

**THE RELATIONSHIPS AMONG EMOTION REGULATION AND SYMPTOM  
IMPROVEMENT DURING TRAUMA-FOCUSED COGNITIVE BEHAVIOURAL  
THERAPY IN A COMMUNITY SAMPLE**

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## Abstract

**Objective.** Children who have experienced trauma have been demonstrated to have problems with emotion regulation and there is a strong link between such difficulties and psychopathology in childhood. As such, numerous clinical interventions have been designed to help children learn to regulate their emotions in adaptive, socially appropriate ways. Despite the interest in helping children learn adaptive skills, it is not currently known whether these interventions effectively help children improve emotion regulation. Moreover, it is unknown whether improvements in emotion regulation lead to positive changes in psychopathology, particularly in children who have experienced trauma. The purpose of the current study was to look at the relationships between emotion regulation and symptomatology in a sample of children who have been exposed to trauma. **Method.** A community sample of traumatized children and their non-offending caregivers received Trauma-Focused Cognitive Behavioural Therapy. Data were collected at five time periods: (1) waitlist ( $n = 30$ ), (2) pre-assessment ( $n = 107$ ), (3) pre-treatment ( $n = 78$ ), (4) post-treatment ( $n = 58$ ), and (5) six-month follow-up ( $n = 44$ ). Questionnaires measured emotion regulation [inhibition, dysregulation, lability/negativity, emotion regulation (ER) skill] and symptomatology [child-reported posttraumatic stress (PTS), parent-reported PTS, internalizing and externalizing symptoms]. **Results.** Results indicated that there was an association between emotion regulation and symptoms prior to beginning therapy, most consistently a link between lability/negativity and symptoms. Furthermore, as a group, children did improve in all maladaptive forms of emotion regulation throughout TF-CBT, but not ER skill, which is an adaptive form of emotion regulation. All improvement effect sizes were small. Finally, to the extent that children decreased their

maladaptive acting out strategies (lability/negativity and dysregulation), their symptoms improved throughout TF-CBT therapy. Improvements in inhibition throughout therapy also predicted improvements in child-reported PTS symptoms. **Conclusions.** These findings suggest that emotion regulation is indeed a worthy target for clinical intervention and that improvements in emotion regulation can be made. However, the small magnitude of improvement suggests that further attention must be paid to the ways in which interventions target emotion regulation. Given that this area of investigation is in its infancy, suggestions for future research are discussed.

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## The Relationships Among Emotion Regulation and Symptom Improvement During Trauma-Focused Cognitive Behavioural Therapy in a Community Sample

Children who have been exposed to maltreatment and/or trauma are at particular risk for negative outcomes, including difficulty with emotion regulation (Kim & Cicchetti, 2010; Shipman, Edwards, Brown, Swisher, & Jennings, 2005; Teisl & Cicchetti, 2008). In Canada, more than 85,000 cases of child abuse and/or neglect were substantiated in 2008, suggesting the importance of research in this area (Trocmé et al., 2010). Children who have experienced maltreatment have been found to be at higher risk than their non-maltreated peers for insecure or disorganized attachments, difficulties with peer relationships, academic failure, and neurobiological changes (Cicchetti & Toth, 2005). Childhood victims of maltreatment are also at particular risk of developing symptoms of posttraumatic stress (e.g., Rowan & Foy, 1993), internalizing problems (e.g., Bolger & Patterson, 2001), and externalizing problems (e.g., Manly, Kim, Rogosch, & Cicchetti, 2001). Research indicates that among children who have experienced trauma, those who have the most difficulty with emotion regulation also have the highest rates of psychopathology (e.g., Muller, Vascotto, Konanur, & Rosenkranz, 2013; Teisl & Cicchetti, 2008).

Emotion regulation refers to a set of processes that monitor, evaluate, and modify emotional reactions (Gross & Thompson, 2007; Thompson, 1994). As such, it makes sense that children who have difficulty regulating their emotions in an adaptive and socially acceptable way have higher rates of psychopathology. Given that difficulty with emotion regulation has been found to be both an outcome of childhood maltreatment and a predictor of symptomatology, theorists and research suggests that difficulties with

emotion regulation may be one mechanism by which psychopathology develops (e.g., Alink, Cicchetti, Kim, & Rogosch, 2009; Shields & Cicchetti, 1998).

Many therapeutic interventions have been designed to help children improve emotion regulation in therapy (e.g., Ford, Steinberg, Hawke, Levine, & Zhang, 2012; Kovacs et al., 2006). Programs that attempt to help children develop adaptive emotion regulation skills operate on two assumptions: first, it is assumed that emotion regulation can indeed be improved through therapeutic interventions, and second, it is assumed that improvements will lead to a reduction in symptomatology. Research in the first area has produced somewhat mixed results that appear dependent on the type of therapy that is being employed. In a review of the available literature, Hannesdottir and Ollendick (2007) found that Cognitive Behaviour Therapy (CBT) for anxiety has had limited success in improving emotion regulation among children. These authors suggested that the education on affect regulation provided by this type of therapy has traditionally been limited in breadth, in opportunity for practice, and by lack of parental involvement. By contrast, two interventions designed to improve emotion regulation among children who have experienced trauma, have shown that improvement through therapy is possible in this population (Ellis et al., 2012; Ford et al., 2012). These interventions incorporated elements of CBT, including emotional awareness, cognitive processing, and exposure in the form of a trauma narrative. These trauma-focused interventions were reported to be more flexible and individualized to the particular clients than are typical in CBT programs.

The second assumption made when interventions are designed to improve emotion regulation, is that improvements in emotion regulation will lead to

improvements in symptoms. This assumption has not been widely addressed in the child literature. Among studies that test the efficacy of interventions designed to improve emotion regulation, it is rare that emotion regulation is in fact measured. It is more common for these studies to only report on improvement of symptoms. For example, the Emotion Detectives Treatment Protocol (Bilek & Ehrenreich-May, 2012) and Mindfulness-Based Cognitive Therapy for Children (Semple, Lee, Rosa, & Miller, 2010) have been reported to improve childhood psychopathology, yet, these studies do not report on changes to emotion regulation directly. However, some studies have found that changes in emotion regulation lead to changes in childhood psychopathology (Kley, Heinrichs, Bender, & Tuschen-Caffier, 2012; Slee, Spinhoven, Garnefski, & Arensman, 2008; Suveg, Sood, Comer, & Kendall, 2009).

Trauma-Focused Cognitive-Behavioural Therapy (TF-CBT) offers children and their non-offending caregivers short-term cognitive behavioural therapy that has been modified to be trauma specific. The model is unique in that it addresses a number of recommendations made by Hannesdottir and Ollendick (2007) for improved emotion regulation education in CBT. These recommendations are implemented by teaching skills related to different aspects of emotion regulation, providing practice using these skills during exposures, and coaching parents how to respond to their child's emotions (Cohen & Mannarino, 2008). The inclusion of each of these techniques make TF-CBT an ideal therapeutic approach in which to examine changes in emotion regulation and whether these changes serve as a mechanism of symptom change.

The purpose of the current study is to explore the relationships among emotion regulation and improvements in symptoms following TF-CBT in a community sample of

children referred for treatment following traumatic experiences. Particular attention was paid to the assumptions outlined above: that emotion regulation improves throughout therapeutic intervention and that improvement in emotion regulation leads to improvements in symptoms.

## **Emotion**

There are different perspectives on emotion found in the literature. The structuralist, functionalist, and constructivist approaches have enduring strengths and weaknesses. For this reason, researchers often use elements of each in their conceptualization of emotion regulation (Thompson, 2011). Structuralists define emotions as discrete identifiable patterns of physiological, cognitive, subjective, and expressive activity, that are organized neurobiologically (Thompson, 2011). This perspective assumes that there are a limited number of basic emotions (Ekman, 1992) and that different modalities of emotion expression will be closely related for each discrete emotion. For example, anger may be expressed by a specific facial expression, behavioural tendencies, and physiological responses that are unique to anger. As such, researchers coming from a structuralist perspective would expect convergence between multiple measures of emotion activation and regulation at any given time point (e.g., self-report, behavioural observation, and physiological response). The advantage of the structuralist perspective is that it is consistent with the common understanding of emotions as categorical and recognizable entities. Individuals recognize “sadness” rather than a constellation of unique experiences that may include a down-turned mouth, lack of energy, and social withdrawal. There are criticisms of the structural perspective. First, there is disagreement as to whether the basic categories of emotion are universal across

cultures, and second, research has failed to find the expected convergences across multiple approaches to the measurement of emotion, for example observation, self-report, and the measurement of physiological phenomena (Thompson, 2011).

By contrast, the functionalist perspective defines emotions as a reflection of an individual's goals and their attainment (Thompson, 2011). Emotions are functional in changing or maintaining relations between an individual and their environment in ways that help the individual to attain their goals. There is an emphasis on the importance of emotional expression as a social signal, and on the motivational qualities of emotions. For example, when obstacles arise that are preventing an individual from attaining their goal, anger may result, and the behavioural tendencies of anger may remove the threat to goal achievement. Whereas more than one emotion may have the same behavioural tendency, they are hypothesized to have different goals. Both fear and shame share active withdrawal as a common behavioural tendency; however, the functionalist would argue that the goal of fear is to maintain physical or psychological integrity of the self, whereas the goal of shame is to maintain the respect and affections of others (K. C. Barrett & Campos, 1987).

It is noteworthy that the functionalist perspective on emotion regulation does not define different attempts at emotion regulation as 'good' or 'bad' (Thompson, 2011). From this perspective, 'poor' emotion regulation refers to efforts at emotion regulation that are not optimal for typical experiences such as peer interactions and the school setting. In addition, the functionalist perspective is much more sensitive to the influence of context and sociocultural interpretations of emotional experience. For example, a child who is experiencing sadness in the comfort of his own home may cry, but at school

may prevent his tears because he feels that crying is not a socially acceptable response. For this reason, the functionalist perspective does not necessarily expect convergence between multiple methods of measurement. The functionalist perspective adds to the structuralist view in that it helps explain variation in cultural and gender differences in emotion, and explains the divergence between multiple methods of emotion measurement. A criticism of the functionalist definition of emotion is that it is very broad, so much so that it is difficult to distinguish emotions from other motivational states, such as hunger, achievement, and sensation seeking (Thompson, 2011).

A third class of models of emotion are the constructivist models. These models explain that emotions emerge when an individual makes sense of internal physiological states in the context of a certain situation (Gendron & Barrett, 2009). For example, a person who experiences an elevated heart rate when alone in a dark alley at night may attribute this physical response to fear, whereas the same elevated heart rate at an amusement park may be attributed to excitement. Constructivists believe that this meaning making may sometimes be instinctual, or may result from additional processes such as categorization or attribution (Gendron & Barrett, 2009). As such, this approach does not accept physiological changes as the key ingredient that distinguishes one emotion from another. Additionally, this approach does not distinguish between emotions and cognitions in a meaningful way, in that appraisal is integral to both categories (Gendron & Barrett, 2009).

The *social* constructivist model was developed from the functionalist model and shares the condition that emotion refers to eliciting conditions rather than the behavioural tendency that accompanies the emotion (L. F. Barrett, 2009). In this model emotions are

thought to be culturally-prescribed performances or the product of social situations (Gross & Barrett, 2011). Differences between individuals are not taken into account by social constructivists, but instead emotions are considered enactments of culture (Gross & Barrett, 2011). *Psychological* constructivists believe that discrete emotions are mental events that come from the interplay of more basic psychological ingredients that are the result of evolution. These basic ingredients can be combined in innumerable ways. Although we group many of these combinations together and label them with the same word, for example “fear,” the combinations do not look or feel the same way (L. F. Barrett, 2009). Although there are basic ingredients of emotions that are considered to result from evolution, no category of emotion is considered to be biologically basic. Psychological constructivists predict variability in emotional life. An emotion emerges when a person’s internal state is understood in some way as related to or caused by the external surrounding.

The psychological constructivist model is similar to the structuralist model in that it assumes there are evolutionary roots to emotions. Whereas the structuralist approach assumes basic emotions and the psychological constructivist model does not, both rely on basic biologically determined building blocks as their starting point (L. F. Barrett, 2009). Both constructivist models are similar to functionalist models in the assumption that context is important to emotions (Gendron & Barrett, 2009). To the functionalist the situation comes first and is the target of meaning analysis. Physiological state changes are assumed to result from the meaning analysis, whereas for the psychological constructivist, it is first the physiological response that must first to be analyzed, but in the context of the external surrounding (L. F. Barrett, 2009). Taking a broader



constructivist view, “reality” cannot be understood beyond the constraints of human sensory systems (Karnaze, 2013). From this perspective, different theories of emotion may each be able to explain different aspects of the events and patterns that make up emotional states, rather than one theory out performing the others (Karnaze, 2013). In fact, many researchers use a hybrid model that combines the goal oriented functionalist approach with structuralist methods and the concept of discrete emotions (Thompson, 2011).

### **Emotion Regulation**

One often cited definition of emotion regulation comes from Thompson (1994, p.27-28), “Emotion regulation consists of the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one’s goals.” Thompson’s definition specifies that emotion regulation processes can both inhibit and enhance arousal in pursuit of a goal. For example, a child may suppress his sad feelings after receiving a poor grade on a test so as not to draw attention to himself. By contrast, another child may enhance feelings of anger in order to muster the courage to stand up to her bully. Second, the definition assumes that both internal resources and external influences can serve to regulate emotions. External influence is evident in young children when their parents manipulate the environment in order to help them remain calm. For example, a mother of an infant who is beginning to show signs of distress may bring her child out of a busy environment and into a calm one, and speak gently in order to help him calm down. Third, it is assumed that emotion regulation efforts are more likely to change the qualitative experience of any given emotion, such as its intensity and the length for which it persists,

rather than change the distinct emotion that is experienced. Finally, Thompson's definition includes a functional perspective, maintaining that the regulation of emotion is in pursuit of specific goals that are unique to any given individual.

Regulation of emotions is a normative process, learned through interpersonal and environmental interactions. Children must learn to regulate both positive and negative emotions, and their behavioural responses to them, in ways that are most adaptive to the current situation. Adaptive regulation may vary by context or when the child is with different people (e.g. with their parent versus with their teacher). The interplay between emotions and emotion regulation has a large role in decision-making processes, information recall, and interpersonal interactions (Thompson, 1994). Adaptive emotional responses must be flexible, situationally responsive rather than rigid, and performance enhancing rather than over- or under-arousing (Thompson, 1994).

The growth of interest in emotion regulation is not surprising, given the now general recognition that difficulty with emotion regulation is central to the development and maintenance of childhood psychopathology (Cicchetti & Toth, 1995). The study of emotion regulation provides a theory that bridges normative and atypical development, accounting for the ways in which emotions facilitate or interfere with other psychological processes (e.g. focused attention, problem solving, social responding; Cole, Martin, & Dennis, 2004). An unfortunate result of the flurry of research studies has been a literature riddled with multiple methods and unclear, inclusive definitions (Adrian, Zeman, & Veits, 2011; Cole et al., 2004; Thompson, 2011). Furthermore, disagreement among researchers as to whether emotional activation must precede emotion regulation or whether emotion (generation/reactivity) and emotion regulation are largely inseparable

processes further complicates empirical progress. Despite these obstacles, Thompson (2011) argues that it is not strictly necessary to determine which biobehavioural systems are activational and which are regulatory when studying them. He points to researchers in the fields of cognition and perception who have become proficient in studying regulatory processes without indicating which are specifically regulatory and which are activational. Additionally, Thompson looks to a developmental systems approach, which emphasizes reciprocal interactions among different components of a response system.

Gross and Thompson (2007) describe five families of emotion regulation processes: situation selection, situation modification, attentional deployment, cognitive change, and response modulation. *Situation selection* refers to actions that increase (or decrease) the likelihood that an individual will end up in a desirable (or undesirable) situation. For example, a high school student may choose to skip biology class on the day that they are dissecting a fetal pig because he believes he will have a negative emotional reaction. *Situation modification*, on the other hand, refers to adjusting a portion of a situation in order to make one's emotional reaction more likely to be desirable. An example of this would be planning structured breaks when faced with a long day working on an undesirable and frustrating task. *Attentional deployment* is the ways in which people direct their attention. Attentional deployment takes many forms and may have a powerful influence on emotion regulation. For example, it may take the form of internal redirection (distraction or concentration) or external redirection (such as looking away from an unpleasant scene or listening to music to drown out parental arguing). Attentional deployment can also be influenced by others, for example, parents often redirect their child's attention from unpleasant events. *Cognitive change* is an

emotion regulation strategy that involves changing the way in which one thinks so as to change the emotional significance a situation holds. This may take the form of changing the way one thinks about the situation or changing the way one thinks about his/her capacity to handle the situation. For example a child who goes to an amusement park with her siblings may experience a racing heart, sweaty palms, and a feeling of butterflies in her stomach when she sees the roller coasters. She may use cognitive change to attribute the sensations to excitement rather than fear. Another cognitive change strategy would be to remind herself of other times she has overcome fear and tell herself that she is capable of doing the same on the roller coasters, which leads to a reduction in the intensity of her fear.

Gross and Thompson (2007) describe the four families of emotion regulation processes described above as antecedent-focused because they occur before full-scale emotional responses occur. By contrast, *response modulation* is referred to as a response-focused form of emotion regulation, as it occurs after an emotional response has been initiated. Response modulation is the type of emotion regulation that has a direct impact on physiological, experiential, or behavioural response to emotion. Examples include relaxation techniques, exercise, and regulating emotion-expressive behaviour (e.g., keeping one's cool when angry).

**The measurement of emotion regulation.** There are four primary ways of measuring emotion regulation in childhood: self-report, other informant (parent, teacher, or peer), observational, and physiological-biological indicators (Adrian et al., 2011). Self-report and parent-report methodologies were the focus of this study. Self-report methodologies are important even in young childhood, because observers cannot

integrate different types of information (e.g. multiple physiological experiences, subjective appraisal of situation, and behavioural response) in the same way that an individual can (Adrian et al., 2011). In addition, children have been found to report higher levels of emotional inhibition than their parents, suggesting that parents may have difficulty reporting on aspects of emotion regulation that are less visible (Hourigan, Goodman, & Southam-Gerow, 2011). However, self-report of emotion is limited by the child's awareness of their own emotions, their ability to label and communicate their experiences, and their retrospective memories (Zeman, Klimes-Dougan, Cassano, & Adrian, 2007). Each of these limiting factors is expected to decrease as children develop; however, children develop at different rates and so it is difficult to say when children are reliable reporters of their own emotions. Other-report of emotion regulation can supplement self-report. Adult respondents often have a better understanding of emotions and emotional processes than child self-respondents, and other-respondents can provide insight into how a child's emotion regulation varies across settings (Adrian et al., 2011). The current study measured both self- and parent-reported emotion regulation.

Among the most commonly used measures of childhood emotion regulation are the Children's Emotion Management Scales (CEMS; Suveg & Zeman, 2004; Zeman, Cassano, Suveg, & Shipman, 2010; Zeman, Shipman, & Penza-Clyve, 2001), a self-report measure, and the Emotion Regulation Checklist (ERC; Shields & Cicchetti, 1997), a parent-report measure. These measures are divided into subscales, each of which measures a form of emotion regulation that maps on to Gross and Thompson's (2007) concept of response modulation, one family of emotion regulation. The CEMS measures three types of response modulation: inhibition of emotion, dysregulation of emotion, and

positive coping with emotion. Inhibition measures the child's tendency to keep his emotional experience to himself, avoiding expressing it outwardly. On this measure, dysregulation represents a child's tendency to act out her emotions in socially inappropriate ways. For example slamming doors when she is mad or crying and carrying on when she is sad. Coping measures a child's ability to keep himself from losing control when experiencing strong emotions and to calmly settle himself down. The ERC measures two types of response modulation: emotional lability/negativity and emotion regulation. Lability/negativity is similar to dysregulation as described above, because it measures a child's acting out of her emotions. This scale also incorporates a tendency towards negative affect. The emotion regulation scale measures a child's ability to express socially appropriate displays of both positive and negative affect. Different authors have called the emotion regulation scale on the ERC different names, for example, *emotion understanding* (Muller et al., 2013), *adaptive emotion regulation* (Shipman et al., 2007), and *emotion regulation skill* (Kliewer et al., 2004). In order to avoid confusing this scale with emotion regulation as a broader concept, *emotion regulation (ER) skill* will be used to describe the concept measured by this scale for the remainder of this document. For the remainder of this document, unless stated otherwise, the terms inhibition, dysregulation, coping, lability/negativity, and emotion regulation skill refer to the definitions above. The current study measured inhibition of emotion, dysregulation of emotion, emotional lability/negativity, and emotion regulation skill.

**Difficulty with emotion regulation and psychopathology.** When measuring the relationship between emotion regulation and childhood psychopathology, there is some overlap in the types of questions asked. In Gross and Thompson's (2007) five families

model of emotion regulation, response modulation is sometimes measured in similar ways to childhood psychopathology. For example, items such as “Is prone to angry outbursts/tantrums easily” is a sign of difficulty with response modulation, but may also be an early precursor to more serious childhood psychopathology. When measuring emotion regulation, there is only a small conceptual overlap with symptomatology because response modulation only accounts for one of the five types of emotion regulation. In addition, the behaviours that overlap are on a continuum in which low levels of the behaviours are considered typical (e.g. taking an extra cookie when Mom is not looking), whereas high levels of the behaviour are considered very problematic (e.g. stealing cash from Mom’s wallet at least once a week). For this reason, items on measures of psychopathology are worded in ways that reflect extreme forms of the behaviour rather than the more mild forms. The differences between difficulty with the response modulation, which is thought to precede full-fledged psychopathology, and the symptoms of mental health problems are larger than the similarities.

When children have difficulties in learning how to regulate their emotions, the resulting patterns are expressed as either overregulation or underregulation (Cole, Michel, & Teti, 1994; Zeman et al., 2001). It has been hypothesized that internalizing problems are likely the result of overregulated (inhibited) positive emotions. By contrast, externalizing problems may result from underregulated negative emotions. However, this model may be oversimplified (Cole et al., 1994). At least some externalizing behaviours appear to meet the criteria for an ‘underregulated’ label. For example, many children with externalizing problems seem to react impulsively to emotionally charged situations; however, some forms of externalizing behaviours seem to be unprovoked and carefully

calculated (e.g. stealing and lying; Mullin & Hinshaw, 2007). In addition, it is unclear whether internalizing symptoms come from overregulation of positive emotions such as happiness, or from underregulation of negative emotions such as fear (Mullin & Hinshaw, 2007). The literature below provides an outline of the research that has looked at the relationships between emotion regulation and psychopathology.

***Internalizing symptoms.*** Internalizing problems, defined as problems that are directed inwards, such as disordered mood or withdrawal (Achenbach & Rescorla, 2001), have been found to be related to inhibition of anger, and dysregulation of both anger and sadness (Zeman, Shipman, & Suveg, 2002) as well as impaired cognitive emotion regulation strategies such as rumination and catastrophizing (Garnefski, Kraaij, & van Etten, 2005). By contrast, emotion regulation, defined as emotional, behavioural, and attentional self-regulatory skills (McCoy & Raver, 2011), and constructive coping with anger (Zeman et al., 2002) have been found to be associated with less internalizing symptomatology. Some of the specific internalizing problems that have been found to be related to difficulty with emotion regulation include elevated levels of anxiety (e.g., Suveg & Zeman, 2004), depression (e.g., Hughes, Gullone, & Watson, 2011), and somatic complaints (e.g., Gilleland, Suveg, Jacob, & Thomassin, 2009; Rieffe, Oosterveld, Miers, Terwogt, & Ly, 2008).

***Anxiety.*** Anxiety has been linked to a variety of measures of emotion regulation. For example, youth with anxiety disorders report poor emotion awareness (Suveg, Hoffman, Zeman, & Thomassin, 2009), greater intensity and frequency of negative emotional responses (Carthy, Horesh, Apter, Edge, & Gross, 2010; Suveg, Hoffman, et al., 2009; Tan et al., 2012), and more frequent physiological reactions to emotion



activation (Suveg, Hoffman, et al., 2009; Tan et al., 2012). Anxiety has been linked to dysregulation of emotion and emotional lability/negativity (Suveg, Hoffman, et al., 2009; Suveg & Zeman, 2004). Anxious children report poor coping with feelings of worry, sadness, and anger (Suveg & Zeman, 2004). In terms of specific coping strategies, anxious children display higher levels of problematic cognitive coping strategies such as rumination, self-blame, and catastrophizing (Carthy et al., 2010; Legerstee, Garnefski, Verhulst, & Utens, 2011), and lower levels of adaptive cognitive coping strategies such as positive reappraisal and refocusing on planning (Carthy et al., 2010; Legerstee, Garnefski, Jellesma, Verhulst, & Utens, 2010; Suveg, Hoffman, et al., 2009).

*Depression.* Similarly, depression has been found to be closely linked to different components of emotion regulation. Poor emotion awareness (Siener & Kerns, 2012), low positive affect frequency (Suveg, Hoffman, et al., 2009), as well as high levels of negative affect intensity (Siener & Kerns, 2012) have been linked to depression in youth. This last finding contradicts the hypothesis that internalizing problems are the result of exclusively overregulated emotions. Inhibited expression of emotion has also been linked to depression (Keenan, Hipwell, Hinze, & Babinski, 2009). Similarly, emotion dysregulation (Suveg, Hoffman, et al., 2009), more biased interpretations of emotionally charged situations (Siener & Kerns, 2012), and poorer emotional control, self-awareness, and situational responsiveness (Hughes et al., 2011) are all related to depression in children and adolescents. Poorer coping strategies such as suppression (Hughes et al., 2011), self-blame, rumination, and catastrophizing (d'Acremont & Van der Linden, 2007) tend to be associated with depression. Conversely, more positive coping strategies such as problem-focused coping, refocusing on planning, and positive reframing (d'Acremont

& Van der Linden, 2007; Siener & Kerns, 2012) are associated with lower levels of depressive symptoms.

Suveg, Hoffman, et al. (2009) conducted a study attempting to determine whether different emotion related variables were specific or common predictors of anxiety and depression. The results were consistent with the previous literature. Specifically, poor emotion awareness, culturally inappropriate emotion expression, poor emotion regulation coping, and a high frequency of negative affect were common correlates of both anxiety and depression. Depression, but not anxiety, was related to low frequency of positive affect. Together these findings suggest that children with anxiety report a greater frequency of negative affective states; however, they continue to experience positive affective states at rates similar to normative children. Anxiety was uniquely related to children reporting a higher frequency of emotional experiences overall, both positive and negative, and more somatic responses to emotions.

***Externalizing symptoms.*** Externalizing problems are directed outwards such as disordered behaviors, aggression, delinquency, or hyperactivity (Achenbach & Rescorla, 2001). Although externalizing disorders have traditionally been characterized as problems of behaviour and cognition rather than disorders of affect, the DSM-IV-TR definitions include disorganized, explosive, and defiant patterns of affect and behaviour, all of which interfere with learning, social maturation, and the rights of others (Mullin & Hinshaw, 2007), providing face validity for studying emotion and emotion regulation in order to gain a full understanding of externalizing disorders. The DSM-5 extends this tradition of including problematic affect regulation in its definition of externalizing disorders, and includes an additional emphasis on difficulty with emotion regulation in

the criteria for Oppositional Defiant Disorder (American Psychiatric Association, 2013). Different components of emotion regulation have been reliably linked to externalizing behaviours. Overall, maladaptive affect regulation has been found to be more influential on problem behaviour than has adaptive affect regulation (Zaremba & Keiley, 2011). Specifically, emotion dysregulation (Zeman et al., 2002), and anger and exuberance (Rydell, Thorell, & Bohlin, 2007) are correlates of externalizing problems. Constructive coping, defined as constructive control over emotional behaviours, has been linked with fewer externalizing behaviour (Zeman et al., 2002).

*Attention deficit hyperactivity disorder (ADHD).* Deficits in inhibitory control, as seen in children with ADHD, are expected to cause disruptions in regulatory executive functions, leading to difficulty with emotion regulation (Mullin & Hinshaw, 2007). Specifically, these children are expected to exhibit emotional reactivity, to have difficulty anticipating emotionally charged events, and to have difficulty regulating their own emotions in service of achieving goals (Mullin & Hinshaw, 2007). Children with ADHD are more emotionally reactive to general events than are typically developing children; however, they are also less emotionally reactive to consequences of their own behaviour (Jensen & Rosén, 2004). Additionally, children with ADHD display poorer emotion recognition (Cadesky, Mota, & Schachar, 2000), and more emotional lability than do controls (Anastopoulos et al., 2011). Some authors purport that high levels of emotional reactivity and difficulty with emotion regulation is unlikely to characterize all children with ADHD, but likely to distinguish a subset of children with ADHD who exhibit concurrent aggression (Mullin & Hinshaw, 2007).

*Conduct problems and aggression.* Overall, high negative reactivity to emotional stimuli and poor emotion regulation are associated with reactive aggression, but not proactive aggression (Mullin & Hinshaw, 2007). That is, regulatory skills are related to defensive reactions to perceived threat, but not pre-meditated, covert aggressive behaviour. Children who are high in reactive aggression are more likely to attribute hostile intentions to ambiguous social interactions and react accordingly (Crick & Dodge, 1996). Conversely, there is evidence that proactive and covert forms of aggression are characterized by underarousal and a lack of emotional reactivity that manifests as low levels of fear in threatening situations and unresponsiveness to discipline (Lahey, Hart, Pliszka, Applegate, & McBurnett, 1993).

*A transactional relationship.* Despite an expansive literature supporting the relationship between emotion regulation and psychopathology, relatively few studies have looked at this relationship longitudinally, attempting to establish a temporal order. Most longitudinal work has looked at emotion regulation as a predictor of later symptoms. For instance, emotion dysregulation predicts internalizing symptoms three months later (McLaughlin, Hatzenbuehler, & Hilt, 2009), and emotion regulation skill six months (Kliewer et al., 2004) and one year (Kim & Cicchetti, 2010) later. Although externalizing symptoms have also been predicted from earlier emotion regulation deficits, the relationship between these variables appears to be more complex. Difficulty with emotion regulation, as observed by researchers during a frustrating family task, in the spring predicted non-compliance in a group of boys with ADHD in the summer of the same year (Melnick & Hinshaw, 2000). In the same study, less constructive coping in the spring, in terms of stronger displays of emotion, poorer accommodation to situations, and

focusing on the negative, predicted aggression in the summer. On the other hand, emotion regulation skill in a group of at-risk African American children did not predict externalizing symptoms six months later (Kliewer et al., 2004). Additionally, lower self-reported emotion regulation of sadness and anger predicted relational, but not overt, aggression two-and-a-half years later, and only for girls (Bowie, 2010). One study, done by Kim and Cicchetti (2010) may provide some insight into these discrepant findings. These authors found no direct relationship between emotion regulation skill and externalizing symptoms one year later; however, they found an indirect path relationship between these variables. The path between emotion regulation skill and externalizing symptoms was mediated by prior externalizing symptoms and by peer rejection.

Neumann, van Lier, Frijns, Meeus, and Koot (2011) attempted to parse out whether emotion regulation predated symptoms or vice versa. This study looked at the relationship between level and variability of different emotions and symptoms of anxiety, depression, and aggression, and found that emotions and symptoms seemed to predict each other in young adolescents. Symptoms of both anxiety and depression at age 13 years predicted both level and variability of happiness, anxiety, sadness, and anger one year later (age 14 years). Similarly, level and variability of each of the same emotions at 13 years, predicted anxiety and depression one year later. Similar relationships were found between aggression, anxiety, sadness, and anger, but not for happiness. There was no relationship in either direction between level and variability of happiness and aggression. These results suggest that the link between at least two measures of emotion regulation and both internalizing and externalizing symptoms may be cyclical, in that

poor emotion regulation leads to internalizing and externalizing symptoms, which then lead to further problems in emotion regulation.

### **Childhood Trauma**

Although many people look at childhood as a time of innocence and play, the reality is that many children experience trauma and abuse. The most recently published incidence study of child abuse and neglect in Canada estimated more than 85,000 substantiated cases of abuse and/or neglect, an incidence of 14.19 cases per 1,000 children (Trocmé et al., 2010). Of the children affected by maltreatment, 18% experienced multiple types of maltreatment. In almost 18,000 additional cases, 2.98 per 1,000 children, maltreatment was suspected, however, there was insufficient evidence to substantiate maltreatment. These numbers are sobering in and of themselves, but it is important to note that they do not include cases of child maltreatment that were unreported or were reported to the police and not to child welfare agencies. In Canada, 46% of children affected by maltreatment have difficulty with daily functioning in at least one domain (Trocmé et al., 2010). The four most indicated domains of functioning difficulties were academic issues, depression/withdrawal, aggression, and difficulty with attachment.

An important consideration in child maltreatment research is the fact that a number of maltreated children appear to be resilient to its effects. Whereas some of the variability may be due to insensitivity of the tools used to measure impaired functioning, children seem to vary in their responses to traumatic events and circumstances. A developmental psychopathology perspective provides a framework for understanding differential outcomes for children who have experienced maltreatment. From this

perspective, maladaptation stems from a dynamic interaction between the individual and his/her environment (Sameroff, 2000). A child who has experienced abuse at the hands of one parent but who has, say, a second supportive parent, or who has an easy temperament, is more likely to adapt positively than a child who suffers the same type of abuse at the hands of a single parent and who has a difficult temperament.

The developmental psychopathology model brings biological, behavioural, and contextual circumstances together in an attempt to understand the individual as a dynamic and evolving being (Sameroff, 2000). From this perspective, any form of child maltreatment is a deviation from the conditions that support healthy development, and steers children away from a normative developmental pathway toward more maladaptive paths, including psychopathology (Cicchetti & Toth, 2005). Each stage of development presents an opportunity for reorganization of prior developmental configurations using higher order structures. Early experiences carry forward as they are reorganized through subsequent developmental stages, throughout the lifespan. Children who are able to successfully negotiate early issues have a higher probability of continuing along an adaptive pathway, whereas failure on early developmental issues increases the likelihood of further deviations in the future. Factors in the external environment can promote the likelihood of positive or negative adaptation (Cicchetti & Toth, 2005). As this is a continuous process, an individual's developmental pathway is ever-changing (Sameroff, 2000).

**Negative sequelae of trauma.** Given that any form of maltreatment is considered a departure from a normative developmental pathway, it is not surprising that myriad deleterious outcomes are associated with childhood trauma. These symptoms

typically present as difficulty with regulation of behavioural, emotional, cognitive, and psychobiological domains and may have a profound effect on the child's ability to meet typical developmental tasks (Margolin & Vickerman, 2011). As a result, traumatized children often present with insecure or disorganized attachment, difficulties with self-system processes, difficulties with peer relationships, academic failure, neurobiological changes, psychopathology, and affect dysregulation (Cicchetti & Toth, 2005).

In terms of psychopathology, many children meet criteria for posttraumatic stress disorder (PTSD) following maltreatment and others develop significant posttraumatic stress (PTS) symptoms but do not meet full criteria for PTSD (McLeer, Deblinger, Atkins, & Foa, 1988; McLeer et al., 1998; Rowan & Foy, 1993; Singer, Anglin, Song, & Lunghofer, 1995). Children who have experienced maltreatment demonstrate a higher incidence of internalizing problems (Bolger & Patterson, 2001; Manly et al., 2001; Moylan et al., 2010; Robinson et al., 2009). Additionally, child maltreatment and exposure to domestic violence have been linked to withdrawal, anxiety, depression, and somatic complaints (Manly et al., 2001; Moylan et al., 2010). Externalizing problems have also been linked to child maltreatment (Manly et al., 2001; Moylan et al., 2010). Conflict with authority (Stouthamer-Loeber, Loeber, Homish, & Wei, 2001), delinquent behaviours (Moylan et al., 2010; Stouthamer-Loeber et al., 2001), aggression (Manly et al., 2001; Moylan et al., 2010; Teisl & Cicchetti, 2008), anger (Robinson et al., 2009), and disruptive behaviour (Manly et al., 2001; Teisl & Cicchetti, 2008) have all been found to be related to childhood maltreatment. Children who have experienced maltreatment have also been found to have decreased positive affect (Robinson et al.,



2009), and lower levels of cooperativeness and ego resilience and higher levels of ego undercontrol (Manly et al., 2001), when compared to their non-maltreated peers.

The negative sequelae of child maltreatment do not end with childhood. Multiple literature reviews have found that adults survivors of childhood sexual abuse are at significant risk of developing a wide range of physical and emotional health problems, including psychotic symptomatology, depression, anxiety, posttraumatic stress, obsessive-compulsive symptoms, dissociation, eating disorders, somatization, personality disorders, low self-esteem, interpersonal problems, suicidal and self-injurious ideation and behaviour, risky sexual behaviours, hostility, anger, perpetration of sexual abuse, somatic symptoms, and revictimization (e.g., Maniglio, 2009; Oddone Paolucci, Genuis, & Violato, 2001). Childhood physical and emotional abuse and neglect also have effects that extend into to adulthood, including depression, anxiety, somatization, drug and alcohol abuse, and more frequent suicide attempts than their non-abused peers (e.g., Hillberg, Hamilton-Giachritsis, & Dixon, 2011; McCauley, Kern, Kolodner, Dill, & Schroeder, 1997; Widom, DuMont, & Czaja, 2007), as well as physical health symptoms in adulthood, including lower general health, gastrointestinal, gynecologic, pain and cardiopulmonary symptoms, and obesity (Irish, Kobayashi, & Delahanty, 2010), and personality disorder characteristics (Gibb, Wheeler, Alloy, & Abramson, 2001).

### **Emotion Regulation and Childhood Maltreatment**

The effects of maltreatment experiences on emotion regulation are of particular interest to this study. Children who have experienced maltreatment in the form of physical abuse (Kim & Cicchetti, 2010; Shields & Cicchetti, 1998; Teisl & Cicchetti, 2008), sexual abuse (Kim & Cicchetti, 2010; Shipman, Zeman, Penza, & Champion,

2000), exposure to domestic violence (Maughan & Cicchetti, 2002), and neglect (Kim & Cicchetti, 2010; Shipman et al., 2005) demonstrate difficulty with emotion regulation. Children who have a history of abuse often become hypersensitive to expressions of anger (Thompson, 2011). By being hypervigilant, children can become aware of early signs of impending abuse and adjust their behaviour in ways that may be protective. Although this vigilance is adaptive in the abusive situation, it is often maladaptive outside of the home. As such, when children are outside of the home or when they are no longer in danger of being maltreated, their previously adaptive hypervigilance interferes with normative developmental processes.

Among maltreated children exposed to anger between adults, 80% of 4-6 year-olds were found to display difficulty with emotion regulation in either undercontrolled ambivalent or overcontrolled unresponsive forms, compared to only 37.2% of nonmaltreated controls (Maughan & Cicchetti, 2002). Child maltreatment has been linked to low emotion understanding (Shipman et al., 2005; Shipman et al., 2000), high levels of emotion lability/negativity (Shields & Cicchetti, 1998; Shipman et al., 2007), high inhibition of anger and sadness (Shipman, Zeman, Fitzgerald, & Swisher, 2003; Shipman et al., 2000), and fewer adaptive regulation skills (Shipman et al., 2005; Shipman et al., 2007). There is some evidence that emotion dysregulation characterized by a lack of socially appropriate expression of emotion, low empathy, and low emotional self-awareness is more closely related to childhood maltreatment experienced at an early rather than later age, and that multiple traumatic events have a cumulative effect, decreasing emotion regulation skill (Kim & Cicchetti, 2010).

Some researchers have investigated the ways in which childhood maltreatment can lead to difficulties with emotion regulation. For example, Shipman et al. (2007) found that maltreating mothers tend to provide their children with less emotional coaching and to respond to their children's emotions in less validating ways than non-maltreating mothers. In their sample, emotional coaching and validation mediated the relationship between maltreatment status and emotion regulation skill. Additionally, neglected children have been found to expect less emotional support and more conflict from their mothers in response to emotional displays of anger and sadness (Shipman et al., 2005). Not surprisingly, these same children reported that they were less likely to express their anger and sadness to their mothers than were non-maltreated children.

Other researchers have looked to neurobiology in search of explanations for the link between childhood maltreatment and difficulty with emotion regulation. Childhood is a time of rapid brain development. The most rapid development to the brain occurs before the age of five; however, brain structures continue to develop and synaptic pruning continues throughout middle childhood and into adolescence (Giedd et al., 1999). Theorists believe that the efficiency of frontal lobe functioning is improved throughout this period by pruning away unused neural synapses and improving the conductance of active neurons through myelination (Lee & Hoaken, 2007). It is theorized that areas of the brain that are activated will have their synaptic connections strengthened; by contrast, underutilized neural connections will be pruned away (Lee & Hoaken, 2007). In children who experience abuse, efforts at emotion regulation that are adaptive in times of threat become strengthened neural pathways. When the child is removed from the maltreating environment, and these efforts become maladaptive in a normative setting, neural

connections related to alternative response pathways may have been pruned away, making it much more difficult for maltreated children to adapt their behaviour. Findings that maltreated children have reduced intracranial and cerebral volumes (Cicchetti & Toth, 2005) provides evidence that childhood maltreatment can have lasting structural effects on the developing brain.

Another proposed mechanism in the association between childhood maltreatment and emotion dysregulation is corticotropin-releasing factor (CRF), a neurotransmitter responsible for coordinating behavioural, autonomic, immune, and endocrine components of responses to stress. In a review of the available literature, Heim and Nemeroff (2001) reported that CRF is essential for normal adaptation to stress; however, in lab animals, prolonged or excessive exposure to CRF has been found to produce stress, depression, anxiety, increased heart rate, disrupted appetite and sleep, and other symptoms reminiscent of prolonged stress or trauma. An abundance of CRF neurons and receptors have been found in the neocortex and the central nucleus of the amygdala, which has been identified as a key brain site in the mediation of emotions. These authors found that early life stress results in hyperactivity of CRF systems, resulting in long lasting hyper-responsiveness to stress. The authors suggested that CRF has a large role in the mediation of both stress and emotion regulation, and may have a key role in the link between childhood maltreatment and emotion regulation difficulties.

**Emotion regulation, childhood maltreatment, and psychopathology.** As in normative populations, among children who have been maltreated, those with impaired emotion regulation display more psychopathology. Among this population, parent-rated poor emotion regulation skill, characterized by a lack of socially appropriate expression

of emotion, low empathy, and low emotional self-awareness predicts internalizing symptomatology (Muller et al., 2013), as does observer coding of anger intensity (Robinson et al., 2009). Emotional lability/negativity predicts internalizing, externalizing, and posttraumatic symptomatology (Muller et al., 2013), and a parent rated q-sort measuring emotional dysregulation as high reactivity, low empathy, and socially inappropriate expressions, predicts externalizing symptomatology (Teisl & Cicchetti, 2008).

As difficulty with emotion regulation is both an outcome of traumatic experiences and a predictor of psychopathology, some researchers have begun to investigate emotion regulation as a mechanism in the path between risk and maladaptive outcome. For example, emotion regulation, measured using the same q-sort mentioned above, has been found to partially account for the relationship between childhood maltreatment and aggression/disruptive behaviour (Shields & Cicchetti, 1998; Teisl & Cicchetti, 2008) and for the association between childhood maltreatment and internalizing and externalizing behaviours (Alink et al., 2009). This later finding was found to be moderated by the child's pattern of relatedness to his/her mother. Emotion regulation was only a mediator for children who evinced an insecure relationship. Finally, emotion undercontrol was found to be a mediator in the relationship between childhood maltreatment and anxious/depressed symptoms (Maughan & Cicchetti, 2002). Given that difficulty with emotional regulation has been shown to be one path from maltreatment to psychopathology, it may be that one way to improve children's psychological functioning is by improving emotional regulation.

### **Emotion Regulation in Psychotherapy**

A number of authors have looked for evidence that emotion regulation can improve over the course of therapy. Research on therapeutic play interventions has yielded mixed results with regards to regulation of affect. For example, a therapeutic playgroup for foster children improved emotional lability/negativity as rated by research assessors but not by foster parents (Pears, Fisher, & Bronz, 2007). An untreated comparison group of foster children were rated to become more emotionally labile/negative over the same time period. By contrast, following a structured play intervention designed to encourage children to express feelings, children did not show evidence of increased emotional understanding or emotion regulation skill (Moore & Russ, 2008). Studies looking at cognitive behavioural therapy (CBT) have reported reductions in maladaptive emotion regulation of worry among anxious children (Kley et al., 2012; Suveg, Sood, et al., 2009), and reductions in emotional lability and increases in the generation of coping strategies in children with high functioning autism (Scarpa & Reyes, 2011).

Interventions specific to the treatment of trauma in children and adolescents have demonstrated some efficacy in improving emotion regulation. Children and adolescents have been found to improve their emotion regulation following Trauma Systems Therapy (TST), an intervention that targets both difficulty with emotion regulation and the child's socio-ecological environment (Ellis et al., 2012). Additionally, adolescents who participated in an emotion regulation intervention (Trauma Affect Regulation: Guide for Education and Therapy; TARGET) designed to help delinquent girls with symptoms of PTSD, demonstrated improvement in ability to identify, manage, and utilize adaptively negative emotions; the size of this effect was reported to be small (Ford et al., 2012).

TARGET uses the principles of CBT, but goes beyond other models of CBT to include a focus on the client's core values and hopes for the future to help identity formation (Ford & Russo, 2006). Ford and colleagues (2012) reported that a comparison group that was provided a relational supportive intervention did not improve in their ability to identify, manage, and utilize adaptively negative emotions in this population.

Despite some promising findings, a review of the literature addressing emotion regulation and CBT for anxiety revealed that adaptive emotion regulation skills are often not taught explicitly enough (Hannesdottir & Ollendick, 2007). For example, although worry regulation was found to improve in CBT for children with anxiety, anger and sadness regulation was not (Suveg, Sood, et al., 2009). Children with anxiety disorders have been shown to have difficulty regulating a wider range of emotions than just worry, including anger and sadness (Suveg & Zeman, 2004). Hannesdottir and Ollendick concluded that a broader range of emotions should be targeted in CBT programs for children with anxiety, given that children with anxiety have difficulty managing emotions above and beyond their fears.

Although this review was specific to CBT for anxiety, Hannesdottir and Ollendick (2007) outlined a number of suggestions to maximize emotion regulation education that may be helpful in a variety of interventions: (a) education on emotions should extend beyond one emotion and should focus on how to steer clear of difficult emotions; (b) teach new skills with exposure so that children have the experience of using skills when distressed; (c) include positive emotions and pleasant activities in therapy to counteract anxiety and depression; (d) teach attention shifting skills to help children focus on positive information when distressed; (e) teach reframing of negative thoughts as positive

thoughts; (f) include direct training in parent management skills and reflective listening that is focused on emotional experiences and the modeling of emotional responses for parents; (g) support parents in adopting an emotion coaching parenting style, which requires that parents tolerate their children's negative mood states without becoming upset or impatient and use these events as opportunities to offer guidance on how to regulate the emotions.

Emotion-focused Cognitive-Behavioural Therapy (ECBT) expands traditional CBT for anxiety to include discussions of a wide range of problematic emotions, such as sadness, anger, or happiness (Suveg, Kendall, Comer, & Robin, 2006). ECBT has been found to increase children's use of emotion-related language, ability to identify emotional states, and understanding of how to change their own emotions. Decreases in inflexibility, lability/negativity, and frequency of both negative and positive emotions have also been reported (Suveg et al., 2006). These results suggest that focusing on a wide variety of emotions in CBT may lead to improvements in a number of different emotion regulation domains.

Considering the substantial literature on emotion regulation and the deleterious outcomes associated with difficulty regulating emotion, surprisingly little research attention has focused on improvement of affect regulation as a predictor of child therapy outcome. Three studies were found that directly addressed this question. Suveg, Sood, et al. (2009) reported that improvements in maladaptive worry regulation (a combination of worry dysregulation and inhibition), but not adaptive worry regulation (worry coping and anxiety self-efficacy), predicted improvements in anxiety scores among anxious youth in a CBT intervention. Similarly, Slee et al. (2008) found that improvement in emotion



regulation, specifically improvement in impulse control and engaging in goal directed behaviour, partially mediated the relationship between type of treatment (treatment as usual versus treatment as usual combined with CBT) and improvement in deliberate self-harm. Finally, Kley et al. (2012) reported that reduction in maladaptive anxiety regulation (a combination of giving up, aggressive action, withdrawal, self-devaluation, and perseveration) predicted reduction in social anxiety following a group CBT intervention.

Additional clues that improvement in emotion regulation may be one mechanism by which improvements in psychopathology occur in treatment exist. For example, in a filial therapy program for parents and children aged 2-10 years, poorer emotion regulation in the children predicted greater reductions in child behaviour problems (Topham, Wampler, Titus, & Rolling, 2011), suggesting that children with more difficulty regulating emotions at the beginning of therapy had more room to improve in terms of psychopathology. Additionally, different treatment protocols that aim to improve emotion regulation have reported improvement in symptoms of psychopathology. For example, children who participated in Contextual Emotion-Regulation Therapy (CERT) improved in terms of symptoms of depression and anxiety (Kovacs et al., 2006). CERT was designed as a 30-session intervention for childhood chronic depression, and includes a parental involvement component. Although CERT uses interventions that are commonly used by therapists, the novelty of the intervention is an explanatory paradigm that frames childhood depression in a developmentally appropriate way, rather than borrowing from the adult literature (Kovacs et al., 2006). This intervention assumes that children's mood problems likely develop gradually in

sensitive children. These children have difficulty regulating dysphoric emotions following one or more stressors, which leads to an overall negative mood. In turn this negative mood leads to social and functional repercussions that further exasperated the dysphoric mood, leading to a spiral of symptoms and a depressive episode. Whereas the authors of this study did not measure changes in emotion regulation directly, changes in symptomatology following a course of treatment designed to improve emotion regulation are suggestive that emotion regulation is the mechanism of change in symptomatic improvement.

Other interventions aimed at improving emotion regulation in children include the Emotion Detectives Treatment Protocol (EDTP; Bilek & Ehrenreich-May, 2012) and Mindfulness-Based Cognitive Therapy for Children (MBCT-C; Semple et al., 2010). EDTP is a 15-session group intervention based on research in emotion science, cognition, and behaviour management. Three core principles guide the treatment (Bilek & Ehrenreich-May, 2012). Children are taught to 1) change their cognitive appraisal of a situation before the onset of intense emotion, 2) prevent emotion avoidance, and 3) modify maladaptive behavioural action tendencies. EDPT has been demonstrated to improve childhood anxiety and depression severity ratings. MBCT-C is a 12-session group intervention that teaches decentering from thought and emotions as a means to promote enhanced attention, improve affective regulation, and increase social-emotional resiliency in children (Semple et al., 2010). Compared to children in a waitlist control group, children in the intervention group showed fewer attention problems following treatment. Additionally, significant improvement in anxiety and behavioural problems was reported for children who had reported elevated levels of anxiety prior to the

intervention. It is noteworthy that neither of these studies measured changes in emotion regulation directly, and simply inferred improvement in emotion regulation from improvement in symptoms.

Despite the few studies above that measured change in emotion regulation throughout therapy directly, there is a gap in the literature, in that it is currently unknown whether therapeutic interventions that are designed to help children improve their emotion regulation actually impact this area of functioning. In addition, it is unknown whether improvements in emotion regulation lead to positive changes in terms of psychopathology, particularly in children who have experienced trauma. One goal for the current study is to address this gap, by testing whether improvements in emotion regulation lead to improvements in symptomatology following Trauma-Focused Cognitive-Behavioural Therapy (TF-CBT).

### **TF-CBT for Childhood Trauma**

Trauma-Focused Cognitive-Behavioural Therapy (Cohen, Mannarino, & Deblinger, 2006) was developed to address the needs of children who have experienced trauma and/or abuse. TF-CBT offers children and their non-offending caregivers short-term Cognitive Behavioural Therapy that has been modified to be trauma specific. TF-CBT has achieved the highest scientific rating (of 1), as rated by the California Evidence-based Clearinghouse for Child Welfare (2011). This rating means that the treatment is well supported by at least two randomized controlled trials in different settings and that evidence supports the benefits of the therapy. Additionally, TF-CBT is one of only three evidence-based treatment modalities to meet the criteria for “best practices” by the Kauffman Best Practices Project (Chadwick Center for Children and Families, 2004).

Finally, The National Registry of Evidence-Based Programs and Practices (NREPP), a sector of the US Department of Health and Human Services (SAMHSA), rated TF-CBT between 3.6 and 3.8 (out of 4.0) on its ability to effectively treat PTSD, depression, and behavior problems, and 3.6 (out of 4.0) for quality of research available (Substance Abuse and Mental Health Services Administration). In a recent review of the published literature on the effectiveness of TF-CBT, Cary and McMillen (2012) found that TF-CBT was more likely to reduce symptoms of posttraumatic stress (PTS) than were attentional control, standard community care, or waitlists, both immediately following therapy and 12 months later. Additionally, TF-CBT was found to be more effective than these controls at reducing both depression and behavioural problems immediately following therapy. Although there was no difference between the TF-CBT group and the controls on measures of depression and behavioural problems at 12 months follow-up, the authors reported that the null finding was likely the result of children in the control groups catching up, as the children treated with TF-CBT did not appear to regress in their symptoms.

TF-CBT is a component-based model. The components can be summarized by the acronym PRACTICE: (P) psychoeducation and parenting component, (R) relaxation skills, (A) affective modulation skills, (C) cognitive coping skills, (T) the trauma narrative and cognitive processing trauma experiences, (I) in vivo mastery of trauma reminders, (C) conjoint child-parent sessions, (E) enhancing safety and future developmental trajectory (Cohen & Mannarino, 2008). The model involves *both* child *and* caregiver at every step of the therapy process. The therapist works with the child for the first half of each 90-minute session, and in the second half, teaches the parent what

the child learned during his/her session. Although the treatment is child focused, it has been demonstrated that including a non-offending caregiver in TF-CBT leads to better therapy outcomes for both children and parents (Cohen et al., 2006), such as decreased depressive and externalizing symptomatology at treatment termination, and fewer abuse-related fears at a three month follow-up session. Furthermore, evidence has been found that adding a parent component to treatment can reduce parental PTSD and depressive symptoms (Cohen, Deblinger, Mannarino, & Steer, 2004; Cohen, Mannarino, & Knudsen, 2004).

**Emotion regulation education in TF-CBT.** Although only one of the components of TF-CBT is labeled as “affective modulation skills,” education on emotion regulation is woven throughout the model. The first part of therapy is devoted to skill building. Children and their parents are taught to identify a wide range of emotions relevant to daily life and traumatic experiences (Cohen et al., 2006). Affective education is presented in the form of games in order to keep the atmosphere as light and playful as possible. In this way, the TF-CBT model meets the recommendations made by Hannesdottir and Ollendick (2007), to include information about a wide range of emotions, including positively valenced emotions, to counteract depression and anxiety. Other skills contribute to the child’s education on emotion regulation as well. For example arousal reduction skills are taught, such as deep breathing, progressive muscle relaxation, mindfulness, grounding activities, and movement activities such as yoga (Cohen & Mannarino, 2008). Cognitively based activities are used to target negative or unhelpful thoughts, which may be the root of difficult affective experiences and maladaptive behaviours. In addition, children develop a feelings survival kit in which

they store coping strategies for when their emotions become overwhelming. Together these skills address Hannesdottir and Ollendick's suggestions to include attention shifting and positive reframing of negatively valenced thoughts.

Including parents in treatment was another recommendation made for better emotion education (Hannesdottir & Ollendick, 2007). The TF-CBT model includes a parenting skills component in which parents are given the tools to use praise, selective attention, and contingency reinforcement programs, all of which help children to manage their behavioural responses to emotion (Cohen & Mannarino, 2008). Furthermore, parents who are involved in treatment are in a position to help maximize the benefits of intervention by assisting their children to apply the strategies and skills that they develop during therapy to everyday life, both throughout therapy and after termination.

Following the skills development portion of TF-CBT, children develop a trauma narrative in which they express their personal experiences of trauma in writing or in other artistic forms (Cohen et al., 2006). This serves as a type of gradual exposure for the child, who progressively adds details to the story. As this exposure occurs, the therapist and child continually monitor the child's state of arousal and use skills developed in the first part of therapy to help regulate the child's emotions, maintaining low levels of distress. Additionally, the therapist helps the child to recognize cognitive distortions related to the trauma that are unhelpful in daily life. These activities correspond to Hannesdottir and Ollendick's (2007) recommendation to teach new skills during exposure. In addition to the trauma narrative, whenever possible, children gain in vivo exposure to trauma reminders. For example, a child who was sexually abused in a public washroom and has developed a fear of entering public restrooms, may gradually regain

her confidence in using such facilities with the help of her therapist. As when creating the trauma narrative, during in vivo exposures, the child's level of distress is carefully monitored and affect regulation skills are used to maintain an optimal level of arousal.

While the child is writing the narrative, the parent is also experiencing a type of gradual exposure to their child's version of the traumatic events. The parent is first exposed to the trauma narrative alone with the therapist during his/her individual portion of the sessions (Cohen et al., 2006). This can be very difficult for parents, as many have never spoken to their children about the traumatic experiences (Cohen & Mannarino, 2008). The therapist coaches the parent how to react to the child when he/she shares the narrative directly with the parent. The therapist helps teach the parent to tolerate the child's feelings of distress and praise the child for discussing ongoing fears and cognitive distortions. When the therapist feels that the parent is adequately prepared, the child reads his/her trauma narrative with the parent. The parent, supported by the therapist, models appropriate emotions for the child, including sadness following a traumatic event, pride for their child who has worked hard to express him/herself, and hope for the future.

Therapist coaching of the parent adheres to Hannesdottir and Ollendick's (2007) final recommendations for emotion regulation education, direct training in parent management and reflective listening, as well as in tolerating children's negative moods. Together, the components of TF-CBT include at least some aspects of each of the recommendations made by Hannesdottir and Ollendick (2007) for effective affect regulation education. As such, TF-CBT may be a good context within which to examine changes to emotion regulation.

### **The Current Study**

A positive outcome of the “affect revolution” described by Adrian et al. (2011) was a wealth of evidence that emotion regulation is closely related to childhood psychopathology. As such, emotion regulation skills have been proposed to be a promising area of development in therapeutic approaches (Thompson, Lewis, & Calkins, 2008). As yet, this proposition has not been widely tested, especially in the area of childhood trauma. The purpose of the current study was to examine emotion regulation and its effects over the course of Trauma-Focused Cognitive-Behavioural Therapy for children exposed to traumatic events. The TF-CBT model teaches skills related to different aspects of emotion regulation, provides practice using these skills during exposures, and coaches parents how to respond to their child’s emotions (Cohen & Mannarino, 2008). Additionally, it addresses the recommendations for effective affect regulation education within a cognitive behavioural therapy framework, as outlined by Hannesdottir and Ollendick (2007). By examining changes in emotion regulation throughout TF-CBT, this study adds to the emerging literature on improvements to emotion regulation throughout cognitive behavioural interventions for childhood trauma. This research is especially pertinent given the strong link between emotion regulation and childhood trauma, and the wide use of TF-CBT to treat these children.

A second, and perhaps more clinically important, purpose of the current study was to examine whether improvements in emotion regulation through TF-CBT predicted improvements in posttraumatic stress (PTS), internalizing, and externalizing symptoms. Whereas researchers now widely agree that emotion dysregulation is central to the development of childhood psychopathology (Cicchetti & Toth, 1995), it is relatively unknown whether improving emotion regulation, through psychotherapy, can improve



childhood symptoms. Only two studies were found to address this issue in the child and adolescent literature, and none were found that looked at a childhood trauma population, indicating a gap in this area. The current study looked at emotion regulation as a potential mechanism of change in TF-CBT for children who have been exposed to trauma.

Four different measures of emotion regulation were analyzed in this study: child-reported emotional inhibition, child-reported emotional dysregulation, parent-reported lability/negativity, and parent-reported maladaptive emotion regulation skill. In addition, four measures of childhood symptoms were analyzed in this study: child-reported posttraumatic stress (PTS) symptoms, parent-reported PTS symptoms, parent-reported internalizing symptoms, and parent-reported externalizing symptoms. Previous work using the sample in the current study revealed that statistically significant symptom change occurred from pre-assessment to post-treatment for measures of posttraumatic stress, not only during the treatment period, indicating that symptomatic improvement began during the assessment period, prior to the beginning of TF-CBT (Konanur, 2013; Konanur & Muller, 2012, 2013). For this reason all of the analyses in the current study will be performed both including and excluding the assessment period.

### **Research Questions and Hypotheses**

**Research Question 1.** What is the association between emotion regulation at pre-assessment and childhood symptoms at pre-assessment?

**Hypothesis 1:** It is expected that those children with the most difficulty with emotion regulation at pre-assessment will also have the highest levels of psychopathology. More specifically, it is expected that:

- a) High levels of child-reported emotional inhibition will be positively related to both child- and parent-reported PTS symptoms, and internalizing symptoms.
- b) High levels of child-reported emotional dysregulation and parent-rated emotional lability/negativity and poor emotion regulation skill will be positively related to both child- and parent-reported PTS symptoms, and internalizing and externalizing symptoms.

**Planned Analyses 1.** Linear regression models will be run to see if emotion regulation measured at pre-assessment will predict symptoms at pre-assessment. Separate models will be run for each dependent variable (child-reported PTS symptoms, parent-reported PTS symptoms, parent-reported internalizing symptoms, and parent-reported externalizing symptoms), each with the same four independent variables (inhibition, dysregulation, lability/negativity, and emotion regulation skill).

**Research Question 2.** To what extent do children experience improvements in emotion regulation over the course of TF-CBT treatment? Are these improvements maintained at 6-month follow-up?

**Hypothesis 2.** It is expected that children's emotion regulation will improve throughout therapy and that these gains will be maintained from post-treatment to follow-up. It is expected that these improvements will be reflected by both self- and parent-report of emotion regulation.

**Planned Analyses 2.** This hypothesis will be assessed in two ways, and it is expected that significant improvements in emotion regulation will be found using both methods.

- a) Emotion regulation scores for the entire group will be compared using paired samples t-tests at pre-assessment and post-treatment, pre-assessment and follow-up, pre-treatment and post-treatment, and pre-treatment and follow-up to determine whether changes have occurred.
- b) Change scores measuring change in emotion regulation that occurred during the waitlist period for waitlist control participants will be compared to change scores measuring changes in emotion regulation that occurred during the treatment period for non-waitlist participants, using independent t-tests.

**Research Question 3.** To what extent does improvement in emotion regulation predict improvement in symptoms?

**Hypothesis 3:** It is expected that children who evidence the most improvement in emotion regulation, as measured by both self- and parent-report, will improve the most in terms of all forms of symptomatology. It is expected that these results will be maintained at follow-up.

**Planned Analyses 3.** Linear regression models will be run to see if emotion regulation change scores measured from pre-assessment to post-treatment will predict symptom change scores from pre-assessment to post-treatment, and if emotion regulation change scores measured from pre-treatment to post-treatment will predict symptom change scores from pre-treatment to post-treatment. Separate models will be run for each type of symptom change at each time period, resulting in four models at each time period. The four measures of emotion regulation will be included in each model. In order to determine whether any effects found are maintained at follow-up, similar linear

regression models will then be run to see if emotion regulation change scores measured from pre-assessment to follow-up will predict symptom change from pre-assessment to follow-up, and if emotion regulation change scores measured from pre-treatment to follow-up will predict symptom change from pre-treatment to follow-up.

Change scores have been found to be biased when the data are skewed, or floor- or ceiling-effects are present in the data (Cribbie & Jamieson, 2000). As such, a second set of linear regression models will be run to see if post-treatment emotion regulation scores, controlling for pre-assessment emotion regulation scores, predict post-treatment symptom scores, controlling for pre-assessment symptom scores. Again, all four measures of emotion regulation will be included in each model looking at one type of symptom at each time period. The same method will be used to look at the time periods between pre-treatment and post-treatment, pre-assessment and follow-up, and pre-treatment and follow-up. This method of analyzing the data was not chosen as a primary method because correlations between pretest and other predictors can bias the relationship between the predictors of interest and change (Cribbie & Jamieson, 2000). The results of this second, covariate, method of data analysis will only be presented when they differ from the change score method.

### **Method**

Data for this study was taken from the Healthy Coping Program (HCP; Muller & Di Paolo, 2008), a multisite project that looks at the effectiveness of Trauma-Focused Cognitive Behaviour Therapy as delivered by community agencies in Toronto and Peel regions, Canada. Ethics approval for this study was obtained from York University and from each of the participating agencies. The research initiative was funded by the

Provincial Centre of Excellence for Child and Youth Mental Health at the Children's Hospital of Eastern Ontario (CHEO) and the Hedge Funds Care Canada Foundation.

Data were collected from March 2006 through January 2013.

### **Procedure**

**Recruitment and eligibility.** Participants were recruited from two agencies: (a) BOOST Child Abuse Prevention & Intervention (BOOST) and (b) Peel Children's Centre (PCC), two agencies that provide assessment and treatment to children who have experienced sexual abuse. Referrals to these agencies were made by the Children's Aid Society (CAS), local police services, family physicians, caregivers, or other community agencies. The caregiver of each child referred between the ages of 7 and 12 years during the recruitment period was approached about research participation. Although the recruiting agencies generally receive referrals for children who have experienced sexual abuse, some of the children were referred for other types of trauma, for example exposure to community violence or physical abuse. In addition, it is common for children referred for services to have experienced more than one type of abuse or trauma (Cohen, Deblinger, et al., 2004; Manly et al., 2001). This was also the case in the HCP sample, resulting in a sample of children who had been exposed to various forms of traumatic experiences.

At the initial intake meeting, a researcher from York University met with the family and an agency clinician to discuss research participation. Information about the research study was delivered by the representative from York University, and not by the clinician. Families were invited to participate in the research if the following conditions were met: (1) the child had a verified abuse or trauma experience, (2) the child was 7 to

12 years of age at the time of treatment, (3) a non-offending parent or caregiver was willing and able to participate in assessment and treatment, (4) the child and/or caregiver did not have an active substance use or psychotic disorder that interfered with functioning, (5) the child was not actively suicidal, (6) the child did not have a documented developmental disorder that would interfere with treatment, (7) the child and/or caregiver were currently on a stable regimen if they were taking a psychotropic medication, and (8) the child had not received any prior treatment directly related to the referral trauma. As incentive to participate in the research, families received a stipend of \$20 for each of the first four data collections, and \$30 for the final data collection. In addition, children who were recruited through BOOST were able to skip the waiting list for treatment at their local treatment center. Families were informed that participation in treatment and/or research was entirely voluntary and that withdrawal from the research would not impact their treatment in anyway. Written and verbal consent was obtained from participating caregivers and verbal assent was obtained from participating children. Families who declined research participation were offered the same TF-CBT protocol.

**Data collection timeline in relation to clinical services.** From March 2006 to August 2008, participating families were randomly assigned to either a waitlist control condition, or to an immediate services group. Participants in the waitlist control group were required to wait three-months prior to receiving assessment. Families were no longer placed in the waitlist control group following August 2008, due to an agency policy change.

All participating families received a clinical assessment at either BOOST or PCC. Although some of the research measures were used by agency clinicians in their

assessments, the assessments were for the purposes of clinical services and not research. For the families on the waitlist, the assessment occurred after their three-month waiting period. Assessments ranged from one to eight sessions ( $M = 3.38$ ;  $SD = 1.98$ ).<sup>1</sup> The time from assessment beginning to completion ranged from 1 to 110 days ( $M = 30.14$ ;  $SD = 29.40$ ; 5% trimmed  $M = 25.47$ ;  $Mdn = 21.00$ ). Following assessment, participating families assessed at BOOST were triaged to 7 community agencies for treatment. These agencies included: Aisling Discoveries Child and Family Centre, Child Development Institute, COSTI Family and Mental Health Services, The Etobicoke Children's Centre, The Hincks-Dellcrest Treatment Centre (Jarvis Site), The Hincks-Dellcrest Treatment Centre (Sheppard Site), and Yorktown Child and Family Centre. Children assessed at PCC remained at PCC for treatment. All families were treated using TF-CBT.

Both participating caregivers and children were asked to complete several measures at different time points. The measures used for this study were all collected at each of the time points. Families who were randomly assigned to the waitlist control group completed measures before beginning the three-month waiting period (waitlist). All participants were asked to complete measures prior to beginning the assessment and after the three-month waitlist for those in the waitlist control group (pre-assessment), following assessment and prior to beginning treatment (pre-treatment), immediately after terminating treatment (post-treatment), and six-months following the end of treatment (follow-up). See Figure 1 for a visual summary of the data collection time periods and the number of participants who completed measures each time.

Each of the measures was collected by two research assistants from York University, who sat with the family members as questionnaires were completed.

Children and their participating parents completed the measures in separate rooms, with the help of the research assistants. Participating families received an average of 17.67 sessions of TF-CBT ( $SD = 7.21$ ; range of 10-45; 5% trimmed  $M = 17.06$ ;  $Mdn = 15.00$ ). Many of the families received more than the suggested 12-16 sessions of TF-CBT, and 6 families received more than 22 sessions. This variability was due to the fact that this study was part of a larger study designed to determine the effectiveness of TF-CBT in a community sample. In some cases the therapists found that families required more than the suggested number of sessions due to family circumstances and other issues that arose during the treatment. As such, these numbers are thought to reflect the variation that exists in typical community settings.

### **Therapists**

Thirty-four therapists from seven Children's Mental Health Centres in Toronto and Peel took part in this study. Participating therapists were predominantly female (33 of the 34) with Master's level education (75.8%). Remaining therapists held partial doctoral degrees (12.1%), undergraduate degrees (3%) or diplomas (3%). Therapists came from social work (60.6%) and psychology (24.3%) educational backgrounds. The remaining fields included art therapy, psychodynamic child therapy, marriage and family therapy, and child youth care. Most therapists had five or more years of clinical practice (67.6%), and five or more years of experience working with children with trauma histories (52.9%). Theoretical backgrounds were varied, including CBT (45.5%), eclectic/integrative (15.2%), client-centered/nondirective (12.1%), psychoanalytic/psychodynamic (9.1%), solution-focused (6.1%), narrative (6.1%), and



other orientations (6.1%). Each therapist saw an average of 2.23 children who participated in the study ( $SD = 1.61$ ; range of 1-8).

Participating therapists were required to read the TF-CBT training manual (Cohen et al., 2006) in detail, and complete the accompanying web-based training program in TF-CBT. Therapists also attended TF-CBT training workshops given by experts in the field. Therapists met in smaller focused facilitation groups on a monthly basis to review questions regarding the TF-CBT model, and to review cases in order to ensure model fidelity. They received extensive ongoing training and supervision in the TF-CBT model by a psychologist who has worked within the model for several years, and who frequently provides TF-CBT training in both Canada and the United States. The trainer was available via phone at many of the team meetings. Finally, therapists completed an adherence checklist following each therapy session, in order to ensure model fidelity. Overall, therapists adhered well to the TF-CBT model, which is flexible as to when and how often different components are covered. Each of the components was covered with each of the families.

### **Participants**

A total of 159 children were approached about participating in the study. Fifteen children were excluded from the research for one of the exclusionary criteria. The caregivers of an additional 31 children declined participation in research, often citing time constraints or disinterest in treatment all together. A total of 113 children participated in at least one data collection point for this study. Fourteen sets of two siblings, and two sets of three siblings participated in at least one data collection. Sixteen children did not have parent-report for at least one data collection. Most often this was

because time constraints did not allow the parent to complete measures for more than one sibling. In some cases this was due to language barriers that made it difficult for the caregiver to complete questionnaires. In order to determine whether inclusion of siblings in this study had an influence on the results, analyses for each of the hypotheses were run including all of the siblings, and again with only one sibling from each family.

Thirty children (28 with parent-report measures) were randomly assigned to a 3-month waitlist. While on the waitlist, three families withdrew from clinical services and one more withdrew from the research, a fifth family was excluded after the data collection because the therapist decided that TF-CBT was not an appropriate intervention for the child. Data are available for 107 children at pre-assessment (97 with parent-report measures), 78 children at pre-treatment (68 with parent-report measures), 58 children at post-treatment (53 with parent-report measures), and 44 children at follow-up (40 with parent-report measures). Thirty-seven families withdrew from all clinical services following completion of at least one data collection point. This is consistent with the number of families who typically dropout of clinical services at the involved agencies. Most often the reasons for dropout were not known; however, some families moved or reported that they were too busy for therapy. An additional 17 families chose to withdraw from the research and continue with clinical services. Of these, three families reported that they were too busy or overwhelmed to continue with the research, three families reported that they did not want to answer the specific questions that were asked, researchers were unable to contact four of the families following treatment for follow-up data collection, and the reason for dropout was unknown for seven families. Fifteen families were excluded from research following at least one data collection point. For 10

of these families the therapist no longer deemed TF-CBT to be an appropriate course of treatment, and for five the therapist had strayed too far from the model. Whereas attrition rate in this study was relatively high, it is within the range of 50-75% reported by other studies of child and family therapy (Kendall & Sugarman, 1997). Therapy completers were compared to non-completers on a range of demographic variables (household income, child gender, child age, and child ethnicity) and on the study variables at each time point. The only difference that was found was that non-completers ( $M = 10$  years, 6 months;  $SD = 1$  year, 7 months) were an average of about 10 months older than completers ( $M = 9$  years, 8 months;  $SD = 1$  year, 7 months). No differences were found between participants who dropped out of the research but remained in treatment when compared to those who dropped out of therapy altogether.

Demographic information about the participants revealed that 79 of the children were female (69.9%) and 34 were male (30.1%), which is consistent with other treatment samples of abused children referred for sexual abuse (Cohen, Deblinger, et al., 2004; Deblinger, Steer, & Lippmann, 1999). The children's ages ranged from 6 years, 11 months to 12 years, 11 months ( $M = 10$  years, 0 months,  $SD = 2$  years, 7 months). The participating caregivers identified their children as 38.1% European Canadian, 18.1% African Canadian, 10.5% Latin American Canadian, 5.7% South Asian Canadian, 4.8% Asian Canadian, 1.9% Aboriginal, and 21.0% other ethnicities. Seventy-five percent of children had no prior diagnosis upon referral. Of those children with such diagnoses, Attention Deficit Hyperactivity Disorder (ADHD) and Learning Disabilities were most common (11.3% each). Four percent of children were taking a psychotropic medication upon referral.

Children were referred for treatment due to sexual abuse (75.2%), physical abuse (11.5%), witnessing domestic violence (7.1%), traumatic loss of a caregiver (2.7%), home invasion (2.7%), and bullying (0.9%). Most children had experienced other traumas in addition to the referral trauma (74.3%). In cases in which there were direct perpetrators (as in abuse or witnessing violence), perpetrators were most often known to the child victim (92.0%), male (96.5%), and adults (80.5%). They were identified as adult non-relatives (36.0%), biological/adoptive father (26.1%), older peer (non-relative; 10.9%), other adult relative (9.0%), older peer (relative; 5.4%), step-father (4.5%), sibling (3.6%), biological/adoptive mother (1.8%), or multiple perpetrators (2.7%).

Participating caregivers were predominantly biological or adoptive mothers (83.3%). The remaining caregivers identified themselves as foster parents (6.5%), biological or adoptive fathers (7.4%), stepfathers (0.9%), one aunt (0.9%), and one child and youth worker (0.9%). Caregivers ranged from 25 to 62 years of age ( $M = 37.23$ ,  $SD = 8.13$ ; 5% trimmed  $M = 35.55$ ;  $Mdn = 37.00$ ), and 52.9% had attended at least some university or college. Caregiver occupations consisted of stay-at-home parents (23.1%), mid- to high- level professionals (16.3%), manual workers (11.5%), clerical/technical positions (9.6%), administrative or educational positions (8.7%), and other (22.1%). A large proportion of participating families reported household income of less than \$20,000 per year (41.0%). The remaining families reported incomes between \$20,000 and \$39,999 (16.2%), between \$40,000 and \$59,999 (21.9%), and over \$60,000 (21.0%).

## **Measures**

### **Measures of emotion regulation.**

**CEMS.** The Children's Emotion Management Scales (Suveg & Zeman, 2004; Zeman et al., 2010; Zeman et al., 2001) consist of three scales evaluating children's self-reported emotion regulation for sadness (12 items), anger (11 items), and worry (10 items). Children rate each item on a 3-point scale, ranging from "*Hardly ever/A little*" to "*Often*." Representative items include "I hold my sad feelings in," "I can stop myself from losing my temper," and "I talk to someone until I feel better when I'm worried." Factor analyses have yielded three factors for each scale, including inhibition, dysregulation, and coping, resulting in nine subscales in total. Some authors have combined the emotions into three total scales for inhibition, dysregulation, and coping (e.g. Shipman et al., 2005; Shipman & Zeman, 2001; Suveg & Zeman, 2004). In the current study total scores for inhibition and dysregulation will be used, combining all three emotions (See Appendix A).

The CEMS have been used with both maltreated and non-maltreated children between the ages of 6 and 12 years (Shipman & Zeman, 2001; Zeman et al., 2010; Zeman et al., 2001). The scale authors report moderate internal consistency for both total measure scores and scale factors, with Cronbach's alphas ranging from .62 to .80. Two-week test-retest reliabilities range from .61 to .80. The scales' validity is supported by studies reporting convergence with other measures of emotion regulation (Suveg & Zeman, 2004; Zeman et al., 2001), and between the CEMS and measures of internalizing and externalizing psychopathology (Zeman et al., 2001; Zeman et al., 2002). In the current study the alpha reliabilities for each of the measures are reported in Table 1.

There are two items on the CEMS dysregulation scale that overlap somewhat with the measures of psychopathology used in this study. "I cry and carry on when I'm sad,"

and “I do things like cry and carry on when I’m worried” are somewhat similar to “cries a lot” on the Child Behavior Checklist and “crying when he or she was reminded of something from the past” on the Trauma Symptom Checklist for Young Children. This small overlap can be attributed to the overlap between response modulation, one family of emotion regulation (Gross & Thompson, 2007), and the way in which childhood mental health problems are measured.

**ERC.** The Emotion Regulation Checklist (Shields & Cicchetti, 1997) is a 24-item parent-report measure of children’s ability to regulate emotions completed by a caregiver. The measure yields two subscales. The Lability/Negativity subscale is comprised of 15 items referring to a lack of flexibility, mood lability, and dysregulated negative affect (e.g., “Is prone to angry outbursts/ tantrums easily,” “Displays negative emotions when attempting to engage others in play”). The Emotion Regulation (emotion regulation skill) subscale is comprised of 8 items tapping in to appropriate displays of emotion, emotional self-awareness, and empathy (e.g., “Is empathetic towards others; shows concern when others are upset or distressed,” “Responds positively to neutral or friendly overtures by adults”). This scale is less concerned with negative behavioural outcomes and more concerned with appropriate emotional expression. In this study, the emotion regulation skill scale was reverse coded so that higher scores reflected poorer emotion regulation skill. Each item is rated on a 4-point scale, ranging from “*Never*” to “*Almost always*.” Strong internal consistency has been demonstrated, with Cronbach’s alphas ranging from .83 to .96 (Ramsden & Hubbard, 2002; Shields & Cicchetti, 1997).

The ERC has also been correlated with both independent observations of, and other measures of children’s emotion regulation (Shields & Cicchetti, 1997, 1998; Suveg

& Zeman, 2004). For example, CEMS sadness inhibition has been found to positively related to ERC lability/negativity (Zeman et al., 2001). In addition, ERC lability/negativity has been found to be positively related to CEMS worry dysregulation and negatively related to CEMS worry coping (Zeman et al., 2010). ERC emotion regulation skill was positively related to CEMS worry coping (Zeman et al., 2010).

### **Measures of childhood symptoms.**

**TSCC.** The Trauma Symptom Checklist for Children (Briere, 1996) is a 54-item self-report of children's posttraumatic distress and related symptomatology. The measure is designed for children from 8-16 years of age. Children rate each item on a 4-point scale, from 1 (*Never happens*) to 4 (*happens Almost all of the time*). Children's responses produce six clinical scale scores, including Anxiety, Depression, Anger, Posttraumatic Stress, Dissociation (with two subscales), and Sexual Concerns (with two subscales). Two validity scales are also scored, indicating whether the child is under or overresponding to an invalid degree. The author reports that internal consistency is strong for five of the scales, with alphas ranging from .82 to .89, but slightly lower for the Sexual Concerns scale ( $\alpha = .77$ ). In the current study only the Posttraumatic Stress (PTS) scale was used as an outcome variable.

The TSCC manual provides evidence from several unpublished studies which have contributed to the convergent and discriminant validity of the TSCC with various samples of children (Briere, 1996). The manual also demonstrates that among normative samples, higher and more variable TSCC scores have been found for children who have been exposed to violence or stressful life events than for those who have not. In child abuse samples, distinct patterns in TSCC scores have been found for children with

different abuse and trauma histories (Briere, 1996). Finally, studies have reported reduction in trauma symptoms as measured by the TSCC following abuse-focused therapy (Briere, 1996; Cohen, Mannarino, & Knudsen, 2005).

**TSCYC.** The Trauma Symptom Checklist for Young Children (Briere, 2005) is a 90-item parent-report of trauma related symptomatology for children between the ages of 3 and 12 years. Parents rate how often each symptom has been present over the previous month on a 4-point scale, from 1 (Not at all) to 4 (Very Often). Responses are combined to form eight clinical scales, including Anxiety, Depression, Anger/Aggression, Posttraumatic Stress (three posttraumatic symptom subscales plus a total score), Dissociation, and Sexual Concerns. Two validity scales are also available. The instrument has good reliability, with internal consistency alphas of .81 to .91, and two-week test-retest reliabilities ranging from .68 to .96 (Briere, 2005; Briere et al., 2001). In the current study the total Posttraumatic Stress (PTS) scale was used as an outcome variable.

The TSCYC has demonstrated validity in several analyses of separate samples. First, higher TSCYC scores have been found in abuse samples compared with non-abuse samples (Briere, 2005; Finkelhor, Ormrod, Turner, & Hamby, 2005), and have successfully discriminated abused from non-abused children (Briere et al., 2001). Gilbert (2004) examined the scale's concurrent validity with other clinical measures in use, and found that measures of similar constructs correlated significantly with the TSCYC subscale scores. This scale has not been examined alongside other caregiver measures specific to trauma symptoms.



**CBCL.** The Child Behavior Checklist 6-18 (Achenbach & Rescorla, 2001) consists of 118 items measuring various psychopathology symptoms in children and youth between 6 and 18 years of age. Caregivers rate how true each item is now and/or within the past six months, from 1 (Not True) to 3 (Very True or Often True). Resulting scores may be grouped into Internalizing and Externalizing scales. Internalizing items query symptoms such as depressed mood, anxiety, and somatic complaints. Externalizing items include aggressive and rule-breaking behaviors. The authors report strong internal consistency, with alphas of .90 (Internalizing) and .94 (Externalizing). One week test-retest reliabilities were .91 (Internalizing) and .92 (Externalizing), and stabilities at 12 months were .80 (Internalizing) and .82 (Externalizing).

Research with the CBCL has demonstrated strong validity in a number of areas. First, CBCL scores successfully discriminate referred from non-referred children (Achenbach & Rescorla, 2001). Scores also correlate with other similar measures (Doyle, Ostrander, Skare, Crosby, & August, 1997; Smith & Reddy, 2002). CBCL scores have demonstrated diagnostic utility for both internalizing and externalizing disorders (Aschenbrand, Angelosante, & Kendall, 2005; Krol, De Bruyn, Coolen, & van Aarle, 2006). Finally, treatment outcome studies with abused children consistently show reductions in CBCL scores following treatment (Cohen, Deblinger, et al., 2004; Deblinger et al., 1999; Nolan et al., 2002).

## **Results**

### **Preliminary Analyses**

Preliminary data analyses were conducted based on the techniques for screening data provided by Tabachnick and Fidell (2013). The internal consistency for each

emotion regulation and outcome variable was examined using Cronbach alpha coefficients. The mean, standard deviations, and alpha reliabilities for each appear in Table 1. Despite combining the inhibition subscales for anger, worry, and sadness into one scale (inhibition) and the dysregulation subscales for anger, worry, and sadness into another scale (dysregulation), the alpha reliabilities for this study were almost all within the range previously reported in the literature (Shipman & Zeman, 2001; Zeman et al., 2010; Zeman et al., 2001). At the waitlist time period, the dysregulation scale has a low alpha reliability in this study (.46). This scale is only used for hypothesis 2b in this study. Additionally, three other scales (post-treatment inhibition, post-treatment dysregulation, and waitlist poor ER skill) had alpha reliabilities that were lower than the acceptable cutoff of .70 (Kline, 2000). The conclusions drawn from the analyses using these scales should be interpreted with caution. Alpha reliabilities for all of the remaining scales were all within the acceptable range. For the regression analyses, the variance inflation factor (VIF) was examined for each predictor. The VIF is reported when it exceeds the identified cut-off of three. Correlations among the measures of emotion regulation are presented in Table 2.

The distributions of each of the variables in the study were screened to ensure that the statistical assumption of normality was satisfied. According to the Shapiro Wilk statistic, many of the variables demonstrated deviations from normality at different time periods. These included inhibition at pre-assessment, dysregulation at pre-treatment and follow-up, lability/negativity at pre-treatment, poor emotion regulation skill at pre-assessment, pre-treatment, and post-treatment, child-reported PTS at all time periods except waitlist, and parent-reported PTS, internalizing, and externalizing at all time

periods. Because these measures needed to be compared across time periods, each variable was transformed the same way across all time periods. Square-root transformations best fit the data for all of the variables except parent-reported PTS, which was log transformed. The remainder of the analyses were performed using the transformed variables. The assumptions of linearity, and homoscedasticity were examined using bivariate plots and examination of the residuals in the regression models. No extreme deviations in homoscedasticity or from linearity were noted. Cook's  $D$  was used to examine influential cases. A cut-off of Cook's  $D > 4/n$  was used to determine which individual observations had an extreme influence on the analysis. When individual cases meaningfully impacted the results, they were removed from the specific analysis that they influenced.

A one-way between subjects ANOVA was conducted to determine whether there were any unhypothesized relationships between demographic variables and the four symptom variables. The demographic variables included were household income, child gender, child age, and child ethnicity. When groups had unequal variance (as determined by Levene's statistic), Welch tests were used in place of standard ANOVA results. Results revealed that there were no significant effects of child age or child ethnicity on any of the outcome variables at any of the five time periods. By contrast there was a significant effect of gender on externalizing behaviour at the waitlist [ $F(1,26) = 5.77, p = .024$ ] and pre-assessment [ $F(1,88) = 4.68, p = .033$ ] time periods. At each of these time periods, parents of male children reported higher levels of externalizing behaviour in their children. At waitlist the mean score for males was 4.68 ( $SD = 1.56$ ) and for females was 3.37 ( $SD = 1.20$ ) and at pre-assessment the mean score for males was 3.81 ( $SD =$

1.18) and for females was 3.24 ( $SD = 1.12$ ). In addition there was a significant effect of household income on internalizing behavior at pre-assessment [ $F(1,87) = 14.67, p = .002$ ]. Parents from households with incomes at or below \$39,999 report reported higher levels of internalizing behaviour in their children at pre-assessment ( $M = 3.95; SD = 1.18$ ) than parents from households with incomes above \$40,000 ( $M = 3.13; SD = 1.22$ ). Given that the effects of gender and income were not found across all time periods, and given the small number of males compared to females, these demographic variables were not included in later analyses.

**Research Question 1: What is the association between emotion regulation at pre-assessment and childhood symptoms at pre-assessment?**

Linear regression analyses were conducted to determine the influence of emotion regulation at pre-assessment on each type of symptomatology pre-assessment. Four separate models were run, each including four measures of emotion regulation as predictors (emotional inhibition, emotional dysregulation, emotional lability/negativity, and poor emotion regulation skill), and one measure of symptomatology as the outcome variable. Standardized beta weights were examined in order to determine which symptoms were predicted by the individual measures of emotion regulation. One-tailed tests of significance were used in cases of directional hypotheses. Results are presented in Table 3.

A linear combination of the four types of emotion regulation at pre-assessment significantly shared a significant proportion of the variability in each of the symptoms at pre-assessment: child-reported PTS symptoms [ $R^2 = .27, F(4,85) = 7.78, p < .001$ ], parent-reported PTS symptoms [ $R^2 = .31, F(4,85) = 9.55, p < .001$ ], internalizing

symptoms pre-assessment [ $R^2 = .30$ ,  $F(4,87) = 9.34$ ,  $p < .001$ ], and externalizing symptoms [ $R^2 = .59$ ,  $F(4,78) = 27.57$ ,  $p < .001$ ]. Higher levels of inhibition, dysregulation, and lability/negativity were significant predictors of higher levels of both child-reported PTS symptoms and externalizing symptoms pre-assessment. By contrast, higher levels of lability/negativity and poor emotion regulation skill predicted higher levels of parent-reported PTS symptoms and internalizing symptoms pre-assessment. These results suggest that lability/negativity is the most consistent predictor of a broad array of symptoms prior to engaging in clinical services, whereas the other three types of emotion regulation predict more specific types of symptoms.

**Research Question 2: To what extent do children experience improvements in emotion regulation over the course of TF-CBT treatment? Are these improvements maintained at 6-month follow-up?**

**Research question 2a.** Paired-samples *t*-tests examined whether scores on the four measures of emotion regulation improved over the course of clinical services. Differences between the scores were compared from pre-assessment to pre-treatment, from pre-assessment to six-month follow-up, from pre-treatment to post-treatment, and from pre-treatment to six-month follow-up. Means, standard deviations, *t*-scores, one-tailed *p*-values, and effect sizes are presented in Table 4.

From pre-assessment to post-treatment, both inhibition and lability/negativity significantly improved. It is noteworthy that although the change in dysregulation was not statistically significant, the *t*-score and effect size were similar to those found for inhibition and lability/negativity. From pre-assessment to follow-up, both inhibition and dysregulation improved. From pre-treatment to post-treatment, only lability/negativity

improved. And finally, from pre-treatment to follow-up inhibition, dysregulation, and lability/negativity improved. Overall, these results show that inhibition, dysregulation, and lability/negativity improved over the course of clinical services for children engaged in TF-CBT treatment. The effect sizes for each of these changes were small. Emotion regulation skill did not improve during any of the time periods measured.

**Research question 2b.** Independent-samples *t*-tests compared changes in emotion regulation that occurred during the waitlist period for waitlist control participants to changes that occurred during the treatment period for immediate services participants. Improvement scores were calculated for each of the four measures of emotion regulation by subtracting scores for the later time period from scores for the earlier time period. For the waitlist group this meant subtracting each of the pre-assessment emotion regulation scores from the corresponding waitlist emotion regulation scores to obtain a change score for the waitlist period. For the immediate services group this meant subtracting the post-treatment emotion regulations scores from the corresponding pre-treatment emotion regulation scores to obtain a change score for the treatment period. Higher change scores represent greater improvement in emotion regulation.

Based on the comments from a reviewer, further analyses were completed to compare changes in emotion regulation experienced during the waitlist period to changes that occurred during the treatment period only for participants who were in the waitlist group. Paired-samples *t*-tests were used. Improvement scores were calculated in the same way as described above. The mean improvement over the waitlist period did not differ from the mean improvement over the treatment period for any of the types of

emotion regulation. Means, standard deviations, *t*-scores, one-tailed *p*-values, and effect sizes are presented in Table 6.

**Research Question 3. To what extent does improvement in emotion regulation predict improvement in symptoms?**

**Change score method.** Improvement was measured using change scores for both emotion regulation and symptoms. Change scores were calculated by subtracting the score for the later time period from the score for the earlier time period, such that higher scores represent greater improvement in emotion regulation or symptoms. Correlations among the change scores from pre-assessment to post-treatment and pre-assessment to follow-up are presented in Table 7. Correlations among the change scores from pre-treatment to post-treatment and pre-treatment to follow-up are presented in Table 8. The change scores were then used in a series of one-tailed linear regression analyses, conducted to determine whether emotion regulation improvement scores predicted symptom improvement scores at four different time periods (pre-assessment to post-treatment, pre-assessment to follow-up, pre-treatment to post-treatment, and pre-treatment to follow-up). Four separate models were run at each time period, each including four change scores for the different measures of emotion regulation as predictors and one single symptom change score as the outcome variable. Results are presented in Tables 9 and 10.

A linear combination of the four emotion regulation change scores predicted a significant proportion of the variability in improvement of each of the symptoms from pre-assessment to post-treatment: child-reported PTS symptoms [ $R^2 = .21$ ,  $F(4,41) = 2.68$ ,  $p = .045$ ], parent-reported PTS symptoms [ $R^2 = .22$ ,  $F(4,43) = 3.09$ ,  $p = .025$ ],

internalizing [ $R^2 = .45$ ,  $F(4,37) = 7.41$ ,  $p < .001$ ], and externalizing symptoms [ $R^2 = .56$ ,  $F(4,39) = 12.48$ ,  $p < .001$ ]. Over this time period, greater improvement in inhibition was a significant predictor of child-reported PTS symptoms. Improvement lability/negativity was a significant predictor of parent-reported PTS symptoms. Finally, improvement in inhibition and lability/negativity were significant predictors of improvement in both internalizing and externalizing symptoms.

From pre-assessment to follow-up, a linear combination of the four emotion regulation change scores predicted a significant proportion of the variability in improvement of child-reported PTS symptoms [ $R^2 = .39$ ,  $F(4,24) = 3.77$ ,  $p = .016$ ] and externalizing symptoms [ $R^2 = .34$ ,  $F(4,30) = 3.78$ ,  $p = .013$ ], but not parent-reported PTS symptoms [ $R^2 = .13$ ,  $F(4,30) = 1.17$ ,  $p = .346$ ] or internalizing symptoms [ $R^2 = .21$ ,  $F(4,30) = 1.97$ ,  $p = .125$ ]. During this time period, greater improvement in dysregulation and lability/negativity significantly predicted improvement in child-reported PTS symptoms and externalizing symptoms.

From pre-treatment to post-treatment, a linear combination of the four emotion regulation change scores shared a significant proportion of the variability in improvement of child-reported PTS symptoms [ $R^2 = .40$ ,  $F(4,37) = 6.08$ ,  $p = .001$ ], internalizing symptoms [ $R^2 = .28$ ,  $F(4,36) = 3.42$ ,  $p = .018$ ], and externalizing symptoms [ $R^2 = .32$ ,  $F(4,39) = 4.51$ ,  $p = .004$ ], but not parent-reported PTS symptoms [ $R^2 = .10$ ,  $F(4,42) = 1.22$ ,  $p = .315$ ]. During this time period, greater improvement in inhibition and dysregulation significantly predicted improvement in child-reported PTS symptoms. Improvement in dysregulation and lability/negativity significantly predicted improvement in internalizing symptoms. Finally, improvement in lability/negativity significantly



predicted improvement in externalizing symptoms. Although the overall regression model was not significant when parent-reported PTS symptoms was the dependent variable, it is noteworthy that the regression coefficient for improvement in lability/negativity came up as significant, suggesting that improvement in lability/negativity alone may predict improvement in parent-reported PTS symptoms if the other emotion regulation variables were not in the model.

Finally, from pre-treatment to follow-up, a linear combination of the four emotion regulation change scores shared a significant proportion of the variability in improvement of child-reported PTS symptoms [ $R^2 = .53$ ,  $F(4,26) = 7.30$ ,  $p < .001$ ] and externalizing symptoms [ $R^2 = .35$ ,  $F(4,28) = 3.80$ ,  $p = .014$ ], but not parent-reported PTS symptoms [ $R^2 = .06$ ,  $F(4,30) = 0.50$ ,  $p = .735$ ] or internalizing symptoms [ $R^2 = .18$ ,  $F(4,31) = 1.68$ ,  $p = .180$ ]. During this time period, greater improvement in dysregulation and lability/negativity significantly predicted improvement in child-reported PTS symptoms, and improvement in lability/negativity significantly predicted improvement in externalizing symptoms. Although the overall regression model was not significant when internalizing symptoms was the dependent variable, it is noteworthy that the regression coefficient for improvement in lability/negativity came up as significant, suggesting that improvement in lability/negativity may predict improvement in internalizing symptoms if the other emotion regulation variables were not in the model.

Overall, these results indicate that improvement in inhibition was the best predictor of improvement in child-reported PTS symptoms over the treatment period. However, when the follow-up period was included in the analyses, improvement in dysregulation and lability/negativity were the best predictors of improvement in child-

reported PTS symptoms. Improvement in lability/negativity significantly predicted improvement in parent-reported PTS, internalizing symptoms, and externalizing symptoms over the treatment period, regardless of whether the treatment period included assessment or not, making lability/negativity the most consistent predictor of parent-reported symptom improvement. At follow-up, improvement in lability/negativity continued to be the best predictor of parent-reported symptom improvement, however, the effect was less consistent. Finally, these results indicate that when looked at concurrently with the other types of emotion regulation, improvement in poor emotion regulation skill did not predict improvement in any of the symptoms measured in the current study.

**Covariate method.** Because change scores have been found to be biased when the data are skewed, or floor- or ceiling-effects are present in the data (Cribbie & Jamieson, 2000), a second set of linear regression models was run to see if post-treatment emotion regulation scores, controlling for pre-assessment emotion regulation scores, predicted post-treatment symptom scores, controlling for pre-assessment symptom scores. These secondary analyses were intended to lend support to the change score analyses above. In this case, all four measures of emotion regulation for both the pre- and post- time periods, as well as the pre- time period symptom score, were included as the predictors in each model. One type of symptom served as the dependent variable. The same method was used to look at the time periods between pre-assessment and follow-up, pre-treatment and post-treatment, and pre-treatment and follow-up. The results of this second, covariate, method of data analysis are considered consistent with the change score method when the standardized beta weights differ in magnitude of .20

or less. Results are presented only when they differ from the change score method. One problem with this covariate method of analysis was that the VIF often surpassed the identified cut-off of three. This was likely due to the strong correlations between each type of emotion regulation across time points, and highlights the potential problems with using the covariate method (i.e. correlations between pretest and other predictors can bias the relationship between predictors of interest and change). These correlations were especially high for lability/negativity and poor emotion regulation skill (see Table 2). In the analyses below, the VIF was below three unless otherwise noted.

At post-treatment, the regression coefficient for dysregulation predicting child-reported PTS symptoms was significant, controlling for these variables at pre-assessment [ $\beta = .23, t(45) = 1.99, p = .028.$ ], whereas, dysregulation was not significant using the change score method. Improvement in dysregulation also predicted improvement in child-reported PTS symptoms using the change score method when the treatment period did not include assessment (see Table 10). Also at post-treatment, inhibition did not predict internalizing problems when controlling for these variables at pre-assessment [ $\beta = .11, t(41) = 1.24, p = .223$ ]. This was in contrast with the change score method where improvement in internalizing symptoms was predicted by improvement in inhibition from pre-assessment to post-treatment. Finally, the standardized regression weight when externalizing symptoms at post-treatment were regressed on lability/negativity at post-treatment, controlling for these variables at pre-assessment, was .22 units higher using the covariate method than when using the change score method [ $\beta = .75, t(43) = 4.54, p < .001$ ]. The VIF for lability/negativity at post-treatment was 3.90. Both methods led to

the conclusion that improvement in lability/negativity predicted improvement in externalizing behaviour from pre-assessment to post-treatment.

At post-treatment, the standardized regression weight when externalizing symptoms were regressed on inhibition, controlling for these variables at pre-treatment, was .25 units lower using the covariate method than when using the change score method [ $\beta = -.02$ ,  $t(43) = -.26$ ,  $p = .797$ ]. Both methods led to the conclusion that improvement in inhibition did not predict improvement in externalizing symptoms from pre-treatment to post-treatment. At follow-up, the standardized regression weight when child-reported PTS symptoms were regressed on lability/negativity, controlling for these variables at pre-treatment, was .240 units higher using the covariate method than when using the change score method [ $\beta = .87$ ,  $t(30) = 4.26$ ,  $p < .001$ ]. The VIF for lability/negativity at follow-up was 5.00. Both methods led to the conclusion that improvement in lability/negativity significantly predicted improvement in child-reported PTS symptoms from pre-treatment to follow-up. Lastly at follow-up, poor emotion regulation skill did not predict internalizing symptoms, controlling for these variables at pre-treatment, using either the covariate or change score method. In this case the standardized regression weight when using the covariate method was .27 units higher than the change score method [ $\beta = .25$ ,  $t(35) = 1.06$ ,  $p = .300$ ]. The VIF for poor emotion regulation skill at follow-up was 4.01.

Overall, when using the covariate method, only two analyses led to different conclusions than the change score method. First, and in contrast with the change score method, at post-treatment the regression coefficient for dysregulation predicting child-reported PTS symptoms was significant, controlling for these variables at pre-assessment.

This difference suggests that both inhibition and dysregulation may be consistent predictors of improvement in child-reported PTS symptoms over the treatment period. It does not, however, change the fact that inhibition was a more robust predictor, which consistently had a higher beta weight than dysregulation when predicting child-reported PTS symptoms. Second, and also in contrast with the change score method, at post-treatment inhibition did not predict internalizing problems when controlling for these variables at pre-assessment. Using the change score method, inhibition was not a consistent predictor of symptom change for the adult-reported measures. This finding does not change the previous finding that lability/negativity was the most consistent predictor of adult-reported symptom improvement.

### **Discussion**

The purpose of the current study was to examine the ways in which emotion regulation changes throughout TF-CBT and its relationships with symptoms. Specifically, it was hypothesized that (1) emotion regulation at pre-assessment would predict symptoms at pre-assessment, (2) emotion regulation would improve throughout TF-CBT, and (3) improvements in emotion regulation would predict improvements in symptoms. Despite the vast number of research studies looking at emotion regulation over the past number of years, many issues remain unclear, especially among the population of children who have experienced trauma. Given the well-established relationships between emotion regulation and childhood symptomatology, a variety of different therapeutic approaches have been designed to address maladaptive emotion regulation. These therapy protocols assume that emotion regulation can be improved through therapeutic intervention and that improvements in emotion regulation will lead to

reductions in symptoms. As yet, neither of these assumptions has been widely studied. In fact, most research studies looking at interventions designed to improve emotion regulation do not measure emotion regulation at all. The results of the current study provide insight into the ways in which emotion regulation and symptoms change throughout therapy and the ways in which these variables are related.

### **The Association Between Emotion Regulation and Symptoms Prior to Clinical Services**

The current study supports the hypothesis that prior to clinical services, emotion regulation is related to symptom severity. Parent-reported lability/negativity was the most robust predictor of symptomatology. This form of emotion regulation consistently predicted more severe symptoms across all four types of symptomatology prior to clinical services (child-reported PTS, parent-reported PTS, internalizing symptoms, and externalizing symptoms). Lability/negativity is a parent's report of the child's inflexibility, mood lability, and tendency to act out negative emotions. These results suggest that when a child's difficulty with emotion regulation is outwardly expressed and recognized by a parent, that these difficulties are associated with a wide variety of symptoms. This finding supports prior research, which has found that emotional lability/negativity, predicts PTS symptoms, and internalizing and externalizing symptoms among children who have experienced trauma (e.g., Anastopoulos et al., 2011; Suveg, Hoffman, et al., 2009).

Although not as robust predictors, each of the other types of emotion regulation predicted some of the different types of symptoms prior to children engaging in clinical services. Inhibition and dysregulation both predicted greater severity of child-reported

PTS and externalizing symptoms. This finding suggests that both the tendency to hold emotional experiences inside without expressing them outwardly, and the tendency to act out emotions externally in inappropriate ways, predict both child-reported PTS symptoms and externalizing symptoms. Although it was hypothesized that inhibition would predict child-reported PTS symptoms, and that dysregulation would predict child-reported PTS and externalizing symptoms, it was surprising to find that inhibition predicted externalizing problems. Inhibition of anger and sadness has failed to predict externalizing symptoms in previous research (e.g., Zeman et al., 2002). Although no previous research was found to support an association between inhibition and externalizing behaviour, this may be in part because few studies have investigated such a link. Inhibition is considered overregulation of emotion and is typically linked with internalizing symptoms. By contrast, externalizing symptoms are hypothesized to be the result of underregulated emotions. Some authors have suggested that this model is oversimplified and that both over- and underregulated emotions may be linked with both types of symptoms (Cole et al., 1994). The result that inhibition predicted externalizing problems supports this notion and suggests that further research is needed in this area.

The finding that inhibition and dysregulation did not predict parent-reported PTS or internalizing symptoms is contrary to the hypotheses made at the outset of the current study, and not supported by the findings of previous research. Other authors have found inhibition of anger to be related to internalizing symptoms (Zeman et al., 2002) and dysregulation related to anxious/depressed symptoms (Maughan & Cicchetti, 2002). No research studies were found that looked at the association between emotional inhibition and PTS symptoms directly; however, maltreated children have been found to display

overcontrolled unresponsive forms of emotion regulation, akin to emotional inhibition (Maughan & Cicchetti, 2002). Maltreated children also display undercontrolled ambivalent forms of emotion regulation, akin to emotional dysregulation (Maughan & Cicchetti, 2002). Additionally, child-reported dysregulation is hypothesized to be similar to parent-reported lability/negativity, which was found to predict all forms of symptomatology above. Given all of these findings, it is somewhat surprising that child-reported PTS and internalizing symptoms were not predicted by inhibition. Children and their caregivers tend to demonstrate relatively low levels of agreement when reporting on the child's behavioural and emotional problems (Achenbach, McConaughy, & Howell, 1987; Hawley & Weisz, 2003; Safford, Kendall, Flannery-Schroeder, Webb, & Sommer, 2005). Moreover, parent-child disagreement varies depending on the type of child problem being considered, with reports of externalizing problems being less discrepant than reports of internalizing problems. This is likely because the nature of externalizing problems makes them more visible to parents (Achenbach et al., 1987; Hawley & Weisz, 2003). Therefore, child-reported inhibition and dysregulation may not predict parent-reported PTS and internalizing symptoms, in part because parents' report of these types of symptoms are expected to be somewhat discrepant from those that would be reported by children.

As anticipated, emotion regulation skill predicted parent-reported PTS and internalizing symptoms prior to clinical services. Poor emotion regulation skill reflects difficulty with socially appropriate expression of positive and negative emotion. This measure is less concerned with negative behavioural outcomes and is more concerned with adaptive expression of emotions (e.g., can say when s/he is feeling sad, angry or



mad, fearful or afraid) and empathy (e.g., is empathetic towards others; shows concern when others are upset or distressed). Thus, poorer ER skill reflected fewer socially appropriate displays of emotions. Children low in ER skill started clinical services with greater severity of PTS and internalizing symptoms, both according to their parents. It may be that children who are able to express their feelings in ways that their parents find appropriate are more likely to have their feelings validated and accepted. Given their positive experiences expressing their emotions, these children may be more prone to continue expressing their feelings. This likely helps them to develop integrated narratives of their traumatic experiences, leading to fewer symptoms of PTS and internalizing problems.

Prior to clinical services, emotion regulation skill was not related to externalizing behaviour. This finding is consistent with previous research on emotion regulation skill and externalizing behaviour (e.g., Kliewer et al., 2004; Zaremba & Keiley, 2011). Children who exhibit externalizing behaviours have difficulty with emotional impulsivity and reactivity (Mullin & Hinshaw, 2007), but they may not have any difficulty with adaptive expression of less intense emotions. Additionally, the ER skill measure relies heavily on children's responses to positive emotion. Externalizing behaviour has been found to be unrelated to children's report of happiness (Neumann et al., 2011). The current results support past research suggesting that maladaptive affect regulation is more influential to externalizing problems than is adaptive affect regulation.

It is somewhat surprising that child-reported PTS symptoms were not predicted by ER skill. This may stem from the expected discordance between parent and child report. It may also be partly attributed to the fact that traumatized children are known to

underreport their symptoms (Drake, Bush, & van Gorp, 2013). These children often use avoidance, denial, and rationalization as defense mechanisms against overwhelming feelings of distress and consequently underreport their symptoms. About one third of the children in the current sample (31.95%) had scores on the TSCC that were indicative or possibly indicative of underreporting. This is consistent with previous research looking at underreporting among children at high risk for emotional and behavioural problems (Ostler, Bahar, & Jessee, 2010).

### **Improvement in Emotion Regulation Over the Course of TF-CBT Treatment**

Improvement in emotion regulation was measured in three different ways. As expected, change in emotion regulation for the entire sample did improve over the course of TF-CBT treatment for children in the current study. It was somewhat surprising that none of the forms of emotion regulation improved consistently over all time periods and that the effect sizes were small. These results suggest that although children did improve in emotion regulation over the course of treatment, the magnitude of change was limited. By contrast, when change in emotion regulation during the waitlist period was compared to change in emotion regulation during TF-CBT, no differences were found. This was true when improvement in emotion regulation for children in the waitlist control group was compared to improvement in emotion regulation for children in the immediate services group, and when changes in emotion regulation in the waitlist control group were compared during the waitlist period and during the treatment period. These findings suggest that children waiting for services showed similar improvement in emotion regulation to children who were in the treatment phase of clinical services. Therefore, it may have been the passage of time, or a combination of time and TF-CBT that led to the

small improvements in emotion regulation seen in the entire sample. By contrast, it may have been the small number of people who were placed on the waitlist that caused the null results. Despite this possibility, the fact that only small improvements in emotion regulation occurred throughout TF-CBT, and that no discernible differences in improvement in emotion regulation exist between the waitlist time period and the treatment period, further research is needed before concluding that TF-CBT helps to improve emotion regulation.

Despite the limited evidence of improvement in emotion regulation, some small improvements were found. Improvement in inhibition was found from pre-assessment to post-treatment and this change was maintained in the six months following treatment. When only the pre-treatment to post-treatment period was measured, improvement in inhibition was not statistically significant. These results suggest that children did improve in terms of inhibition over the course of clinical services, but that the improvement began even before the TF-CBT treatment started. The children in the current study all went through a fairly extensive assessment prior to beginning TF-CBT. During the assessment children were asked about their thoughts and feelings about their trauma and about their behaviours in relation to these thoughts and feelings. For many of the children this was the first time they had the opportunity to talk about the traumatic event in a supportive environment and in an open way. Although the assessment was not standardized across all participants,<sup>1</sup> the findings from the current study and others using the same sample (e.g., Konanur, 2013) suggest that clinical change began before TF-CBT was administered, due to the therapeutic effects of the assessment. When children are inhibited, they tend to keep their emotional experiences to themselves, avoiding outward

expressions of their internal worlds. Both the assessment and treatment portions of clinical services provided the children in this sample with the opportunity to practice expressing their emotions in a safe space. These results suggest that overall, the children were able to benefit from this practice as they became less inhibited by the end of the treatment period and were able to maintain this gain six months following treatment's end.

Children in the current study also showed statistically significant improvement in dysregulation from pre-assessment to follow-up and from pre-treatment to follow-up, but that meaningful improvement did not occur during the clinical services periods.

Dysregulation reflects the child's tendency to act out emotions in socially inappropriate ways. Throughout the TF-CBT process children are taught strategies for managing their emotions in ways that are productive and socially appropriate to replace their current strategy of acting out emotions. It may have been that children needed more time to change their acting out habits than the clinical services period allowed. The demonstrated improvement in dysregulation suggests that the children were able to use these strategies to replace outward acting out of their negative emotions over the course of clinical services, and that they built on these gains in the six months following treatment's end.

Improvement in lability/negativity was found at post-treatment regardless of whether or not assessment was included in the analysis. These gains continued to be statistically significant at follow-up when the assessment period was not included in the analysis. Although improvement in lability/negativity was not statistically significant from assessment to follow-up, the analysis approached significance and the effect size

did not differ greatly from that for the improvement from pre-treatment to follow-up. Parent-reported lability/negativity is similar to child-reported dysregulation in that it measures the extent to which children act out their negative emotions. Lability/negativity also captures a tendency toward negative affect and mood lability. It is expected that the improvements made in lability/negativity were a result of the strategies that children learned during clinical services, including those in the TF-CBT model. These results are most compelling when taken together with those above as they demonstrate that children were able to replace acting out of negative emotions with more adaptive strategies, according to both child- and parent-report.

In the current study, there was no evidence of change in emotion regulation skill across any of the time periods measured. Emotion regulation skill measures the child's ability to express their emotions, both positive and negative, in adaptive and socially appropriate ways and demonstrate empathy. Unlike the other measures of emotion regulation used in the current study, this measure is not concerned with negative behaviours and is more focused on appropriate emotional expression. It may be that children did not improve in ER skill because the skills involved were not targeted by the treatment or assessment. Some of the items on this scale were "responds positively to neutral or friendly overtures by adults" (or "peers"), "is a cheerful child," and "is empathetic towards others." The TF-CBT treatment was not designed to help children develop positive social responses or empathy. Instead it was designed to help children cope with the strong negative emotions that often follow from traumatic experiences.

Overall, improvement in emotion regulation was seen across the treatment period and at follow-up; however, the changes were inconsistently observed and the size of the

effects was small. In addition, no differences were found in the amount of improvement that occurred during the waitlist period and the treatment period. These findings are consistent with previous research looking at change in emotion regulation following psychological treatment. For example, some authors have reported improvement to emotion regulation following therapy (e.g., Scarpa & Reyes, 2011; Suveg, Sood, et al., 2009), whereas others have failed to find improvements in their samples (Moore & Russ, 2008). Still others have found inconsistent results, for example lability/negativity has been found to improve following a therapeutic playgroup according to research assessors, but not foster parents (Pears et al., 2007). Finally, when improvement was reported, small effect sizes are typical (e.g., Ford et al., 2012; Kley et al., 2012). It seems that overall, the interventions targeting emotion regulation have had limited success in improving this construct.

### **Improvement in Emotion Regulation as a Predictor of Improvement in Symptoms**

It was hypothesized that improvement in each type of emotion regulation would predict improvement in symptomatology. It was not hypothesized how improvements in specific measures of emotion regulation would predict improvements in specific measures of symptomatology because relatively little research has been done in this area. However, it was assumed that improvement in none of the types of emotion regulation would lead to a worsening of symptoms. As predicted, relationships were found between improvement in emotion regulation and improvement in symptoms.

Throughout clinical services, improvement in inhibition was the best predictor of improvement in child-reported PTS symptoms, but not parent-reported PTS symptoms, regardless of whether or not the assessment was included in the analysis. However, this

relationship was not maintained at follow-up. Inhibition of emotion has been associated with a wide variety of symptoms (e.g., Zeman et al., 2002) and, thus, it was expected that improvements to emotional inhibition would predict improvements in all types of symptoms. Children inhibit emotional expression in an attempt to avoid difficult emotional experiences. By holding emotions inside, the child fails to fully experience the emotion. The trauma narrative component of TF-CBT allows children to gradually be exposed to emotions that may have been previously inhibited. In this way the child becomes desensitized to the powerful nature of difficult emotions and learns to tolerate them, no longer needing to rely on inhibition. The result that improvement in inhibition predicts improvement in child-reported PTS symptoms suggests that to the extent that children adaptively express negative emotions they also experience reductions in their self-reported PTS symptoms. It is interesting that this relationship was only seen during the clinical services period and was not maintained at six-month follow-up. It may be that improvement in PTS symptoms occurred in the context of a supportive relationship between children and their therapists, but was not maintained when children left clinical services. Although small improvements in inhibition were maintained at six-month follow-up, it may be that the magnitude of these improvements in expressed emotions was not enough to maintain gains in PTS symptoms when the child was no longer in contact with the therapist.

Improvement in dysregulation and lability/negativity were the most robust predictors of improvement in child-reported PTS symptoms at follow-up regardless of whether or not assessment was included in the analysis. Similarly, improvement in lability/negativity was the most robust predictor of improvement in all parent-reported

symptoms. As previously mentioned, dysregulation and lability/negativity are similar constructs in that they both measure outward expression of difficult emotions. These emotional displays are typically considered socially inappropriate ways of dealing with emotions. Children who have experienced trauma have higher levels of lability/negativity than their non-traumatized peers (e.g., Shields & Cicchetti, 1998; Shipman et al., 2007). Moreover, dysregulation and lability/negativity has been linked to a variety of psychological symptoms (e.g., Anastopoulos et al., 2011; Kim-Spoon, Cicchetti, & Rogosch, 2013; Muller et al., 2013; Zeman et al., 2002). Thus, it is not surprising that improvement in dysregulation and lability/negativity play an important role in symptom improvement throughout TF-CBT.

Maltreating families evince difficulty regulating emotions, more family chaos, less role clarity, and more rigid relationship strategies than non-maltreating families (Howes, Cicchetti, Toth, & Rogosch, 2000). Thus, traumatized children have less opportunity than their non-traumatized peers to learn effective emotion regulation strategies because these skills are not modeled at home. Consistent with a developmental psychopathology view, this veers maltreated children further from a normative pathway of development. The existing literature has shown that parents' positive emotion-related behaviours are linked to their children's ability to inhibit emotional expression (e.g., Duncombe, Havighurst, Holland, & Frankling, 2012; Eisenberg et al., 2001). This skill is lacking in children who are high in dysregulation and lability/negativity. While participating in TF-CBT, both parents and children are provided with instruction in emotion identification, arousal reduction, and cognitively based emotion management skills (Cohen et al., 2006). Having parents and children learn these skills alongside each



other may be especially helpful for traumatized children who have missed out on positive modeling of emotion regulation in their early years. Participating parents may use what they have learned in session to help their children to manage labile and negative emotions throughout the week. It has been demonstrated that mothers' emotional coaching among children high in lability/negativity is associated with lower levels of externalizing behaviour, supporting the notion that involving parents in emotion regulation education may be an important aspect of symptom change (Dunsmore, Booker, & Ollendick, 2013). Furthermore, recent research by Kim-Spoon, Cicchetti, and Rogosch (2013) demonstrated that emotion regulation skill mediated the relationship between lability/negativity and internalizing symptoms, suggesting that teaching children adaptive, socially appropriate emotion regulation strategies may have an impact on the level of symptomatology that they display.

Improvement in inhibition also predicted other forms of symptoms, albeit not consistently. From pre-assessment to post-treatment improvement in inhibition predicted improvement in internalizing symptoms; however, this effect was only observed using the change score method and not the covariate method of analysis. Similarly, when assessment was included in the analyses, improvement in inhibition also predicted improvement in externalizing symptoms from pre-assessment to post-treatment. Because improvement in inhibition was such an inconsistent predictor of internalizing and externalizing symptoms, these findings should be replicated before they are interpreted as clinically meaningful.

When looked at concurrently with other types of emotion regulation, improvement in none of the different symptoms was predicted by improvement in

emotion regulation skill. This is in contrast to Kim-Spoon et al.'s (2013) finding that emotion regulation skill was a mediator between lability/negativity and internalizing symptoms. This may indicate that improvement in ER skill has little or no impact on improvement in symptoms during TF-CBT treatment, however it may relate to the finding that ER skill was not found to improve among the children in the current study, and thus restriction of range prevented a possible effect from being detected. As previously noted, the ER skill measure is less concerned with maladaptive forms of emotion regulation and focuses on adaptive ways of regulating emotions and socially appropriate displays of emotion. Maladaptive and adaptive emotion regulation may not be two ends of one continuum, but may be separate constructs that develop independently of each other. This hypothesis is supported by the fact that previous studies have found links between externalizing symptoms and maladaptive forms of emotion regulation such as lability/negativity, but not externalizing symptoms and ER skill (e.g., Kliewer et al., 2004; Zaremba & Keiley, 2011). Furthermore, in the current study both child-reported PTS symptoms and externalizing problems prior to therapy were predicted by all maladaptive forms of emotion regulation (inhibition, dysregulation, and lability/negativity), but not ER skill.

### **Clinical Implications**

The results of the current study increase our understanding of the ways in which emotion regulation and symptoms improve throughout therapy, and the ways in which these variables are related. To the extent that children improved in inhibition they improved in self-reported symptoms of PTS, and to the extent that they improved in lability/negativity, and to some degree dysregulation, they improved in parent-reported

symptoms. Improvements in adaptive emotion regulation skill did not predict improvements in symptomatology. These results suggest that therapeutic interventions that focus on decreasing *maladaptive* forms of emotion regulation are effective and much needed. This is consistent with the little work that has been done in this area. Suveg, Sood, et al., (2009) also reported that only improvement in maladaptive forms of emotion regulation, namely a combination of worry dysregulation and inhibition, predicted improvement in anxiety scores among anxious youth in a CBT intervention. Similarly, Slee et al., (2008) found that improvements in impulse control decreased deliberate self-harm among adolescents and young adults and Kley et al. (2012) reported that reductions in maladaptive anxiety regulation predicted decreased social anxiety among school-aged children; these authors did not investigate change in adaptive emotion regulation strategies.

It is important to note that not all research is consistent with the notion that only improvement in maladaptive emotion regulation strategies impacts symptoms. The work by Slee et al. (2008), mentioned above demonstrated that improved goal directed behavior also helped to decrease deliberate self-harm in adolescents and young adults. Moreover, longitudinal research by Kim-Spoon, Cicchetti, and Rogosch (2013) demonstrated that emotion regulation skill might be one path by which children move from lability/negativity to fewer internalizing symptoms. This suggests that teaching children adaptive, socially appropriate emotion regulation strategies may also have an impact on the level of symptomatology that they display. Taken together, the current state of the literature indicates that emotion regulation education that helps children both *increase* adaptive strategies and *decrease* maladaptive forms of emotion regulation may

be the most effective way to impact symptom change. There is a wide range of therapeutic approaches for children that target emotion regulation, yet not much is known about their success in actually improving different forms of emotion regulation. These therapies provide an opportunity to expand this area of research, which is very much in its infancy. Researchers should evaluate the approaches to change emotion regulation that are taught in therapy and explore how improvements in both adaptive and maladaptive emotion regulation strategies impact child symptomatology.

Overall, the children in the current study demonstrated only small improvements in emotion regulation from pre- to post-therapy. This finding is consistent with much of the extant literature (e.g., Kley et al., 2012; Scarpa & Reyes, 2011). In addition, the amount of improvement in emotion regulation was no different for the waitlist group and the immediate treatment group, or for the waitlist group during the waiting period and during the intervention period. This suggests that TF-CBT is not as effective at targeting emotion regulation as it could potentially be. It is important to remember that research has not been done on improvement in emotion regulation for all therapeutic approaches that endeavor to teach emotion regulation. Future research should begin by focusing on the therapeutic approaches that already exist.

There is heavy emphasis on emotion regulation education within the TF-CBT model. In fact, the way in which TF-CBT addresses emotion regulation adheres to many of the recommendations made by Hannesdottir and Ollendick (2007) for emotion regulation education in CBT. For example, the model includes education about a wide range of both positively and negatively valenced emotions, new skills are practiced during exposure to trauma reminders, and perhaps most importantly, parents are included

in the treatment. As such, it is somewhat disappointing that larger improvements in emotion regulation were not noted. It may be that there is not enough follow-up with emotion regulation skills after they are being taught. The model recommends that therapists return to difficult concepts until the child demonstrates competence in that area. For many children, this means that only one session is devoted to each emotion regulation skill. Later in therapy, skills are practiced while the child writes and reviews their own trauma story, providing practice with emotion regulation skills during exposure to trauma reminders. Whereas a child may develop competence in emotion regulation skills in the supportive therapeutic environment, it may be much more difficult to gain competence in these skills outside of therapy. It may be unreasonable to expect that children who have years of experience with maladaptive emotion regulation strategies will change their patterns of regulation after one or two lessons. This may also be true for parents, who can be taught to be effective emotion regulation coaches in session, but may have more difficulty transferring these skills into their everyday lives. It may be that more follow-up is needed regarding each of the emotion regulation skills taught. For example, parents and children may need to process real-life difficult emotional scenarios that occur each week and receive feedback from therapists until everyone is confident that improvement in emotion regulation has occurred outside of the therapy setting. Only then should children move on to the trauma narrative portion of therapy or terminate services. Additionally, families could be offered booster sessions targeting emotion regulation after treatment has been completed. These suggestions may maximize a child's opportunity for success in therapy.

### **Limitations**

The main limitations of the current study were attrition and sample size. Although 113 children participated in at least one data collection, only 44 completed measures at follow-up. This discrepancy was partly due to a large number of families withdrawing from TF-CBT services prior to completing the therapy. Other times families withdrew from the research because they found the commitment to be too time consuming. Whereas attrition can be problematic when the final sample differs from the original sample in meaningful ways, no differences were found between therapy completers and non-completers on any of the variables of interest in this study. In fact, the only difference between the two groups was the somewhat younger age of the completers. Nonetheless, attrition was problematic in this study in that it limited the sample size. The resulting sample precluded more complex analyses such as structural equation modeling, which would have allowed for all of the variables under study to be examined simultaneously. Furthermore, examination of the demographic data revealed that parents of male children reported higher levels of externalizing behavior at waitlist and pre-assessment, and parents from households with incomes below \$39,999 reported higher levels of internalizing problems than parents from households with incomes above \$40,000 at pre-assessment. Due to the small sample size and relatively small number of males, these demographic findings could not be explored further. Future studies with a greater sample size may use more complex statistical models and will allow for a more sensitive examination of demographic differences among children.

Another limitation of the current study was the inclusion of siblings in the sample. A decision was made to include siblings in order to maximize sample size due to the relatively high attrition rate. Inclusion of siblings in research samples can be problematic

because there is shared variance among siblings that is not present among other participants. For this reason, all analyses were run including all of the siblings, and again with only one sibling from each family. No differences in the results occurred regardless of whether or not siblings were included the data. Nonetheless, future research with larger sample sizes should exclude sibling pairs in order to eliminate the problem of shared variance.

In this study one-tailed tests of hypotheses were used due to directional hypotheses, which can increase the risk of type I error. Additionally, a large number of statistical analyses were completed, further increasing the risk of type I error. Correcting for multiple comparisons has the effect of lowering power, increasing the risk of type II error. Given the relatively small sample size in this study it was decided that correcting for multiple comparisons would have unduly increased the risk of type II error and thus no such corrections were made. As such, the results of this study should be interpreted with caution. Future studies are needed to confirm the results found here, preferably with large sample sizes and controlling for multiple comparisons.

Other limitations stemmed from the instruments used to measure emotion regulation. All variables were assessed through paper-and-pencil measures, which may be subject to biases. Whereas inclusion of both parent and child perspectives represents a strength of this study and only children can integrate a variety of levels of information about their own emotions, there are problems with paper-and-pencil methods of measurement. Child-report measures are limited by children's awareness of emotions, ability to monitor emotions, recall of emotional experience, and ability to communicate this information (Adrian et al., 2011). Moreover, parent-report measures can be biased,

for example, by parental psychopathology (Adrian et al., 2011). Future research involving observational methods of measurement would complement the use of child- and parent-report.

Finally, in the current study, internal reliability was found to be low for some of the measures at particular time points. Cronbach alpha's of less than .70 were found for post-treatment inhibition, waitlist and post-treatment dysregulation, and waitlist poor ER skill. In particular, at the waitlist time period, the dysregulation scale had a very low alpha reliability score (.46). This score indicated that the responses children gave on the dysregulation scale prior to beginning the waitlist period did not hang together particularly well and raises a red flag as to the reliability of the dysregulation scale. Alpha reliability scores for these measures were within acceptable limits for the other time periods. In addition, the waitlist period was only included for hypothesis 2b. As no significant differences were found between the waitlist and treatment periods for any of the types of emotion regulation, it is unlikely that the low reliability of the dysregulation scale at waitlist time period had much impact on the conclusions drawn from the current study.

## **Conclusion**

Despite these limitations, the current study represents an important contribution to the emerging literature on improvement in emotion regulation throughout therapy and the ways in which this impacts symptom outcome. Consistent with previous research, there was an association between emotion regulation and symptoms prior to beginning therapy, the most consistent link being with lability/negativity. Additionally, to the extent that children decreased their maladaptive acting out strategies for managing their emotions,



PTS, internalizing, and externalizing symptoms improved throughout TF-CBT therapy. Furthermore, children who decreased their emotional inhibition throughout therapy reported fewer symptoms of PTS at the end of therapy. These findings suggest that the numerous clinical interventions currently targeting emotion regulation are on the right track.

Taken together with the extant literature the results of the current study suggest that more work needs to be done to ensure that emotion regulation education is maximally effective for children and caregivers. Consistent with previous research the current study found small effect sizes for improvement in maladaptive emotion regulation. This suggests that current interventions targeting emotion regulation could be improved, and/or the more effective means to improvement in emotion regulation are not being studied. More research is needed to understand the best ways to increase the magnitude of improvement in emotion regulation throughout clinical intervention. For example, a focus on increasing adaptive emotion regulation strategies and decreasing maladaptive emotion regulation strategies is needed, as is more practice using new skills in real-life situations. Once treatments that are tailored to reliably produce greater improvement in emotion regulation, researchers will have a better platform from which to examine how improvement in emotion regulation predicts improvement in symptoms. Improvement in emotion regulation throughout therapy and its effects on symptom outcome represents an exciting new area of investigation.

### Footnotes

<sup>1</sup> The variability in length of assessments was due to changes in policy at the children's mental health agencies. Assessments took place at Boost or PCC. For the earliest participants in the study, participants were randomly assigned to either a trauma or brief assessment condition. The trauma assessment included one session with the child's caregiver and approximately 2 to 4 sessions with the child. The brief assessment included only one session with the child's caregiver and the child was required to complete a standardized trauma symptom measure. Partway through the recruitment process, Boost decided to abandon these two assessments and began using a new assessment procedure that more closely mapped on to the trauma assessment. Additionally, PCC had their own version of a trauma assessment. All assessments resulted in a report including treatment recommendations, and feedback given to the family. Although these differences are not ideal in a research study, they are representative of the services available to clients in the Greater Toronto Area and the conditions under which clinicians are expected to operate. When studying the effectiveness of a particular treatment in a community setting it makes sense to do so without implementing artificial constraints on services.

<sup>2</sup> Means differ slightly at each time period because of different sample sizes due to missing data.

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## Appendix A

In a recent review of methodologies in the study of emotion regulation, the Child Emotion Management Scales (CEMS) and the Emotion Regulation Checklist (ERC) were found to be the most prevalent measures of self- and parent-reported emotion regulation respectively (Adrian et al., 2011). The use of well-established measures is especially useful in a field such as emotion regulation, in which so many methodologies are used. By using measures that are regularly employed in the literature the results of different studies can be compared more easily. Unfortunately, these measures have been used in several different ways in the literature.

The CEMS is composed of three separate scales of emotion regulation for anger, sadness, and worry (Suveg & Zeman, 2004; Zeman et al., 2010; Zeman et al., 2001). The three emotion scales are then further broken down into three separate subscales entitled inhibition, dysregulation, and coping, resulting in nine subscales in total. Different authors have combined these subscales in a number of different ways to analyze child self-reported emotion regulation. For example, some authors have looked at each of the CEMS subscales separately (e.g. Sullivan, Helms, Kliewer, & Goodman, 2010; Zeman et al., 2010; Zeman et al., 2001; Zeman et al., 2002), other authors have combined the emotions into three total scales for inhibition, dysregulation, and coping (e.g. Shipman et al., 2005; Shipman & Zeman, 2001; Suveg & Zeman, 2004), while still others further combined the inhibition and dysregulation composite scales into one 'maladaptive' scale which contrasted with an adaptive coping scale (e.g. Suveg, Hoffman, et al., 2009). Some authors chose to report a combination of these methods (e.g. Suveg, Sood, et al., 2009). Finally, one study was found that used the CEMS dysregulation scales as parent-

report measures (Feng et al., 2009). Whereas most of the authors above cited statistical reasons for their decisions to combine subscales, the sheer number of methods reported complicates the interpretation of the available literature.

### **Confirmatory Factor Analysis**

In order to determine whether the three-factor structure (combining anger, sadness, and worry into the three subscales of inhibition, dysregulation, and coping) fit the data from this study, a confirmatory factor analysis was performed. Using the Amos 20.0 statistical package (Arbuckle, 2011), the three-factor model was tested using data from pre-assessment. Pre-assessment data was chosen because the sample was largest at this time period. Full Information Maximum Likelihood (FIML) estimation was used to make maximal use of all data available. See Figure A.1 for a visual representation the model.

A Chi-square test of Model 1 [ $\chi^2(24) = 33.17, p = .100$ ] provided some evidence that the model adequately fit the data. Additionally the RMSEA = .05, offering further evidence that the model adequately fits the data. The squared multiple correlations for the model showed that the dysregulation factor accounted for 12% of the variance in the anger dysregulation scale, 51% of sadness dysregulation, and 59% of worry dysregulation. The inhibition factor accounted for 32% of anger inhibition, 86% of sadness inhibition, and 28% of worry inhibition. Finally, the coping factor accounted for 67% of anger coping, 37% of sadness coping, and 29% of worry coping. The correlation between coping and dysregulation was  $-.57$  and the covariance estimate was  $-.06$  ( $p = .050$ ) indicating that these variables are related. No other covariances between the factors were significant. Given that the model adequately fit the data, it was determined that use

of the three-factor model was warranted, combining anger, sadness, and worry when calculating the three subscales (inhibition, dysregulation, and coping). Factor loadings for each of the factors are found in Table A.1.

Table A.1

*Confirmatory Factor Loadings*

|               | Estimate | SE   | Standardized estimate |
|---------------|----------|------|-----------------------|
| Dysregulation |          |      |                       |
| Anger         | 1.00     |      | .35                   |
| Sadness       | 0.80**   | 0.32 | .71                   |
| Worry         | 0.81***  | 0.32 | .77                   |
| Inhibition    |          |      |                       |
| Anger         | 1.00     |      | .56                   |
| Sadness       | 1.68**   | 0.54 | .93                   |
| Worry         | 2.88**   | 0.78 | .53                   |
| Coping        |          |      |                       |
| Anger         | 2.02***  | 0.55 | .82                   |
| Sadness       | 1.62***  | 0.45 | .61                   |
| Worry         | 1.00     |      | .54                   |

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

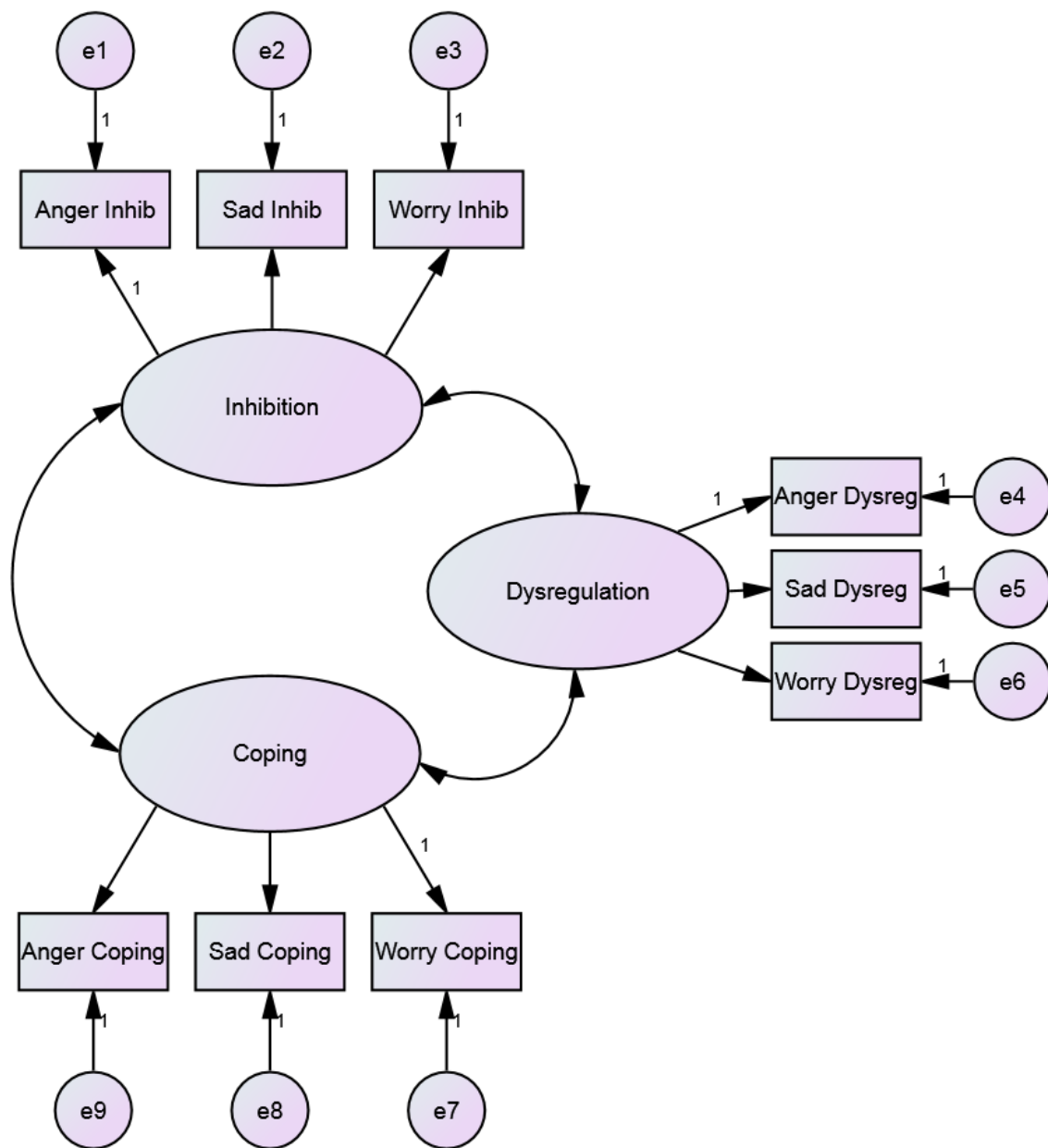


Figure A.1. Three factor model of the Children's Emotion Management Scales.

Table 1  
*Descriptive Statistics and Alpha Reliabilities for Raw Scores*

| Measure                       | <i>M</i> | <i>SD</i> | <i>CI (95%)</i> | <i>α</i> |
|-------------------------------|----------|-----------|-----------------|----------|
| Inhibition                    |          |           |                 |          |
| Waitlist                      | 23.60    | 5.69      | 21.48 – 25.73   | .85      |
| Pre-assessment                | 22.72    | 5.13      | 21.73 – 23.71   | .82      |
| Pre-treatment                 | 22.22    | 4.61      | 21.17 – 23.28   | .79      |
| Post-treatment                | 21.70    | 3.57      | 20.76 – 22.65   | .64      |
| Six-month follow-up           | 20.72    | 3.97      | 19.50 – 21.94   | .74      |
| Dysregulation                 |          |           |                 |          |
| Waitlist                      | 15.17    | 2.73      | 14.15 – 16.19   | .46      |
| Pre-assessment                | 16.01    | 3.93      | 15.25 – 16.77   | .75      |
| Pre-treatment                 | 15.49    | 3.84      | 14.61 – 16.37   | .74      |
| Post-treatment                | 14.93    | 3.39      | 14.03 – 15.83   | .69      |
| Six-month follow-up           | 14.30    | 3.64      | 13.18 – 15.42   | .77      |
| Lability/negativity           |          |           |                 |          |
| Waitlist                      | 31.57    | 7.18      | 28.79 – 34.36   | .84      |
| Pre-assessment                | 30.72    | 6.19      | 29.46 – 31.99   | .81      |
| Pre-treatment                 | 30.28    | 6.92      | 28.60 – 31.97   | .85      |
| Post-treatment                | 28.83    | 6.21      | 27.10 – 30.56   | .82      |
| Six-month follow-up           | 28.95    | 6.78      | 26.78 – 31.12   | .88      |
| Poor emotion regulation skill |          |           |                 |          |
| Waitlist                      | 15.68    | 3.95      | 14.15 – 17.21   | .69      |
| Pre-assessment                | 15.00    | 3.67      | 14.25 – 15.75   | .73      |
| Pre-treatment                 | 14.46    | 3.41      | 13.63 – 15.29   | .69      |
| Post-treatment                | 14.08    | 3.73      | 13.04 – 15.11   | .76      |
| Six-month follow-up           | 14.15    | 3.97      | 12.88 – 15.412  | .79      |
| Child-reported PTS            |          |           |                 |          |
| Waitlist                      | 11.93    | 6.57      | 9.48 – 14.39    | .81      |
| Pre-assessment                | 10.69    | 6.63      | 9.41 – 11.97    | .86      |
| Pre-treatment                 | 9.34     | 6.80      | 7.79 – 10.90    | .88      |
| Post-treatment                | 7.71     | 5.33      | 6.31 – 9.107    | .82      |
| Six-month follow-up           | 7.19     | 6.22      | 5.27 – 9.101    | .88      |
| Parent-reported PTS           |          |           |                 |          |
| Waitlist                      | 47.89    | 12.52     | 43.04 – 52.75   | .90      |
| Pre-assessment                | 45.31    | 12.02     | 42.88 – 47.75   | .90      |
| Pre-treatment                 | 45.00    | 11.30     | 42.24 – 47.76   | .90      |
| Post-treatment                | 40.00    | 11.54     | 36.82 – 43.18   | .92      |
| Six-month follow-up           | 38.88    | 11.80     | 35.10 – 42.65   | .93      |
| Internalizing symptoms        |          |           |                 |          |
| Waitlist                      | 17.25    | 10.41     | 13.22 – 21.29   | .91      |
| Pre-assessment                | 14.43    | 9.07      | 12.58 – 16.28   | .88      |
| Pre-treatment                 | 12.49    | 8.74      | 10.36 – 14.63   | .89      |
| Post-treatment                | 10.09    | 9.65      | 7.44 – 12.75    | .90      |
| Six-month follow-up           | 9.20     | 8.40      | 6.51 – 11.89    | .90      |
| Externalizing symptoms        |          |           |                 |          |
| Waitlist                      | 15.93    | 11.43     | 11.50 – 20.36   | .93      |
| Pre-assessment                | 13.08    | 8.76      | 11.30 – 14.87   | .90      |
| Pre-treatment                 | 11.40    | 9.53      | 9.08 – 13.73    | .92      |
| Post-treatment                | 9.13     | 7.50      | 7.07 – 11.20    | .89      |
| Six-month follow-up           | 9.45     | 8.35      | 6.78 – 12.12    | .90      |

Table 2  
*Intercorrelations Among Emotion Regulation Variables*

| Measure                | 1a               | 1b               | 1c               | 1d                | 1e               | 2a   | 2b               | 2c               | 2d               | 2e   | 3a               | 3b               | 3c               | 3d               | 3e               | 4a               | 4b               | 4c               | 4d               |
|------------------------|------------------|------------------|------------------|-------------------|------------------|------|------------------|------------------|------------------|------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| 1. Inhibition          |                  |                  |                  |                   |                  |      |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| a. Waitlist            | 1                |                  |                  |                   |                  |      |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| b. Pre-assessment      | .77 <sup>c</sup> | 1                |                  |                   |                  |      |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| c. Pre-treatment       | .64 <sup>c</sup> | .55 <sup>c</sup> | 1                |                   |                  |      |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| d. Post-treatment      | .07              | .20              | .19              | 1                 |                  |      |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| e. Follow-up           | .39              | .10              | .56 <sup>c</sup> | .31 <sup>a</sup>  | 1                |      |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| 2. Dysregulation       |                  |                  |                  |                   |                  |      |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| a. Waitlist            | .02              | -.05             | .12              | -.05              | .16              | 1    |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| b. Pre-assessment      | -.17             | -.18             | -.04             | .01               | .03              | .32  | 1                |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| c. Pre-treatment       | -.14             | -.13             | .02              | -.27 <sup>a</sup> | .07              | .20  | .61 <sup>c</sup> | 1                |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| d. Post-treatment      | -.23             | -.16             | -.15             | .06               | .19              | .12  | .27 <sup>a</sup> | .42 <sup>c</sup> | 1                |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| e. Follow-up           | -.25             | -.05             | -.23             | -.03              | -.09             | .03  | .39 <sup>b</sup> | .52 <sup>c</sup> | .51 <sup>c</sup> | 1    |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| 3. Lability/negativity |                  |                  |                  |                   |                  |      |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| a. Waitlist            | -.06             | .19              | .21              | .35               | .34              | .13  | .22              | .37 <sup>a</sup> | .19              | .02  | 1                |                  |                  |                  |                  |                  |                  |                  |                  |
| b. Pre-assessment      | .12              | .14              | .17              | -.02              | .25              | .30  | .09              | .29 <sup>b</sup> | .16              | .15  | .89 <sup>c</sup> | 1                |                  |                  |                  |                  |                  |                  |                  |
| c. Pre-treatment       | .09              | .12              | .19              | .12               | .50 <sup>c</sup> | .20  | -.01             | .18              | .08              | .03  | .83 <sup>c</sup> | .67 <sup>c</sup> | 1                |                  |                  |                  |                  |                  |                  |
| d. Post-treatment      | .44              | -.02             | .00              | .06               | .30 <sup>a</sup> | .12  | .19              | .29 <sup>a</sup> | .17              | .17  | .75 <sup>c</sup> | .65 <sup>c</sup> | .78 <sup>c</sup> | 1                |                  |                  |                  |                  |                  |
| e. Follow-up           | .36              | -.04             | .16              | .25               | .43 <sup>b</sup> | .28  | .27 <sup>a</sup> | .14              | .04              | .01  | .82 <sup>c</sup> | .72 <sup>c</sup> | .76 <sup>c</sup> | .79 <sup>c</sup> | 1                |                  |                  |                  |                  |
| 4. Poor ER skill       |                  |                  |                  |                   |                  |      |                  |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |
| a. Waitlist            | .34 <sup>a</sup> | .47 <sup>a</sup> | .30              | .43               | .19              | -.09 | -.15             | -.04             | -.25             | -.42 | .53 <sup>b</sup> | .63 <sup>c</sup> | .51 <sup>a</sup> | .46 <sup>a</sup> | .39              | 1                |                  |                  |                  |
| b. Pre-assessment      | .48 <sup>a</sup> | .27 <sup>b</sup> | -.02             | .15               | .12              | .03  | .13              | .08              | .02              | -.07 | .47 <sup>a</sup> | .45 <sup>c</sup> | .32 <sup>b</sup> | .36 <sup>b</sup> | .31 <sup>a</sup> | .75 <sup>c</sup> | 1                |                  |                  |
| c. Pre-treatment       | .61 <sup>b</sup> | .32 <sup>b</sup> | .08              | .19               | .11              | -.21 | -.19             | .02              | -.12             | -.15 | .53 <sup>b</sup> | .35 <sup>b</sup> | .42 <sup>c</sup> | .44 <sup>c</sup> | .41 <sup>b</sup> | .77 <sup>c</sup> | .64 <sup>c</sup> | 1                |                  |
| d. Post-treatment      | .76 <sup>c</sup> | .09              | .04              | .07               | .10              | -.29 | -.11             | -.02             | -.04             | -.01 | .10              | .18              | .17              | .42 <sup>c</sup> | .36 <sup>a</sup> | .61 <sup>b</sup> | .64 <sup>c</sup> | .65 <sup>c</sup> | 1                |
| e. Follow-up           | .79 <sup>c</sup> | .36 <sup>a</sup> | .16              | .42 <sup>b</sup>  | .18              | -.08 | -.09             | -.12             | -.09             | -.12 | .38              | .35 <sup>a</sup> | .32 <sup>a</sup> | .43 <sup>b</sup> | .50 <sup>c</sup> | .71 <sup>b</sup> | .69 <sup>c</sup> | .75 <sup>c</sup> | .73 <sup>c</sup> |

*Note.* Poor ER skill = Poor emotion regulation skill

<sup>a</sup> $p < .05$ . <sup>b</sup> $p < .01$ . <sup>c</sup> $p < .001$ .

Table 3  
*Predicting Symptoms from Emotion Regulation at Pre-Assessment*

|                        | <i>B</i> | <i>SE B</i> | $\beta$ | <i>t</i> | <i>sr</i> <sup>2</sup> |
|------------------------|----------|-------------|---------|----------|------------------------|
| Child-reported PTS     |          |             |         |          |                        |
| Inhibition             | 0.43     | 0.22        | .20     | 1.97*    | .03                    |
| Dysregulation          | 1.01     | 0.23        | .44     | 4.42***  | .17                    |
| Lability/negativity    | 0.56     | 0.23        | .26     | 2.45**   | .05                    |
| Poor ER skill          | -0.24    | 0.27        | -.10    | -0.90    | .01                    |
| Parent-reported PTS    |          |             |         |          |                        |
| Inhibition             | 0.01     | 0.02        | .05     | 0.54     | .00                    |
| Dysregulation          | -0.37    | 0.02        | -.12    | -1.30    | .01                    |
| Lability/negativity    | 0.07     | 0.02        | .34     | 3.22***  | .08                    |
| Poor ER skill          | 0.07     | 0.03        | .28     | 2.63**   | .06                    |
| Internalizing symptoms |          |             |         |          |                        |
| Inhibition             | -0.27    | 0.23        | -.12    | -1.19    | .01                    |
| Dysregulation          | -0.38    | 0.24        | -.15    | -1.59    | .02                    |
| Lability/negativity    | 0.79     | 0.24        | .35     | 3.34***  | .09                    |
| Poor ER skill          | 0.77     | 0.28        | .29     | 2.72**   | .06                    |
| Externalizing symptoms |          |             |         |          |                        |
| Inhibition             | 0.39     | 0.15        | .21     | 2.64**   | .04                    |
| Dysregulation          | 0.33     | 0.15        | .17     | 2.15*    | .03                    |
| Lability/negativity    | 1.34     | 0.16        | .72     | 8.59***  | .39                    |
| Poor ER skill          | -0.21    | 0.18        | -.10    | -1.16    | .01                    |

*Note.* Poor ER skill = Poor emotion regulation skill

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



Table 4  
*Paired-Samples t-Tests Measuring Improvement in Emotion Regulation<sup>2</sup>*

|                                       | Mean at first<br>time period<br><i>M (SD)</i> | Mean at<br>second time<br>period <i>M</i><br><i>(SD)</i> | <i>t (df)</i> | <i>p</i> | Cohen's <i>d</i> |
|---------------------------------------|---|--|---------------|----------|------------------|
| Pre-assessment to post-treatment      |   |  |               |          |                  |
| Inhibition                            | 4.77 (0.52)                                   | 4.64 (0.39)  | 1.77 (55)     | .042     | 0.30             |
| Dysregulation                         | 3.95 (0.47)                                   | 3.83 (0.45)  | 1.61 (55)     | .057     | 0.26             |
| Lability/negativity                   | 5.47 (0.59)                                   | 5.35 (0.57)  | 1.69 (50)     | .049     | 0.20             |
| Poor ER skill                         | 3.81 (0.48)                                   | 3.73 (0.50)  | 1.41 (50)     | .082     | 0.17             |
| Pre-assessment to six-month follow-up |   |  |               |          |                  |
| Inhibition                            | 4.72 (0.53)                                   | 4.52 (0.44)  | 1.92 (41)     | .031     | 0.39             |
| Dysregulation                         | 3.96 (0.46)                                   | 3.75 (0.47)  | 2.63 (41)     | .006     | 0.45             |
| Lability/negativity                   | 5.47 (0.59)                                   | 5.36 (0.62)  | 1.49 (38)     | .073     | 0.18             |
| Poor ER skill                         | 3.79 (0.50)                                   | 3.76 (0.53)  | 0.96 (38)     | .172     | 0.12             |
| Pre-treatment to post-treatment       |   |  |               |          |                  |
| Inhibition                            | 4.69 (0.48)                                   | 4.65 (0.40)  | 0.58 (54)     | .283     | 0.10             |
| Dysregulation                         | 3.91 (0.48)                                   | 3.86 (0.44)  | 0.78 (54)     | .220     | 0.11             |
| Lability/negativity                   | 5.45 (0.60)                                   | 5.32 (0.58)  | 2.20 (48)     | .017     | 0.21             |
| Poor ER skill                         | 3.73 (0.45)                                   | 3.70 (0.51)  | 0.46 (48)     | .324     | 0.05             |
| Pre-treatment to six-month follow-up  |   |  |               |          |                  |
| Inhibition                            | 4.65 (0.51)                                   | 4.53 (0.44)  | 1.82 (42)     | .038     | 0.26             |
| Dysregulation                         | 3.93 (0.51)                                   | 3.75 (0.47)  | 2.37 (42)     | .012     | 0.36             |
| Lability/negativity                   | 5.46 (0.57)                                   | 5.25 (0.46)  | 1.82 (39)     | .039     | 0.20             |
| Poor ER skill                         | 3.73 (0.47)                                   | 3.73 (0.53)  | 0.01 (39)     | .495     | 0.00             |

*Note.* Poor ER skill = Poor emotion regulation skill

Table 5  
*Independent-Samples t-Tests Measuring Improvement in Emotion Regulation for the Waitlist and Immediate Services Groups*

|                     | Waitlist Group | Immediate Services  |               |          |                  |
|---------------------|----------------|---------------------|---------------|----------|------------------|
|                     | <i>M (SD)</i>  | Group <i>M (SD)</i> | <i>t (df)</i> | <i>p</i> | Cohen's <i>d</i> |
| Inhibition          | 0.07 (0.41)    | 0.04 (0.58)         | 0.21 (63)     | .416     | 0.05             |
| Dysregulation       | -0.01 (0.43)   | 0.04 (0.47)         | -0.47 (63)    | .320     | -0.12            |
| Lability/negativity | 0.20 (0.30)    | 0.11 (0.41)         | 0.85 (55)     | .199     | 0.23             |
| Poor ER skill       | 0.03 (0.39)    | 0.02 (0.35)         | 0.18 (55)     | .429     | 0.05             |

*Note.* Improvement in emotion regulation was calculated for the period between waitlist and pre-assessment data collections for the waitlist group and for the period between pre-treatment and post-treatment data collections for the immediate services group; Poor ER skill = Poor emotion regulation skill

Table 6  
*Paired-Samples t-Tests Measuring Improvement in Emotion Regulation Over the Waitlist and Treatment Periods for the Waitlist Group*

|                     | Waitlist Period        | Treatment                     | <i>t</i> ( <i>df</i> ) | <i>p</i> | Cohen's <i>d</i> |
|---------------------|------------------------|-------------------------------|------------------------|----------|------------------|
|                     | <i>M</i> ( <i>SD</i> ) | Period <i>M</i> ( <i>SD</i> ) |                        |          |                  |
| Inhibition          | .06(.36)               | .04(.49)                      | .11(14)                | .918     | .05              |
| Dysregulation       | .03(.45)               | .07(.55)                      | -.19(14)               | .850     | -.08             |
| Lability/negativity | .18(.25)               | .16(.39)                      | .22(13)                | .829     | .06              |
| Poor ER skill       | .02(.37)               | .04(.50)                      | -.15(13)               | .882     | -.05             |

*Note.* Improvement in emotion regulation was calculated for the period between waitlist and pre-assessment data collections for the waitlist period and for the period between pre-treatment and post-treatment data collections for the treatment period. Only families from the waitlist group were included in this analysis; Poor ER skill = Poor emotion regulation skill

Table 7

*Intercorrelations Among Change Scores from Pre-Assessment to Post-Treatment and Pre-Assessment to Follow-Up*

| Measure                     | 1a               | 1b               | 2a   | 2b               | 3a               | 3b               | 4a               | 4b               | 5a               | 5b               | 6a               | 6b               | 7a               | 7b               | 8a               | 8b |
|-----------------------------|------------------|------------------|------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----|
| 1. Inhibition               |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-assess to Post-treat | 1                |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| b. Pre-assess to Follow-up  | .71 <sup>c</sup> | 1                |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| 2. Dysregulation            |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-assess to Post-treat | .09              | .15              | 1    |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| b. Pre-assess to Follow-up  | -.03             | -.08             | .65  | 1                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| 3. Lability/negativity      |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-assess to Post-treat | .27              | .24              | -.03 | .14              | 1                |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| b. Pre-assess to Follow-up  | .32 <sup>a</sup> | .34 <sup>a</sup> | -.12 | -.06             | .64 <sup>c</sup> | 1                |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| 4. Poor ER skill            |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-assess to Post-treat | .14              | .16              | -.07 | -.09             | .32 <sup>a</sup> | .37 <sup>a</sup> | 1                |                  |                  |                  |                  |                  |                  |                  |                  |    |
| b. Pre-assess to Follow-up  | .15              | .05              | -.13 | -.09             | .16              | .36 <sup>b</sup> | .59 <sup>c</sup> | 1                |                  |                  |                  |                  |                  |                  |                  |    |
| 5. Child-reported PTS       |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-assess to Post-treat | .25              | .12              | .14  | .18              | .05              | .10              | .07              | .14              | 1                |                  |                  |                  |                  |                  |                  |    |
| b. Pre-assess to Follow-up  | -.03             | .07              | .10  | .31 <sup>a</sup> | .08              | .16              | .25              | .24              | .61 <sup>c</sup> | 1                |                  |                  |                  |                  |                  |    |
| 6. Parent-reported PTS      |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-assess to Post-treat | .27              | .20              | .13  | .07              | .36 <sup>b</sup> | .12              | .10              | .01              | .26              | .18              | 1                |                  |                  |                  |                  |    |
| b. Pre-assess to Follow-up  | .35 <sup>a</sup> | .23              | .04  | .08              | .17              | .36 <sup>b</sup> | .03              | .08              | .36 <sup>a</sup> | .42 <sup>b</sup> | .64 <sup>c</sup> | 1                |                  |                  |                  |    |
| 7. Internalizing            |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-assess to Post-treat | .34 <sup>a</sup> | .17              | .12  | .06              | .32 <sup>a</sup> | .33 <sup>a</sup> | -.03             | -.08             | .35 <sup>a</sup> | .34 <sup>a</sup> | .42 <sup>b</sup> | .48 <sup>b</sup> | 1                |                  |                  |    |
| b. Pre-assess to Follow-up  | .37 <sup>a</sup> | .11              | -.07 | -.03             | .16              | .45 <sup>b</sup> | .03              | .34 <sup>a</sup> | .36 <sup>a</sup> | .40 <sup>a</sup> | .40 <sup>b</sup> | .70 <sup>c</sup> | .59 <sup>c</sup> | 1                |                  |    |
| 8. Externalizing            |                  |                  |      |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-assess to Post-treat | .36 <sup>a</sup> | .34 <sup>a</sup> | .16  | .21              | .56 <sup>c</sup> | .45 <sup>b</sup> | .26              | .25              | .24              | .48 <sup>b</sup> | .43 <sup>b</sup> | .39 <sup>a</sup> | .63 <sup>c</sup> | .46 <sup>b</sup> | 1                |    |
| b. Pre-assess to Follow-up  | .27              | .08              | .19  | .23              | .37 <sup>a</sup> | .51 <sup>c</sup> | .24              | .34 <sup>a</sup> | .30              | .62 <sup>c</sup> | .14              | .45 <sup>b</sup> | .44 <sup>b</sup> | .52 <sup>c</sup> | .77 <sup>c</sup> | 1  |

*Note.* Pre-assess = Pre-assessment; Post-treat = Post-treatment; Poor ER skill = Poor emotion regulation skill

<sup>a</sup> $p < .05$ . <sup>b</sup> $p < .01$ . <sup>c</sup> $p < .001$ .

Table 8

*Intercorrelations Among Change Scores from Pre-Treatment to Post-Treatment and Pre-Treatment to Follow-Up*

| Measure                    | 1a               | 1b   | 2a               | 2b               | 3a               | 3b               | 4a               | 4b  | 5a               | 5b               | 6a               | 6b               | 7a               | 7b               | 8a               | 8b |
|----------------------------|------------------|------|------------------|------------------|------------------|------------------|------------------|-----|------------------|------------------|------------------|------------------|------------------|------------------|------------------|----|
| 1. Inhibition              |                  |      |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-treat to Post-treat | 1                |      |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| b. Pre-treat to Follow-up  | .60 <sup>c</sup> | 1    |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| 2. Dysregulation           |                  |      |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-treat to Post-treat | .34 <sup>b</sup> | .29  | 1                |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| b. Pre-treat to Follow-up  | .40 <sup>b</sup> | .21  | .62 <sup>c</sup> | 1                |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| 3. Lability/negativity     |                  |      |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-treat to Post-treat | .10              | -.03 | .01              | .02              | 1                |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| b. Pre-treat to Follow-up  | .13              | .00  | .08              | .13              | .54 <sup>c</sup> | 1                |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| 4. Poor ER skill           |                  |      |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-treat to Post-treat | -.03             | .14  | .16              | .15              | .44 <sup>b</sup> | .38 <sup>a</sup> | 1                |     |                  |                  |                  |                  |                  |                  |                  |    |
| b. Pre-treat to Follow-up  | .14              | .05  | .23              | .27              | .10              | .32 <sup>a</sup> | .47 <sup>b</sup> | 1   |                  |                  |                  |                  |                  |                  |                  |    |
| 5. Child-reported PTS      |                  |      |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-treat to Post-treat | .36 <sup>b</sup> | .12  | .38 <sup>b</sup> | .27              | .10              | .07              | .10              | .11 | 1                |                  |                  |                  |                  |                  |                  |    |
| b. Pre-treat to Follow-up  | .21              | .02  | .32 <sup>a</sup> | .34 <sup>a</sup> | .33 <sup>a</sup> | .34 <sup>a</sup> | .18              | .21 | .60 <sup>c</sup> | 1                |                  |                  |                  |                  |                  |    |
| 6. Parent-reported PTS     |                  |      |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-treat to Post-treat | .08              | .08  | .04              | .13              | .33 <sup>a</sup> | .15              | .10              | .02 | .17              | .09              | 1                |                  |                  |                  |                  |    |
| b. Pre-treat to Follow-up  | .06              | .09  | -.18             | .10              | -.03             | .23              | .01              | .10 | .02              | .14              | .47 <sup>b</sup> | 1                |                  |                  |                  |    |
| 7. Internalizing           |                  |      |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-treat to Post-treat | .30 <sup>a</sup> | -.03 | .22              | .25              | .20              | .28              | .21              | .01 | .10              | .17              | .15              | .23              | 1                |                  |                  |    |
| b. Pre-treat to Follow-up  | .15              | -.08 | -.01             | .17              | .10              | .38 <sup>a</sup> | .14              | .18 | .14              | .34 <sup>a</sup> | .28              | .69 <sup>c</sup> | .51 <sup>c</sup> | 1                |                  |    |
| 8. Externalizing           |                  |      |                  |                  |                  |                  |                  |     |                  |                  |                  |                  |                  |                  |                  |    |
| a. Pre-treat to Post-treat | .30 <sup>a</sup> | .10  | .02              | -.11             | .42 <sup>b</sup> | .41 <sup>b</sup> | .10              | .00 | -.20             | .09              | .14              | .02              | .53 <sup>c</sup> | .11              | 1                |    |
| b. Pre-treat to Follow-up  | -.11             | -.12 | -.08             | -.13             | .33 <sup>a</sup> | .53 <sup>c</sup> | .31              | .23 | -.23             | .13              | .13              | .25              | .30              | .39 <sup>b</sup> | .59 <sup>c</sup> | 1  |

*Note.* Pre-treat = Pre-treatment; Post-treat = Post-treatment; Poor ER skill = Poor emotion regulation skill

<sup>a</sup> $p < .05$ . <sup>b</sup> $p < .01$ . <sup>c</sup> $p < .001$

Table 9

*Predicting Improvement in Symptoms from Improvement in Emotion Regulation, Beginning at Pre-Assessment*

|                        | From pre-assessment to post-treatment |             |         |          |                        | From pre-assessment to six-month follow-up |             |         |          |                        |
|------------------------|---------------------------------------|-------------|---------|----------|------------------------|--|-------------|---------|----------|------------------------|
|                        | <i>B</i>                              | <i>SE B</i> | $\beta$ | <i>t</i> | <i>sr</i> <sup>2</sup> | <i>B</i>                                   | <i>SE B</i> | $\beta$ | <i>t</i> | <i>sr</i> <sup>2</sup> |
| Child-reported PTS     |                                       |             |         |          |                        |  |             |         |          |                        |
| Inhibition             | 0.75                                  | 0.26        | .42     | 2.93**   | .17                    | 0.32                                       | 0.23        | .24     | 1.37     | .05                    |
| Dysregulation          | -0.07                                 | 0.28        | -.04    | -0.26    | .00                    | 0.69                                       | 0.29        | .41     | 2.37*    | .14                    |
| Lability/negativity    | 0.38                                  | 0.40        | .15     | 0.94     | .02                    | 0.66                                       | 0.31        | .37     | 2.11*    | .11                    |
| Poor ER skill          | -0.24                                 | 0.38        | -.01    | -0.62    | .01                    | 0.26                                       | 0.35        | .13     | 0.74     | .01                    |
| Parent-reported PTS    |                                       |             |         |          |                        |  |             |         |          |                        |
| Inhibition             | 0.04                                  | 0.03        | .20     | 1.35     | .03                    | 0.02                                       | 0.03        | .16     | 0.89     | .02                    |
| Dysregulation          | 0.02                                  | 0.03        | .08     | 0.57     | .01                    | 0.02                                       | 0.03        | .13     | 0.72     | .02                    |
| Lability/negativity    | 0.10                                  | 0.04        | .37     | 2.55**   | .12                    | 0.06                                       | 0.04        | .27     | 1.45     | .06                    |
| Poor ER skill          | 0.01                                  | 0.04        | .02     | 0.16     | .00                    | 0.00                                       | 0.05        | -.01    | -0.05    | .00                    |
| Internalizing symptoms |                                       |             |         |          |                        |  |             |         |          |                        |
| Inhibition             | 0.58                                  | 0.20        | .38     | 2.95**   | .13                    | 0.29                                       | 0.29        | .18     | 1.01     | .03                    |
| Dysregulation          | -0.13                                 | 0.21        | -.08    | -0.62    | .01                    | 0.07                                       | 0.34        | .03     | 0.19     | .00                    |
| Lability/negativity    | 1.10                                  | 0.31        | .54     | 3.54***  | .19                    | 0.63                                       | 0.42        | .27     | 1.48     | .06                    |
| Poor ER skill          | -0.47                                 | 0.35        | -.20    | -1.36    | .03                    | 0.54                                       | 0.47        | .20     | 1.16     | .04                    |
| Externalizing symptoms |                                       |             |         |          |                        |  |             |         |          |                        |
| Inhibition             | 0.52                                  | 0.20        | .29     | 2.59**   | .08                    | 0.38                                       | 0.27        | .23     | 1.42     | .05                    |
| Dysregulation          | 0.18                                  | 0.23        | .08     | 0.78     | .01                    | 0.63                                       | 0.31        | .31     | 2.02*    | .09                    |
| Lability/negativity    | 1.46                                  | 0.34        | .53     | 4.34***  | .21                    | 0.85                                       | 0.39        | .36     | 2.15*    | .10                    |
| Poor ER skill          | 0.42                                  | 0.31        | .16     | 1.36     | .02                    | 0.38                                       | 0.43        | .14     | 0.88     | .02                    |

*Note.* Poor ER skill = Poor emotion regulation skill

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

Table 10

*Predicting Improvement in Symptoms from Improvement in Emotion Regulation, Beginning at Pre-Treatment*

|                        | From pre-treatment to post-treatment |             |         |          |                        | From pre-treatment to six-month follow-up |             |         |          |                        |
|------------------------|--------------------------------------|-------------|---------|----------|------------------------|---|-------------|---------|----------|------------------------|
|                        | <i>B</i>                             | <i>SE B</i> | $\beta$ | <i>t</i> | <i>sr</i> <sup>2</sup> | <i>B</i>                                  | <i>SE B</i> | $\beta$ | <i>t</i> | <i>sr</i> <sup>2</sup> |
| Child-reported PTS     |                                      |             |         |          |                        |   |             |         |          |                        |
| Inhibition             | 0.88                                 | 0.29        | .42     | 3.03**   | .15                    | -0.27                                     | 0.30        | -.13    | 0.92     | .02                    |
| Dysregulation          | 0.84                                 | 0.33        | .35     | 2.53**   | .10                    | 0.82                                      | 0.27        | .43     | 3.02**   | .17                    |
| Lability/negativity    | 0.23                                 | 0.42        | .08     | 0.54     | .01                    | 1.79                                      | 0.44        | .63     | 4.04***  | .30                    |
| Poor ER skill          | -0.43                                | 0.43        | -.16    | -1.00    | .02                    | -0.47                                     | 0.45        | -.17    | -1.03    | .02                    |
| Parent-reported PTS    |                                      |             |         |          |                        |   |             |         |          |                        |
| Inhibition             | 0.01                                 | 0.02        | .05     | 0.29     | .00                    | 0.02                                      | 0.04        | .08     | 0.46     | .01                    |
| Dysregulation          | 0.00                                 | 0.03        | .00     | 0.01     | .00                    | 0.01                                      | 0.03        | .06     | 0.32     | .00                    |
| Lability/negativity    | 0.08                                 | 0.04        | .32     | 1.95*    | .08                    | 0.05                                      | 0.04        | .23     | 1.22     | .05                    |
| Poor ER skill          | 0.00                                 | 0.04        | -.02    | -0.10    | .00                    | -0.02                                     | 0.05        | -.06    | -0.31    | .00                    |
| Internalizing symptoms |                                      |             |         |          |                        |   |             |         |          |                        |
| Inhibition             | 0.37                                 | 0.26        | .21     | 1.40     | .04                    | -0.23                                     | 0.37        | -.10    | -0.61    | .01                    |
| Dysregulation          | 0.76                                 | 0.35        | .33     | 2.16*    | .09                    | 0.27                                      | 0.33        | .14     | 0.83     | .02                    |
| Lability/negativity    | 0.75                                 | 0.44        | .32     | 1.70*    | .06                    | 0.87                                      | 0.30        | .38     | 2.23*    | .13                    |
| Poor ER skill          | -0.44                                | 0.50        | -.16    | -0.88    | .02                    | -0.06                                     | 0.52        | -.02    | -0.11    | .00                    |
| Externalizing symptoms |                                      |             |         |          |                        |   |             |         |          |                        |
| Inhibition             | 0.27                                 | 0.16        | .23     | 1.64     | .05                    | -0.09                                     | 0.34        | -.04    | -0.27    | .00                    |
| Dysregulation          | -0.13                                | 0.20        | -.10    | -0.67    | .01                    | -0.46                                     | 0.28        | -.26    | -1.62    | .06                    |
| Lability/negativity    | 0.83                                 | 0.27        | .50     | 3.04**   | .16                    | 1.20                                      | 0.42        | .51     | 2.83**   | .19                    |
| Poor ER skill          | 0.04                                 | 0.32        | .02     | 0.12     | .00                    | 0.34                                      | 0.50        | .12     | 0.68     | .01                    |

*Note.* Poor ER skill = Poor emotion regulation skill

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

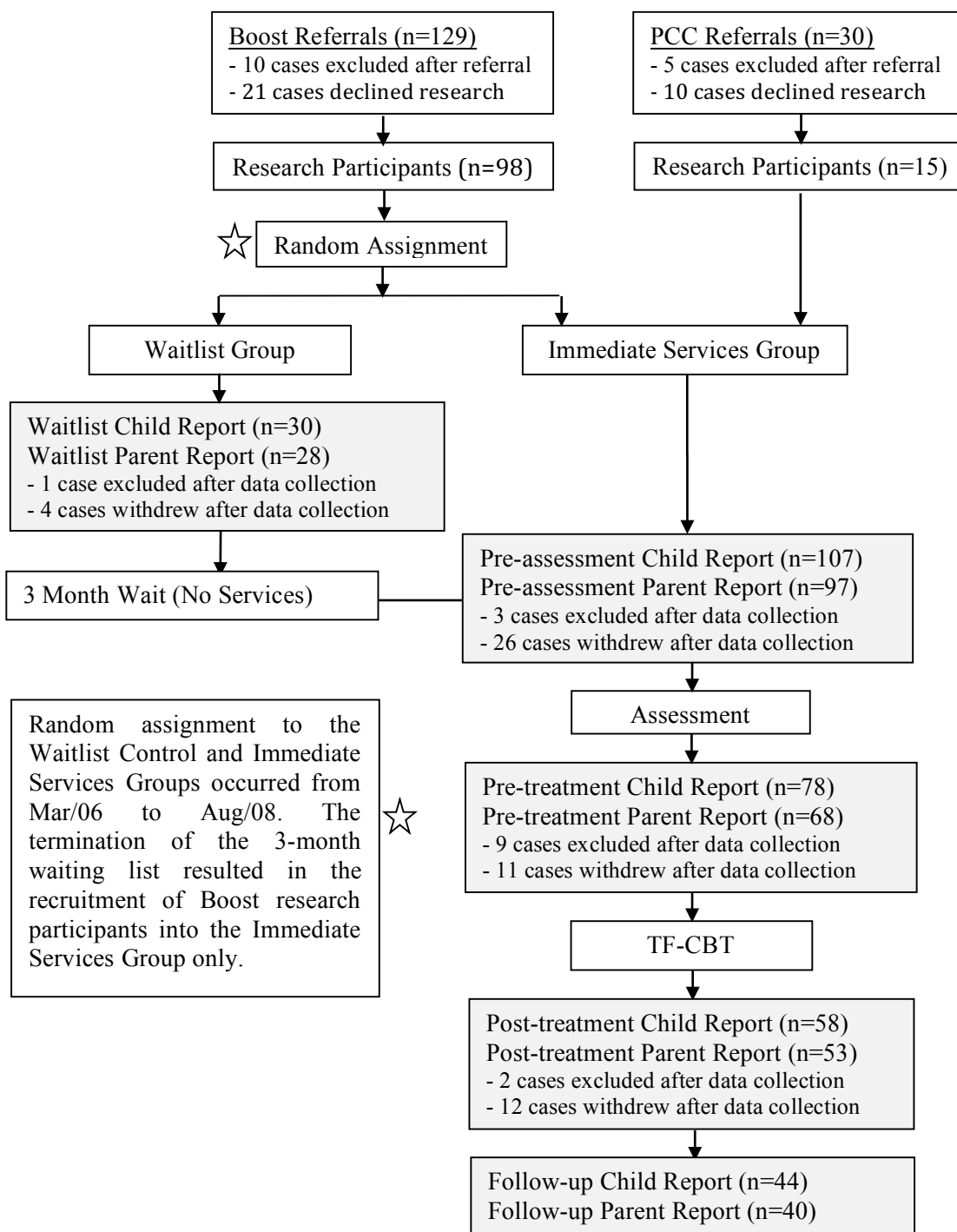


Figure 1. Recruitment and Progress Flowchart.