted, inhibited behavior was observed infrequently during the EaS task. This could potentially explain the low

levels of reliability for these codes, and also justify the elimination of these codes within these contexts from future analyses.

Conceptually, these results are consistent with the quality of the Interview and EaS tasks. During the Interview task, participants are first asked to interact with an unfamiliar adult (the examiner), and are then asked to separate from their parents and discuss their fears and concerns. In comparison, during the EaS task, the child interacts only with a familiar parent, and although they are completing a frustrating task, they are not asked to discuss their own worries or fears. It is reasonable to assume that children are more likely to hide their emotional experiences (e.g. engage in inhibition) in an unfamiliar situation with an unfamiliar person, than with a parent. Additionally, they are more likely to display coping behaviors (e.g. problem-solving or displaying positive affect) when engaging in a difficult task with a parent than when they are discussing their fears with an unfamiliar examiner. Thus, it is not surprising that very low rates were found for inhibition during the EaS task, and low rates of coping were found for the Interview task.

Given the similar rates for dysregulation across tasks, it is less clear why only the EaS task provided a reliable code of dysregulation. It is possible that, given the low rate of inhibition in the EaS task, coding dysregulation during this task was somewhat ‘cleaner’ and included fewer distractions for the coders. While coping behaviors were clearly distinct from behaviors associated with negative affect or withdrawal, inhibited and dysregulated behaviors may have had more overlap. Indeed, during training sessions, the coders expressed some difficulty distinguishing between inhibition and dysregulation behaviors. Although every attempt was made to adequately differentiate the two scales in

the development of the coding scheme, when operationalized they often required the coder to make a judgment call. For example, the behavior of “gritting teeth” is provided as an example in the coding of inhibition, as it can be a sign of emotional overcontrol. However, it is not hard to imagine a scenario where “gritting teeth” could instead be interpreted as a dysregulated behavior (e.g. displaying anger and frustration). In comparison to the EaS task, it is possible that dysregulated behaviors were coded less consistently during the Interview task, leading to lower reliability ratings.

Before future research can be conducted employing this coding scheme, further iterations of the emotion regulation subscales should be tested. While there may not be a strong rationale for examining coping within the Interview task or inhibition within the EaS task, the dysregulation coding scheme, and its distinctness from the inhibition scale could be refined to further facilitate training and coder reliability in the future.

***Frequency and intensity.*** The frequency codes generally demonstrated better reliability than did the intensity codes. This may reflect the nature of the coding scheme, wherein frequency codes simply required objective counts of the number of times a behavior was observed, whereas intensity required a subjective judgment on the intensity of each behavior. Thus, there may be justification for adjusting the coding scheme to focus solely on frequency codes. It is possible that, by eliminating the second set of codes (intensity scores), the cognitive load of the rater will be lessened, potentially improving reliability across codes. However, there is some research suggesting that the cognitive load of recording responses does not significantly reduce rating quality (Kolk, Born, van der Flier, & Olman, 2002).

One potential danger of eliminating the intensity scores from the coding scheme is that there will be no avenue for capturing the difference between an extreme behavior (e.g. throwing an object) and a mild one (e.g. frowning). It is worth examining whether significant information is lost with the elimination of the intensity codes. As they are currently operationalized, the intensity codes for inhibition and dysregulation require better training or, potentially, simplification. The intensity code currently comprises a five-point scale including the following intensity anchors: none, mild, moderate, significant, and extreme. Reducing this to a three-point scale, similar to the scale used on the CEMS questionnaires (none, some, a lot), might reduce the difficulty of parsing intensity, which may also reduce overall rater cognitive load. However, restricting the range of the intensity ratings would reduce variability in responses, which might in turn reduce reliability (Sackett, Laczo, & Arvey, 2002).

It should be noted that not all of the intensity codes provided poor reliability. Indeed, the coping intensity scale proved reliable for the EaS task, whereas the corresponding frequency scale did not. In fact, although the coping scales on the Interview task both demonstrated insufficient reliability, the reliability for the intensity scale was somewhat higher than that of the frequency scale (.33 and .24 respectively). It is not immediately obvious why this would be true. One hypothesis is that coping was the most frequently observed behavior during the EaS task (average score = 2.04 instances of coping per minute, as compared to .04 instances/minute of inhibitive behaviors and 1.24 instances/minute of dysregulative behavior). If the behaviors are happening at a high rate, a rater might miss a second instance of the behavior while recording the first (and related intensity), thus resulting in slightly different frequency ratings across raters. Indeed there

is research indicating that the attention-shifting required in recording behaviors can lead to missing important behaviors (Hennessey, Mabey, and Warr, 1998). Again, elimination of the intensity scale might reduce the cognitive load on raters, allowing them to focus on recording accurate frequency. Alternatively, instructing the coders to first watch the tape for frequency and later for intensity might accomplish this same goal.

**Tasks.** The tasks chosen for the current investigation were selected to provide distinct, but complimentary ratings of youth emotion regulation. The EaS task was chosen to elicit frustration and negative affect (Ginsburg & Grover, 2009). In general, reliability for the EaS task was better than that of the Interview task, likely due to the standardized procedures. Each clinician followed a script and provided very specific instructions to the families for how to complete the task.

Conversely, the Interview task was chosen for its naturalism; the introduction and separation are inherent characteristics of the youth assessment rather than a true ‘task’. This portion of the interview was chosen for coding as it was hypothesized that anxious children might have difficulty separating from their parents, or meeting a new person. However, the sample was extremely diverse, including children with separation or social anxiety, as well as children with generalized anxiety, specific phobias, obsessive-compulsive disorder, etc. It is possible that the heterogeneity of anxiety and anxious youth makes creating a natural environment that is emotionally salient for all anxious youth extremely difficult. Additionally, while naturalistic observation is used in research of preschoolers and infants (e.g. Bulotsky-Shearer & Fantuzzo, 2004; Adrian et al., 2011), it is used much less frequently with school age children (Adrian et al., 2011; Weiss, Thomson & Chan, 2014). This too may reflect the difficulties creating

ecologically valid environments that are also salient and evocative. Rather than implementing a naturalistic task, future research using this coding scheme might include an additional analogue task from the emotion regulation literature, such as parent-child discussion of emotional events (e.g, Suveg et al., 2008). Observation of such a task would allow for examination of emotion regulation across more than one context, while still providing ecologically valid opportunities for observing emotion.

## **Conclusion**

Despite these limitations, the current study sheds new insight into the unique and shared variance across reporters and methods for assessing emotion regulation. This study builds upon previous research by confirming the assertion that a single method for assessing emotion regulation is insufficient (e.g. Adrian et al., 2011; Morris et al., 2006, Thompson, 2011a). Theory has suggested that emotion regulation is a complex multifaceted construct that cannot be determined by a single method of emotional assessment. In support of this theory, the current study found that a single method for assessing emotion regulation rarely converges with other methods, indicating that different methods are likely assessing different facets of the emotional construct. Moreover, a multimethod assessment of emotion regulation provided a much stronger prediction of youth anxiety than did single assessments. A range of reporters and emotion management subscales combined to form a strong emotion regulation canonical variate that predicted youth anxiety.

This result confirms research demonstrating a relationship between youth regulation and youth anxiety and furthers the field by breaking down the components of emotion regulation that *uniquely contribute* to the prediction of anxiety. The finding that



parent-reported inhibition accounts for significant variance in the prediction of youth anxiety is a novel one that has significant implications for the fields of emotion regulation and youth anxiety. The current study allows future emotional research to extend this research on unique contribution of emotional deficits to predicting other internalizing concerns, such as depression. Additionally, this research facilitates treatment development that may now examine deficits and regulation profiles as potential predictors and mechanisms of change in youth anxiety treatments.

## TABLES

Table 1

*Descriptive Statistics for the Coding Scheme*

<b>Coding Subscales</b>	<b><i>n</i></b>	<b>% rated zero</b>	<b>Mean (Std. Deviation)</b>
Interview Inhibition Frequency	43	16.3	1.23 (1.06)
EaS Inhibition Frequency	42	81.8	0.04 (0.10)
Interview Inhibition Intensity	43	16.3	0.70 (0.47)
EaS Inhibition Intensity	42	81.8	0.04 (0.11)
Interview Dysregulation Frequency	43	9.3	1.17 (0.83)
EaS Dysregulation Frequency	42	11.4	1.24 (1.08)
Interview Dysregulation Intensity	43	9.3	0.82 (0.48)
EaS Dysregulation Intensity	42	11.4	0.66 (0.45)
Interview Coping Frequency	43	37.2	0.53 (0.74)
EaS Coping Frequency	42	0	2.01 (1.16)
Interview Coping Intensity	43	37.2	0.43 (0.48)
EaS Coping Intensity	42	0	1.28 (0.62)

*Note.* CEMS = Children's Emotional Management Scales (Zeman et al., 2001). EaS = Etch a Sketch task (Ginsburg & Grover, 2009).

Table 2

*Pearson's R Correlation Matrix for Aim 1*

Correlational Matrix		CEMS Self-Report		
Emotional Scale	CEMS Parent-Report	Inhibition	Dysregulation	Coping
Anger	Inhibition	.106	-.218	.109
	Dysregulation	.058	.335**	.023
	Coping	.068	-.308*	.07
Sadness	Inhibition	.174	-.307*	.249
	Dysregulation	-.050	.167	-.149
	Coping	.137	-.177	.213
Worry	Inhibition	.245	-.302*	-.254*
	Dysregulation	-.190	.262*	-.062
	Coping	.171	.016	.004
Total	Inhibition	.191	-.347**	.262
	Dysregulation	-.064	.309*	-.128
	Coping	.040	-.150	.094

*Note.*  $n=60$ ; CEMS = Children's Emotional Management Scales (Zeman et al., 2001). EaS = Etch a Sketch task (Ginsburg & Grover, 2009).

\* correlation is significant at the .05 level (2-tailed)

\*\* correlation is significant at the .01 level (2-tailed)

Table 3

*T-Tests and Effect Sizes for Parent and Child-report Discrepancies on the CEMS*

Emotional Scale	Management Scale	Parent [M(SD <sup>+</sup> )]	Child [M(SD <sup>+</sup> )]	<i>t</i> -score	Cohen's <i>d</i>
Anger	Inhibition	1.56(0.49)	1.98(0.61)	-4.36**	-0.77
	Dysregulation	1.71(0.52)	1.48(0.50)	2.86*	0.44
	Coping	1.81(0.51)	2.32(0.49)	-5.66**	-1.01
Sadness	Inhibition	1.57(0.57)	1.92(0.63)	-3.56**	-0.58
	Dysregulation	2.04(0.59)	1.80(0.56)	2.50	0.42
	Coping	1.71(0.40)	2.07(0.47)	-5.11**	-0.83
Worry	Inhibition	1.61(0.45)	1.93(0.63)	-3.63**	-0.58
	Dysregulation	2.08(0.63)	1.68(0.61)	4.15**	0.65
	Coping	1.74(0.43)	2.21(0.55)	-5.20**	-0.95
Total	Inhibition	1.58(0.40)	1.94(0.56)	-4.55**	-0.75
	Dysregulation	1.94(0.41)	1.65(0.46)	4.36**	0.67
	Coping	1.75(0.34)	2.19(0.44)	-6.31**	-1.10

Note. *n*=60; CEMS = Children's Emotional Management Scales (Zeman et al., 2001).

+ statistic calculated by averaging relevant statistics from each imputation

\* *t*-test is significant at the .0042 level

\*\* *t*-test is significant at the .001 level

bonferroni correction for 12 tests = .05/12 = 0.0042

Table 4

*Summary of Significant Regression Analyses*

Regression Analysis	Variable	$B$	$SE_B$	$\beta^+$
Dysregulation Discrepancy (Aim 1 hypothesis 2; $n=54$ )	Intercept	.46	.43	-
	Age	-.01	.04	-.02 (.018)
	Parent reported anxiety on SCARED	.01	.01	.26(.010)
	Child reported anxiety on SCARED	-.02	.01	-.45*(.007)
Observer and Reporter Dysregulation (Aim 1 hypothesis 3; $n=30$ )	Intercept	-1.58	1.30	-
	Parent reported Dysregulation On CEMS	.34	.43	.15 (.011)
	Child reported Dysregulation on CEMS	2.98	1.04	.55**(.025)

*Note.* \*  $p < .05$ ; \*\*  $p < .01$ ;  $B$  = unstandardized regression coefficient;  $SE_B$  = Standard error of the coefficient;  $\beta$  = standardized coefficient. <sup>+</sup> pooled estimates of the standardized coefficient are not estimated using SPSS. The reported coefficient is the average of the standardized coefficients from each imputation. *CEMS* = Children's Emotion Management Scale (Zeman et al., 2001)

Table 5

*Pearson's R Correlation Matrix for Inhibition and Anxiety*

Correlational Matrix	Inhibition Scale		
Anxiety Scale	Observer coded inhibition frequency on Interview ( <i>n</i> )	Parent reported inhibition on CEMS ( <i>n</i> )	Child reported inhibition on CEMS ( <i>n</i> )
Parent reported anxiety on SCARED	.111 (37)	.087 (133)	-.029 (59)
Child reported anxiety on SCARED	.122 (36)	.194* (109)	-.053 (60)

*Note.* Sample sizes for each analysis provided in parentheses. *Interview* = Interview task. CEMS = Children's Emotional Management Scales (Zeman et al., 2001). SCARED = Screen for Children's Anxiety Related Emotional Disorders (Birmaher et al., 1997)

\* correlation is significant at the .05 level (2-tailed)

Table 6

*Canonical Structure for Dysregulation and Youth Anxiety*

Variable	Canonical Variate Structure Loading <sup>+</sup>
Dysregulation	
EaS Dysregulation Frequency	<b>.677(.011)</b>
Parent-report Dysregulation	<b>.701(.014)</b>
Child-report Dysregulation	-.207(.029)
Youth Anxiety	
Parent-report Anxiety	<b>.897(.018)</b>
Child-report Anxiety	-.125(.040)

*Note.*  $n=27$ ; Standardized structure loadings of the statistically significant ( $p<.05$ ) canonical relationship are reported. Loadings  $\geq .50$  are considered substantial contributions and are bolded.

<sup>+</sup> stats are the average and standard deviations of the absolute values of the statistics for all five imputations. Signs reflect the direction of the relationship with regard to the other variables (i.e. in some imputations the EaS and parent dysregulation coefficients were positive while the child dysregulation coefficients were negative, while in others the signs were reversed; however, the nature of this relationship was always maintained).

Table 7

*Pearson's R Correlation Matrix for Coping and Anxiety*

Correlational Matrix	Coping Scale		
Anxiety Scale	Observer coded coping intensity on EaS ( <i>n</i> )	Parent reported coping on CEMS ( <i>n</i> )	Child reported coping on CEMS ( <i>n</i> )
Parent reported anxiety on SCARED	.213 (34)	-.177* (133)	-.067 (59)
Child reported anxiety on SCARED	-0.16 (34)	.148 (109)	-.185 (60)

*Note.* Sample sizes for each analysis provided in parentheses. EaS = Etch a Sketch task (Ginsburg & Grover, 2009). CEMS = Children's Emotional Management Scales (Zeman et al., 2001).

SCARED = Screen for Children's Anxiety Related Emotional Disorders (Birmaher et al., 1997.)

\* correlation is significant at the .05 level (2-tailed)



Table 8

*Canonical Structure for Emotion Regulation Scales and Youth Anxiety*

Variable	Canonical Variate Structure Loading <sup>+</sup>
Emotion Regulation	
Interview Inhibition Frequency	.034(.046)
Parent-report Inhibition	<b>.537(.013)</b>
Child- report Inhibition	-.453(.006)
EaS Dysregulation Frequency	-.124(.038)
Parent-report Dysregulation	.356(.061)
Child-report Dysregulation	.369(.011)
EaS Coping Intensity	.046(.019)
Parent-report Coping	.027(.038)
Child-report Coping	-.494(.017)
Youth Anxiety	
Parent-report Anxiety	<b>.979(.014)</b>
Child-report Anxiety	<b>.522(.067)</b>

*Note.*  $n=26$ ; Entries are the structure loadings indicating statistically significant ( $p<.05$ ) canonical relationship. Loadings  $\geq .50$  are considered substantial contributions and are bolded.

<sup>+</sup> stats are the average and standard deviations of the absolute values of the statistics for all five imputations. Signs reflect the direction of the relationship with regard to the other variables.

Table 9

*Canonical Commonality Analysis: Unique contributions of each variable to the canonical variates*

<i>Component</i>	<i>Commonality Coefficient<sup>+</sup></i>	<i>% Total<sup>+</sup></i>
<i>Emotion Regulation Variate</i>		
Parent-report inhibition	.346 (.02)	<b>54.01</b> (1.61)
EaS coping intensity	.064 (.01)	10.014 (.75)
Child-report coping	.060 (.01)	9.396 (2.02)
EaS dysregulation frequency	.043 (.01)	6.739 (1.49)
Child-report dysregulation	.024 (.01)	3.727 (.74)
Child-report inhibition	.018 (.003)	2.873 (.51)
Parent-report dysregulation	.009 (.01)	1.406 (1.20)
Interview inhibition frequency	.006 (.002)	.886 (.30)
Parent-report coping	.003 (.002)	.474 (.34)
Common to multiple criterion	.067	10.48
Total	.641	100
<i>Youth Anxiety Variate</i>		
Child-report of anxiety	.459 (.03)	<b>71.665</b> (6.18)
Parent-report of anxiety	.069 (.02)	10.744 (2.04)
Common to both reports	.113 (.03)	17.591 (4.32)
Total	.641	100

*Note.*  $n=26$ ; Unique contributions  $\geq 50\%$  are considered substantial contributions and are bolded.

<sup>+</sup> stats are the average and standard deviations of the absolute values of the statistics for all five imputations. EaS = Etch a Sketch task (Ginsburg & Grover, 2009); Interview = Interview task.

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## APPENDICES

### **Appendix 1. Coding scheme for the observational tasks** (developed with aid from Janice Zeman, based on a coding scheme by Ginsburg & Grover, 2009).

#### Coded **Child** Behaviors Rated on a Dimensional Scale

<b>Coded behaviors</b>	<b>Description of behavior</b>
Inhibition	<p>Child expresses excessive levels of emotional control, trying to suppress emotional expression. Ultimately, Inhibition refers to any indication that the child is reluctant to show an emotion and is trying to hide it.</p> <p>Examples:</p> <p>This may manifest as: children making overt attempts not to cry (3), covering their face (2), changing the subject (2), slumping down in chair (1), not participating in the task due to perceived anxiety (3), not providing a verbal response due to anxiety (2), Whispers (1), avoiding eye-contact (1), gritting teeth (1), frowning (1), looking down (1), playing with clothing (1). Child may curl up in a ball (4) or hide behind parent (4) or say, “I don’t want to feel bad” (3).</p>
Dysregulation	<p>Child expresses culturally inappropriate displays of emotion.</p> <p>Examples:</p> <p>Child may whine (2), cry (3), say aggressive things (3), or mope (2). Child may appear sad or discouraged (e.g., may put head down on table) beyond what would be expected. The child may hold his head in his hands, sigh (1), or make utterances (“Ugh”) that indicate frustration (1).</p> <p>Child may appear hostile, angry, annoyed, irritated, and/or frustrated. Child uses parent’s EaS dial (1). Child may use a harsh tone with the parent (2). Child gives the parent a command (rather than an open instruction) (1). Child may say things like, “This isn’t any fun,” (1) or “This game is stupid!” (2) “I don’t want to do this!” (2) “You’re stressing me out!” (2)</p> <p>Hostility/negative affect can be directed toward the parent and/or the task. This category also includes verbal threats of aggression (3) and/or physical aggression toward the parent and/or property (e.g., throwing the game board, crumpling up the paper with the instructions) (4). Child may take responsibility for any negative</p>

	<p>events or outcomes (e.g., “It’s my fault,” (2) “I messed up,” (2) “I can’t do this.”(2)).</p> <p>Child may appear or make anxious or fearful statements, act cautiously in the absence of danger/threat, express self-doubt, seek reassurance (“am I doing this right?”(1)), catastrophize, may shift excessively in their seat, swing legs (physical agitation), or scratch themselves due to anxiety. Child may say things like, “We are never going to get this right,”(2) “This is tricky!” (1)“Uh oh,” (1) or “Oh no!” (2) “What if that woman (the research assistant) is mad at me?” (2) or “Are you sure this looks okay?” (2) “Is she watching us?” (1) or “how much time is left to complete the task?” (1). Child may express anxiety non-verbally by rocking in the chair (2) , being startled by loud noises (2), sitting on parent’s lap (2), etc. Child may ask to discontinue the task (3) or actually discontinue the task (4).</p>
Coping	<p>Child expresses appropriate levels of control, and manages emotion in a constructive way.</p> <p>Examples:</p> <p>The child appears to stay calm and collected in the face of emotional stressors. The child may engage in strategies calmly to deal with the emotional situation. This may include engaging in problem-solving behaviors (such as brainstorming solutions (3), evaluating positives and negatives of each solution (3), developing a plan for the task (4). Child may say things like, “Let’s first turn the right knob” (3) or “Why don’t we take turns?” (3) Child may ask the parent (in a non-anxious tone) to aid them in the process (e.g. “tell me when to stop” (1)). Problem solving can also be nonverbal, for example, the child may fold the paper in order to better estimate the size of the line (2). Child may admit feelings of frustration, but then make a comment to sooth self (e.g. “It’s okay. (2) This is a tough one.”(2)). Child uses a positive valence to cope with a difficult/frustrating task (e.g. “oooooh” but happily (1) or “dang” but in a positive tone (1)). Child responds productively and with cooperation to questions about concerns or anxiety (2).</p> <p>Child may alternatively display positive affect, including nonverbal expressions of positive emotion (e.g., laughter (2), gentle touches (2), smiles (1), high fives (4), clapping when finished (4)) or words indicating the experience of positive affect (e.g., this is fun! (3))</p>

### **Defining a discrete behavior:**

#### **Verbal:**

- 1) A single clause (e.g. “I am scared”)
- 2) A vocalization that has a discrete beginning and end (e.g. “ahhh”)
- 3) NB – if a statement includes a conjunction (and, because) consider each part a separate behavior (e.g. “I am scared because this task is soo hard”)

#### **Nonverbal:**

- 1) If it goes together with a verbalization (e.g. starts and ends at the exact same time) count as only a single behavior (e.g. not both a verbal and nonverbal)
- 2) If the behavior and vocalization start and end at separate times, consider as separate behaviors. That said, if the behavior like a vocalization starts at the end of one minute and falls into the next minute—only count as one behavior with the frequency being marked at the starting minute.
- 3) If a behavior is already present at the beginning of the clip (e.g. child is already sitting on mom’s lap, hiding behind the chair, covering face with hand), you should still count the behavior. Each minute this behavior occurs within the minute should be marked. In other words, if the child sits on mom’s lap in minute one and in minute two she is still sitting on mother’s lap—this should be marked for both those minutes.
- 4) If a behavior happens multiple discrete times, count as multiple behaviors (e.g. child covers mouth, then uncovers, and then recovers = 2 behaviors)



### Intensity anchors

0 (none)	No evidence of coded behaviors
1 (mild)	Behavior is minor and non-obtrusive <u>examples</u> I – child covers mouth with hand, avoids eye-contact D – child sighs audibly; asks for affirmation (is this ok? Did I do this right?); C – child gives instruction with positive valence (“do this now”); child smiles
2 (moderate)	Behavior is somewhat obtrusive I – child covers part of face with both hands D – child says “oh no” or “I can’t do this”; child whimpers or whines; sits on parent’s lap C – child gives small compliment (good!), laughs; child says “it’s ok”; child states something to indicate problem-solving “it’s like stairs”
3 (significant)	Behavior is conspicuous and likely requires a response I – child blatantly avoids the task; child articulates desire not to experience discomfort/emotion D – Child cries, yells or makes a strong negative or aggressive statement (I hate this!), begs parent/examiner to stop task C – Child engages in active problem solving (let’s do this first), uses coping statements (we can do it!), or demonstrates verbal positive affect (this is fun!)
4 (extreme)	Behavior is extreme I – child curls up in a ball, child hides behind parent, child states that they don’t want to feel this way/be seen D – child is physically aggressive or violent (e.g. throws things); child uses inappropriate language; child discontinues task C – child gives a high five, claps hands, gives others praise or statement of positive self-esteem (we’re awesome!)

## BEHAVIOR RATING FORM

Use the following rating scale to code **CHILD** behaviors for each individual minute by writing your numerical rating in the appropriate box. After rating each minute, please assign an Overall Task rating in the last column. If total task length is under five minutes, finish coding by rounding UP to the nearest minute and marking all other minutes as “N/A”. *Please write neatly.*

<b>Frequency:</b>					
Please mark the number of behaviors per minute (and then the average number in overall)					
<b>Intensity:</b>					
0	1	2	3	4	
None	mild	moderate	significant	severe	

CHILD	Rating Minute 1	Rating Minute 2	Rating Minute 3	Rating Minute 4	Rating Minute 5	Over all Task
<b>Inhibition</b> Child expresses excessive levels of emotional control, trying to suppress emotional expression.						
<b>Dysregulation</b> Child expresses culturally inappropriate displays of emotion.						
<b>Coping</b> Child expresses appropriate levels of control, and manages emotion in a constructive way.						

**Appendix 2. Children's Emotion Management Scale – Child-report (CEMS; Zeman et al., 2001).**

**Instructions:** Please read each statement carefully and circle the number that best describes how you feel.

<b><i>Anger</i></b>	<b>Hardly ever</b>	<b>Sometimes</b>	<b>Often</b>
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
<b><i>Sadness</i></b>	<b>Hardly ever</b>	<b>Sometimes</b>	<b>Often</b>
12. When I am feeling sad, I can control my crying and carrying on.	1	2	3
13. I hold my sad feelings in.	1	2	3
14. I stay calm and don't let sad things get to me.	1	2	3
15. I whine/fuss about what is making me sad.	1	2	3
16. I hide my sadness.	1	2	3
17. When I'm sad, I do something totally different until I calm down.	1	2	3
18. I get sad inside but I don't show it.	1	2	3
19. I can stop myself from losing control of my sad feelings.	1	2	3
20. I cry and carry on when I am sad.	1	2	3
21. I try to calmly deal with what is making me sad.	1	2	3

22. I do things like mope around when I am sad.	<b>1</b>	<b>2</b>	<b>3</b>
23. I'm afraid to show my sadness.	<b>1</b>	<b>2</b>	<b>3</b>

<b><i>Worried</i></b>	<b>Hardly ever</b>	<b>Sometimes</b>	<b>Often</b>
24. I keep myself from losing control of my worried feelings.	<b>1</b>	<b>2</b>	<b>3</b>
25. I show my worried feelings.	<b>1</b>	<b>2</b>	<b>3</b>
26. I hold my worried feelings in.	<b>1</b>	<b>2</b>	<b>3</b>
27. I talk to someone until I feel better when I'm worried.	<b>1</b>	<b>2</b>	<b>3</b>
28. I do things like cry and carry on when I'm worried.	<b>1</b>	<b>2</b>	<b>3</b>
29. I hide my worried feelings.	<b>1</b>	<b>2</b>	<b>3</b>
30. I keep whining about how worried I am.	<b>1</b>	<b>2</b>	<b>3</b>
31. I get worried inside but don't show it.	<b>1</b>	<b>2</b>	<b>3</b>
32. I can't stop myself from acting really worried.	<b>1</b>	<b>2</b>	<b>3</b>
33. I try to calmly settle the problem when I feel worried.	<b>1</b>	<b>2</b>	<b>3</b>

**Appendix 3. Children's Emotion Management Scale – Parent-report (CEMS;**  
Zeman, Shipman & Penza-Clyve, 2001).

Instructions: Please circle the response that best describes your child/adolescent's behavior when he/she is feeling **mad**.

1.	When my child is feeling mad, he/she can control his/her temper.	Hardly Ever 1	Sometimes 2	Often 3
2.	My child holds his/her anger in.	Hardly Ever 1	Sometimes 2	Often 3
3.	My child stays calm and keeps his/her cool when he/she is feeling mad.	Hardly Ever 1	Sometimes 2	Often 3
4.	My child does things like slam doors when he/she is mad.	Hardly Ever 1	Sometimes 2	Often 3
5.	My child hides his/her anger.	Hardly Ever 1	Sometimes 2	Often 3
6.	My child attacks whatever it is that makes him/her very angry.	Hardly Ever 1	Sometimes 2	Often 3
7.	My child gets mad inside but doesn't show it.	Hardly Ever 1	Sometimes 2	Often 3
8.	My child can stop him/herself from losing his/her temper when he/she is mad.	Hardly Ever 1	Sometimes 2	Often 3
9.	My child says mean things to others when he/she is mad.	Hardly Ever 1	Sometimes 2	Often 3
10.	My child tries to calmly deal with what is making him/her mad.	Hardly Ever 1	Sometimes 2	Often 3
11.	My child is afraid to show his/her anger.	Hardly Ever 1	Sometimes 2	Often 3

Instructions: Please circle the response that best describes your child/adolescent's behavior when he/she is feeling **sad**.

1.	When my child is feeling sad, he/she can control his/her crying and carrying on.	Hardly Ever 1	Sometimes 2	Often 3
2.	My child holds his/her sad feelings in.	Hardly Ever 1	Sometimes 2	Often 3
3.	My child stays calm and doesn't let sad things get to him/her.	Hardly Ever 1	Sometimes 2	Often 3
4.	My child whines/fusses about what's making him/her sad.	Hardly Ever 1	Sometimes 2	Often 3
5.	My child hides his/her sadness.	Hardly Ever 1	Sometimes 2	Often 3
6.	When my child is sad, he/she does something totally different until he/she calms down.	Hardly Ever 1	Sometimes 2	Often 3
7.	My child gets sad inside but doesn't show it.	Hardly Ever 1	Sometimes 2	Often 3
8.	My child can stop him/herself from losing control of his/her sad feelings.	Hardly Ever 1	Sometimes 2	Often 3
9.	My child cries and carries on when he/she is sad.	Hardly Ever 1	Sometimes 2	Often 3
10.	My child tries to calmly deal with what is making him/her sad.	Hardly Ever 1	Sometimes 2	Often 3
11.	My child does things like mope around when he/she is sad.	Hardly Ever 1	Sometimes 2	Often 3
12.	My child is afraid to show his/her sadness.	Hardly Ever 1	Sometimes 2	Often 3

Instructions: Please circle the response that best describes your child/adolescent's behavior when he/she is feeling **worried**.

1.	My child can keep him/herself from losing control of his/her worried feelings. .	Hardly Ever 1	Sometimes 2	Often 3
2.	My child shows his/her worried feelings.	Hardly Ever 1	Sometimes 2	Often 3
3.	My child holds his/her worried feelings in.	Hardly Ever 1	Sometimes 2	Often 3
4.	My child talks to someone until he/she feels better when he/she is worried	Hardly Ever 1	Sometimes 2	Often 3
5.	My child does things like cry and carry on when he/she is worried.	Hardly Ever 1	Sometimes 2	Often 3
6.	My child hides his/her worried feelings.	Hardly Ever 1	Sometimes 2	Often 3
7.	My child keeps whining about how worried he/she is.	Hardly Ever 1	Sometimes 2	Often 3
8.	My child gets worried inside but doesn't show it.	Hardly Ever 1	Sometimes 2	Often 3
9.	My child can't stop him/herself from acting really worried	Hardly Ever 1	Sometimes 2	Often 3
10.	My child tries to calmly settle the problem when he/she feels worried.	Hardly Ever 1	Sometimes 2	Often 3

**Appendix 4. Screen for Child Anxiety Related Disorders – Child Version (SCARED:**  
Birmaher et al., 1997).

**Screen for Child Anxiety Related Disorders (SCARED)**  
**Child Version—Pg. 1 of 2 (To be filled out by the CHILD)**

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Directions:**

Below is a list of sentences that describe how people feel. Read each phrase and decide if it is “Not True or Hardly Ever True” or “Somewhat True or Sometimes True” or “Very True or Often True” for you. Then for each sentence, fill in one circle that corresponds to the response that seems to describe you for the last 3 months.

	<b>0</b> <b>Not True or</b> <b>Hardly</b> <b>Ever True</b>	<b>1</b> <b>Somewhat</b> <b>True or</b> <b>Sometimes</b> <b>True</b>	<b>2</b> <b>Very True</b> <b>or Often</b> <b>True</b>
1. When I feel frightened, it is hard to breathe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I get headaches when I am at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I don't like to be with people I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I get scared if I sleep away from home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. I worry about other people liking me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. When I get frightened, I feel like passing out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I am nervous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I follow my mother or father wherever they go.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. People tell me that I look nervous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I feel nervous with people I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I get stomachaches at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. When I get frightened, I feel like I am going crazy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I worry about sleeping alone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I worry about being as good as other kids.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. When I get frightened, I feel like things are not real.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I have nightmares about something bad happening to my parents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I worry about going to school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. When I get frightened, my heart beats fast.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. I get shaky.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I have nightmares about something bad happening to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



**Screen for Child Anxiety Related Disorders (SCARED)**  
**Child Version—Pg. 2 of 2 (To be filled out by the CHILD)**

	<b>0</b> Not True or Hardly Ever True	<b>1</b> Somewhat True or Sometimes True	<b>2</b> Very True or Often True
21. I worry about things working out for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. When I get frightened, I sweat a lot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. I am a worrier.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. I get really frightened for no reason at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. I am afraid to be alone in the house.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. It is hard for me to talk with people I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. When I get frightened, I feel like I am choking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. People tell me that I worry too much.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. I don't like to be away from my family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. I am afraid of having anxiety (or panic) attacks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
31. I worry that something bad might happen to my parents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32. I feel shy with people I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33. I worry about what is going to happen in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34. When I get frightened, I feel like throwing up.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35. I worry about how well I do things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36. I am scared to go to school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
37. I worry about things that have already happened.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
38. When I get frightened, I feel dizzy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
39. I feel nervous when I am with other children or adults and I have to do something while they watch me (for example: read aloud, speak, play a game, play a sport.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
40. I feel nervous when I am going to parties, dances, or any place where there will be people that I don't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
41. I am shy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**SCORING:**

A total score of  $\geq 25$  may indicate the presence of an **Anxiety Disorder**. Scores higher than 30 are more specific.

A score of 7 for items 1, 6, 9, 12, 15, 18, 19, 22, 24, 27, 30, 34, 38 may indicate **Panic Disorder** or **Significant Somatic Symptoms**.

A score of 9 for items 5, 7, 14, 21, 23, 28, 33, 35, 37 may indicate **Generalized Anxiety Disorder**.

A score of 5 for items 4, 8, 13, 16, 20, 25, 29, 31 may indicate **Separation Anxiety Disorder**.

A score of 8 for items 3, 10, 26, 32, 39, 40, 41 may indicate **Social Anxiety Disorder**.

A score of 3 for items 2, 11, 17, 36 may indicate **Significant School Avoidance**.

*\*For children ages 8 to 11, it is recommended that the clinician explain all questions, or have the child answer the questionnaire sitting with an adult in case they have any questions.*

Developed by Boris Birmaher, M.D., Suneeta Khetarpal, M.D., Marlane Cully, M.Ed., David Brent M.D., and Sandra McKenzie, Ph.D., Western Psychiatric Institute and Clinic, University of Pgh. (10/95). E-mail: birmaherb@msx.upmc.edu

## Appendix 5. Screen for Child Anxiety Related Disorders – Parent Version (SCARED: Birmaher et al., 1997).

### Screen for Child Anxiety Related Disorders (SCARED) Parent Version—Pg. 1 of 2 (To be filled out by the PARENT)

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Directions:**

Below is a list of statements that describe how people feel. Read each statement carefully and decide if it is “Not True or Hardly Ever True” or “Somewhat True or Sometimes True” or “Very True or Often True” for your child. Then for each statement, fill in one circle that corresponds to the response that seems to describe your child for the last 3 months. Please respond to all statements as well as you can, even if some do not seem to concern your child.

	0 Not True or Hardly Ever True	1 Somewhat True or Sometimes True	2 Very True or Often True
1. When my child feels frightened, it is hard for him/her to breathe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. My child gets headaches when he/she is at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. My child doesn't like to be with people he/she doesn't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. My child gets scared if he/she sleeps away from home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. My child worries about other people liking him/her.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. When my child gets frightened, he/she feels like passing out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. My child is nervous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. My child follows me wherever I go.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. People tell me that my child looks nervous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. My child feels nervous with people he/she doesn't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. My child gets stomachaches at school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. When my child gets frightened, he/she feels like he/she is going crazy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. My child worries about sleeping alone.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. My child worries about being as good as other kids.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. When he/she gets frightened, he/she feels like things are not real.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. My child has nightmares about something bad happening to his/her parents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. My child worries about going to school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. When my child gets frightened, his/her heart beats fast.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. He/she gets shaky.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. My child has nightmares about something bad happening to him/her.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Screen for Child Anxiety Related Disorders (SCARED)

**Parent Version—Pg. 2 of 2 (To be filled out by the PARENT)**

	0 Not True or Hardly Ever True	1 Somewhat True or Sometimes True	2 Very True or Often True
21. My child worries about things working out for him/her.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. When my child gets frightened, he/she sweats a lot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23. My child is a worrier.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. My child gets really frightened for no reason at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. My child is afraid to be alone in the house.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. It is hard for my child to talk with people he/she doesn't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27. When my child gets frightened, he/she feels like he/she is choking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28. People tell me that my child worries too much.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29. My child doesn't like to be away from his/her family.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30. My child is afraid of having anxiety (or panic) attacks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
31. My child worries that something bad might happen to his/her parents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
32. My child feels shy with people he/she doesn't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
33. My child worries about what is going to happen in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
34. When my child gets frightened, he/she feels like throwing up.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
35. My child worries about how well he/she does things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
36. My child is scared to go to school.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
37. My child worries about things that have already happened.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
38. When my child gets frightened, he/she feels dizzy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
39. My child feels nervous when he/she is with other children or adults and he/she has to do something while they watch him/her (for example: read aloud, speak, play a game, play a sport.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
40. My child feels nervous when he/she is going to parties, dances, or any place where there will be people that he/she doesn't know well.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
41. My child is shy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### **SCORING:**

A total score of  $\geq 25$  may indicate the presence of an **Anxiety Disorder**. Scores higher than 30 are more specific.

A score of 7 for items 1, 6, 9, 12, 15, 18, 19, 22, 24, 27, 30, 34, 38 may indicate **Panic Disorder** or **Significant Somatic Symptoms**.

A score of 9 for items 5, 7, 14, 21, 23, 28, 33, 35, 37 may indicate **Generalized Anxiety Disorder**.

A score of 5 for items 4, 8, 13, 16, 20, 25, 29, 31 may indicate **Separation Anxiety Disorder**.

A score of 8 for items 3, 10, 26, 32, 39, 40, 41 may indicate **Social Anxiety Disorder**.

A score of 3 for items 2, 11, 17, 36 may indicate **Significant School Avoidance**.

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