A Trauma-Informed Cognitive-Behavioral Intervention for Pediatric Oncology Patients

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ABSTRACT

Conceptualizing mental health difficulties among a pediatric oncology population from a traumatic stress perspective is gaining speed. Research has shown support for the development of posttraumatic stress reactions among chronically ill children and their family members. Despite this evidence, the majority of intervention studies have not incorporated key trauma-informed intervention components that have proven to be effective in symptom reduction for trauma-exposed children. Examining key aspects of both the child trauma and pediatric psychology fields have enabled researchers to meld their strengths into one comprehensive approach. This revised perspective has clinical implications for the development of prevention and intervention techniques that are more likely to yield superior outcomes. Yet, an evidence-based, trauma-informed intervention for youth has not yet been empirically examined among a pediatric oncology population. Thus, the purpose of this study was to examine the efficacy of TF-CBT intervention program for children/adolescents diagnosed with cancer and their parents. **Methods:** This was a prospective longitudinal study that utilized a single-subject, non-concurrent multiple baseline design to assess the efficacy of TF-CBT intervention. A sample of five youth (ages 9 to 15) and seven parents enrolled in the study; three youth and five parents completed their participation in the study. Manualized treatment consisted of six sessions lasting approximately two hours per session (including child and parent) that targeted psychoeducation, relaxation training, affective identification and expression skills, cognitive processes, coping strategies, trauma processing, and family processes. Examined constructs, including posttraumatic stress symptomatology, depression, quality of life, parenting stress, coping utilization, coping efficacy, somatization, internalizing, and externalizing symptoms, were assessed by child self-report, parent report, and parent self-report at enrollment (baseline), post-treatment, and one-, and three-month follow-up. **Results:** Simulation Modeling Analysis (SMA) revealed a statistically significant reduction, from baseline to intervention, for one parent's PTSS ($R = -0.711$, $p = .027$) and another parent's PTSS reduction approached significance ($R = -0.747$,

p = .055).   Comparatively, no significant reduction was found for child PTSS. One child showed a significant improvement in coping efficacy (R = 0.619, p = .048) as a function of the intervention, and an additional two child participants approached significance (R = 0.618, p = .055; R = 0.689, p = .094). Visual inspection of the data did reveal noteworthy reductions for some study participants in both domain specific (i.e., PTSS) and broader psychological outcomes (e.g., quality of life, somatization, internalizing and externalizing symptoms, etc.). **Conclusions:** These results provide some support for a trauma-informed CBT intervention for pediatric oncology patients in remission and their parents.

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1.0 - Introduction

Examining the effects of trauma on children has garnered considerable interest in the past several decades. Studies have found that children are the most vulnerable to the effects of a traumatic event (e.g., Ziegler, Greenwald, DeGuzman & Simon, 2005). Understanding key factors implicated in the development of posttraumatic stress reactions and the underlying processes involved can lead to the proper identification of those children who are likely to be most at risk for developing mental health difficulties. Progress in these domains has afforded researchers the opportunity to develop effective, theory-informed, and empirically supported prevention and intervention approaches.

In comparison, our understanding of the mental health implications of pediatric chronic illness (e.g., cancer) is in its early stages. Recent research has found evidence for an increased risk of psychopathology, psychoeducational difficulties, functional impairment and a variety of psychosocial difficulties among affected children and adolescents (e.g., Katz, Rubinstein, Hubert, & Blew, 1988; Vannatta & Gerhardt, 2003). Additional research has also pointed to the negative impact on parents and families, including psychopathology, global distress and life disruption factors (e.g., Alderfer, Labay, & Kazak, 2003; Dongen-Melman et al., 1995; Sahler et al., 2002). Researchers have also begun to examine medical illness and injury among children and adolescents from a traumatic stress perspective (e.g., Lutz Stehl et al., 2009; Kassam-Adams, 2006; Kazak et al., 2006; Kazak et al., 2004). This approach has led to the development of modified intervention approaches based on this theoretical framework.   Despite evident advancement in this area, several key issues and questions remain. Therefore, the purpose of this study is to empirically examine the efficacy of a trauma-informed cognitive behavioral intervention program for children diagnosed with cancer and their parents.

Pediatric Chronic Illness

There are a host of chronic illnesses that can adversely affect children and adolescents, such as cancer, sickle cell disease, multiple sclerosis, cystic fibrosis, chronic pain, and a variety of gastrointestinal disorders. Such illnesses have obvious physical health implications, but only recently have researchers begun to examine the potential mental health implications. Moreover, children and adolescents pose a particular complexity with regards to conceptualizing their mental health needs as a result of their ever changing development and maturation. As such,

posing accurate conceptual models and developing adequate intervention modalities has been challenging. Nevertheless, recent attention has been put forth in an attempt to further our understanding and attainment of these goals.

Given that children's lives are considerably intertwined with their parents, family and friends, it is not surprising that researchers have begun to identify the broad nature of mental health consequences for children and their families; when a child is diagnosed with a chronic illness, the entire family is likely to be affected. With regards to the individual child, pediatric chronic illness has been associated with increases in depression, anxiety, adjustment disorders, posttraumatic stress symptoms (e.g., intrusive thoughts, avoidance behaviors), the development of new fears, somatization, and a sense of isolation, in addition to a decrease in self-esteem (Drotar, 2006). These children and adolescents can also suffer from a variety of psychosocial difficulties, such as social withdrawal, disruptive behavior in the classroom, and a negative impact on interpersonal (e.g., peer) relationships (e.g., MacAllister, Boyd, Holland, Milazzo, & Krupp, 2007). An epidemiological study suggested that approximately 30% of children with a chronic illness suffer from psychosocial maladjustment, and these children are also twice as likely to develop a diagnosable psychiatric disorder (Cadman, Boyle, Szatmari, & Offord, 1987). For example, frequent and long-term hospitalization, along with new physical limitations, can lead to children feeling different from their peers (e.g., Baum & Baum, 1989). Despite the obvious potential for these mental health difficulties to occur, prevalence rates have ranged considerably, from very rare to about 50% (MacAllister et al., 2005) of those affected.

Childhood cancer occurs in a complex and interactive network of social systems rather than simply affecting the individual child (Kazak, Rourke, & Crump, 2003). When the child is adversely affected by a chronic illness, it makes sense that those in his/her nearby systems have the potential to be affected as well. Research has found increased rates of depression, anxiety, posttraumatic stress symptoms, adjustment difficulties, and maladaptive coping among parents, along with parenting stress, marital discord and financial stress (e.g., Barakat, Patterson, Tarazi, & Ely, 2007; Noll, et al., 1995). Mothers also appear to be more vulnerable distress (Kazak et al., 2001). Some researchers have even suggested that the impact of childhood cancer is more severe and distressing for parents than the actual child (e.g., Grootenhuis & Last, 1997).

Research has also suggested that childhood chronic illness negatively impacts the parent-child relationship (e.g., Burlew, Evans, & Oler, 1989). Moreover, it is well known that parent functioning is significantly related to child adjustment (e.g., Drotar, 1997).

Given the stress related to pediatric illness, analyzing why some children adapt and adjust better than others has led researchers to study the construct of coping. While research has elucidated common coping strategies employed by these children, there have been mixed findings regarding their effectiveness in terms of psychological outcomes (e.g., Sorgen & Manne, 2002). In general, the effectiveness of particular coping strategies seems to be dependent upon the situation. For example, children appear to respond more favorably when using a more proactive coping strategy, such as information-seeking, for situations that are within the individual's control. In contrast, uncontrollable situations, such as a cancer diagnosis, more appropriately lend themselves to techniques like avoidance coping (e.g., Altshuler & Ruble, 1989). Notably, however, this technique has also been associated with adverse effects, such as an increase in depressive and anxiety-related symptoms (Frank, Blount, & Brown, 1997). Sorgen and Manne (2002) also noted the importance of the fit between the stressor and the child's preferred coping style, (i.e., problem-focused or emotion-focused) with regard to positive outcomes. Nevertheless, teaching children and their family members adaptive coping strategies seems to be essential for fostering mental health recovery for this population.

Main Theoretical Model

When the child is adversely affected by a chronic illness, it makes sense that those in his/her nearby systems have the potential to be affected as well. Kazak (2006) proposed a biopsychosocial framework for examining the level of psychosocial need of families with acute or chronically ill children. The Pediatric Psychosocial Preventative Health Model (PPPHM) is founded on a social ecological perspective and is embedded in a public health approach. The social ecological perspective is grounded in the social ecology model initially proposed by Bronfenbrenner (1977), which conceptualizes the child as the center of many nested systems. More immediate microsystems include the family, neighborhood, health care system, and school, which are important to the overall development of the child. Further, understanding the interaction among these systems is fundamental to the child's consequent functioning. The public health emphasis of the model utilizes a tiered approach for identifying those most in need

of services. Thus, the overarching goal of this model is to provide a framework that fosters accurate needs assessment among a pediatric population. Implications for prevention and intervention are thus paramount.

Moving away from a singular focus on the afflicted child and towards a holistic focus on the family unit is a recent change in pediatric settings (Kazak, 2006). The PPPHM borrowed from the National Institute of Mental Health's (NIMH, 1998) concepts of *Universal, Selective*, and *Indicated* and developed a tiered approach to providing the appropriate amount of services to families based on their level of need. The first tier, known as Universal, embodies all families who have experienced an unexpected injury or illness of a child. Families in this tier are assumed to be functioning at a relatively normal level; the majority of their difficulties are related to the present pediatric medical stressor. Nevertheless, those in the Universal tier are not free from distress. Therefore, Kazak (2006) stressed the need for supporting these families and providing resources aimed at preventing chronic and/or future difficulties. Comparatively, a smaller subset of families will comprise the second tier, or the Targeted care group. These families have the stressors associated with the disease of the child but also have the added stress of limited resources, such as taxed coping skills, pre-existing difficulties, and familial difficulties. Kazak (2006) noted that while these families are typically identified as needing services by the medical system, treatment is often inconsistent and/or piecemeal. The final tier of families, the Clinical/Treatment group, is the smallest of the three tiers and represents those most in need, oftentimes of a multitude of services. These families report the highest levels of stressors, have the least amount of resources available (e.g., coping skills, social support, etc.), and utilize the majority of health care resources. Moreover, the PPPHM has the objective of matching the specific needs of the family with the appropriate clinical services via an empirically supported assessment approach.

Generally speaking, there is good evidence to support the PPPHM's three-tiered approach. Utilizing a brief screening measure assessing psychological distress among children recently diagnosed with cancer and their family members, Kazak and colleagues (2003) found that 59.2% of the families were characteristic of a Universal tier, 33.6% were characteristic of the Targeted tier, and 7.2% were characteristic of the Clinical/Treatment tier. Similar findings were reported by Lefkowitz and colleagues (2005; as cited in Kazak, 2006), with rates of 53.9% for the Universal tier, 33.7% in the Targeted tier, and 12.4% in the Clinical/Treatment tier

following brief assessment of families in a neonatal intensive care unit. It is worth noting, however, that assessment of need among these studies and presented in the PPPHM is based solely on psychosocial risk factors. Nevertheless, conceptualizing which services to provide based on the families' level of risk is an innovative approach that will have a weighty impact on interventions for this population.

Developmental Considerations

Children suffering from chronic illness still experience all of the developmental changes associated with maturation, similar to other healthy children. In particular, emotional-behavioral responses and cognitive-developmental maturity are becoming more complex during these formidable years (e.g., Fields & Prinz, 1997). However, these children experience added stressors associated with their illness. As such, accurate assessment of their distress and symptomatology must consider the developmental stage of the child. Additionally, repeated assessments throughout the course of their illness are crucial.

Young children in the stages of infancy through preschool have not yet developed the cognitive capacity to fully understand their illness and its implications. For them, medical procedures can be painful and very frightening, which can lead to the development of new fears and phobias. Baum and Baum (1989) noted that fears of separation and abandonment can also develop due to prolonged stays in an unfamiliar hospital setting and disruption of their daily routine. Further, regression or interruption of achieved developmental milestones is also a possibility for this age group.

Comparatively, afflicted children in their school-aged years must deal with the additional difficulties associated with their social development. Because of their illness, these children often experience a disruption in their school attendance, a significant decrease in opportunities to engage in peer activities, and an interruption in their academic studies. The physical ramifications of their disease (e.g., hair loss, jaundice, weight loss, etc.) also become more apparent for these children (Baum & Baum, 1989), which further fuels their sense of isolation from peers. Notably, a sense of control over their disease has been found to be of great consequence. For example, Band and Weisz (1988) found an increase in positive adjustment among school-aged children who reported greater perceived control over their diabetes disease.

Individuals in the adolescence to young adulthood developmental stages face similar difficulties as school-aged children. Social relationships remain an important part of their growth and development, which is greatly affected by their disease. Nichols (1995) noted the significance of social support, which was found to be associated with engaging in more positive coping techniques among adolescents diagnosed with cancer. However, individuals in these stages must also cope with the added challenges associated with their cognitive maturity. In particular, while they are more likely to understand the full implications of their disease, positive adaptation is dependent on their ability to employ cognitive coping strategies in the face of challenging circumstances (e.g., Fields & Prinz, 1997).

The developmental stage of the child also has intervention implications. For instance, children's understanding of chronic illness does evolve systematically over time in a sequence consistent with their cognitive development (Burbach & Peterson, 1986). As such, cognitive intervention techniques (e.g., cognitive restructuring) are obviously dependent on the child's ability to grasp such concepts, which is a requirement for their effectiveness. Additionally, coping skills are inherently related to the developmental stage of the child (Compas & Epping, 1993). Children as young as six years of age can incorporate coping strategies in response to stressors (Band & Weisz, 1988), and these younger children tend to use more behavioral coping skills and avoidant strategies while older youth engage in more cognitive coping skills (Altshuler & Ruble, 1989). Further, what is an effective coping strategy seems to be highly dependent on the developmental stage of the child. Accordingly, alleviating distress associated with chronic illness must incorporate this vital interaction between developmental stages and effective intervention strategies.

Pediatric Psychosocial Interventions

Pediatric chronic illness can give rise to many new problems and challenges for children and their family members. As such, psychological interventions aimed at improving mental health outcomes of those affected by pediatric illness, and in particular pediatric oncology, have become a focal point. Presently, the provision of mental health services is considered a vital part of a comprehensive cancer treatment given the potential risks that can ensue (American Academy of Pediatrics, 1997).

Children and adolescents face the challenges of managing their physical needs, bodily aches and pains, and negative emotions, such as anger, grief, helplessness, and worry as a result of their illness. Parents also struggle with providing emotional support for their child, being overprotective, marital conflicts, interpersonal conflicts, financial stressors (e.g., managing medical bills, insurance coverage, etc.) and exhaustion, among others. As such, problem-solving skills appear to be crucial for positive adaptation. Indeed, an increase in adaptive problem-solving styles has been found to be associated with a decrease in mothers' depressive symptoms (Sahler et al., 2002). Given these problems, researchers have developed problem-solving skills intervention programs specific to this population. Specifically, Sahler and colleagues (2005) examined the benefits of a problem-solving skills training (PSST) for mothers of children recently diagnosed with cancer. PSST is a cognitive-behavioral technique based on problem-solving therapy (PST), and it involves five basic components, namely problem formulation, problem definition and orientation, generation of alternatives, decision making, and solution implementation and verification. Multi-site findings point to a significant increase in adaptive problem-solving skills along with a significant decrease in negative affectivity and distress levels for mothers immediately following training (D'Zurilla, Chang, Nottingham, & Faccini, 1998). Notably, however, it is uncertain whether the benefits of PSST is maintained long-term, and this question remains an area of future research.

The psychosocial consequences of chronic illness among children and adolescents are clear; these children may miss a considerable amount of schooling and may not be able to participate in social activities. As a result, they tend to feel isolated and alone (e.g., Carey, Barakat, Foley, Gyato, & Phillips, 2001). In an attempt to address these difficulties, Schwartz and Sprangers (1999) assessed the effects of a three-day weekend intervention program aimed at providing psychosocial support, education and recreation for young adult cancer survivors. In the short-term, gains were seen for quality of life. However, these gains were not maintained at three-months post-intervention. Notably, baseline measures suggest that these cancer survivors reported greater positive affect and less negative affect compared to a healthy comparison group. In an effort to explain these findings, the authors noted the phenomenon of a "response shift," or changes that occur with regard to one's internal standards, values and conceptualization of quality of life as a result of health state changes (Schwartz & Sprangers, 1999). Moreover, participants in the study seemed to return to a more normative quality of life level following

intervention completion. This finding could have led researchers to erroneously conclude that the intervention was futile (i.e., it reduced the perceived quality of life) if they had not considered response shift. Therefore, this study highlights the importance of not only examining the efficacy of psychosocial interventions but also the potential for mediating phenomena involved in the process of long-term adaptation among cancer survivors.

These intervention programs appear to be vital to positive adjustment and adaptive functioning in this population. However, some researchers have called into question the efficacy of current intervention approaches geared towards pediatric chronic illness. For instance, Pai and colleagues' (2006) meta-analytic findings were attention-grabbing. While they did find a modest overall decrease in parental distress and parental adjustment levels, no significant symptom reductions were found for children diagnosed with a cancer. The authors proposed several explanations for this lack of significant findings for children. First, they offered that the majority of studies were carried out with little or no evidence (e.g., a theoretical underpinning) of the interventions' potential benefits. Second, they noted that the interventions included in the meta-analysis were largely unfocused and eclectic in their approach (i.e., not conforming to an overall psychotherapeutic approach). Third, only a few studies utilized an appropriate control group, calling into question key methodological limitations. Fourth, the authors also noted the potential limitation of using more global outcome measures, such as distress and adjustment levels. This begs the question, are we assessing and treating the appropriate symptoms from a theoretically-informed perspective?

1.1 - Pediatric Psychology from a Traumatic Stress Perspective

According to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition Text Revision* (DSM-IV-TR; American Psychiatric Association (APA), 2001), a trauma is classified as an event in which an individual "experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others," which involves the response of "…intense fear, helplessness, or horror," (p. 467). Briere and Scott (2006) note that technically, "trauma" should only refer to an event in and of itself and not the reactions to that event. However, they conclude that "an event is traumatic if it is extremely upsetting and at least temporarily overwhelms the individual's internal resources," (p. 4) and that the more technical definition may be unduly limited. Further, the DSM-IV-TR (APA, 2001) includes life-threatening illnesses on its list of

potentially traumatic events. Some have even postulated that an individual's interpretation of the event, and not the event itself, is the best predictor of whether he/she will develop PTSD (McNally, 2003). Thus, it is sensible that researchers have begun to conceptualize pediatric chronic illness from a traumatic stress framework (e.g., Kazak et al., 2004; Kazak et al., 2006; Stuber, Kazak, Meeske & Barakat, 1998).

In an effort to meld the field of pediatric illness with the field of traumatic stress, the National Child Traumatic Stress Network (NCTSN) has defined Pediatric Medical Traumatic Stress (PMTS) as "a set of psychological and physiological responses of children and their families to pain, injury, serious illness, medical procedures, and invasive or frightening treatment experiences," and being informed that one has a serious illness is conceptualized as a traumatic event. In addition, there is growing evidence that common posttraumatic stress reactions are found among a pediatric population. For example, rates of PTSD among adolescent cancer survivors have ranged between 5-10% and even as high as 21% for young adult survivors (Kazak et al., 2004). Kazak and colleagues (2001) reported that 50% of cancer survivors met diagnostic criteria for the re-experiencing cluster whereas 29% met diagnostic criteria for the arousal cluster of PTSD. Another study found that as many as 78% of childhood cancer survivors will meet criteria for at least one PTSD cluster (Erickson & Steiner, 2001).   PTSS has also been found among parents of children diagnosed with a chronic illness. More specifically, rates of parental PTSD of children with chronic illnesses have ranged from 5-25% with even greater numbers meeting partial PTSD criteria (e.g., Brown, Madan-Swain, & Lambert, 2003; Manne et al., 2002). Similarly, Kazak and colleagues (2004) found that 30% of mothers met full diagnostic criteria for PTSD at some point following their adolescent's cancer diagnosis, 20% of families had at least one parent meeting current PTSD criteria, and 99% of families had at least one family member reporting re-experiencing symptoms.

Researchers have therefore conceptualized cancer diagnosis as representing a life threat, which is integral to a traumatic stress framework (e.g., Cohen, Mannarino, & Deblinger, 2006; Kazak et al., 2004). Moreover, it appears as though the mental health effects of pediatric chronic illness, and in particular, pediatric oncology, can be duly understood from a traumatic stress perspective. Kassam-Adams (2006) noted that such a framework can be valuable for understanding reactions of children and their families who have experienced medical illnesses and injuries. Notably, researchers espousing this approach emphasize that understanding

medical illness and injury should not be limited to the assessment and treatment of PTSD among a pediatric population. Rather, a traumatic stress framework can provide a better overall understanding of pediatric chronic illness, such as cancer, with regard to the emergence and process of mental health difficulties. Further, the application of this framework for mental health intervention approaches is quickly gaining speed. Researchers are now attending to factors commonly examined in the trauma literature, such as coping, resiliency, posttraumatic stress reactions, and posttraumatic growth (e.g., Barakat, Alderfer, & Kazak, 2005).

Pediatric Medical Traumatic Stress (PMTS) Model

The field of pediatric chronic illness has yielded several conceptual models aimed at informing assessment and interventions associated with psychosocial difficulties experienced by this population. In an effort to continue the field's growth in this endeavor, Kazak and colleagues (2006) recently proposed a Pediatric Medical Traumatic Stress (PMTS) model. This model builds on knowledge from both the pediatric psychology and traumatic stress literature and is an attempt to more adequately conceptualize traumatic medical events of children and their families. More specifically, the model emphasizes the child's and family's experiences of this traumatic event and the importance of the timing with regard to the progression of disease stages.

Phase I focuses on the peritraumatic period during and immediately after the medical traumatic event (e.g., diagnosis of pediatric cancer, first chemotherapy treatment, etc.). During this phase, the examination of pre-existing factors (e.g., pre-existing psychopathology, psychosocial difficulties, anxiety, high parental distress levels, etc.) is paramount. Therefore, Kazak and colleagues (2006) offered that assessment of these factors is vital to identifying those most at risk for developing posttraumatic stress symptoms. Additionally, this phase stresses characteristics of the event as indicative of those who will be more likely to experience psychological distress. Notably, this conceptualization is quite similar to the DSM-IV-TR criterion A for PTSD with regard to experiencing a life threat that evokes fear, horror and/or helplessness (APA, 2001). Kazak and colleagues (2004) even proposed that the diagnosis of cancer does represent a threat to life, which is at the heart of a traumatic stress perspective. Additionally, characteristics of the disease, such as stage and severity, have also predicted outcomes (e.g., Fein et al., 2002). The authors also stressed the importance of assessing the child's and family's subjective experience of the medical event. This notion is grounded in

research from the trauma literature. In particular, Lazarus and Folkman's (1984) Transactional Model of Stress emphasizes that the key to understanding which individuals experience distress is not their objective experience but rather their subjective experience, or their interpretation of the situation. Therefore, intervention goals should focus on altering their negative subjective experience, for example, via cognitive restructuring techniques. Again, this intervention approach clearly borrows from the trauma literature, which has emphasized cognitive interventions and found evidence for the effectiveness of cognitive therapy approaches for traumatized individuals (e.g., Briere & Scott, 2006; Chard, 2005; Foa et al., 2005; Wethington, et al., 2008).

After the initial shock that accompanies the peritraumatic period of PMTS, the attention then shifts to the period of primary, more acute treatment of the illness/disease. Phase II of the PMTS model then focuses on the ongoing and ever-evolving mental health reactions of the child and family. This time period is typically characterized by invasive medical procedures, repeated hospitalizations, and at times considerable pain and discomfort to the child. Research has found increases in parental anxiety (e.g., Chahal et al., 2010) and PTSS (e.g., Landolt, Vollrath, Ribi, Gnehm, & Sennhasuer, 2003) and negative emotions for the child, such as anger and sadness (e.g., Kupst et al., 1982) during this time. Utilizing a traumatic stress perspective, examining Acute Stress Disorder (ASD) responses, while not sufficient in and of itself to predict PTSD, has been found to be significantly correlated with later development of PTSD (e.g., Scott, Jones, & Briere, 2006). Rates of ASD among parents with children newly diagnosed with a chronic illness tend to be significantly higher than for afflicted children. For instance, Patiño-Fernandez and colleagues (2008) reported ASD prevalence rates of 68% for mothers and 57% for fathers two weeks post-diagnosis. While most individuals with ASD-related symptoms recover naturally over time (e.g., Norris et al., 2002), of those experiencing symptoms severe enough for an ASD diagnosis, 80% will meet criteria for PTSD six months following the traumatic event, and 60-70% will meet PTSD criteria two years post-trauma (Bryant & Harvey, 2000). Similarly, subclinical levels of ASD were found to predict PTSD among children who experienced a medical injury (Kassam-Adams & Winston, 2004). Therefore, Kazak and colleagues (2006) propose intervention efforts aimed at preventing the development of ASD-related symptoms during this period.

The final phase of the PMTS model focuses on longer-term issues following pediatric medical traumas, such as fear of disease relapse, coping with survivorship, and adverse health consequences (e.g., Friedman & Meadows, 2002). Again, utilizing a traumatic stress framework is informative in terms of understanding the potential for PTSS in this population. Trauma-related literature suggests that, while a decline of PTSD symptoms over time is common and somewhat expected for the majority of individuals, a subset of individuals continues to suffer from posttraumatic stress long after the traumatic event is over. Further, some studies have found evidence to support the chronic nature of PTSD (e.g., North, 2001; North, Smith, & Spitznagel, 1997). Similar findings have been suggested in the pediatric literature. Specifically, there is sufficient research to suggest that the majority of child cancer survivors adjust favorably in the long-term (e.g., Kazak, 1994). However, prevalence rates of PTSD have ranged from 5-10% for adolescent survivors (e.g., Butler, Rizzi, & Handwerger, 1996) and 15-21% for young adult survivors (e.g., Hobbie et al., 2000). Subclinical rates of PTSS are much higher, and long-term functional impairment has also been reported. Moreover, parents of childhood cancer survivors tend to report greater levels of chronic PTSS and PTSD (e.g., Kazak et al., 2001).

In summary, a PMTS model for conceptualizing pediatric illness seems justified. Chronic illness in childhood can be traumatic, leading to feelings of fright, helplessness, and vulnerability. Mental health difficulties also vary as a function of the disease stage. Therefore, understanding the difficulties of afflicted children and their families throughout the course of the illness is essential. Family functioning is oftentimes disrupted, and a small number of parents and children develop severe and intense PTSS. Moreover, developing screening, prevention and intervention programs stemming from this model are of paramount importance.

A Theory-Informed Intervention

In an effort to bridge the gap between a theoretical framework and informed intervention, Kazak and colleagues (2004) developed a brief cognitive-behavioral treatment approach aimed at reducing posttraumatic stress symptomatology entitled the *Surviving Cancer Competently Intervention Program* (SCCIP). SCCIP was designed as a 4-session, 1-day manualized intervention largely focusing on cognitive processing and coping skills techniques, along with a family systems perspective, to reduce PTSS. The authors utilized a randomized wait-list control trial design and included 150 adolescent cancer survivors and their family members. Notably, findings suggest that this intervention program was successful in significantly reducing

adolescents' arousal symptoms and fathers' intrusion symptoms. However, no other PTSS or anxiety reductions were found, and mothers reported no improvements.

To date, this particular intervention appears to be one of a few methodologically sound and theoretically informed approaches utilizing a traumatic stress framework for pediatric illness. Nevertheless, several limitations may have affected the results. Specifically, the mean elapsed time post-recovery for the afflicted adolescents was 4.8 years. It is possible that these families may already be on the path to recovery and less symptomatic compared to families with adolescents who are in the more acute phases of the disease. Kazak et al. (2004) also noted a nonrandom attrition rate for those who reported higher levels of PTSS, and avoidance symptoms in particular, at baseline. Moreover, this issue is commonplace among trauma research, and it underlines the struggle involved in providing services to those most in need.

More recently, Lutz Stehl and colleagues (2009) modified the SCCIP to focus on families at a time where high distress levels and PTSS are more likely, shortly after cancer diagnosis. Research has found that approximately half of parents will meet criteria for ASD within the first two weeks following a child's cancer diagnosis (e.g., Patiño-Fernanadez et al., 2008). Thus, the overarching goal of the *Surviving Cancer Competently Intervention Program-Newly Diagnosed* program (SCCIP-ND) is to promote healthy family adjustment to a potentially stressful medical condition. However, when compared to Treatment as Usual (TAU) using a RCT approach, the SCCIP-ND group was not significantly different from the TAU group. Unusually high rates of attrition and low rates of participation were also noted as considerable challenges for the study. Moreover, given these difficulties, the authors proposed that a RCT approach, with its stringent guidelines aimed at high internal validity, may not be appropriate for a pediatric oncology population (Lutz Stehl et al., 2009). Nevertheless, the significant finding regarding adolescents' reduction in arousal symptoms following SCCIP intervention is promising.

Towards a Trauma-Informed Intervention

Trauma-focused interventions have been and remain a vital area of research. Adults and children alike are impacted, and it is seemingly imperative for the research community to explore and identify effective treatment options for a variety of groups affected by diverse trauma experiences. Fremont (2004) refers to a multitude of research regarding treatment options, and in particular cognitive-behavioral therapy (CBT) approaches, that have been identified as the most rigorously studied and efficacious treatment modality for traumatized children. Further

support for the superiority of CBT for trauma-exposed children and adolescents was reported by Wethington and colleagues (2008). These researchers conducted a systematic review of the most commonly utilized treatment approaches for this population, and strong evidence was found for both individual and group CBT in reducing psychological harm following a trauma. Again, it is important to note that children can develop a wide variety of problems following a trauma, including anxiety, depression, affective dysregulation, and behavioral problems, in addition to PTSD. Cohen and colleagues (2009) noted that trauma-specific CBT treatments have shown to be effective for such a wide range of difficulties in this population.

Trauma-focused cognitive behavioral therapy (TF-CBT). TF-CBT arose as a collaboration of efforts and was developed to serve the needs of traumatized children (Cohen & Mannarino, 1998; Deblinger, McLeer, Atkins, Ralph, & Foa, 1989). This intervention is primarily based on cognitive-behavioral and trauma-informed principles and is a skills- and strengths-based approach specifically designed for trauma-exposed children. The core components of TF-CBT, known by the acronym P.R.A.C.T.I.C.E., are psychoeducation about the trauma experience and PTSD, affective modulation skills, stress-management skills, identification of the relationships between thoughts, feeling and behaviors (i.e., the cognitive triad), creating a trauma narrative, cognitive processing, and the development of safety skills. Children are also taught focused breathing, muscle relaxation, and meditative skills to cope with physiological arousal and distress related to their traumatic experience.

One conceptual strength of this intervention approach is its focus on and inclusion of a multitude of difficulties children may face following a trauma, which the authors termed "trauma symptoms." Here, trauma symptoms refer to behavioral, cognitive, physical, and emotional problems associated with the trauma and extend beyond the more typical PTSD-related problems. These difficulties may include fears, general anxiety, depressive feelings, anger, affective dysregulation, irrational beliefs, maladaptive behaviors, relational problems, and somatic problems. Moreover, the authors suggest that TF-CBT can show symptom improvement not only for PTSD-related difficulties but also more global difficulties related to the trauma experience.

Another asset of TF-CBT is its inclusion of a parental component. While other areas of childhood disorder research and intervention efficacy have yielded little to no support for the benefit of including parents in the treatment process (e.g., Barrett, Duffy, Dadds, & Rapee,

2001), it is also important to note that parents can be directly traumatized, indirectly traumatized through their child's struggles, or both following a traumatic experience (American Academy of Child and Adolescent Psychiatry (AACAP), 1998). For instance, researchers have suggested that parental past trauma exposure and loss, reactivity to reminders, current responsiveness to the child, and trauma-related psychopathology are all related to child outcomes following a traumatic experience (Pynoos, Steinberg, & Piacentini, 1999). As such, this intervention aims to positively impact parents' functioning (e.g., parents' skill deficits, parenting efficacy) and parent-child interactions (e.g., dyadic communication, relational difficulties) using both individual parent and child sessions as well as conjoined sessions. It is known that environmental factors, such as the family environment, can considerably influence the development of mental health sequelae among children. Research has also examined the effect of including parents in the intervention process and found evidence for their inclusion (Deblinger, Lippmann, & Steer, 1996). For instance, including parents in a trauma-informed intervention can assist them in learning and utilizing more positive coping skills, and parents are helpful in encouraging children to practice the skills taught during session. Further, the authors of the TF-CBT model stress the impact of parental factors with regard to the child's recovery, suggesting that such an approach affords the child with the best chance of experiencing long-lasting positive changes (Cohen, Mannarino, & Deblinger, 2006). Yet, the authors also note the importance of recognizing developmental differences between younger child and adolescents with regard to the parental component of TF-CBT. Therefore, intervention goals for the dyad are ultimately a function of age-appropriate interactions (e.g., (in)dependence, boundaries, etc.).

The inclusion and emphasis of trauma narrative and *in vivo* exposure techniques are another noteworthy strength of TF-CBT. Conceptually, children develop fears and avoidance-related behaviors as a result of their trauma experience. These fears then become generalized to seemingly innocuous cues, which can then result in increased avoidance behaviors, functional impairment and other related difficulties. In this treatment model, children are gradually and hierarchically exposed to trauma reminders to promote habituation and desensitization (Cohen & Mannarino, 2008). Further, the authors stress the importance of completing all steps of the hierarchy as failing to do so would inadvertently reinforce the child's existing fears (Cohen, Mannarino, & Deblinger, 2006). As well, working through the child's trauma narrative towards a cohesive, integrative, and meaningful story fosters recovery. Additional research on exposure

therapy techniques have found them be most effective in reducing re-experiencing and avoidance symptoms (Taylor, et al., 2003). Similarly, another study demonstrated that trauma-informed treatment utilizing self-exposure techniques was quite effective in reducing individuals' behavioral avoidance difficulties (Şalcioğu, Başoğlu, & Livanou, 2007). Interestingly, Deblinger and Heflin's (1996) previously published intervention manual was the first CBT-based manual to incorporate exposure techniques with trauma-exposed children.

Following several randomized control trials (e.g., Cohen, Mannarino, & Knudsen, 2005; Deblinger, Stauffer, & Steer, 2001; Deblinger, Steer, & Lippmann, 1999) and replication studies (e.g., King et al., 2000), the efficacy of TF-CBT has been empirically supported. Specifically, in a multisite randomized controlled trial (RCT) study, TF-CBT was found to be superior to child-centered therapy (CCT) in reducing children's PTSD, depression, behavior problems, and shame and parents' depression, trauma-specific distress, as well as improving parenting practices and parental support (Cohen, Deblinger, Mannarino, & Steer, 2004). Significant symptom reductions with regard to PTSD and shame among children and trauma-specific distress among parents were maintained at both six and 12 months post-treatment in comparison to CCT (Deblinger, Mannarino, Cohen, & Steer, 2006). In a similar RCT study, sexually abused youth who completed TF-CBT program showed significantly greater reductions in anxiety, depression and dissociation symptoms, as well as a reduction in sexual problems, compared to those who received non-directive supportive therapy (NST) at six and 12-month follow-ups (Cohen, Mannarino, & Knudsen, 2005). More recently, a pilot RCT study comparing TF-CBT plus psychopharmacology (i.e., Sertraline) to TF-CBT yielded interesting findings. While both groups exhibited significant posttraumatic stress and other clinical symptom reductions, the TF-CBT plus Setraline group only evidenced a significant benefit when looking at the Child Global Assessment Scale (CGAS) ratings; all other comparisons were non-significant (Cohen, Mannarino, Perel, & Staron, 2007). Moreover, children dealing with traumatic stress difficulties following traumatic experiences have shown extensive symptom reductions following TF-CBT.

Given its conceptualization of the traumatic experience and its relative strengths, examining the efficacy of TF-CBT among a pediatric oncology population seems justifiable. First, evidence points towards CBT as the superior intervention approach for trauma exposure and PTSD among adults and children alike (e.g., Wethington et al., 2008; Fremont, 2004). As cancer diagnosis and chronic illness are now considered potentially traumatic events by the APA

(2001), meet the DSM-IV-TR (APA, 2001) PTSD A.1 diagnostic criterion for experiencing an event that involves threatened death and threat to one's physical integrity, and meet the A.2 diagnostic criterion of the event evoking intense fear, helplessness, or horror, a trauma-informed CBT intervention appears warranted for this population. Second, findings suggest that parents are, in fact, negatively impacted by their child's cancer diagnosis in a multitude of ways (e.g., Brown, Madan-Swain, & Lambert, 2003; Kazak et al., 2001; Sahler et al., 2002). Therefore, it makes sense to examine a trauma-informed CBT intervention that has a strong parental component. Third, TF-CBT efficacy studies have primarily examined youth exposed to abuse (e.g., domestic violence exposure, physical and sexual abuse). Such abuses tend to be more chronic in nature and not a single episode event. This element holds true for youth diagnosed with a chronic illness, such as cancer. Fourth, TF-CBT was initially designed to reduce a wide range of trauma-related symptoms beyond PTSS, and efficacy studies have supported this (e.g., Cohen, Mannarino, & Knudsen, 2005). Finally, TF-CBT was developed for and examined among both children and adolescents. Given the inherent difficulties associated with availability and enrollment of pediatric oncology patients and their parents in a research study, coupled with high attrition rates, an intervention that is effective for a wider age range is optimal.

Current Study

The purpose of this study was to empirically examine the efficacy of a trauma-informed cognitive behavioral intervention program for children diagnosed with cancer, namely the Trauma-Focused Cognitive-Behavioral Therapy program (Cohen & Mannarino, 1996). More specifically, this study attempted to address the question of whether a trauma-informed CBT intervention would significantly reduce mental health sequelae among a pediatric oncology population. This population reports a posttraumatic stress symptom picture that is quite similar to children and adolescents who have been exposed to more typically investigated traumatic experiences (e.g., natural disasters, terrorism, etc). As such, a primary aim of the study was to address the question: if more traditionally researched, trauma-exposed youth have shown significant PTSS symptom improvement following previously established and empirically supported CBT interventions, could the same be found for youth diagnosed with cancer? A secondary aim of the study was to examine whether parents of youth diagnosed with cancer reported reductions in trauma-related difficulties (e.g., PTSS and depressive symptomatology)

following TF-CBT. A tertiary aim of the study was to examine whether youth reported symptom improvements in areas more commonly assessed in pediatric psychosocial interventions, such as quality of life. In an attempt to accomplish these aims, the following hypotheses were offered:

Hypothesis 1: baseline assessment. During the baseline phase of the study (i.e., two, three, or four weeks in duration depending on random assignment to phase), it was hypothesized that the frequency, intensity, and severity of symptoms/difficulties for both youth and their parents will be relatively stable.

a. Child/adolescent symptoms of posttraumatic stress, depression, anxiety, somatization, and global difficulties (i.e., internalizing and externalizing difficulties) as well as their quality of life, coping efficacy, and sense of coping efficacy will remain unchanged during the varying baseline condition.

b. Parents' symptoms of posttraumatic stress, depression, and illness-related parenting stress will remain unchanged during the varying baseline condition.

Hypothesis 2: intervention effects.

a. It was hypothesized that the frequency, intensity, and severity of symptoms/difficulties for both youth and their parents will decrease as a function of the therapeutic intervention.

   1. Child/adolescent symptoms of posttraumatic stress, depression, anxiety, somatization, and global difficulties (i.e., internalizing and externalizing difficulties) will decrease in frequency, intensity, and severity following the intervention, in comparison to their baseline levels.

   2. Parent's symptoms of posttraumatic stress, depression, and illness-related parenting stress will decrease in frequency, intensity, and severity following the intervention, in comparison to their baseline levels.

b. It was hypothesized that youth will evidence intervention-related improvements.

   1. Children/adolescents will evidence improvements in their quality of life and sense of coping efficacy following the intervention in comparison to their baseline levels.

Hypothesis 3: maintenance of intervention effects.

a. It was hypothesized that decreases in symptoms/difficulties for both youth and their parents will be maintained at one-month and three-month follow-up.

1. Decreases in child/adolescent symptoms of posttraumatic stress, depression, anxiety, somatization, and global difficulties (i.e., internalizing and externalizing difficulties) will remain relatively stable at one- and three-month follow-up compared to their post-intervention levels.

2. Decreases in parent's symptoms of posttraumatic stress, depression, and illness-related parenting stress will remain relatively stable at one- and three-month follow-up compared to their post-intervention levels.

b. It was hypothesized that youth's intervention-related improvements will be maintained at one-month and three-month follow-up.

1. Children/adolescents' improvements in their quality of life and sense of coping efficacy will remain relatively stable at one- and three-month follow-up compared to their post-intervention levels.

2.0 - Methods

2.1 - Participants

A sample size of nine youth and their parents was initially proposed for the current study. Children between the ages of eight and 12 years at the time of study enrollment were the primary focus of participant enrollment in an attempt to limit the possibility of developmental considerations affecting the results (e.g., potential moderation effects). However, due to the unusually low rates of participation and high rates of attrition found in a similar study by Lutz Stehl and colleagues (2009), the age range was extended to include youth aged eight to 17 years. Again, it is worth noting that TF-CBT has been shown to be efficacious for both children and adolescents.

Youth and their parent(s) were recruited from the Oncology Division of the Carilion Roanoke Memorial Hospital in Roanoke, Virginia. Dr. Joan Fisher, M.D. specializes in pediatric hematology and oncology at Carilion and served as this study's liaison. To be eligible for the study, these children and/or adolescents must have been previously diagnosed with cancer and have recently completed medical treatment for that diagnosis. More specifically, youth have completed medical treatment for cancer between the timeframe of zero years, one month to four years, zero months prior to study enrollment. This criterion served to control for the potential differential effects of disease stage. That is, all youth enrolled in the study were considered to be in the third and final phase of the PMTS model (Kazak et al., 2006).

Youth who met these criteria, and their parent(s)/legal guardian(s), were eligible for the study. The following served as exclusion criteria: (1) youth who are not cognitively capable of providing assent and completing the study requirements; (2) youth and/or parent(s)/legal guardian(s) who cannot read or understand English; (3) youth who are currently receiving CBT treatment related to their cancer diagnosis and/or treatment; (4) youth with significant suicidality; (5) youth who recently began taking psychotropic medication (i.e., are not yet stabilized), and (6) youth who have experienced additional significant traumatic events (e.g., sexual abuse) other than being diagnosed with cancer. Moreover, participants who did not meet inclusion/exclusion criteria were not enrolled for the study.

Eligible families were contacted via the study's Carilion liaison, Dr. Fisher. Follow-up contact was then be initiated by study personnel with the purpose of explaining the study and inviting them to participate. Informed parental consent and assent of child and adolescent participants was then obtained at the enrollment session prior to any baseline data collection. Dr. Fisher completed a review of those who are potentially eligible for the study, and approximately 20 families were identified. Of these families: five consented to participate in the study and completed the initial assessment battery; three families immediately chose not to participate in the study; six families initially expressed interest, asked for time to discuss it with family, but then never responded to follow-up phone contacts; initial contact was unsuccessful with four families; and two did not meet study eligibility criteria (e.g., too young). In sum, all potentially eligible families listed on Carilion Clinic Department of Hematology/Oncology's Patient Registry were approached for study participation. Of the five families that consented to treatment, one withdrew immediately after enrollment, and another family withdrew after completing four treatment sessions.

2.1.1 - Detailed Child and Family Characteristics

"Kaleb." Kaleb was a nine year old Caucasian male who was diagnosed with Acute Lymphoblastic Leukemia (ALL) in late 2003. He underwent 2 ½ years of chemotherapy treatment, had a blood transfusion, and long-term steroid utilization. The steroid treatment caused Kaleb to gain weight, which subsequently affected his self-esteem and contributed to him being picked on at school. Kaleb's parents also separated while Kaleb was undergoing medical treatment, which was identified as another major stressor for Kaleb. As a result, he and his younger sister were splitting time between his mother and father at the time of study participation. The family's income was $40,000-$50,000 annually. Kaleb's mother reported that Kaleb had always been "very strong willed," even from a very young age. As well, Kaleb was diagnosed with Attention Deficit Hyperactivity Disorder in 2008 and exhibited some difficulties with defiance after completing his cancer treatment. Kaleb and his mother withdrew from study participation after completing four treatment sessions, indicating that while they "learned a good deal" from the study, the associated time commitment interfered with the family's daily activities.

"Tanner." Tanner was a 12 year old Caucasian male who resided with his mother, father, and older brother (age 15 years). Tanner was initially diagnosed with Medulloblastoma, a malignant brain tumor, in March of 2005. He underwent nine rounds of chemotherapy and an eight hour brain surgery to remove the tumor, occurring over the span of 15 months. Tanner's mother was employed as a teacher and pursuing a Master's Degree, and Tanner's father was employed as a lab technician. The family's income was $90,000-$100,000 annually. As a result of their child's cancer diagnosis, Tanner's mother quit her job to care for him, subsequently causing the family financial distress. In addition to their child's cancer diagnosis, both parents reported other psychosocial stressors occurring prior to and subsequent to his diagnosis. Specifically, Tanner's father experienced the passing of three close individuals, including his brother, in the past two years. Tanner's mother also lived through the suicide of her father about 10 years prior to study enrollment and received mental health services for depression.

"Shannon." Shannon was a 14 year old Caucasian female who resided with her mother, father, and older sister (age 17 years). Shannon was initially diagnosed with ALL in March of 2002. She underwent 37 (of a planned 57) chemotherapy treatments but was unable to complete full treatment as her body began to "shut down." Shannon also had surgery to remove lymph nodes from the left side of her neck. Shannon's mother was a stay-at-home mother, and Shannon's father was employed in the United States Military at the time of Shannon's diagnosis. During study participation, he was classified as a Disabled Veteran. The family's income was $50,000-$60,000 annually. In January of 2003 (i.e., 10 months after Shannon's cancer diagnosis), Shannon's father was deployed to Iraq for approximately 16 months. He indicated that he probably could have pled his case to stay home with the family, but he chose to be deployed because "he needed an outlet for his intense anger and rage," (discussion during treatment session 5 on 5/17/2011). Shannon's father also indicated that he began to heavily drink alcohol to cope with his intense emotions. Sibling conflict was also noted by the family. Shannon's older sister was also diagnosed with Anorexia Nervosa in the years following Shannon's cancer diagnosis due to severe food restriction and over-exercising behaviors. Shannon's parents indicated that they struggled to deal with both daughters' intensive medical and psychological needs.

"Elizabeth." Elizabeth was a 15 year old Caucasian female who resided with her mother and older brother. Elizabeth was initially diagnosed with ALL in late 2002. She completed 2 ½ years of intensive chemotherapy treatment, followed by an additional 2 ½ years of maintenance treatment. She also underwent surgery to remove blot clots. After verbally agreeing to participate in the study via telephone, Elizabeth and her mother found out that Elizabeth's ALL had relapsed. The dyad initially requested to remain in the study to "help Elizabeth cope with her cancer relapse." However, after enrollment and baseline data collection, the dyad chose to withdraw from the study due to Elizabeth's rigid treatment schedule and time associated with study participation. Elizabeth and her mother reported elevated symptoms at baseline. Her mother then indicated that Elizabeth was seeking counseling services elsewhere related to her cancer relapse. The family's income was less than $10,000 annually.

"Selina." Selina was an 11 year old Hispanic female who resided with her permanent foster parents. Selina was initially diagnosed with ALL in 2004 while under the care of her biological mother. Selina received chemotherapy treatment and was placed on a strict diet. Her biological mother was unable to care for a child with complex medical needs, which therefore led to Selina being fostered by her current foster family. Due to the foster mother's physical limitations resulting from a brain tumor diagnosis and treatment in 1998, as well as family difficulties of the foster mother, Selina was placed with another foster family for approximately nine months. Selina then returned to her current foster family. For about three years (i.e., between the ages of six and nine years old), Selina split time between her biological mother and current foster family. At age nine years, her biological mother's parental rights were terminated. Selina's foster mother identified her religious beliefs as why she chose to permanently foster a child with such medical needs. The permanent foster family's income was $30,000-$40,000 annually.

2.2 - Measures

Families who met inclusion/exclusion criteria and agreed to participate in the study (i.e., provide written consent and verbal assent) were asked to complete a battery of assessment measures throughout the duration of the study. Specifically, parents completed several self-report questionnaires assessing mental health difficulties related to their child's cancer diagnosis

and treatment.   Parents also completed several parent-report measures assessing their child's illness-related difficulties. Youth also completed self-report questionnaires pertaining to their illness-related difficulties. A brief description of each measure is provided below.

Measures completed by parent. Parents completed a basic demographic and illness-related questionnaire specifically designed for the current study. Specifically, this questionnaire assessed age, race/ethnicity, socio-economic status, of the family, brief pre-morbid functioning items assessing the youth's functioning prior to his/her cancer diagnosis, and several questions related to his/her cancer diagnosis and experience.

The *Post-Traumatic Stress Disorder (PTSD) Checklist-Specific* (PCL-S; Weathers, Litz, Herman, Huska, & Keane, 1993) is a standardized self-report measure comprised of 17 items on a 5-point likert scale (i.e., 1 = not at all, 5 = extremely) corresponding to symptoms of PTSD related to a specific and identified "stressful experience," which for this study was considered to be receiving a cancer diagnosis for their child. A total symptom severity score is determined by summing the scores from each of the 17 items and can range from a score of 17 - 85. A suggested cutoff score for screening purposes has been suggested as a score of 25 or higher for "civilian primary care" participants (e.g., Sherman, Carlson, Wilson, Okeson, & McCubbin, 2005; Walker, Newman, Dobie, Ciechanowski, & Katon, 2002). The PCL-S also allows for a diagnosis of PTSD, as defined by the DSM-IV (APA, 1994) criteria: at least 1 re-experiencing cluster item endorsed (questions 1-5), at least 3 avoidance cluster items endorsed (questions 6-12), and at least two arousal cluster items endorsed (questions 13-17). Symptoms rated as "moderately" or above (i.e., responses 3 through 5) are counted as present.   Further, evidence suggests that a 5 - 10 point change represents reliable change (i.e., change not due to chance) and a 10 - 20 point change represents clinically significant change (Weathers, Litz, Herman, Huska, & Keane, 1993). Previous research utilizing the PCL demonstrated sensitivity of .82 and specificity of .83 for male war veterans (Weathers et al., 1993), a sensitivity of .69 and a specificity of .99 among women with breast cancer (Andrykowski, Cordova, Studts, & Miller, 1998), and a sensitivity of .94 and specificity of .86 for civilians following motor vehicle accidents and adult sexual assault (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). It is worth noting, however, that the psychometric properties of the three PCL versions have been

limited to samples of veterans or highly selective civilian groups. Internal consistency (i.e., Chronbach's alpha) for the current sample ranged from .88 to .96 for parent report from baseline to three month post-treatment follow-up.

The *PTSD Checklist Parent Report on Child* (PCL-PR; Ford & Thomas, 2000) is 17-item parent-report measure of their child's posttraumatic stress symptoms corresponding to symptoms of PTSD as indicated in the DSM-IV (APA, 1994).   Items are assessed on a five-point likert scale (i.e, 1 = not at all, 5 = extremely) and assess the occurrence of these symptoms in the past month. Total scores can range from 17 to 85, and a score of 28 or higher represents the cutoff score generating optimal sensitivity and specificity for screening purposes. The PCL-PR has evidenced internal consistency with alpha coefficients of .89 for the total score, .84 for the re-experiencing cluster, .77 for the avoidance cluster, and .80 for the arousal cluster. The PCL-PR also showed good one-week test-retest reliability ($r = .92$, $p < .0001$) and two to four month test-retest reliability ($r = .82$, $p < .01$). Internal consistency (i.e., Chronbach's alpha) for the current sample ranged from .94 to .96 for parent report across the four assessment phases of the study.

The *Beck Depression Inventory-II* (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item self-report assessment of the severity of depressive symptoms in adolescents and adults aged 13 to 80 years. The BDI-II is a revised version of the original Beck Depression Inventory (BDI; Beck, Steer, & Garbin, 1988) and has been updated to reflect the DSM-IV (APA, 1994) criteria for Major Depressive Disorder. The items are on a 4-point likert scale, ranging from zero to three. A total score is obtained by summing all items together. The following is a breakdown of the level of depressive symptomatology based on the total score: less than 14 reflects "minimal symptoms," 14 – 19 reflects a "mild level," 20 – 28 reflects a "moderate level," and greater than 28 reflects a "severe range."   The BDI-II has demonstrated high internal consistency with an alpha coefficient of .94 in a primary medical care setting (Arnau, Meagher, Norris, & Bramson, 2001). Chronbach's alpha for the current sample ranged from .88 to .96 for parent report across the four assessment phases.

The *Child Behavior Checklist for Ages 6 – 18* (CBCL/6-18; Achenbach & Rescorla, 2001) is a standardized parent-report measure designed to assess a child's problem behaviors and competencies from the parent's perspective. Twenty items assess competencies and 120 items tap a broad range of symptoms on a 3-point likert scale (0 = not true, 2 = very true or often true) on how true each item is currently or was true for the child/adolescent in the past six months.

The measure yields scores on internalizing, externalizing, and total problems scales in addition to scores corresponding to DSM-IV (APA, 1994) oriented scales. The following subscales are also assessed: aggressive behavior, anxious/depressed, attention problems, delinquent rule-breaking behavior, social problems, somatic complaints, thought problems, and withdrawn. Estimates of internal consistency for full scales have been generally high, ranging from .78 to .97, and test-retest reliability is excellent, ranging from .95 to 1.00. For the current sample, reliability estimates ranged from .77 (externalizing) to .96 (internalizing) across study phases.

The *Pediatric Oncology Quality of Life Scale* (POQOLS; Goodwin, Boggs, & Graham-Pole, 1994) is a parent-report inventory designed to assess the quality of life of children diagnosed with cancer from their parent's perspective. The POQOLS contains 21 items rated on a 7-point likert scale (0 = never, 6 = very often) and asks parents to report on a variety of illness-related difficulties (e.g., "My child has expressed fear about the disease and its treatment.") for the past two weeks. The measure yields a total score and three factor scores (physical restriction, 9 items; emotional distress, 7 items; and discomfort from medical treatment, 5 items). Estimates of internal consistency reliability coefficients were as follows: .85 for the total measure .87 for the physical restriction factor, .79 for the emotional distress factor, and .68 for the discomfort from medical treatment factor. While the POQOLS is helpful in better understanding participants' overall impact of medical treatments for children with cancer over time, research on the clinical utility of this measure is still needed to determine its sensitivity and specificity for diagnostic or treatment-related decisions (Boggs & Durning, 1998). For the purpose of the current study, participant data was compared to data from a normative sample reported in the scale manual, which included a broad range of diagnoses and phases of treatment. Internal consistency for the current sample ranged from .76 (total score) to .96 (emotional distress factor) from baseline to three month post-treatment follow-up.

The *Pediatric Inventory for Parents* (PIP; Streisand, Branieki, Tercyak, & Kazak, 2001) is a 42-item self-report measure used to assess parenting stress related to caring for a child with an illness. The items are on a 5-point likert scale (1 = not at all, 5 = extremely) and address both the frequency of a particular stressor in the past week and the level of difficulty associated with that stressor. Items are grouped into one of four domain scales (communication, medical care, role function, and emotional function). Frequency and difficulty scores are summed separately for each of the four domains, and total frequency and total difficulty scores are calculated by

summing the related domain scores. Initial estimates of internal consistency were high with Cronbach's alpha above .80 for all domain scores, .95 for the total frequency score, and .96 for the total difficulty score. In a validation study assessing mothers' of children with Type I diabetes, high internal consistency was supported for the total measure (Cronbach's alpha = .97) and for the Frequency (Cronbach's alpha = .94) and Difficulty domains (Cronbach's alpha = .94) (Lewin, Storch, Silverstein, Baumeister, Strawser, & Geffken, 2005). For the current study, a high Cronbach's alpha was shown for both the total frequency and total difficulty scores, which ranged from .91 to .98, to .89 to .98 respectively.

Measures completed by child/adolescent.

The *Child PTSD Symptom Scale* (CPSS; Foa, Johnson, Feeny, & Treadwell, 2001) is a child version of the PDS (Foa, Cashman, Jaycox, & Perry, 1997). It is a 26-item self-report measure designed to assess the severity of PTSD, as defined in the DSM-IV (APA, 1994), in children and adolescents aged eight to 18 years. The first two items are event-related to assess DSM-IV criterion A.1, exposure to a traumatic event. The next 17 items correspond to the PTSD criteria defined by the DSM-IV and are rated on a 4-point likert scale (i.e., 0 = not at all, 3 = 5 or more times a week). The remaining seven items tap daily functioning and functional impairment, occurring in the past two weeks on a dichotomous scale (i.e., 0 = absent, 1 = present). The CPSS allows for the calculation of a total severity score ranging from 0 to 51 and a total impairment severity score ranging from 0 to 7. The measure also allows for calculation of total symptoms endorsed for each PTSD symptom cluster. Psychometric properties of the CPSS show high internal consistency (i.e., Chronach's alpha coefficients of .89 for total score, .80 for re-experiencing cluster, .73 for avoidance cluster, and .70 for arousal cluster) and test-retest reliability (i.e., reliability coefficients of .84 for total score, .85 for re-experiencing cluster, .63 for avoidance cluster, and .76 for arousal cluster). Finally, divergent validity analyses suggested that the CPSS does, in fact, measure a construct different from anxiety and depression in youth (Foa et al., 2001). A cutoff score of 11 has been used in previous studies as a positive screen for PTSD among children (e.g., Kataoka et al., 2003). For the current study, the first two items were omitted as the defining trauma event was considered to be the youth's cancer diagnosis. Internal consistency was good with chronbach's alpha for severity score ranging from .89 to .92 and chronbach's alpha for impairment scores ranging from .82 to .84.

The *Children's Depression Inventory* (CDI; Kovacs, 1992) is a 27-item self-report measure designed to assess cognitive, affective, and behavioral symptoms of depression in children and adolescents aged seven to 17 years. These items consist of three statements each wherein the child is asked to choose that statement that best represents his/her feelings in the past two weeks. The CDI yields a total score ranging from 0 to 54 with a clinical cutoff score of 13 or higher indicating elevated depressive symptomology among clinical samples, which represents the 65th percentile (Kovacs, 2003). Internal consistencies have ranged from .71 to .87 (e.g., Brooks & Kutcher, 2001; Kovacs, Feinberg, Crouse-Novak, Paulauskas, & Finkelstein, R., 1984), and test-retest reliability has been found to be moderate to high (e.g., Kazdin, 1987; Sorensen, Frydenberg, Thastum, & Thomsen, 2005). For the current study, chronbach's alpha for the total score ranged from .93 to .95 for study phases, revealing high internal consistency.

The *Multidimensional Anxiety Scale for Children* (MASC; March, 1997) is a 39-item self-report measure designed to examine dimensions of anxiety in youth aged eight to 19 years. Items are assessed on a 4-point likert scale (0 = never true about me; 3 = often true about me) and correspond to the following four factor scales: physical symptoms, social anxiety, harm avoidance, and separation/panic. The measure also yields scores for the following areas: anxiety disorders index, total anxiety index, and an inconsistency index. *T* scores of 65 or above are thought to reflect clinically significant symptoms. Estimates of reliability for scaled scores were good to high, ranging from a Cronbach's alpha of .74 (harm avoidance) to .85 (physical symptoms), and the estimate of the MASC total score was found to be high (i.e. .90) (March, Parker, Sullivan, Stallings, & Conners, 1997). Another study reported a sample reliability estimate of .94 for the MASC total sore for an inpatient sample (Osman, Williams, Espenschade, Gutierrez, Bailey, & Chowdhry, 2009). The current sample yielded a high internal consistency for the total score, ranging from .91 to .94 across study phases.

While there is no agreed upon "gold standard" for assessing coping in children (Spirito, 1996), the *KidCope* (Spirito et al., 1988) has been widely adopted for studies attempting to examine cognitive and behavioral strategies in this population; it has been used in the past in studies assessing children's coping following war, hurricanes, and traffic accidents (e.g., Stallard, Velleman, Langsford, & Baldwin, 2001; Vernberg et al., 1996) as well as coping with chronic illness (e.g., Edgar & Skinner, 2003) and chemotherapy treatments (e.g., Donaldson, Prinstein, Danovsky, & Spirito, 2000). There are two different versions of the KidCope based on

age of the child, a version for younger children aged five to 13 years and an adolescent version for youth aged 13 to 16 years. Both versions assess the following 10 coping strategies: distraction, social withdraw, cognitive restructuring, self-criticism, blaming others, problem solving, emotional regulation, wishful thinking, social support, and resignation. The adolescent version contains 11 items that assess the frequency of each coping strategy used on a 4-point likert scale (0 = not at all, 3 = almost all the time). The younger child version contains 15 items assessing whether the child engages in a particular coping strategy on a dichotomous (i.e., yes/no) scale. Spirito and colleagues (1988) provided justification for two versions, noting the skill and complexity of coping strategies that develop and progress over time. Regarding a factor structure of the KidCope, Cheng and Chan (2003) examined the adolescent version using confirmatory factor analysis and found a two-factor structure, escape-oriented coping and control-oriented coping, and estimates of internal reliability within an acceptable range (i.e., Chronbach's alpha of .76 and .65, respectively). Comparatively, Vernberg and colleagues (1996) examined the younger child version and found a four-factor structure (positive coping, blame and anger, wishful thinking, and social withdraw) with internal consistencies ranging from .43 to .77. In terms of the measure's clinical utility, Spirito (1996) recommends examining each item endorsed, rather than calculating subscale scores, to better understand the individual's coping process. For the purposes of the current study, coping categories endorsed by each participant, and their subsequent perceived efficacy in each category, were compared across study phases. Given low n-size, internal consistency for all study phases was calculated collectively. The KidCope for younger children version had an overall chronbach's alpha of .91, and the KidCope for older children version had an overall chronbach's alpha of .88.

Children's self-perceived coping efficacy was also examined using a seven-item scale developed by Sandler and colleagues (2000). These items assess whether a child thinks his or her coping strategies will be successful and how well they feel they are able to handle problems as they arise (e.g., "In the future, how good do you think you will be in handling your problems?") using a four-point format (i.e., 1 = not at all, 4 = very good). A total score is calculated by summing the child's responses for all items. Confirmatory factor analysis yielded a one-factor structure for this measure, and initial estimates of internal consistency yield a Cronbach's alpha of .74. Further, coping efficacy has been found to mediate the relationship between active coping and internalizing difficulties among children of divorce (Sandler, Tein,

Mehta, Wolchik, & Ayers, 2000). The current study assessed children's coping efficacy across all baseline and treatment session data points, as well as at follow-up. Internal consistency for the overall measure was good with chronbach's alpha ranging from .73 to .75 across study phases.

The *Children's Somatization Inventory, Revised Form* (CSI-24; Walker, Beck, Garber & Lambert, 2009) is a self-report questionnaire that assesses children's perceived severity of non-specific somatic complaints during the past two weeks on a five-point likert scale (i.e., 0 = not at all, 4 = a whole lot). It includes items from the Somatization Disorder as defined in the DSM-III (APA, 1987) and items that loaded on the somatization factor of the Hopkins Symptom Checklist (HSCL; Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974). Total scores can be computed by summing all items, resulting in a possible range of zero to 96. Internal consistency for this CSI-24 was good (i.e., Cronbach's alpha = .87), and exploratory and confirmatory factor analyses revealed that one stable factor characterizing the presence of many somatic symptoms explained 30% of the total variance. Further, the CSI-24 provides a more comprehensive assessment of somatization than the eight items somatic complaints scale of the CBCL (Achenbach & Rescorla, 2001). The current study utilized the CSI-24 as a method for tracking somatic symptoms and monitoring youth's response to treatment with regard to their perception of somatic symptom severity. As suggested by Gledhill and Garralda (2006), it was not used as a diagnostic tool. Internal consistency for the present sample was .97 for the baseline phase and 1.00 for post-treatment and follow-up phases.

Measure completed by both parent and child.

The *Anxiety Disorders Interview Schedule for DSM-IV, Child and Parent Versions* (ADIS-IV-C/P; Silverman and Albano, 1996) is a widely used, semi-structured clinical interview designed to assess DSM-IV (APA, 1994) diagnoses of childhood anxiety, mood, and behavioral disorders for youth aged seven to 17 years. Psychometric properties of the ADIS-IV-C/P have been favorable, including test-retest reliability in the good to excellent range (Silverman, Saavedra, & Pina, 2001) and acceptable inter-rater reliability (e.g., Rapee, Barrett, Dadds, & Evans, 1994) Noteworthy, however, are Grills and Ollendick's (2003) finding of low levels of agreement among parent and child reports with kappa coefficients below the acceptable value (i.e., $\kappa > .60$) for all diagnostic categories of the ADIS-IV-C/P. For the purposes of the current

study, only the PTSD Module of the ADIS-IV-P and ADIS-IV-C was administered. Moreover, the "Traumatic Event" section also provided a thorough history of other trauma exposures the child may have experienced.

The *Subjective Units of Distress Scale* (SUDS; Wolpe, 1969) is a widely used measurement of individuals' current subjective discomfort and/or psychological pain on a 0 – 10 scale (i.e., 0 = peace, serenity, total relief, no bad feelings of any kind about a particular issue; 10 = feeling unbearably bad, out of control, as in a nervous breakdown, overwhelmed).   It is often used in intervention studies to assess reductions in distress levels, which is considered an indication of recovery. For example, Benjamin, O'Neil, Crawley, Beidas, Coles, and Kendall (2010) assessed anxious children's peak SUDS and magnitude of SUDS change throughout the process of CBT treatment. The SUDS has also shown to be correlated with a variety of physiological stress reactions (e.g., Thyer, Papsdorf, Davis, & Vallecorsa, 1984).   For the purpose of the current study, both youth and their parents completed SUDS ratings at three time points for each intervention session (i.e., at the beginning of each session, midway through each session, and at the end of each session) and was used for clinical purposes only.

Measure completed by observer/outside rater.

The *Clinical Global Improvement* (CGI; Guy, 1976) is a three-item observer-rated measure designed to assess a client's illness severity (CGIS), global improvement or change (CGIC), and therapeutic response. The CGI is evaluated on a 7-point scale for the CGIS and CGIC scales (CGIS: 1 = normal, 7 = amongst the most severely ill patients; CGIC: 1 = very much improved, 7 = very much worse) and on a 5-point scale for therapeutic response (i.e., 0 = marked improvements and no side effects, 4 = unchanged or worse and side-effects outweigh the therapeutic effects). For the current study, the CGI served as a general measure of child participants' symptom(s) improvement over time, relative to pre-treatment severity levels, from the clinician's perspective.

This study also implemented treatment fidelity checks. To accomplish this task, the *Comparative Psychotherapy Process Scale* (CPPS; Hilsenroth, Blagys, Ackerman, Bonge, & Blais, 2005) was used. The CPPS is a brief, 20-item measure on a 7-point likert scale (e.g., 0 = not at all characteristic, 6 = extremely characteristic) of the distinctive features of psychodynamic-interpersonal (PI; 10 items) and cognitive-behavioral (CB; 10 items) treatments. The CPPS was designed to assess therapist activity and techniques used during the treatment

session. It is important to note that the CPPS was not intended for any specific treatment program or manual. Rather, the authors note that it is applicable to a wide range of PI and/or CB therapies. Items are descriptive and help to identify between-treatment differences. CB items and PI items are each summed, then divided by 10 to produce an average score interpretable on a 0-6 scale. Internal consistency estimates were high with a Cronbach's alpha of .92 for PI and .94 for CB subscales. For the purposes of the current study, the CPPS was completed by the therapist for all treatment sessions and a trained external rater for 36.4% of treatment sessions (i.e., 8 of the 22 total sessions). An inter-rater reliability was examined for the mean CB score using the two-way random-effect model intraclass correlation coefficient (Shrout & Fleiss, 1979) and was found to be in the "good" range [ICC(2,1) = .71].

Enrollment	Baseline Phases	Intervention	Post-Intervention	1-month Follow-Up	3-month Follow-Up
Parent:					
Demographics					
ADIS-P (PTSD)			ADIS-P (PTSD)		
CBCL			CBCL	CBCL	
POQOLS			POQOLS	POQOLS	
PIP			PIP	PIP	
PCL-PR			PCL-PR	PCL-PR	
PCL-S	PCL-S^	*PCL-S	PCL-S	PCL-S	
BDI-II			BDI-II	BDI-II	
		*SUDS			
Child:					
ADIS-C (PTSD)			ADIS-C (PTSD)		
CPSS	CPSS^	*CPSS	CPSS	CPSS	
CDI			CDI	CDI	
MASC			MASC	MASC	
Kidcope			Kidcope	Kidcope	
CSI-24			CSI-24	CSI-24	
CES	CES^	*CES	CES	CES	
		*SUDS			
Observer:					
		*CGI			
		*CPPS			

* denotes a measure that will be collected during each of the intervention sessions (i.e., six total sessions).

^ denotes a measure that will be collected at each week of the baseline phase.

2.3 - Treatment

TF-CBT is a components-based intervention program and emphasizes a set of central skills that are both interrelated and progressively build upon one another. As such, the authors do not propound a session-by-session approach to TF-CBT but rather note the importance of therapist flexibility and adaptability based on the family's specific needs. Nevertheless, efficacy studies have adhered to testing conditions where the order of components addressed follows the P.R.A.C.T.I.C.E. acronym. Therefore, each of these components is discussed in detail (refer to Appendix A for a more comprehensive outline of each intervention goal).

Psychoeducation & parenting skills. The main goal of psychoeducation provision is normalizing both the parent's and child's response to the traumatic experience. It is typically provided in a gradual and continuous fashion, starting with more basic information (e.g., general information about the trauma event, information regarding the treatment process) presented during initial treatment sessions, followed by more complex information as the dyad continues to engage in the treatment process (e.g., common emotional and behavioral reactions, why certain strategies are often effective in managing and/or reducing symptoms). Another goal of psychoeducation is to offer simple strategies for managing current symptoms. Overall, the goal is to mitigate the effects of a traumatic experience by imparting relevant and educational information to the individual. Secondly, parenting skills are emphasized in the early stages of treatment and throughout the treatment process to increase the youth's chances for optimal outcomes. Examples of specific parenting skills include how to offer praise and positive attention, employ selective attention appropriately (e.g., not responding to the child's negative behaviors), and properly utilize a contingency reinforcement program.

Relaxation. Teaching the dyad how to properly engage in relaxation skills increases their ability to regulate physiological tension and arousal. Arousal dysregulation, such as exaggerated startle response and restlessness, is a core criterion of PTSD (APA, 2001). Focused breathing for children and guided meditation for adolescents can assist them, for example, in learning how to relax specific body parts, which may be particularly useful for pediatric oncology patients. Additionally, progressive muscle relaxation can help with sleep difficulties and somatic symptoms. Further, including a relaxation component during parent only sessions serves the purposes of assisting them in managing their own stress difficulties and allowing them

to practice relaxation techniques with their children. DeBellis and colleagues (1999) noted that such relaxation techniques can be effective in reversing physiological arousal resulting from traumatic experiences.

Affective expression and modulation. Initial work in this domain consists of assisting youth in expanding their range of affective expression. This task can be accomplished by having them identify their common, everyday feelings, which also serves the purpose of rapport-building, establishing trust and opening lines of communication between the client and clinician. For parents, affective expression work typically entails providing a safe and comfortable place where he/she can express and therefore process his/her emotional experiences related to the traumatic experience. Additionally, this intervention component also focuses on the importance of reinforcing his/her child's affective expression efforts. Affective modulation aims to identify areas where the child and parent have difficulties (e.g., response to negative affective cues, problem solving skills related to affective modulation, etc.) and then learning ways to strengthen these skills. Techniques, such as thought stopping and positive self-talk, are used to achieve this goal.

Cognitive coping and processing. The primary goal of this intervention component is to assist the child and parent in understanding the "cognitive triangle," or the connections among one's thoughts, feelings and behaviors. Following a traumatic experience, it is common for children to develop irrational beliefs and dysfunctional thoughts. To combat this process, cognitive coping techniques are utilized to encourage youth and parents to identify their trauma-related thoughts, challenge them, and ultimately replace them with more accurate and neutral thoughts. Again, because TF-CBT notes the importance of progressive skill building, working on challenging negative thoughts does not initially need to be related to the traumatic experience. Rather, the learning process is emphasized early on. Parents should be encouraged to monitor their negative thoughts early on in the treatment process. This self-monitoring tasks aims to help him/her to become more aware of when these negative thoughts occur. As the dyad progresses through treatment, cognitive coping and processing then becomes more focused on correcting pessimistic thoughts related to the traumatic experience.

Trauma narrative. Children and adolescents often develop fears and avoidance-related behaviors as a result of their trauma experience. These fears can then become generalized to seemingly innocuous cues, which can then result in increased avoidance behaviors, functional

impairment and other related difficulties. The goal of this component is to assist the parent and child in "unpairing" thoughts, reminders, and conversations about their traumatic experience from intense negative emotions via processing their trauma narrative. Pennebaker and Francis (1996) note that, while not sufficient in and of itself to foster recovery, this process is key to helping individuals integrate their traumatic experience into a meaningful experience.

In vivo **mastery of trauma reminders.**   This component is a logical next step following the trauma narrative technique and is especially useful for children experiencing avoidance-related behaviors to seemingly innocuous cues. Therefore, the goal of this intervention component is to gradually and hierarchically expose youth to trauma reminders with the aim of promoting habituation and desensitization (Cohen & Mannarino, 2008). Further, the authors stress the importance of completing all steps of the hierarchy as failing to do so would inadvertently reinforce the child's existing fears. Working through the child's trauma narrative towards a cohesive, integrative, and meaningful story fosters recovery. Perhaps more notably, *in vivo* exposure techniques also help children regain a sense of competency and mastery in their lives.

Conjoint child-parent sessions. The purpose of this component is to foster open lines of communication between parent and child. Here, the major task is to have the child/adolescent share his/her trauma narrative with his/her parent.   The therapist should also model relevant parenting skills previously addressed, such as praising the child for completion of the trauma narrative.

Enhancing future safety and development. The final component of TF-CBT focuses on teaching and reviewing skills that will enhance children's sense of self-efficacy and preparedness. More specifically, the importance of being able to communicate about one's traumatic experiences can foster a sense of future safety in children. Further, aiding the child in feeling safe is often optimized by parental involvement; parents can assist children in retaining and using specific skills reviewed during treatment.

2.4 - Procedures

This was a prospective longitudinal study that utilized a single-subject, non-concurrent multiple baseline design. Single subject designs are often used to test conceptual theories or to identify and validate intervention programs (Horner et al., 2004). This design approach uses a varying time schedule to determine if a program truly influences behavior change and is a viable

alternative to group designs, for example, during the generation of pilot data and/or when it is not possible to obtain large sample sizes (e.g., when examining rare/uncommon types of experimental participants) (Bulté & Onghena, 2009). Pre-intervention program data points were utilized to establish a baseline. Baseline data also represented any change in relevant behaviors that may have occurred in the absence of the intervention. These data were then compared to changes occurring both during and after intervention implementation to determine whether symptom improvement occurred. Moreover, a multiple baseline design approach can be used to identify causal relationships when threats to internal validity have been ruled out (e.g., Kazdin, 1998). Using this research design affords experimental control by evaluating relevant behaviors across different baselines.

Given logistical difficulties associated with session attendance (e.g., scheduling of families, room availability, etc.), each session for the present study generally addressed material typically covered in two sessions. Therefore, the intervention program consisted of six sessions, lasting approximately two hours per session, with one session per week, and adhered to the treatment guidelines and component goals put forth by the program's authors (Cohen, Mannarino, & Deblinger, 2006). Notably, a recent study assessing the feasibility and efficacy of an intensive CBT intervention for PTSD found that it was well tolerated by participants, produced similar outcomes compared to more traditional treatment provision time frames (e.g., one, one-hour sessions per week) but did so in a shorter timeframe (Ehlers et al., 2010). Further, preliminary findings of TF-CBT for children aged four to 10 years exposed to domestic violence suggested that as few as eight sessions was effective in reducing posttraumatic stress symptoms compared to nondirective supportive therapy (A. Mannarino, personal communication, September 10, 2010). Regarding the structure of the current study's sessions, the first half of the session was devoted to the child/adolescent and the remaining half was devoted to the parent for the first 4-5 sessions. Remaining consistent with the authors, the final 1-2 sessions included conjoined sessions in addition to individual time for both the child/adolescent and parent.

Youth and their parents were randomly assigned to one of three baseline phases lasting two, three, or four weeks with three participants assigned to each of the three phases. During each baseline week, participants completed measures to establish a variety of mental health trends prior to the implementation of the intervention. It was hypothesized that: (1) these trends will remain relatively stable across baseline, and (2) symptom improvements will commence and

persist with the initiation of and progression through the intervention program. A bachelor's level graduate student will assist with the assessment data collection process throughout the duration of the study.

Youth and their parents then completed the TF-CBT intervention program as previously outlined. To reduce opportunities for experimenter effects, one master's level graduate student was responsible for providing these services. This therapist completed web-based training on TF-CBT and a live two-day training on TF-CBT. Follow-up data to address whether any symptom improvements were maintained was collected at one-month and three-months post-intervention completion.

2.5 - Initial Statistical Analyses

Power analyses. Given the proposed use of quantitative statistical analyses, power analyses yield helpful *a priori* information. In their multi-site, RCT study of TF-CBT compared to CCT for sexually abused children, Cohen, Deblinger, Mannarino, and Steer (2004) reported the following TF-CBT effect sizes for significant outcomes obtained: children's re-experiencing symptoms ($d = .49$), avoidance symptoms ($d = .70$), hypervigilance symptoms ($d = .40$) related to PTSD, and for their CBCL total score ($d = .33$), and parents' depressive symptoms ($d = .38$). According to Cohen's (1992) effect size criteria, these findings reflect medium to large effect sizes. Given this information, power analyses were conducted using G*Power statistical software, version 3.1.2 (Erdfelder, Faul, & Buchner, 1996). Analyses revealed that, given the proposed sample size (i.e., n = 9) and generally accepted error probability rate (i.e., $\alpha = .05$), the effect size obtainable is 0.91. This is considerably larger than the effect sizes reported by Cohen and colleagues (2004). A second power analysis was conducted to determine the present study's power to detect the aforementioned effect sizes given the proposed sample size (i.e., n = 9) and generally accepted error probability rate (i.e., $\alpha = .05$) and resulted in power ranging from .23 to .61. A third power analysis was conducted to determine the necessary sample size needed to detect the aforementioned effect sizes given acceptable error probability (i.e., $\alpha = .05$) and power ($\rho = .80$) rates. Results yielded a necessary sample size ranging from 15 – 59 participants.

The discrepancy between previously reported effect sizes for TF-CBT and the present study's attainable effect size, in addition to its power and reduced sample size, is somewhat discouraging. Yet, it is important to keep in mind the purpose of the present study, which is to examine the efficacy of an intervention program with a unique population. Oftentimes this

approach is considered a "pilot" or "feasibility" study and is therefore a preliminary trial of the given research question carried out utilizing the entire intervention program but with fewer participants (vanTeijlingen & Hundley, 2001). While findings from this study cannot generalize to all youth diagnosed with cancer due to the small sample size, the goal was to obtain preliminary data regarding the feasibility and potential effects of TF-CBT for pediatric oncology patients.

3.0 - Results

3.1 - Visual Inspection of the Data

Given the study design and sample size, statistical analyses examining change as a result of the intervention are limited. Therefore, primary analyses included visual inspection of the data. Changes from baseline to intervention and from intervention to post-intervention phases were examined to determine a conclusion regarding the reliability and consistency of intervention effects (Long & Hollin, 1995). More specifically, Kazdin (1998) identified data characteristics for visual examination of the data when utilizing a multiple baseline design: (1) *mean* differences in symptom severity across phases; (2) *level* of change of these differences across time (i.e., a shift or discontinuity in the data across phases), (3) *trend* of the data, which displays whether any increases or decreases occurred as a function of time; and (4) *latency* of these changes (i.e., where gains were observed in the course of treatment). Moreover, visual inspection of the data were completed for constructs with sufficient data points (i.e., child self-report PTSS, parent self-report PTSS, and child self-report coping efficacy).

Child Posttraumatic Stress Symptoms (Self-report). An examination of each child participant's self-reported posttraumatic stress symptoms was undertaken to inspect changes in means, trends, and latency of change across baseline, treatment, and follow-up. Table 1 presents all child participants' self-reported posttraumatic stress symptoms (total scores) endorsed on the CPSS across the four main study phases. Refer to Figure 1 for a visual plot of the data for child participant #001. During the baseline phase, child participant #001 endorsed a variable level of PTSS (baseline mean rating of 11.20; baseline slope = -2.20) with the highest endorsement at baseline 1 (CPSS total score = 19). With the implementation of treatment, ean PTSS showed a decrease (average treatment CPSS total score = 6.75; treatment slope = -1.90). The change in mean PTSS and overall downward trend (slope = -1.26) suggests that the child participant's self-reported PTSS may have improved with treatment (i.e., a negative change score of 14 points from initial baseline to treatment session 4, refer to Figure 3); however, given variable baseline levels of PTSS, this cannot be concluded with certainty. It is important to note that parent/child participant #001 dyad ended their participation prior to full study completion (i.e., after treatment session 4). Therefore, post-treatment and follow-up data inspection for PTSS levels cannot be completed.

Refer to Figure 2 for a visual plot of the data for child participant #002. During the baseline phase, child participant #002 endorsed an initially variable (i.e., high baseline 1 symptoms, CPSS total score = 8) then stable (i.e., baseline 2 through baseline 4; mean CPSS total score = 0.00) level of PTSS (overall baseline CPSS total score = 2.00; baseline slope = -2.40). With the implementation of treatment, mean PTSS showed a decrease when compared to overall mean baseline levels (treatment CPSS total score = 0.00; mean change = 2.00) but remained stable when compared to PTSS during baseline 2 through 4 (mean change = 0.00). PTSS levels remained stable throughout treatment (mean rating of 0.00; treatment slope = 0.00). During the post-treatment/follow-up phase, PTSS levels remained stable (CPSS total score = 0.00; follow-up slope = 0.00). The change in mean PTSS and overall downward trend (slope = -0.26) suggests that the child participant's self-reported PTSS may have benefited from study involvement (i.e., a negative change score of 8 points from initial baseline to post-treatment, refer to Figure 4) with these possible benefits maintained at follow-up. However, given the considerably discrepant initial baseline endorsement of PTSS, and therefore variable baseline levels of PTSS, this benefit cannot be concluded with confidence.

Refer to Figure 3 for a visual plot of the data for child participant #003. During the baseline phase, child participant #003 endorsed an initially variable (i.e., high baseline 1 symptoms, CPSS total score = 14) then stable (i.e., baseline 2 through baseline 4; mean CPSS total score = 1.33) level of PTSS (overall baseline CPSS total score = 4.50; baseline slope = -3.60). With the implementation of treatment, mean PTSS showed a decrease when compared to overall mean baseline levels (treatment mean CPSS total score = 0.67; mean change = 3.83) but remained stable when compared to PTSS during baseline 2 through 4 (mean change = 0.67). PTSS levels remained relatively stable throughout treatment (treatment slope = 0.22). During the post-treatment/follow-up phase, PTSS levels remained stable (follow-up CPSS total score = 1.00; follow-up slope = 0.00). The change in mean PTSS, and overall downward trend (slope = -0.43) suggests that the child participant's self-reported PTSS may have benefited from treatment (i.e., a negative change score of 13 points from initial baseline to post-treatment, refer to Figure 5) with these possible benefits maintained at follow-up. However, given the considerably discrepant initial baseline endorsement of PTSS, and therefore variable baseline levels of PTSS, this benefit cannot be concluded with confidence.

Child participant #004 withdrew from the study immediately after initial baseline data collection. Therefore, no conclusions can be made with respect to treatment effects. Notably, this child reported the highest level of PTSS when compared to other child participants across all study phases (CPSS total score = 29.00; 1 ½ standard deviations above sample baseline 1 total CPSS score).

Refer to Figure 4 for a visual plot of the data for child participant #005. During the baseline phase, child participant #005 endorsed an initially variable (i.e., high baseline 1 symptoms, CPSS total score = 9) then stable (i.e., baseline 2 through baseline 3; CPSS total score = 0.00) level of PTSS (overall baseline mean CPSS total score = 3.00; baseline slope = -4.50). With the implementation of treatment, mean PTSS showed stability when compared to overall mean baseline levels (treatment mean CPSS total score = 2.67; mean change = 0.33) but increased when compared to PTSS during baseline 2 through 3 (mean change = 2.67). Interestingly, this child participant's PTSS levels were slightly variable across treatment sessions (i.e., overall treatment slope of 0.11). During the post-treatment/follow-up phase, PTSS levels decreased (follow-up mean CPSS total score = 1.00; follow-up slope = -1.50). The change in mean PTSS, and overall downward trend (slope = -0.26) suggests that the child participant's self-reported PTSS may have benefited from treatment (i.e., a negative change score of 6 points from initial baseline to post-treatment, refer to Figure 6) with these possible benefits further improved at the end of follow-up. However, given the considerably discrepant initial baseline endorsement of PTSS, as well as variability during treatment, this benefit cannot be concluded with certainty.

Parent Posttraumatic Stress Symptoms. An examination of each parent participant's self-reported PTSS was undertaken to inspect changes in means, trends, and latency of change across baseline, treatment, and follow-up. Table 1 also presents all parent participants' self-reported posttraumatic stress symptoms (total scores), endorsed on the PCL-S across the four main study phases. Refer to Figure 5 for a visual plot of the data for parent participant #001. During the baseline phase, parent participant #001 endorsed a relatively consistent level of PTSS (baseline PCL-S total score = 32.00; baseline slope = -0.50) with the highest endorsement at baseline 2 (PCL-S total score = 34). With the implementation of treatment, mean PTSS showed a decrease (treatment mean PCL-S total score = 28.25; treatment slope = -1.30). The change in mean PTSS and overall downward trend (slope = -0.82) suggests that this parent participant's self-reported PTSS may have improved with treatment (i.e., a negative change score of 8 points

from initial baseline to treatment session 4); however, given somewhat variable baseline levels of PTSS and the fact that this parent did not complete treatment, these results must be interpreted with caution. Again, parent/child participant #001 dyad ended their participation prior to full study completion. Therefore, post-treatment and follow-up data inspection for PTSS levels cannot be completed.

Refer to Figure 6 for a visual plot of the data for parent participant #002 (mother and father data). During the baseline phase, the mother of child participant #002 endorsed a stable level of PTSS (i.e., baseline mean PCL-S total score = 19.75; baseline slope = -0.30). With the implementation of treatment, mean PTSS showed a decrease when compared to overall mean baseline levels (mean treatment PCL-S total score = 17.50; treatment slope = -0.26). During the post-treatment/follow-up phase, PTSS levels initially increased (at post-treatment, PCL-S total score = 21.00), followed by a reduction to stable, asymptomatic levels at one- and three-month follow-up (mean follow PCL-S total score = 17; follow-up slope = -2.00). The change in mean PTSS and overall downward trend (slope = -0.21) suggests that this mother's self-reported PTSS may have slightly benefited from treatment (i.e., a negative change score of 3 points from initial baseline to post-treatment, refer to Figure 8); however, maintenance of treatment effects cannot be concluded with any confidence due to variable endorsement of PTSS at follow-up study phases.

During the baseline phase, the father of child participant #002 endorsed a stable level of PTSS (i.e., baseline mean PCL-S total score = 22.50; baseline slope = 0.20). With treatment implementation, mean PTSS showed a decrease when compared to mean baseline levels (mean treatment PCL-S total score = 20.67) with PTSS stability noted across treatment sessions (treatment slope = 0.17). At follow-up, somewhat variable levels of PTSS were endorsed (follow-up mean PCL-S total score = 19.00; follow-up slope = 1.00). The change in mean PTSS and overall downward trend (slope = -0.29) suggests that this father's self-reported PTSS may have modestly benefited from treatment (refer to Figure 8); however, maintenance of treatment effects cannot be concluded with any confidence due to variable endorsement of PTSS at follow-up study phases.

Refer to Figure 7 for a visual plot of the data for parent participant #003 (mother and father data). The mother of child participant #003 endorsed an initially variable (i.e., elevated initial baseline symptoms, PCL-S total score = 23) then stable (i.e., baseline 2 through baseline

4; mean PCL-S total score = 20.00) level of PTSS (overall baseline mean PCL-S total score = 20.75; baseline slope = -0.90). With the implementation of treatment, mean PTSS showed a decrease when compared to overall mean baseline levels (treatment mean PCL-S total score = 18.83). PTSS levels further decreased across treatment sessions (treatment slope = -0.71). During the post-treatment/follow-up phase, PTSS levels continued to decrease to asymptomatic levels from treatment and remained stable (mean follow-up PCL-S total score = 17; follow-up slope = 0.00). The change in mean PTSS and overall downward trend (slope = -0.43) suggests that that this mother's self-reported PTSS likely decreased as a function of treatment, with these possible benefits maintained at follow-up (refer to Figure 9). However, given the somewhat variable initial baseline endorsement of PTSS, these results must be interpreted with caution.

Comparatively, the father of child participant #003 reported an initially high level of PTSS at baseline (baseline 1 PCL-S total score = 56) followed by a noteworthy reduction across remaining baseline data collection (overall baseline mean PCL-S = 33.25; baseline slope = -9.90). With treatment implementation, mean PTSS showed a further decline (treatment mean PCL-S total score = 20.50; treatment slope = -0.49) with some variability across treatment sessions noted. However, PTSS endorsement at post-treatment increased, particularly at one-month and three-month follow-up (mean follow-up PCL-S total score = 29.00; follow-up slope = 6.50). The change in mean PTSS and overall downward trend (slope = -0.81) suggests that that this father's self-reported PTSS may have decreased as a function of treatment. Yet, these improvements were not maintained at follow-up. Nevertheless, this father's PTSS at study completion remained lower than levels at study commencement (refer to Figure 9). Nevertheless, variable initial baseline endorsement of PTSS do not allow for conclusions to be reliability made with regard to treatment effects.

The mother of child participant #004 reported a high level of PTSS at initial baseline (PCL-S total score = 63; more than two standard deviations above parent participants' baseline 1 PCL-S total score), thereby meeting diagnostic criteria for PTSD. However, no further analyses can be conducted due to the dyad's withdrawal from the study. Finally, refer to Figure 8 for a visual plot of the data for parent participant #005. The mother of child participant #005 reported stable, asymptomatic levels of PTSS across all phases of the study (PCL-S total scores = 17;

refer to Figure 10). Given the lack of data variability and endorsed PTSS, treatment effects cannot be determined. However, it is worth noting that study participation did not inadvertently increase this mother's PTSS.

In sum, four of the five parent participants (i.e., 80%) who completed the study endorsed an overall decline in PTSS from baseline to three-month follow-up phases with the majority of symptom reductions occurring between initial baseline and post-treatment study phases. Maintenance of these symptom improvements was somewhat variable for 60% of parents. Baseline variability was also found for several parents, which limits the ability to conclude that the decline in PTSS was solely due to treatment.

Child Coping Efficacy. An examination of each child participant's self-reported coping efficacy was undertaken to inspect changes in means, trends, and latency of change across baseline, treatment, and follow-up. Table 2 presents total coping efficacy scores.

Refer to Figure 1 for a visual plot of the data for child participant #001. During the baseline phase, child participant #001 endorsed minimally variable levels of coping efficacy (baseline mean rating of 22.00; baseline slope = 0.10). With the implementation of treatment, mean coping efficacy gradually increased through treatment session 4 (treatment mean rating of 23.25; treatment slope = 0.30). The change in mean coping efficacy, and overall upward trend (slope = 0.28) suggests that the child participant's sense of coping efficacy may have improved with treatment (i.e., a positive change score of 2 points from initial baseline to treatment session 4, refer to Figure 3); however, given modestly variable baseline levels of coping efficacy, this cannot be concluded with certainty. As well, parent/child participant #001 dyad ended their participation prior to full study completion (i.e., after treatment session 4). Therefore, post-treatment and follow-up data inspection for coping efficacy levels cannot be completed.

Refer to Figure 2 for a visual plot of the data for child participant #002. During the baseline phase, child participant #002 endorsed relatively stable levels of coping efficacy (baseline mean rating of 16.50; baseline slope = 0.60). With the implementation of treatment, mean coping efficacy remained relatively stable and throughout treatment (treatment mean rating of 17.50; treatment slope = -0.14) and at post-treatment/follow-up (mean rating of 17.33; follow-up slope = -0.50). The change in mean coping efficacy, and overall stable trend (slope = 0.08)

suggests that the child participant's sense of coping efficacy did not change as a function of treatment (i.e., a positive change score of 2 points from initial baseline to post-treatment, refer to Figure 4) with no change at follow-up.

Refer to Figure 3 for a visual plot of the data for child participant #003. During the baseline phase, child participant #003 endorsed relatively stable levels of coping efficacy (baseline mean rating of 21.33; baseline slope = 0.60). With the implementation of treatment, mean coping efficacy quickly increased (i.e., a 4 point increase by treatment session 3) and remained stable and high throughout treatment (treatment mean rating of 26.00; treatment slope = 1.37) and at post-treatment/follow-up (follow-up mean rating of 28.00; follow-up slope = 0.00). The change in mean coping efficacy, and overall upward trend (slope = 0.76) suggests that the child participant's sense of coping efficacy likely benefited from treatment (i.e., a positive change score of 8 points from initial baseline to post-treatment, refer to Figure 5) with these benefits maintained at follow-up.

Refer to Figure 4 for a visual plot of the data for child participant #005. During the baseline phase, child participant #005 endorsed stable levels of coping efficacy (baseline mean rating of 20.00; baseline slope = 0.00). With the implementation of treatment, mean coping efficacy quickly increased (i.e., a 4 point increase by treatment session 3), followed by slight variation, throughout treatment (treatment mean rating of 23.33; treatment slope = 0.86). At post-treatment/follow-up, coping efficacy slightly decreased compared to treatment levels (follow-up mean rating of 24.33; follow-up slope = -1.00). The change in mean coping efficacy, and overall upward trend (slope = 0.50) suggests that the child participant's sense of coping efficacy benefited from treatment (i.e., a positive change score of 5 points from initial baseline to post-treatment, refer to Figure 6) but showed a slight decline at follow-up.

3.2 - Pre- and Post-Intervention Results

Constructs assessed at enrollment (i.e., baseline time point 1), post-intervention, and at the two follow-up intervals were examined for pre- and post-intervention changes as well as maintenance of change at follow-up. Results are presented below.

Child Posttraumatic Stress Symptoms (Parent-report). Table 3 presents child participants' parent-reported posttraumatic stress symptoms, by symptom cluster, endorsed on the PLC-PR across the four main study phases. Of importance, the two child participants (i.e., child participants 1 and 4) who withdrew their participation prior to the end of the study (i.e.,

prior to post-treatment data collection phase) have the highest parent-reported child PTSS (M = 41.00, SD = 22.63) compared to the three child participants (i.e., child participants 2, 3 and 5) who completed the study (M = 18.60, SD = 2.30).   Child participant #001's mother reported subclinical PTSS levels at baseline (total score = 25). However, no comparisons with post-treatment and follow-up levels of PTSS can be made as the dyad ended their participation prior to full study completion (i.e., after treatment session 4).

Data were collected from both parents for child participant #002 across all study phases. Child participant #002's mother notably endorsed asymptomatic levels of PTSS across all phases (total score = 17 for all four phases). Comparatively, this child participant's father reported subclinical levels of PTSS at baseline (total score = 20), which then decreased to asymptomatic levels (i.e., no PTSS) at post-treatment and one-month follow-up assessments, followed by a minimal increase (total score = 18) at three-month follow-up.

Data were also collected from both parents for child participant #003 across all study phases. Both parents for this child participant reported asymptomatic levels of PTSS (i.e., total score = 17) at baseline. However, this child participant's mother reported a subclinical increase in PTSS at post-treatment (total score = 19) whereas her father reported no change in PTSS at post-treatment. At one-month and three-month follow-up phases, her mother reported asymptomatic PTSS, representing a return to baseline functioning. Comparatively, her father reported an increase in PTSS at one-month follow-up (total score = 21) and a further increase at three-month follow-up (total score = 26). Further, child participant #003's highest parent-reported PTSS meets neither screening cutoff criteria (total score of 28 or higher) nor diagnostic criteria for PTSD as no re-experiencing symptoms were reported.

Child participant #004's mother reported clinical PTSS levels at baseline (total score = 57). However, no comparisons with post-treatment and follow-up levels of PTSS can be made as the dyad ended their participation following study enrollment (i.e., initial baseline data collection phase). Child participant #005's mother reported asymptomatic baseline levels of PTSS (total score = 17). During the remaining study phases (i.e., post-treatment, one-month and three-month follow-up), this child participant's mother continued to report asymptomatic PTSS levels (total scores = 17), representing no change in PTSS from baseline level of functioning due to treatment.

Overall, parents reported a general decrease in their child's PTSS from baseline (M=25.00, SD=14.43) to post-treatment (M = 17.40, SD = 0.89). When accounting for elevated scores from the 2 dyads that withdrew from study participation (i.e., removing their scores from data analyses, M = 18.60, SD = 2.30), this decrease was still present, though negligible. This decrease was initially maintained at one-month follow-up (M = 17.80, SD = 1.79). Yet, a slight increase in PTSS at three-month follow-up was observed (M = 19.00, SD = 3.94). However, PTSS of child participants completing treatment was generally stable from baseline to study completion. Moreover, the mean decrease in symptoms from baseline to post-treatment, and their maintained effect at one-month follow-up, suggests that child participants' parent-reported PTSS may have improved only minimally as a function of treatment.

Child Depressive Symptoms. Table 4 presents T-scores for child participants' self-reported depressive symptoms endorsed on the CDI across the four main study phases. Again, the two child participants (i.e., child participants 1 and 4) who terminated their participation prior to the end of the study have the highest self-reported total depressive symptoms at baseline (M = 62.00, SD = 12.73) compared to the three child participants (i.e., child participants 2, 3 and 5) who completed the study (M = 40.00, SD = 6.56). Child participant #001 reported average level depressive symptoms at baseline (total score T-score = 53).

Child participant #002 reported "below average" depression levels at baseline (total T-score = 39), followed by a further reduction to asymptomatic levels at post-treatment (total T-score = 34). This asymptomatic level of depressive symptoms was maintained at one-month and three-month follow-up. Similarly, child participant #003 reported asymptomatic levels of depression (total T-score = 34) across all study phases. Overall, these child participants did not present with significant symptoms of depression throughout the study.

Child participant #004 presented with clinically significant symptoms of depression at baseline (total T-score = 71) with significant elevations in the domains of Negative Mood, Interpersonal Problems, and Ineffectiveness. No study phase comparisons are possible due to participant study withdrawal.

Child participant #005 endorsed "average" range depressive symptoms at baseline (total T-score = 47). Symptom reduction was found at post-treatment (total T-score = 39), which was generally maintained at one-month and three-month follow-up (total T-scores = 40). Again, this

child participant presented with average to below average levels of depressive symptoms throughout the study.

In sum, the three child participants who completed the study did not endorse any clinical elevations for depressive symptoms across all four study phases. As well, modest symptom reductions were found for two children from baseline to post-treatment, and the remaining child reported symptom stability. These low/asymptomatic levels were maintained at follow-up.

Child Somatization. Table 5 presents child participants' self-reported somatization symptoms endorsed on the CSI-24. All five child participants reported symptoms of somatization at the baseline phase (M = 21.60, SD = 21.89). Again, the two child participants (i.e., child participants 1 and 4) who terminated their participation prior to the end of the study (i.e., prior to post-treatment data collection phase) reported the highest somatization scores (M = 41.00, SD = 32.53) compared to the three child participants (i.e., child participants 2, 3 and 5) who completed the study (M = 8.67, SD = 6.43). Interestingly, all three of these child participants reported no somatization symptoms at post-treatment and both follow-up phases of the study. Moreover, the mean decrease in symptoms from baseline to post-treatment, and their maintained effect at three-months follow-up, suggests that child participants' self-reported somatization likely decreased as a function of treatment.

Child Anxiety. Table 6 presents T-scores for child participants' self-reported anxiety symptoms endorsed on the MASC across all study phases. Again, the two child participants (i.e., child participants 1 and 4) who terminated their participation prior to the end of the study have slightly elevated total anxiety symptoms at baseline (M = 53.00, SD = 1.41) when compared to the three child participants (i.e., child participants 2, 3 and 5) who completed the study (M = 44.00, SD = 10.44). However, all five child participants endorsed total anxiety scores generally within normal limits. Child participant #001 reported average level anxiety symptoms at baseline (total score T-score = 52). However, no comparisons with remaining study phases are possible due to participant study withdrawal.

Child participant #002 endorsed a noteworthy decline in anxiety-related difficulties from baseline to post-treatment (difference in T-score = 24 points). Further modest declines were also reported from post-treatment to one- and three-month follow-up phases. Moreover, while this child participant reported anxiety symptoms within normal limits across all study phases, a sizable reduction was reported at a time suggestive of a positive treatment effect (i.e., from

baseline to post-treatment). Child participant #003 also endorsed a decline to asymptomatic levels of anxiety from baseline to post-treatment (difference in T-score = 14 points). This reduction was maintained at one- and three-month follow-up. While this child participant reported anxiety symptoms within normal limits across all study phases, symptom reduction was reported at a time suggestive of a positive treatment effect (i.e., from baseline to post-treatment).

Child participant #004 reported overall anxiety levels within normal limits (T-score = 54) but did endorse clinically significant symptoms on the Separation/Panic subscale (T-score = 65) at baseline. This participant withdrew from study participant prior to additional data collection, thereby eliminating the opportunity for between-phases comparison of anxiety symptoms. Finally, child participant #005 reported no change in overall anxiety symptoms from baseline to post-treatment, which was followed by a modest symptom reduction at one-month follow-up and asymptomatic levels of anxiety at three-months post-treatment. As such, treatment did not appear to impact anxiety-related difficulties for this child participant.

In summary, all child participants reported anxiety symptoms within normal limits for all study phases, with the exception of one child who reported clinically significant symptoms of separation/panic at baseline. Of the three child participants who completed the study, all three endorsed a reduction in anxiety-related difficulties to asymptomatic levels from baseline to three-month post-treatment follow-up. This finding provides evidence for a positive treatment effect with respect to anxiety symptom reduction among child participants.

Child Coping Strategy Utilization and Effectiveness. Each child participant's perceived coping strategies used during an identified problem, related to their cancer diagnosis and/or treatment, as well as their effectiveness, were examined using the KidCope scoring and interpretation guidelines (Spirito et al., 1988).

Child participant #001 completed the younger version of the KidCope and reported the primary problem of weight gain and being "overweight" because of his cancer treatment. This participant stated that he is "…overweight because of treatment and I really don't like that; [I] was on steroids and it did something to my body where I can't lose weight," which caused him to feel "somewhat" nervous, angry, and mad, and "pretty much" sad. At baseline, he endorsed using the following coping strategies: distraction (very effective), social withdraw (a little effective), self-criticism (a little effective), problem-solving (very effective), emotion regulation (very effective), wishful thinking (a little effective), and social support/resignation (a little

effective). Further, four adaptive and three maladaptive coping strategies were endorsed, with three of the four adaptive coping strategies rated as very effective, whereas all three maladaptive coping strategies were rated as a little effective. Comparisons across remaining study phases could not be completed as this dyad withdrew from the study during the treatment phase.

Child participant #002 completed the younger version of the KidCope and reported the primary problem of smaller stature as a result of his cancer treatment. He stated that his "…height bothers me and makes me feel like I am a target for bullies because I'm smaller," which caused him to feel "somewhat" nervous, angry, and mad, and "a little" sad. At baseline, he endorsed using the following coping strategies: distraction (very effective), social withdraw (not at all effective), cognitive restructuring (a little effective), and social support/resignation (a little effective). The three identified positive coping strategies were rated as being a little to very effective, whereas the maladaptive coping strategy was rated as being not at all effective. Interestingly, at post-treatment, one-month, and three-month follow-up, this child participant endorsed only using one coping strategy, namely distraction, which he rated as "very effective." Notably, this child also reported that he no longer felt any nervousness, anger/madness, or sadness related to this problem during these study phases. Therefore, the reduction in utilized coping strategies is likely due to there no longer being a distress as a result of the identified problem requiring coping strategies, rather than a decrease in adaptive coping strategy utilization, per se.

Child participant #003 completed the older version of the KidCope and reported the primary problem of having a tumor on the left side of her neck requiring surgery, which left a scar that serves as a constant reminder of her cancer experience. This identified problem caused her to feel "a little" anxious/nervous, "somewhat" sad/depressed, and "somewhat" angry/mad. At baseline, she endorsed using the following coping strategies "almost always" and as being "very much" effective: distraction, social withdraw, cognitive restructuring, emotion regulation, wishful thinking, and resignation; she also reported using social support "sometimes," which was "a little" effective. That is, four of the five adaptive coping strategies endorsed were rated as being "very much effective," and both of the maladaptive coping strategies endorsed were also rated as being "very much effective." In comparison, this child participant endorsed only using three coping strategies "almost all the time" at post-treatment (i.e., cognitive restructuring, emotion regulation, and resignation), all of which were adaptive and rated as "very much

effective." Notably, this child also reported that she no longer felt any anxiety/nervousness, anger/madness, or sadness/depression related to this problem during post-treatment and remaining follow-up study phases. At one-month and three-month follow-up, this child participant reportedly no longer utilized any coping strategies related to the identified problem. Moreover, the reduction in utilized coping strategies is again possibly due to there no longer being a distressing problem that she must to cope with, rather than a decrease in coping strategy utilization, per se.

Child participant #004 completed the older version of the KidCope and reported the primary problem of having to frequently give herself shots as a part of her cancer treatment. This identified problem caused her to feel "pretty much" anxious/nervous, "very much" sad/depressed, and "pretty much" angry/mad. At baseline, she endorsed using the following coping strategies, with the most frequently utilized strategies listed first: distraction (almost all the time, a little effective), wishful thinking (almost all the time, a little effective), resignation (almost all the time, not at all effective), cognitive restructuring (a lot of the time, a little effective), emotion regulation (a lot of the time, a little effective), social withdraw (sometimes, not at all effective), blaming others (sometimes, a little effective), and social support (sometimes, not at all effective). Of the five identified adaptive coping strategies, she rated three of them as only a little effective and the remaining two as not at all effective. Of the three identified maladaptive coping strategies, two were rated as a little effective with the remaining one as being not at all effective. Comparisons across remaining study phases could not be completed as this dyad withdrew from the study after completing the baseline study phase.

Child participant #005 completed the younger version of the KidCope and reported the primary problem of having a compromised immune system and the subsequent embarrassment of having to wear a mask at school during her cancer treatment, which caused her to feel "pretty much" nervous, "somewhat" angry and mad, and "not at all" sad. At baseline, she endorsed using the following coping strategies: distraction (a little effective), social withdraw (very effective), problem-solving (a little effective), emotion regulation (a little effective), and wishful thinking (very effective). The three identified adaptive coping strategies were all rated as being a little effective, whereas the two maladaptive coping strategies were rated as very effective. At post-treatment, she endorsed using the same strategies identified at baseline. However, she also identified using an additional adaptive coping strategy, namely cognitive restructuring, which

she rated as very effective. Additionally, two of the four adaptive coping strategies were rated as being very effective, whereas the two maladaptive coping strategies were rating as a little effective. Finally, this child also reported that she no longer felt any nervousness, anger/madness, or sadness related to this problem during these study phases. Moreover, these data represent an increase in the use and effectiveness of adaptive coping strategies, a decrease in the effectiveness of maladaptive coping strategies, and a decrease in associated distress, from baseline to post-treatment. No change in either utilization, effectiveness of coping strategies, or distress levels was endorsed at one-month and three-month follow-up.

In summary, all three child participants who completed the study reported decreases in nervousness, anger/madness, and sadness across phases of the study, particularly from baseline to post-treatment, which was maintained at follow-up. Less coping strategies utilization, both adaptive and maladaptive, was reported by two of the three child participants at post-treatment and follow-up. The remaining child participant reported increased use of adaptive coping strategies at post-treatment, which was maintained at follow-up. Notably, the two child participants who withdrew from the study prior to treatment completion reported using on average one more maladaptive coping strategy at baseline compared to those children who completed treatment; no difference in adaptive coping strategy utilization was observed.

Child Internalizing/Externalizing Symptoms. Table 7 presents T-scores for Internalizing, Externalizing, PTSD, and Total Behavior Problems subscales on the CBCL. Specifically, six of the seven parents reported at-risk or clinically significant scores at various assessment phases (baseline to three-month follow-up). Similar to other reported symptomatology, parents of the two child participants (i.e., child participants 1 and 4) who terminated their participation after baseline data collection reported the highest scores on the CBCL compared to the three child participants (i.e., child participants 2, 3 and 5) who completed the study. That is, the parent of child participant #001 reported clinically significant Internalizing (T = 68), Externalizing (T = 66), PTSD (T = 64), and Total Problems (T = 66) at baseline. Similarly, the parent of child participant #004 reported clinically significant Internalizing (T = 73), Externalizing (T = 64), PTSD (T = 80), and Total Problems (T = 70) at baseline.

The mother of child participant #002 did not endorse any clinically significant or at-risk concerns at baseline, post-treatment, one-month or three-month follow-up. Comparatively, this child participant's father endorsed an at-risk concern for Internalizing symptoms at baseline (T = 62); however, this was no longer an at-risk concern at the one-month or three-month post-treatment follow-up. Therefore, while his mother reported no change in his asymptomatic presentation, this child appeared to have benefited from treatment based on his father's endorsement of internalizing difficulties.

The mother of child participant #003 reported a clinically significant concern for PTSD-related symptoms (T = 64) and an at-risk concern for Total Problems (T = 63) at baseline. Concern in these areas decreased to within normal limits at post-treatment, one-month and three-month follow-up, suggesting symptom improvement within these domains as a function of treatment. The father of child participant #003 endorsed clinically significant concerns for PTSD-related symptoms (T = 64) and Total Problems (T = 64) at baseline. Concern in these areas decreased to at-risk levels for Total Problems (T = 61) and within normal limits for PTSD at post-treatment. However, an increase was observed for at-risk Externalizing (T = 63), PTSD (T = 62), and clinically significant Total Problems (T=66) concerns at one-month, which was followed by a reported decrease to within normal limits for all areas at three-month follow-up. Given the variability of her father's symptom endorsement, across domains and study phases, no reliable determination can be made regarding treatment effects.

The mother of child participant #005 reported at-risk concerns for Externalizing (T = 62) and Total Problems (T = 62) symptoms. At post-treatment, concern for Externalizing (T = 65) and Total Problems (T = 65) reached clinically significant levels, followed by a decrease to at-risk concerns for these subscales at one-month follow-up (T = 60 and T = 60, respectively). While concerns further decreased for Total Problems symptoms to within normal levels (T = 57), this child participant's mother endorsed a clinically significant concern for Externalizing symptoms (T = 64) at three-month follow-up. Given the variability of her mother's symptom endorsement, across domains and study phases, no reliable determination can be made regarding treatment effects.

Child Quality of Life. Table 8 presents total scores for the Physical Restriction, Emotional Distress, and Response to Medical Treatment subscales, as well as a total measure score on the POQOLS, with higher scores indicating lower quality of life. As standardized

scores are not available for this measure, population means and standard deviations, as reported by Bijttebier and colleagues (2001), are provided for comparative purposes. Again, the two child participants (i.e., child participants 1 and 4) who terminated their participation prior to the end of the study had lower parent-reported child quality of life (M = 77.00, SD = 57.98) compared to the three child participants (i.e., child participants 2, 3 and 5) who completed the study (M = 32.80, SD = 7.73) at the baseline phase. Child participant #001's mother reported higher quality of life across all subscales when compared to data from a normative pediatric oncology sample. However, no comparisons with post-treatment and follow-up levels of quality of life can be made as the dyad ended their participation prior to full study completion.

Data were collected from both parents for child participant #002 across all study phases. Child participant #002's mother endorsed decreased quality of life from baseline to treatment, and from treatment to one-month post-treatment follow-up; however, an increase was endorsed at three-month follow-up, which represented the highest quality of life endorsement for all study phases. Comparatively, this child participant's father reported increased quality of life from baseline to treatment and treatment to one-month post-treatment follow-up. However, a considerable decrease was reported at three-month follow-up, which was lower than baseline level of quality of life. It is worth noting that, when compared to the normative pediatric oncology sample, both parents' endorsement of quality of life was higher for all phases of the study (i.e., study participants reported better quality of life compared to the normative sample).

Data were also collected from both parents for child participant #003 across all study phases. Child participant #003's mother endorsed a modest increase in quality of life from baseline to treatment, followed by a decrease at the one-month post-treatment phase. A return to baseline functioning was then reported at three-month follow-up. Comparatively, this child participant's father reported decreased quality of life from baseline to treatment and treatment to one-month post-treatment follow-up. However, a decrease was reported at three-month follow-up, which remained lower than baseline level of quality of life. Of noteworthy importance, when compared to the normative pediatric oncology sample, both parents' endorsement of quality of life was higher for all study phases.

Child participant #004's mother reported very low quality of life at baseline (total score = 118), which was lower than ratings from a normative sample. However, no comparisons with post-treatment and follow-up quality of life levels can be made as the dyad ended their

participation following study enrollment (i.e., after initial baseline data collection phase). Child participant #005's mother reported a decrease in quality of life from baseline to treatment, followed by an increase from treatment to one-month post-treatment and three-month follow-up. Final study phase level of quality of life remained slightly lower than baseline levels.

Overall, parents reported a general increase in their child's quality of life from baseline (M = 45.43, SD = 14.43) to post-treatment (M = 34.20, SD = 6.38). However, when taking into consideration scores from the two dyads that withdrew from study participation and removing their scores from data analyses (i.e., M = 32.80, SD = 7.73), this increase is no longer present. Rather, scores represent relative stability from baseline to post-treatment. At one-month follow-up (M = 38.60, SD = 9.71), study participant quality of life slightly decreased, which was maintained at three-month follow-up (M = 37.20, SD = 12.38). Moreover, these data suggest that child participants' quality of life, as reported by their parents, may not have improved as a function of treatment. Remarkably, when compared to the normative sample reported in the POQOLS manual, which included a broad range of diagnoses and phases of treatment, sample participants' scores indicated significantly higher quality of life across all subscales.

Parent Depressive Symptoms. Table 9 presents the total scores for parent participants' self-reported depressive symptoms across all study phases. Again, the two parent participants (i.e., mothers for child participants 1 and 4) who terminated their participation prior to the end of the study had elevated depressive symptoms (M = 25.50, SD = 7.78) compared to the three parent participants (i.e., parents of child participants 2, 3 and 5) who completed the study (M = 9.60, SD = 14.50) at baseline. Child participant #001's mother reported depressive symptoms in the "moderate" range at baseline (total score = 20). However, no comparisons with post-treatment and follow-up levels of depression can be made as the dyad ended their participation prior to full study completion.

Data were collected from both parents for child participant #002 across all study phases. Child participant #002's mother endorsed "minimal" depressive symptoms at baseline (total score = 1), which slightly increased but still remaining in the "minimal" range at post-treatment (total score = 3). At one- and three-month follow-up, this mother was reportedly asymptomatic for depressive symptoms (total scores = 0). Child participant #002's father endorsed "minimal"

depressive symptoms at baseline (total score = 12), which steadily declined across remaining study phases (post-treatment total score = 6, one-month follow-up total score = 5, and three-month follow-up total score = 3).

Data were collected from both parents for child participant #003 across all study phases. Child participant #003's mother reported asymptomatic levels of depression across all phases of the study (total scores = 0). In contrast, this child participant's father endorsed "severe" depressive symptoms at baseline (total score = 34), followed by a noteworthy decline to "minimal" levels at post-treatment (total score = 12). However, his endorsement of depressive symptoms increased to a "moderate" level at one-month follow-up (total score = 21), followed by a decline to a "minimal" level at three-month follow-up (total score = 14). Moreover, this father's reported levels of depressive symptoms at the end of the study was considerably reduced at study completion when compared to baseline functioning.

Child participant #004's mother endorsed depressive symptoms in the "severe" range at baseline (total score = 31). However, no comparisons with post-treatment and follow-up levels of depression due to participant study withdrawal. Child participant #005's mother reported asymptomatic levels of depression across all phases of the study (baseline total score = 1, remaining study phases total scores = 0).

Overall, four of the five parent participants (i.e., 80%) who completed the study reported minimal range depressive symptoms across all study phases. This suggests that these parents did not experience significant symptoms of depression, and no change as a function of intervention was readily apparent.

Parenting Stress. Table 10 presents the total frequency and difficulty scores for the PIP. Higher scores designate greater frequency of problems in the domains of communication, medical care, emotional disturbance, and role function, as well as more difficulty in these domains. As standardized scores are not available for this measure, means and standard deviations for a pediatric oncology population, as reported in Streisand, Braniecki, Tercyak, & Kazak (2001), are provided for comparative purposes. The two parent participants (i.e., mothers for child participants 1 and 4) who terminated their participation prior to the end of the study had elevated total parenting stress (M = 125.00, SD = 56.57) and related difficulty (M = 129.50, SD

= 45.97) compared to the three parent participants (i.e., parents of child participants 2, 3 and 5) who completed the study (M = 61.80, SD = 15.64 parenting stress; M = 63.00, SD = 21.48 related difficulty) at baseline.

Child participant #001's mother reported lower frequency of parenting stress and related difficulty when compared to data from a normative pediatric oncology sample. However, no comparisons with post-treatment and follow-up levels can be made due to participant study withdrawal.

Child participant #002's mother reported an initial increase in parenting stress frequency from baseline to treatment, followed by no perceived stress at one- and three-month follow-up. With regard to her parenting stress difficulty, she indicated a decline in her total parenting stress difficulty from baseline to treatment, followed by further decline to asymptomatic levels at one-month follow-up, which was maintained at three-month follow-up. This child's father reported a decline in parenting stress frequency and difficulty from baseline to post-treatment, which was initially maintained at one-month follow-up. However, an elevation was reported at three-month follow-up, which exceeded his baseline functioning levels, yet remained below population means.

Child participant #003's mother reported moderate levels of parenting stress and related difficulty at baseline and post-treatment, followed by noteworthy declines at one- and three-month follow-up. This child's father reported variable levels of parenting stress and difficulty across study phases. Notably, his perceived difficulty decreased from baseline to treatment, followed by a return to baseline levels at one- and three-month follow-up. In comparison, this child's father reported variable levels of parenting stress and difficulties across study phases, which were generally commensurate with population means (i.e., within one SD) for both frequency and difficulty.

Child participant #004's mother considerably high levels of parenting stress and difficulty at baseline (i.e., 2 SDs above the population mean and for stress frequency and 1.5 SDs above the population mean for stress difficulty). Data for remaining study phases is unavailable due to participant study withdrawal. Lastly, child participant #005's mother reported minimal parenting stress at baseline in the area of role function, and no related difficulty, followed by a decline to asymptomatic levels for remaining study phases.

Overall, parent participants' responses somewhat varied with regard to their perceived parenting stress levels across study phases. Of the five parents who completed the study, two endorsed steady declines in stress levels, two endorsed variable stress levels, and one endorsed no stress levels across study phases. Interestingly, parents of the same child reported somewhat disparate trends with regards to their parenting stress. Moreover, of the five parent participants who completed the study, all reported considerably less (i.e., one standard deviation below) total stress frequency compared to population means for all phases of the study. This suggests that these parents did not experience significant parenting stress and related difficulty throughout the study. Further, no change as a function of treatment was readily apparent.

3.3 - Results in the Aggregate (by Hypothesis)

Results are also presented by hypothesis, in the aggregate, and are as follows. In general, the present study found support for some but not all of the proposed hypotheses. *Hypothesis 1 (baseline assessment)*: Baseline stability was examined using the constructs of parent PTSD, child PTSD, and child coping efficacy (i.e., constructs with multiple baseline data points). During the baseline phase, five of the six parent participants reported stable posttraumatic stress symptoms (i.e., points range of less than five points (Weathers, Litz, Herman, Huska, & Keane, 1993)), zero of the four child participants reported stable posttraumatic stress symptoms (i.e., all four child participants had significantly higher self-reported endorsement of PTSS for the baseline time point 1; however, remaining baseline data points were then stable), and three of the four child participants reported stable coping self-efficacy. Thus, parent posttraumatic stress symptomatology stability and child coping self-efficacy stability, were established for some, but not all participants. Child posttraumatic stress symptomatology was not fully stable.

Hypothesis 2 (intervention effects): Mean change from baseline to treatment was calculated using the constructs of parent PTSD, child PTSD, and child coping efficacy. Score difference from enrollment (i.e., baseline time point 1) to post-treatment was compared for remaining constructs (i.e., parental depression and stress levels; parent-reported child PTSD, parent-reported child quality of life; parent-reported child internalizing/externalizing symptoms, child self-reported depression, anxiety, coping, and somatization). Compared to baseline, a mean decrease in parental PTSS was found for five of the six parent participants; the remaining one parent reported no change in asymptomatic levels from baseline to treatment. That is, 80% of parents indicated decreased PTSS from baseline to treatment. Comparatively, no mean change

in child self-reported PTSS was found from baseline to treatment for all four of the child participants (i.e., self-reported PTSS was generally stable from baseline to treatment). Compared to baseline, a mean increase in child self-reported coping efficacy was found for all four of the child participants, suggesting a greater sense of self-efficacy among child participants from baseline to treatment phase.

For the remaining constructs, individual score difference from baseline to post-treatment was used to evaluate intervention effects. Of the five parents participating in the intervention phase, score reduction in depressive symptoms was found for three parents, with the remaining one parent participant reporting no score change and one parent reporting a slight score increase. This suggests that more than half of parents reported a reduction in depressive symptoms from baseline to treatment phase. Similarly, two parents reported a modest decrease in parenting stress, two parents endorsed low and stable rates of parenting stress, and the remaining one parent endorsed a minimal increase in parenting stress from baseline to treatment phase. This suggests a somewhat variable treatment effect on parenting stress levels.

From baseline to treatment phase for parent-reported child PTSS, score reductions were reported by two of the five parents, score stability by two parents, and a score increase was reported by the remaining parent. Interestingly, of the two child participants with both parents participating in the study, score differences for parent-reported child PTSS were modestly discrepant for both sets of parents (i.e., for one child, his mother endorsed no change in PTSS whereas his father reported a slight decrease in symptoms; for the other child, her mother reported a slight increase in PTSS whereas her father reported no change). From baseline to treatment phase for parent-reported child quality of life (with higher scores indicating lower quality of life), score reductions were reported by two of the five parents, and score increases were reported by three parents. Again, of the two child participants with both parents participating in the study, score differences for parent-reported child quality of life were modestly discrepant for both sets of parents (i.e., for one child, his mother endorsed a slight decrease in quality of life, whereas his father reported a slight increase; for the other child, her mother reported a slight increase in quality of life whereas her father reported a modest decrease). With regard to identified subscales on the CBCL, four of the five parents endorsed decreased total problems from baseline to treatment with the remaining parent reporting a slight

increase. Of the two child participants with both parents participating in the study, parental consensus was obtained for both children on the CBCL for score changes from baseline to treatment.

Score reductions in child self-reported depressive symptoms were found for two of the three child participants, with the remaining child participant reporting no score change, from baseline to treatment phase. From baseline to treatment phase for child self-reported anxiety, total score reductions were reported by two of the three child participants, with no change reported by the remaining child. Additionally, all three child participants reported decreases in nervousness, anger/madness, and sadness from baseline to post-treatment, and two of the three children endorsed less coping strategies utilization, both adaptive and maladaptive at post-treatment; the remaining child participant reported increased use of adaptive coping strategies at post-treatment. Finally, score reductions in child self-reported somatization symptoms were found for all three child participants. In total, positive treatment effects were established for some, but not all participants.

Hypothesis 3 (maintenance of intervention effects): When comparing symptoms from treatment to follow-up study phases, three of the five parent participants reported somewhat variable PTSS at follow-up, whereas the remaining two parents endorsed symptom stability. At one- and three- follow-up, maintenance of PTSD symptom presentation was obtained for two of the three child participants for self-reported PTSS with the remaining child reporting further decreases in PTSS. Gains in child coping efficacy were maintained for two of the three child participants with the remaining child participant reporting a slight decrease in coping efficacy at follow-up study phases.

Two parents endorsed further decreases in depression symptoms at follow-up; one parent reported an increase from minimal to moderate range depressive symptoms at one-month, followed by a decrease to mild levels at three-months follow-up; and, the remaining two parents endorsed maintenance of asymptomatic depression levels at follow-up. Parenting stress and difficulty was very stable at follow-up for four of the five parents. The remaining parent endorsed an increase in stress/difficulties at three-months follow-up.

With regard to parent-reported child PTSS from treatment to follow-up study phases, two parents endorsed stable asymptomatic levels; one parent reported a slight decrease, representing a return to baseline asymptomatic levels; and, the remaining parent reported an increase in child PTSS at one- and three-month follow-up.

For parent-reported children's quality of life, one parent reported a slight decrease at one-month followed by an increase in child quality of life, representing highest study levels, at three-month follow-up; one parent endorsed an initial slight increase followed by a noteworthy decline in quality of life at three-months follow-up; one parent reported a slight decrease at one-month followed by an increase in child quality of life, representing a return to baseline levels, at three-month follow-up; one parent endorsed a moderate decrease at one-month followed by an increase in child quality of life, while remaining somewhat below baseline levels, at three-month follow-up; the remaining parent endorsed modest increases at both one- and three-month follow-up in their child's quality of life. Overall, parents' report of their child's quality of life was somewhat inconstant from treatment to follow-up study phases. With regard to parent consensus, score differences for parent-reported child quality of life were somewhat discrepant for both sets of parents (i.e., for one child, his mother endorsed an overall increase in quality of life from treatment to three-month follow-up, whereas his father reported a slight decline; for the other child, her mother reported relatively stable quality of life from treatment to three-month whereas her father reported a modest increase).

Of the five parent participants, one parent reported stable levels of total problems on the CBCL at follow-up; one parent reported an initial decrease at one-month followed by a slight increase to post-treatment levels at three-months; one parent endorsed stable levels from treatment to follow-up; another parent reported an initial increase at one-month followed by a decrease at three-month with this decrease representing lowest levels at any study phase; and the remaining parent endorsing symptom maintenance at follow-up study phases. Moreover, patterns of parent-reported child global problems from treatment to follow-up were variable across study participants.

When comparing treatment to follow-up symptom levels, child depressive symptoms were stable and within normal limits at follow-up for all three child participants. Further reductions in anxiety were endorsed by two child participants with no change reported by the

remaining child. This data generally suggest a decrease in anxiety symptoms from treatment completion to post-treatment follow-up. As well, the decrease in somatization symptoms to asymptomatic levels for all child participants from baseline to post-treatment was maintained at one- and three-months follow-up. In sum, treatment gains were maintained for some, but not all participants.

3.4 - Qualitative Analyses

To supplement standardized questionnaires, semi-structured interviews were also conducted at study enrollment and post-treatment to assess child PTSS using the parent and child versions of the ADIS PTSD Module.   At enrollment, child participant #001 endorsed four symptoms from the Re-experiencing cluster, five symptoms from the Avoidance cluster, and all five symptoms from the Hyperarousal cluster, with a clinically significant interference rating. Based on this child's report, he met diagnostic criteria for PTSD related to his cancer diagnosis and treatment. Noteworthy comments recorded during the interview included: "I put them in the back of my mind. If someone says something, then bad memories come back," (B.1); "I don't like the bad memories, I remember what they did to me, and it scares me," (B.4); "I put it in the back of my mind. My mind has a jail, and I lock it up there," (C.1); and "I'm kind of a 'scaredy cat,' and I tense up and my heart starts beating if I'm in a place that makes me uncomfortable," (D.4). Similarly, this child's mother endorsed three Re-experiencing symptoms, three Avoidance symptoms, and four Hyperarousal symptoms.   While his mother reported slightly fewer symptoms, she did indicate clinically significant interference, thereby meeting criteria for a PTSD diagnosis. That is, this dyad met diagnostic agreement. Notable comments from his mother included: "Going to the clinic for check-up, he dreads it, and getting his blood drawn," (C.2); "It's hard for him to show both positive and negative feelings. He can become aggressive," (C.6); and "The smallest bodily sensation, he worries about it, especially any symptoms that he had before or doctors told him to look out for," (D.4). No comparison with post-treatment PTSS is available due to participant study withdrawal.

At enrollment, child participant #002 endorsed two symptoms from the Re-experiencing cluster, three symptoms from the Avoidance cluster, and one symptom from the Hyperarousal cluster. Despite these symptoms, he indicated that these difficulties did not interfere with his daily life. He therefore did not meet full criteria for PTSD. Telling comments recorded during this interview include: "I feel secluded from society because I was in the hospital for a long

time," "It's scary thinking about if I had to go through it all over again," (B.3) and "It helps if I try not to think about it," (C.1). This child's parents endorsed no Re-experiencing symptoms, one Avoidance symptom, and no Hyperarousal symptoms. While his parents endorsed fewer PTSS, there was diagnostic agreement between the child and his parents. These parents did note that their child "…initially didn't show emotion. Now, he cannot take criticism well or accept that he did something wrong, which is possibly because he could do no wrong when he was going through treatment." At post-treatment, child participant #002 only endorsed one symptom (i.e., C.7, a sense of a foreshortened future), and his parents similarly endorsed one symptom (i.e., C.6, restricted range of affect). While this child did not meet PTSD criteria at enrollment, a reduction of six symptoms, per child's report, was found at post-treatment. This suggests that this child's PTSS may have improved due to treatment.

At enrollment, child participant #003 endorsed one symptom from the Re-experiencing cluster, five symptoms from the Avoidance cluster, and two symptoms from the Hyperarousal cluster. Despite these symptoms, she indicated that these difficulties did not interfere with her daily life. She therefore did not meet full criteria for PTSD based on her interference rating. Clinically relevant comments recorded during the interview include: "I try to stay away from other people going through it, who have cancer," (C.2); "I keep it to myself," (C.6); and "I have a hard time paying attention to stuff I don't want to talk about," (D.3). This child's parents endorsed one Re-experiencing symptom, two Avoidance symptoms, and four Hyperarousal symptoms, as well as clinically significant interference. Despite this interference rating, this child did not meet full diagnostic criteria for PTSD. As such, there was diagnostic agreement between the child and her parents. At post-treatment, child participant #003 reported fewer PTSS, only endorsing one Avoidance symptom and one Hyperarousal symptom. This represents a reduction of six symptoms, per child's report, following treatment. Similarly, her parents only endorsed one symptom at post-treatment. Again, these results can be interpreted as an improvement in PTSS potentially due to treatment.

Child participant #004 endorsed all five symptoms from the Re-experiencing cluster, all seven symptoms from the Avoidance cluster, and all five symptoms from the Hyperarousal cluster at enrollment, which significantly interfered with her daily life. As such, she meet full criteria for PTSD. Notable comments during the interview included: "I have thoughts that I'm going to die when I get my treatment," (B.1); "I just want to be normal and not think about it,"

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(C.1); "I keep things to myself quite often because I feel like they [friends] won't understand," (C.6); "I blow up a lot, even over simple things, like my mom asking me to do something," (D.2); and " I don't like riding in cars, bridges, or small spaces because someone might shoot up the car or the bridge might collapse," (D.4). Similarly, this child's mother endorsed four Re-experiencing symptoms, four Avoidance symptoms, and four Hyperarousal symptoms. While her mother reported slightly fewer symptoms, she did indicate significant PTSS and interference, thereby meeting criteria for a PTSD diagnosis. This dyad met diagnostic agreement. Unfortunately, no comparison with post-treatment PTSS is available due to participant study withdrawal.

Finally, child participant #005 reported two symptoms from the Re-experiencing cluster, one symptom from the Avoidance cluster, and two symptoms from the Hyperarousal cluster at enrollment. Yet, she did not endorse clinical interference. Therefore, she did not meet PTSD criteria. Noteworthy comments during the interview were as follows: "I get upset if people ask me about it, like how did I survive. I usually don't like to talk about it because it's scary," (B.4); and "I remember being put to sleep a lot, having my port being put in and them taking blood. I had to stay in the hospital for a really long time and got really sick." Comparatively, this child's mother endorsed no Re-experiencing symptoms, three Avoidance symptoms, and no Hyperarousal symptoms, with no daily life interference. Again, diagnostic agreement between parent and child was obtained. At post-treatment, this child endorsed an increase in Avoidance symptoms (i.e., three symptoms) and a decrease to no symptoms of Re-experiencing or Hyperarousal. An overall symptom decrease was found, per child's report (i.e., from five symptoms at enrollment to three symptoms at post-treatment), indicating a possible treatment effect. However, no change in symptoms was reported by her mother as a function of treatment. Therefore, results must be interpreted with caution.

Overall, of those children who completed the study, none met diagnostic criteria for PTSD. In comparison, both children who withdrew from the study met full diagnostic criteria for PTSD at enrollment. Additionally, all three children who completed the study reported symptom reductions following treatment. That is, two of the children reported a reduction of six symptoms, and the remaining child reported a reduction of two symptoms. These findings

support a possible beneficial effect on PTSS as a function of treatment. Interestingly, parents tended to report fewer symptoms of PTSS at enrollment and post-treatment compared to their children. Yet parent-child diagnostic agreement was obtained for both study phases.

3.5 - Simulation Modeling Analysis

Simulation Modeling Analysis (SMA; www.clinicalresearcher.org) for case-based time-series examination is a statistical approach that evaluates the significance of an effect using bootstrapping methods while accounting for phase length and autocorrelation. Researchers have clearly stated that autocorrelation in behavioral data is pervasive, and not accounting for its effect runs the risk of a Type I error (e.g., Busk & Marascuilo, 1998). Consequently, the current study utilized SMA (version 9.9.28) to evaluate the statistical significance of between-phase changes (i.e., between baseline and treatment phase) and best-fitting slopes for constructs with an adequate number of data/time points (i.e., child self-reported PTSS and coping efficacy, and parent self-reported PTSS); all procedural analyses were followed as precisely outlined in the SMA User's Guide. The simulation model was set to use Pearson's R, which represented the parametric correlation between the dependent variable and the phase vector. The number of simulations set to run equaled 5000 (i.e., the suggested minimum). Multivariate process analyses for child PTSS and coping efficacy could not be computed using SMA cross-lagged correlations as there was insufficient data points in the treatment phase. It is also important to note Borckardt and colleagues (2008) suggested minimum of 10-16 total data points, with 5-8 data points per study phase, as being optimal for SMA. Given that the current study baseline phase length of 3-5 data points for the identified constructs (which varies by participant due to multiple baseline design) is fewer than what is suggested, results using SMA should be interpreted with caution.

Table 11 presents mean level symptom changes from baseline to treatment using SMA. Additionally, Figures 1-8 present visual depictions of time series data for each participant. Figures 1-4 present these data for child participants' CPSS total score and CES total score, and Figures 5-8 present these data for parent participants' PCL-S total score. Overall, a few significant mean level differences were found between baseline and treatment phases using SMA.

All findings were in the predicted direction for all participants.   That is, all child and parent participants reported a negative correlation between baseline and treatment for PTSS (i.e., a symptom decrease in PTSS), and all child participants reported a positive correlation for

coping efficacy. However, none of the four child participants who participated in treatment showed significant mean level changes for PTSS. One of the child participants showed a significant change for coping efficacy (#002: R = 0.619, p = .048), and an additional two child participants approached significance (#001: R = 0.618, p = .055; #005: R = 0.689, p = .094). Comparatively, one parent participant showed a significant change for PTSS (#002 father: R = -0.711, p = .027) and another parent approached significance (#001 mother: R = -0.747, p = .055).

In addition to mean level change, SMA was also used to test the data stream against five unique standard vectors (i.e., slope vector 1 = baseline increase with decreasing treatment; slope vector 2 = no change in baseline with increasing treatment; slope vector 3 = baseline increase with no treatment change; slope vector 4 = baseline increase with increasing treatment; and slope vector 5 = baseline increase with drop then increasing treatment). Table 12 presents the best-fitting slope for each participant with respect to the identified construct. A significant correlation indicates that the data stream matches the slope of the identified vector.

With regard to child self-reported PTSS, the most common slope was slope #3 with three of the four child participants' data show this best-fitting slope, two of which were statistically significant (#002: R = -.709, p = .014; #003: R = -.730, p = .011). Importantly, all slope #3 correlations were negative, indicating a decrease in baseline followed by a relatively flat treatment phase. The remaining child participant's data stream significantly matched slope #4 (#001: R = -.772, p = .040), indicating a linear decrease straight through from baseline to treatment phase. With respect to child self-reported coping efficacy, the most common slope was slope #2 with two of the four data streams showing this best-fitting slope, one of which was statistically significant (#005: R = .848, p = .023). A positive correlation with this slope represents a flat baseline followed by an increase during treatment phase. Another data stream significantly matched slope #3 (#002: R = .777, p = .008) with a linear increase during baseline and a leveling out during the treatment phase. The remaining data stream significantly matched slope # 4 (#003: R = .898, p = .017), indicating a linear increase straight through from baseline to treatment phase.

Data streams for parent self-reported PTSS were somewhat variable with two parent participants' data matching slope #3, two parent participants' data matching slope #4, and the remaining one parent participant's data matching slope # 5. Data streams with best-fitting slope #4 were both statistically significant (#001 mother: R = -.845, p .015; #002 father: R = -.721, p =

.027), representing a linear decrease straight through from baseline to treatment phase. Of the two with best-fitting slope #3, one was significant (#003 father: -.835, p = .004), indicating a linear increase during baseline and a leveling out during treatment phase. The final data stream significantly matched with slope #5 (#003 mother: R = -.868, p = .003), with a negative correlation indicating a decrease in baseline, followed by a brief increase and then a decrease again during the treatment phase. Interestingly, of the two child participants with both parents participating in the study, none of the parent dyads' data streams matched with respect to their PTSS.

3.6 - Treatment Efficacy

The CGI was used to assess child participants' overall symptom severity and improvement in his/her functioning over time. It was also used as one of several tools to evaluate treatment efficacy for the current study (e.g., Zaider, Heimberg, Fresco, Schneier, & Liebowitz, 2003). To accomplish this task, ratings on the CGI across the six treatment sessions were examined. At treatment commencement, which included four total child participants, one child was rated as "borderline mentally ill" (child participant #002), one child rated as "mildly ill" (child participant #005) and the remaining two children were rated as "moderately ill" (child participants #001 and #003) (M = 3.25, SD = 0.96 at treatment session one). By treatment session 6, all child participants' ratings had decreased (M = 1.67, SD = 0.58), suggesting a modest improvement in overall functioning, conceivably due to treatment.

4.0 - Discussion

The primary aim of the current study is to evaluate the efficacy of Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) intervention for pediatric oncology patients and their parents. This study is based on Kazak and colleagues (2006) PMTS model wherein diagnosis and treatment of a potentially life-threatening illness, namely cancer, can be conceptualized as a traumatic experience. The study sample represents those in the third (and final) phase of the PMTS model as the child participants are diagnosed as being in remission. During this phase, there is a shift to longer-term issues when fear of disease relapse, coping with survivorship, and adverse health consequences are often present (e.g., Friedman & Meadows, 2002). According to the PMTS model, the focus of intervention should therefore be the reduction of PTSS and prevention of chronic PTSD, which is the goal of TF-CBT. The findings of this pilot study suggest that a trauma-informed CBT intervention may be beneficial for pediatric oncology patients in remission and their parents. Overall, these results provide some support for the study hypotheses and suggest that this intervention has potential for both PTSS-specific as well as broad ranging improvements.

4.1 - Resilience & Protective Factors

While study participants showed some clinically significant symptoms across a broad range of disorders, they were generally resilient. Of those child participants who completed the study, none met diagnostic criteria for PTSD based on the semi-structured interview (i.e., administration of the ADIS PTSD Module) at baseline or post-treatment. In comparison, standardized questionnaires revealed that 67% endorsed PTSS within normal limits at baseline (i.e., total PTSS score < 11 on the CPSS), and 100% were within normal limits at remaining study phases.

At baseline, 80% of child participants reported depressive symptoms within normal limits (i.e., T-scores below clinically significant cut-off); the one child participant with elevated depression levels was diagnosed as in relapse from cancer. For remaining study phases, all child participants reported depression symptoms within normal limits. Similarly, 80% of child participants reported anxiety symptoms within normal limits (i.e., T-scores below clinically significant cut-off); the one child participant with elevated anxiety on the Separation/Panic subscale was diagnosed as in relapse from cancer. For remaining study phases, all child participants reported anxiety symptoms within normal limits. With regard to parents' perceptions

of their child's quality of life, 85% (i.e., six of seven parents) reported total baseline levels at or below (i.e., indicating higher quality of life) a normative sample of pediatric oncology patients, which included a broad range of diagnoses and phases of treatment; for remaining study phases, 100% of parents reported comparable or higher quality of life for their children.

The majority of parents also reported subclinical levels of PTSS over the course of the study. Based on the suggested cutoff score of 25 or higher for "civilian primary care" screening purposes (e.g., Sherman, Carlson, Wilson, Okeson, & McCubbin, 2005), 57% of parents (i.e., four of seven total parents) were within normal limits with respect to PTSS at baseline. At three-month follow-up, 80% of parent participants were within normal limits for PTSS. As well, of the five parent participants who completed the study, 100% reported considerably less (i.e., one standard deviation below) total stress frequency compared to population means for all phases of the study. This suggests that these parents did not experience significant parenting stress and related difficulty across study phases.

Research on risk and resilience factors involves identifying factors that either safeguard one against adversity and promote successful development or promote vulnerability and failure to successfully develop (Perkins & Borden, 2003-PRELIM). Masten (1994) defined resilience as the "…successful adaptation despite risk and adversity…a pattern over time, characterized by good eventual adaptation despite developmental risk, acute stressors, or chronic adversities." That is, there are youth who appear to thrive despite their traumatic experience. Therefore, researchers have identified factors that seem to protect them from trauma-related difficulties and foster resiliency. Such factors can be conceptualized as pre-trauma history of difficulties (e.g., trauma history, maternal psychopathology, low socio-economic status, etc.) and peri-trauma factors (e.g., subjective experience of the trauma, trauma severity, and intensity, etc.) that are either protective or put a child at an increased risk for developing mental health sequelae (Vogt, King, & King, 2007). For instance, Daud, Klinteberg, and Rydelius (2008) assessed Iraqi refugee children with a history of parental PTSD. Their findings suggest that a child's emotional expression, prosociality, and healthy peer relations promote resiliency despite parental psychopathology. Hobfoll's Conservation of Resources Theory (COR; Hobfoll, 1989) has also been used to conceptualize the manifestation of stress symptoms in children and is an example of the interactive nature of both risk and protective factors. COR theory hypothesizes family factors to be the chief resource in identifying risk and protective factors. In particular, parental

warmth, parental attention, parental support, and a close relationship between parent and child serve as protective factors whereas parental lack of support, overprotectiveness and family conflict serve as risk factors (Bokszczanin, 2008).

Parent participants in the study informally reported engaging these protective factors during their child's treatment process, and such factors were observed during the study intervention. More broadly, it is possible that child participants' remission status during the current study in part explains their resilience following a pediatric medical traumatic stress event. Remarkably, research has suggested that the majority of parents and chronically ill children are relatively similar in their adjustment levels when compared with families with no chronically ill or handicapped children (e.g., Kazak, Rourke, & Crump, 2003; Patenaude & Kupst, 2005).   As well, levels of distress tend to be heightened initially and normalize over the course of medical treatment (Sawyer, Antonious, Toogood, Rice, & Bagurst, 2000). Nevertheless, disease relapse may continue to threaten the afflicted child's life and is therefore associated with a considerable increase in PTSS in a small subset of children and their parents (Werba & Kazak, 2009).

4.2 - Posttraumatic Stress Symptoms

A primary aim of the present study is to examine the effect of TF-CBT on symptoms of PTSD for youth diagnosed as being in remission from cancer and their parents. Using visual data inspection of self-report questionnaires assessing PTSS, none of the four child participants reported stable posttraumatic stress symptoms. That is, all four child participants had significantly higher self-reported endorsement of PTSS at enrollment, and remaining baseline data points were then generally stable and within normal limits. As such, results must be interpreted with caution. SMA revealed no significant mean change in child self-reported PTSS from baseline to treatment for all four of the child participants (i.e., self-reported PTSS was generally stable from baseline to treatment). At one- and three-month follow-up for children who completed the study, maintenance of PTSD symptom presentation was obtained for two of the three child participants for self-reported PTSS with the remaining child reporting a decrease in PTSS. In comparison, during the semi-structured interview assessing symptoms of PTSD, all three children who completed the study reported noteworthy symptom reductions from enrollment to post-treatment. That is, two of the children reported a reduction of six symptoms, and the remaining child reported a reduction of two symptoms. Such findings highlight the importance, but also the difficulty in data interpretation, of multiple data collection methods.

Moreover, TF-CBT appears to have some effect on youth PTSS; however, the extent of this effect is unclear, and variable baseline data further limits the ability to conclude any treatment effects.

With regard to parent participants' PTSS as a function of treatment, visual inspection of the data revealed five of the six parent participants with stable posttraumatic stress symptoms (i.e., points range of less than five points (Weathers, Litz, Herman, Huska, & Keane, 1993)) during the baseline phase. A mean decrease in parental PTSS was found for five of the six parent participants; the remaining one parent reported no change in asymptomatic levels from baseline to treatment. That is, 80% of parents indicated decreased PTSS from baseline to treatment. When comparing symptoms from treatment to follow-up study phases, three of the five parent participants reported somewhat variable PTSS at follow-up, whereas the remaining two parents endorsed symptom stability. SMA revealed a significant reduction in PTSS for one parent (i.e., father of child participant #002), and approaching a significant reduction in PTSS for another parent (i.e., mother of child participant #001). However, given that the current study baseline phase length of 3-5 data points for the identified constructs is fewer than what is suggested for SMA, results using SMA should be interpreted with caution.

Findings from the present study suggestion the potential benefit of including parents in a trauma-informed CBT intervention for pediatric oncology patients. That is, parents endorsed greater reductions in PTSS, possibly as a function of treatment on self-report measures, compared to child participants. These findings are generally consistent with findings from the SCCIP intervention study (Kazak et al., 2004), which found reductions in fathers' (but not mothers') re-experiencing/intrusive symptoms following treatment. As well, greater symptom reductions were found for child participants via semi-structured interview than self-report questionnaires, which is noteworthy. Recent research conducted by Kowalik and colleagues (2011) lends further support to the efficacy of CBT for trauma-exposed youth. These authors conducted a meta-analysis to evaluate results of CBT interventions for pediatric PTSD, identifying eight RCT studies with comparison groups receiving active treatment. Importantly, studies included in this meta-analysis were largely comprised of sexually abused child populations. Further research is needed to determine the efficacy of a trauma-informed CBT intervention for pediatric medical traumatic stress populations, including pediatric oncology.

4.3 - Coping

Lazarus and Folkman (1984) defined coping as "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person," (p. 141). The potential stress related to pediatric illness has led researchers to examine why some children adapt and adjust better than others and how coping maps onto this process. While research has elucidated common coping strategies employed by these children, there has been mixed findings regarding their effectiveness in terms of psychological outcomes (e.g., Sorgen & Manne, 2002). In general, the effectiveness of particular coping strategies seems to be dependent upon the situation. For example, children appear to respond more favorably when using a more proactive coping strategy, such as information-seeking, for situations that are within the individual's control. In contrast, uncontrollable situations, such as a cancer diagnosis, more appropriately lend themselves to techniques like avoidance coping (e.g., Altshuler & Ruble, 1989). Notably, however, such techniques have also been associated with adverse effects, such as an increase in depressive and anxiety-related symptoms (Frank, Blount, & Brown, 1997). Sorgen and Manne (2002) also note the importance of the fit between the stressor and the individual's preferred coping style, (i.e., problem-focused or emotion-focused) with regard to positive outcomes.

Given these findings on the importance of adaptive coping among a pediatric oncology population, as well as the emphasis on coping strategies in TF-CBT, the construct of coping was evaluated in the current study. Child participants reported engaging in a number of coping strategies, both through completion of standardized questionnaires and during informal discussions. That is, one child reported an increase in adaptive coping strategies and a slight decrease in maladaptive coping strategies with regard to an identified problem related to their cancer experience across study phases. It is possible that treatment assisted this child in discriminating between adaptive and maladaptive coping strategies (i.e., recognizing the limited effectiveness of such strategies). Comparatively, two child participants reported less overall coping strategy utilization across study phases. Given the relationship between these child participants' reported distress and coping strategy utilization, these data can be interpreted in two ways. That is, reduced distress to an identified problem either decreases the necessity for coping strategy utilization or increases the use of adaptive coping strategies, perhaps to maintain distress improvements. When comparing coping strategy utilization among children who completed the

study versus those who withdrew, children who withdrew from the study endorsed using a slightly greater number of overall coping strategies (both adaptive and maladaptive) and more maladaptive coping strategies. This finding again supports the notion that those dyads who withdrew from the study experienced more overall distress and symptomatology at baseline compared to those who completed the study.

Finally, children's perceived coping efficacy also increased over the course of the study for all youth (i.e., all four children reporting positive slopes from baseline to study completion, and three of the four children reporting the largest positive slope as a function of treatment). SMA revealed statistically significant improvements for one child and approaching significance improvements for an additional two children, from baseline to treatment. Again, given that the current study baseline phase length of 3-5 data points for this construct is fewer than what is suggested for SMA, results regarding change in child coping efficacy as a function of treatment using SMA should be interpreted with caution. Yet, these results suggest that one of the main goals of TF-CBT, namely increasing children's coping skills with respect to their traumatic experience, may have been achieved during the current study. These findings also underscore the importance of including adaptive coping strategies as an intervention component for this population.

Religious coping. While not a specific TF-CBT intervention technique, several child participants in the current study also endorsed statements indicative of religious coping, particularly during the trauma narrative component of the intervention. That is, when child participants were asked what they would share with another child who was diagnosed with cancer, responses included: "Be glad who you are, be glad who you're with, and the most person that would be with you is the Holy Spirit – God or Jesus," "Keep a friend next to you (like God) so that way you won't be lonely or sad," and "There is a higher power than a doctor."

Youth who are diagnosed with cancer must face numerous stressors related to having a potentially life-threatening illness. Common challenges these youth experience include fear and uncertainty about their health and future, intrusive and painful treatments and procedures, and dealing with a considerable disruption to their daily routine. As previously stated, research addressing these issues largely includes various forms of coping when attempting to predict psychological adjustment or subsequent psychosocial difficulties. Research with adult populations has examined the role of spirituality as promoting positive health outcomes (e.g.,

Dunn & Horgas, 2004; Pargament & Raiya, 2007). For instance, believing that negative events, such as medical illness, can have important meaning and significance can instill hope and help empower individuals to fight their illness, thereby reducing psychological distress (Paloutzian & Kirkpatrick, 1995).   However, there has been must less attention paid to religious/spiritual coping among pediatric populations (Shelton & Mabe, 2006). One such study by Ebmeier, Lough, Huth, and Autio (1991) examined religious coping among hospitalized children. Their findings suggest that religious coping among youth is more salient and adaptive among the seriously ill and serves to bolster the effectiveness of other coping adaptive strategies. Findings from the current study support this notion given child participants' endorsement of religious coping and their overall resilience following pediatric medical traumatic stress.

4.4 - The Role of Maladaptive Cognitions

Trauma Psychology research among adults have identified cognitive pathways that explain the development and maintenance of PTSD. In particular, Ehlers and Clark's Cognitive Model of PTSD (2000) is helpful in understanding the role of negative (i.e., threat-relevant) cognitions, or appraisals, in the development of PTSD among adults. The authors theorized that PTSS occurs when an individual's processing of the traumatic event leads to the perception of a continued, current threat. This "faulty" processing is a function of two core processes, the individual's appraisal of the event and their memory for it. Further, this perception of threat, not the actual likelihood of threat, is activated and thus leads to symptoms of re-experiencing, arousal, anxiety, etc. Consequently, this perceived threat then serves to prevent cognitive change. In the short-term, the perception of threat alters one's behaviors and cognitions (i.e., avoidance and/or safety behaviors); the goal is distress reduction, but they are in fact maladaptive. The long-term effect is maintenance of PTSD.   However, it wasn't until recently that research begun to examine specific cognitions associated with traumatic events and the development of PTSD. Dalgleish and colleagues (2005) identified cognitive factors, particularly one's subjective threat appraisal, as being related to maladaptive coping techniques (e.g., rumination, thought suppression) and therefore PTSS. Moreover, Stallard and Smith (2007) found support for the application of Ehlers and Clark's (2000) Model among children.

In the current study, child participants did not readily identify maladaptive cognitions related to their cancer experience, either retrospectively (i.e., during the trauma narrative component of the intervention, when asked to record their thoughts after diagnosis and during

treatment) or during the treatment process. However, pediatric cancer survivors do experience a chronic "current threat" simply by virtue of their cancer diagnosis, treatment and outcomes (i.e., during their treatment prior to remission, potential for relapse, etc.). As well, one could argue that accurate (i.e., not simply perceived) appraisals, which are trauma-resulting cognitions, can be attached to their trauma. These could include a change in their self-concept and self-view (Kalsched, 1996), their worldview, and a sense of permanent life change. Yet, the current study sample did not report dysfunctional or maladaptive cognitions typical of trauma-exposed youth (e.g., attributions of responsibility that lead to feelings of guilt and/or anger). Yet, they did report emotions of fear and anger. Anger as a secondary emotion to a trauma has been found to be associated with the chronic PTSD (Vernberg, LaGreca, Silverman, & Prinstein, 1996). This begs the question, are cognitive appraisals among a pediatric oncology population uniquely different compared to youth who experience more traditional traumatic experiences (e.g., accidental injury, exposure to a natural disaster or act of terrorism, etc.)? Or, does their lack of maladaptive cognitions further point to their, and other pediatric oncology populations' resiliency? Further research is needed to address this question.

4.5 - Cognitive Deficits

Cognitive intervention techniques, such as TF-CBT, are dependent on the child's ability to grasp such concepts, which is a requirement for their effectiveness. Youth previously diagnosed with cancer pose a unique concern with regard to their response to cognitive interventions. Medical treatments for cancer have been shown to increase their risk for a variety of neurocognitive deficits of the central nervous system (CNS). Such effects among children may emerge well after treatment ends and affect their developmental trajectory and adjustment as they grow (Mulhern & Butler, 2004). Historically, medical treatments for luekemias have involved chemotherapy as well as cranial radiation therapy (CRT) whereas treatments for brain tumors varied depending on tumor histology and location (i.e., various combinations of surgery, CRT, and/or chemotherapy). Early research on the effects of such treatments found consistent associations with CRT and impairment in non-dominant hemisphere functioning (e.g., nonverbal intelligence, visual-motor integration, susceptibility to distraction), which often resulted in long-term academic and achievement difficulties (e.g., Campbell et al., 2007). As such, CRT now is restricted to use for those with poor prognoses and high relapse potential. Chemotherapy, while less harmful, is still associated with neurocognitive deficits. For instance, slight decreases in

youth's overall intelligence scores and perceptual-motor skills have been reported (Copeland, Moore, Francis, Jaffe, & Culbert, 1996) as well as attentional dysfunction (Buizer, deSonneville, van den Heuvel-Eibrink, & Veerman, 2005), poor mental flexibility, and processing speed deficits (Reeves et al., 2006).

In the current study, two families reported cognitive deficits as a result of cancer treatment, which was validated by their child's medical doctor (per their parents' report). Both of these child participants (i.e., #003 and #005) were diagnosed with ALL and received chemotherapy treatment. Their parents reported academic difficulties, including poor spelling skills, reading comprehension problems, and an overall below average academic performance compared to same-aged peers. Importantly, premorbid cognitive functioning for these participants is currently unknown. Furthermore, these child participants did not appear to have any difficulties understanding the components of TF-CBT (i.e., cognitive coping, affective identification and expression, etc.). Yet they did report frustration as a result of these cognitive deficits.

As the number of youth surviving cancer continues to rise, so does our interest in the prevention of and intervention for the cognitive effects of medical treatment. Specifically, efficacy research on the Cognitive Remediation Program (CRP) for youth cancer survivors (Butler, 1998) is on the rise. CRP involves instruction on metacognitive strategies (i.e., monitoring one's own thinking), Attention Process Training (ATP; Sohlberg & Mateer, 1986), and various cognitive-behavioral methods (e.g., cognitive reframing, stress inoculation, use of positive self-statements, etc.). Results are promising with increases in attentional functioning reported (Butler & Copeland, 2002).

4.6 - Towards a Family-Based Approach

Several studies have incorporated a family systems intervention approach among a variety of pediatric populations. For instance, Wysocki and colleagues (2000) conducted a controlled trial of a Behavioral Family Systems Therapy (BFST) aimed at parent-adolescent conflict in reference to diabetes treatment management, and outcomes were encouraging. Other family interventions have also shown promise with regard to treatment adherence among a pediatric diabetes population (e.g., Anderson, Brackett, Ho, & Laffel, 2000). Family-based interventions for procedural pain among a pediatric chronically ill population have also been

effective (e.g., Barrera, 2000; Schiff, Holtz, Peterson, & Rakusan, 2001). Notably, however, these interventions have focused more on medically relevant issues rather than psychological difficulties.

As previously addressed, a large number of studies have reported increased prevalence rates of a variety of mental health difficulties, such as distress, PTSS, and anxiety among family members of chronically ill children. Pai and colleagues (2007) conducted a meta-analytic review of the impact of pediatric cancer on family functioning and found that mothers with cancer-stricken children reported higher levels of family conflict compared to mothers of healthy children. Despite the abundance of data pointing to the negative mental health sequelae experienced by these family members, there is a relative lack of empirically tested and established family intervention approaches for this population (Kazak, Simms, & Rourke, 2002). Nevertheless, Kazak (2006) contended that family-oriented interventions are vital for long-term adaptive adjustment for all members.

As such, the current study included parent participants as parents can be psychologically impacted by their child's cancer diagnosis and as TF-CBT includes a large parenting component (e.g., parenting efficacy, dyadic communication, etc.). Overall, findings suggest that parents showed some improvement with regard to PTSS. However, the effect of treatment on parental depression is unclear given that the majority of parents who completed the study reported minimal symptoms at baseline (i.e., 80%). Additional research is necessary to determine whether parents of pediatric oncology patients benefit from involvement in a trauma-informed treatment, both in terms of their role as a parent and their own psychological symptoms. For additional information on the effects of pediatric cancer on siblings, readers are referred to Appendix B, the "Screening Process" section of the supplemental chapter entitled "From Research to Practice: Integrating Findings from the Current Study to Inform a Framework for Mental Health Service Utilization."

4.7 - Concordance Ratings

While overall levels of PTSS were low for the majority of child participants who completed the current study, some discrepancies were identified for child self-reported PTSS compared to parents' report of their child's PTSS across study phases, both via standardized questionnaires and semi-structured interview. Notably, while exact symptoms and their frequency tended to differ, diagnostic agreement between parent and child was achieved.

Interestingly, both parents and children endorsed greater PTSS via semi-structured interview than on standardized questionnaires. As well, additional discrepancies were found when both parents of a child participated in the study. Such discrepancies are not uncommon in child clinical research. For instance, Grills and Ollendick (2003) found parent-child agreement to be more discrepant than parental cross-agreement for a variety of anxiety disorders.

Other factors may also contribute to these findings. Indeed, it is possible that parents' own trauma reactions to their child's diagnosis and treatment of cancer may affect their reporting of children's emotional and behavioral difficulties (Nader, 2008). For example, maternal depression has been shown to produce deficits in a mother's ability to accurately identify the emotional states of her children (Zahn-Waxler & Wagner, 1993). As well, research has suggested that mothers tend to endorse more child difficulties compared to fathers on behavioral assessment scales (e.g., Briere et al., 2001), and concordance between parents is higher for disruptive behaviors than for internalizing symptoms (Reynolds & Kamphaus, 1998). Interestingly, the opposite was found to be true for the current study as fathers generally reported minimally higher levels of child PTSS than mothers.

Thirdly, in cases where both parents participated in the study, self-endorsement of parental PTSS and depressive symptoms also varied. This finding underscores the potential benefit of including both parents in the assessment and intervention process as they may present with varying degrees of symptoms and/or distress levels. Including only one parent may limit the opportunity to identify parents in need of services, as well as identifying factors that may be contributing to their child's overall symptom picture. Yet, multiple informants can also pose a dilemma in terms of determining consensus ratings of children's psychopathology (Achenbach, McConaughy, and Howell, 1987).

4.8 - Key Strengths of the Current Study

The primary strength of the current study is the utilization of an empirically supported trauma-informed CBT intervention (i.e., TF-CBT) with a unique population, namely pediatric oncology patients in remission and their parents. Their posttraumatic stress symptom picture is quite similar to children and adolescents who have been exposed to more commonly investigated traumatic experiences (e.g., natural disasters, terrorism, etc.). Yet, only two studies to date have examined the efficacy of a trauma-informed CBT intervention, with both utilizing the SCCIP

one-day intervention program with pediatric oncology patients (Kazak et al., 2004; Lutz Stehl et al., 2009). Nevertheless, findings from the current study and previous studies are promising and highlight the importance and potential benefits of future research in this area.

Despite low to asymptomatic symptomatology of study participants, findings suggest that benefits resulting from the intervention are still possible. Specifically, TF-CBT's emphasis on developing and utilizing adaptive coping strategies may be particularly useful for pediatric oncology youth currently in remission as they will undoubtedly face longer-term issues. Even though youth may be cancer-free, some effects can be permanent and arduous to cope with in the long-term, such as fear of disease relapse, coping with survivorship, and adverse health consequences (e.g., Friedman & Meadows, 2002). Cognitive processes, such as learning, attention, and memory may also be affected, particularly by those with brain tumors or those who underwent intensive chemotherapy at a young age (Armstrong & Mulhern, 2000).

The current study also examined a number of constructs for both youth and their parents, which allowed for the examination of intervention effects beyond simply PTSS and depression. As well, the current study utilized a multi-informant approach for key child constructs by obtaining both child self-report and parent-report of child's symptoms. Current recommendations suggest a multi-informant approach to assessing youth symptomatology despite the potential for discrepancies (Grills & Ollendick, 2003).

Finally, utilization of analyses beyond visual inspection of the data strengthened the current study's ability to more accurately identify the presence of treatment effects. More specifically, SMA evaluated the statistical significance of between-phase changes (i.e., between baseline and treatment phase) and best-fitting slopes for constructs with a sufficient number of data points. Indeed, SMA statistical approach accounted for phase length and autocorrelation, thereby reducing the risk of a Type I error. Given its clear utility, future research with a single subject time-series design will benefit from SMA utilization.

4.9 - Limitations and Future Directions

While the current study produced a number of key findings, several limitations are noted. First, single subject designs are often used to test conceptual theories or to identify and validate intervention programs (Horner et al., 2004), which was the primary aim of this study. However, the study design limited statistical analyses in the examination of change as a result of the intervention. As well, the current study was subject to low participation rates and therefore small

sample size. This is unfortunately common among research with pediatric oncology youth and noted by Lutz Stehl and colleagues (2009) as a major challenge in conducting intervention research with this population. Thus, findings of the current study based primarily on visual inspection are subject to interpretation bias.

Second, there were inconsistencies noted with regard to when symptom improvements occurred. That is, some participants reported improvements when the intervention was introduced while others did not. Such findings call into question whether such improvements represent true intervention effects (Kazdin, 1998). Third, the majority of participants endorsed low to asymptomatic levels of distress and symptoms within normal limits on a number of examined constructs. While this is conceptually telling (i.e., that participants were generally resilient following an identified pediatric medical trauma), this limited the current study's ability to examine intervention effects.

Fourth, given that the two families with the highest reported symptomatology withdrew from the study, this raises the issue of differential study retention rates, as well as service utilization among individuals with posttraumatic stress reactions. Research has found a number of barriers to service utilization among adults with PTSD. For instance, fewer than 25% of adults who met screening criteria for PTSD pursued psychological treatment, and one third of trauma injury survivors perceived a need for treatment but chose to not seek help (Jaycox et al., 2004). Indeed, avoidance symptoms associated with PTSD is another barrier to treatment. Examining a very similar population of pediatric oncology patients in remission and their parents, Kazak et al. (2004) reported a nonrandom attrition rate among those reporting higher levels of PTSS, and avoidance symptoms in particular, at baseline. Armbruster and Kazdin (1994) also identified more general factors contributing to treatment drop-out, including socioeconomic disadvantage, minority group status, high levels of stress and family dysfunction, and difficult living conditions. Such findings have weighty implications for both research and clinical practice with such populations.

Finally, study participants presented with diverse backgrounds, family history of traumatic experiences, and family dynamics. For instance, one father was a disabled veteran previously diagnosed with PTSD. Another family had a complex trauma history that included suicide of a family member and recent deaths of three other family members in the past decade. Yet another family was concurrently dealing with the diagnosis of Anorexia Nervosa of a

sibling. A child participant was also likely exposed to medical neglect during her early years and had a difficult foster care history. Moreover, study sample heterogeneity limits generalizability of findings. Nevertheless, such variability is representative of the myriad of factors that can contribute to one's psychological resilience or vulnerability following pediatric medical traumatic stress.

Despite these limitations, findings from the current study point towards several potential areas of future research. First, while it makes theoretical sense to utilize a trauma-informed CBT approach for a pediatric oncology population, further methodologically sound research is needed to determine its efficacy. Second, additional research on posttraumatic growth and its relationship to PTSS is needed. Indeed, the idea that individuals can experience positive changes in their life (e.g., self-concept, relationships, future orientation) following a traumatic experience is relatively novel and captivating (e.g., Park & Helgeson, 2006). However, the relationship between PTG and PTSD remains somewhat unclear. Some have found positive correlations between PTS and PTSS (e.g., Barakat, Alderfer, & Kazak, 2005; Park, Aldwin, Fenster, & Snyder, 2008) while others have found an inverse relationship (e.g., Levine, Laufer, Stein, Hamama-Raz, & Solomon, 2009).   Nevertheless, examination of this phenomenon in both fields is gaining speed.

Third, future research aimed at exploring the *processes*, or underlying mechanisms involved in these risk, resilience, and posttraumatic growth factors is crucial, particularly as it relates to accurate assessment of PTSS and appropriate interventions for a pediatric oncology population. Fourth, the addition of a cognitive remediation component to trauma-informed CBT interventions for this population is another potentially fruitful area of research given the prevalence of neurocognitive deficits following cancer treatment. It is also possible that such an addition would improve their ability to learn and implement cognitive-based skills (e.g., cognitive coping) inherent in trauma-informed CBT interventions.

Fourth, further work is required to determine which maladaptive cognitive appraisals and coping styles are specifically associated with chronic post-traumatic symptomatology among a pediatric oncology population. Finally, future research on the generalizability of TF-CBT for pediatric oncology patients (e.g., in various disease stages) and other medical traumatic stress populations is also recommended. Readers are referred to Appendix B for a review of where the

field stands with applying research to clinical practice and a proposed framework based on findings from the current study.

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Table 1. Child and Parent Self-Reported Posttraumatic Stress Symptoms

Participant	Member	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up
1	Mother	*33	-	-	-
	Father	-	-	-	-
	Child	*19	-	-	-
2	Mother	20	21	17	17
	Father	22	17	21	19
	Child	8	0	0	0
3	Mother	23	17	17	17
	Father	*56	21	*32	*34
	Child	*14	1	1	1
4	Mother	*63	-	-	-
	Father	-	-	-	-
	Child	*29	-	-	-
5	Mother	17	17	17	17
	Father	-	-	-	-
	Child	9	3	0	0
Overall Means	Mother	31.20 (18.77)	18.33 (2.31)	17.00 (0.00)	17.00 (0.00)
	Father	39.00 (24.04)	19.00 (2.83)	26.50 (7.78)	26.50 (10.61)
	Child	15.80 (8.58)	1.33 (1.53)	0.33 (0.58)	0.33 (0.58)

NOTE: Parents' PTSS based on PCL-S measure, and children's PTSS based on CPSS measure.
*indicates total scores above clinical cutoff.

Table 2. Child Posttraumatic Stress Symptoms (Parent-Report)

Participant	Clusters	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up
1 (mother)	Re-Experiencing	7	-	-	-
	Avoidance	11	-	-	-
	Hyperarousal	7	-	-	-
	Total Score	25	-	-	-
2 (mother)	Re-Experiencing	5	5	5	5
	Avoidance	7	7	7	7
	Hyperarousal	5	5	5	5
	Total Score	17	17	17	17
2 (father)	Re-Experiencing	6	5	5	5
	Avoidance	9	7	7	8
	Hyperarousal	5	5	5	5
	Total Score	20	17	17	18
3 (mother)	Re-Experiencing	5	5	5	5
	Avoidance	7	7	7	7
	Hyperarousal	5	7	5	5
	Total Score	17	19	17	17
3 (father)	Re-Experiencing	5	5	5	5
	Avoidance	7	7	8	10
	Hyperarousal	5	5	8	11
	Total Score	17	17	21	26
4 (mother)	Re-Experiencing	17	-	-	-
	Avoidance	21	-	-	-
	Hyperarousal	19	-	-	-
	Total Score	57	-	-	-
5 (mother)	Re-Experiencing	5	5	5	5
	Avoidance	7	7	7	7
	Hyperarousal	10	5	5	5
	Total Score	22	17	17	17
Overall Means	Re-Experiencing	7.14 (4.41)	5.00 (7.00)	5.00 (0.00)	5.00 (0.00)
	Avoidance	9.86 (5.15)	7.00 (0.00)	7.20 (0.45)	7.80 (1.30)
	Hyperarousal	8.00 (5.20)	5.40 (0.89)	5.60 (1.34)	6.20 (2.68)
	Total Score	25.00 (14.43)	17.40 (0.89)	17.80 (1.79)	19.00 (3.94)

Table 3. Child Depressive Symptoms (Self-Report)

Child Participant	Measure	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up
1	Negative Mood	44	-	-	-
	Interpersonal Problems	57	-	-	-
	Ineffectiveness	59	-	-	-
	Anhedonia	56	-	-	-
	Negative Self-Esteem	46	-	-	-
	Total Score	53	-	-	-
2	Negative Mood	44	37	37	37
	Interpersonal Problems	42	43	43	43
	Ineffectiveness	39	38	38	38
	Anhedonia	45	38	38	38
	Negative Self-Esteem	40	39	39	39
	Total Score	39	34	34	34
3	Negative Mood	37	37	37	37
	Interpersonal Problems	43	43	43	43
	Ineffectiveness	38	38	38	38
	Anhedonia	38	38	38	38
	Negative Self-Esteem	39	39	39	39
	Total Score	34	34	34	34
4	Negative Mood	**75	-	-	-
	Interpersonal Problems	**84	-	-	-
	Ineffectiveness	**66	-	-	-
	Anhedonia	56	-	-	-
	Negative Self-Esteem	58	-	-	-
	Total Score	**71	-	-	-
5	Negative Mood	45	45	50	50
	Interpersonal Problems	45	45	45	45
	Ineffectiveness	64	41	41	41
	Anhedonia	42	38	38	38
	Negative Self-Esteem	45	40	40	40
	Total Score	47	39	40	40
Overall Means	Negative Mood	49.00 (14.88)	39.67 (4.62)	41.33 (7.51)	41.33 (7.51)
	Interpersonal Problems	54.20 (17.71)	43.67 (1.15)	43.67 (1.15)	43.67 (1.15)
	Ineffectiveness	53.20 (13.66)	39.00 (1.73)	39.00 (1.73)	39.00 (1.73)
	Anhedonia	47.40 (8.23)	38.00 (0.00)	38.00 (0.00)	38.00 (0.00)
	Negative Self-Esteem	45.60 (7.57)	39.33 (0.58)	39.33 (0.58)	39.33 (0.58)
	Total Score	48.80 (14.39)	35.67 (2.89)	36.00 (3.46)	36.00 (3.46)

**Clinically significant (T-scores ≥ 65)

NOTE: T-score significance based on age and gender of child

Table 4. Child Coping Efficacy (Self-Report)

Participant	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up
#001	22	-	-	-
#002	15	18	17	17
#003	20	28	28	28
#004	14	-	-	-
#005	20	25	25	23
Overall Mean	18.20 (3.49)	23.67 (5.13)	23.33 (5.69)	22.67 (5.51)

With higher numbers indicating greater coping efficacy.

Table 5. Child Somatization Symptoms (Self-Report)

Participant	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up
#001	18	-	-	-
#002	6	0	0	0
#003	16	0	0	0
#004	64	-	-	-
#005	4	0	0	0
Overall Mean	21.60 (21.89)	0	0	0

Table 6. Child Anxiety Symptoms (Self-Report)

Child Participant	Measure	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up
1	Harm Avoidance	49	-	-	-
	Social Anxiety	53	-	-	-
	Separation/Panic	62	-	-	-
	Total Score	52	-	-	-
2	Harm Avoidance	59	26	26	25
	Social Anxiety	64	40	44	38
	Separation/Panic	56	47	39	39
	Total Score	56	32	31	26
3	Harm Avoidance	49	25	25	25
	Social Anxiety	34	32	32	32
	Separation/Panic	43	43	43	43
	Total Score	39	25	25	25
4	Harm Avoidance	29	-	-	-
	Social Anxiety	50	-	-	-
	Separation/Panic	**65	-	-	-
	Total Score	54	-	-	-
5	Harm Avoidance	35	40	44	25
	Social Anxiety	44	41	32	32
	Separation/Panic	41	40	39	33
	Total Score	37	37	31	25
Overall Means	Harm Avoidance	44.20 (12.05)	30.33 (8.39)	31.67 (10.69)	25.00 (0.00)
	Social Anxiety	49.00 (11.09)	37.67 (4.93)	36.00 (6.93)	34.00 (3.46)
	Separation/Panic	53.40 (10.92)	43.33 (3.51)	40.33 (2.31)	38.33 (5.03)
	Total Score	47.60 (8.91)	31.33 (6.03)	29.00 (3.46)	25.33 (0.58)

**Clinically significant (T-scores ≥ 65)

NOTE: T-score significance based on age and gender of child

Table 7. Child Internalizing/Externalizing Symptoms (Parent-Report)

Participant	Measure	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up
1 (mother)	Internalizing	68**	-	-	-
	Externalizing	66**	-	-	-
	PTSD	64**	-	-	-
	Total Problems	66**	-	-	-
2 (mother)	Internalizing	50	47	40	40
	Externalizing	34	34	40	34
	PTSD	50	50	50	50
	Total Problems	41	38	37	38
2 (father)	Internalizing	62*	55	47	50
	Externalizing	40	43	34	34
	PTSD	51	50	50	50
	Total Problems	52	46	37	45
3 (mother)	Internalizing	55	53	45	48
	Externalizing	54	51	40	52
	PTSD	64**	60*	53	56
	Total Problems	63*	59	54	57
3 (father)	Internalizing	53	53	59	55
	Externalizing	59	56	63*	54
	PTSD	64**	56	62*	58
	Total Problems	64**	61*	66**	59
4 (mother)	Internalizing	73**	-	-	-
	Externalizing	64**	-	-	-
	PTSD	80**	-	-	-
	Total Problems	70**	-	-	-
5 (mother)	Internalizing	56	59	52	54
	Externalizing	62*	65**	60*	64**
	PTSD	56	56	54	56
	Total Problems	62*	65**	60*	57
Overall Means	Internalizing	59.57 (8.42)	53.40 (4.34)	48.60 (7.23)	49.40 (5.98)
	Externalizing	54.14 (12.44)	49.80 (11.90)	47.40 (13.15)	47.60 (13.22)
	PTSD	61.29 (10.27)	54.40 (4.34)	53.80 (4.92)	54.00 (3.74)
	Total Problems	59.71 (9.91)	53.80 (11.34)	50.80 (13.29)	51.20 (9.23)

**Clinically Significant (T-Score >64; >90th percentile)

*Borderline/At-Risk (T-Score 60-63; 84th – 90th percentile)

Table 8. Child Quality of Life (Parent-Report)

Participant	Measure	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up	Normative Sample Data
1 (mother)	Physical Restriction	13	-	-	-	
	Emotional Distress	17	-	-	-	
	Response to Med. Tx.	6	-	-	-	
	Total Score	36	-	-	-	
2 (mother)	Physical Restriction	16	19	17	12	
	Emotional Distress	8	9	11	7	
	Response to Med. Tx.	5	5	10	5	
	Total Score	29	33	38	24	
2 (father)	Physical Restriction	27	20	15	31	
	Emotional Distress	11	11	7	13	
	Response to Med. Tx.	8	6	5	7	
	Total Score	46	37	27	51	
3 (mother)	Physical Restriction	10	9	25	14	
	Emotional Distress	11	10	7	8	
	Response to Med. Tx.	5	5	5	5	
	Total Score	26	24	37	27	
3 (father)	Physical Restriction	11	15	17	18	
	Emotional Distress	13	13	23	17	
	Response to Med. Tx.	8	8	14	14	
	Total Score	32	36	54	49	
4 (mother)	Physical Restriction	45	-	-	-	
	Emotional Distress	39	-	-	-	
	Response to Med. Tx.	34	-	-	-	
	Total Score	118	-	-	-	
5 (mother)	Physical Restriction	15	12	16	16	
	Emotional Distress	11	15	12	10	
	Response to Med. Tx.	5	14	9	9	
	Total Score	31	41	37	35	
Overall Means	Physical Restriction	19.57 (12.54)	15.00 (4.64)	18.00 (4.00)	18.20 (7.50)	±25.89 (13.68)
	Emotional Distress	15.71 (10.63)	11.60 (2.41)	12.00 (6.56)	11.00 (4.06)	±15.40 (6.75)
	Response to Med. Tx.	10.14 (10.61)	7.60 (3.78)	8.60 (3.78)	8.00 (3.74)	±11.66 (6.57)
	Total Score	45.43 (32.64)	34.20 (6.38)	38.60 (9.71)	37.20 (12.38)	±52.95 (24.32)

with higher scores indicating lower quality of life.

±population means and standard deviations reported in Bijttebier et al. (2001)

Table 9. Parent Depressive Symptoms (Self-Report)

Participant	Parent	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up
1	Mother	**20	-	-	-
	Father	-	-	-	-
2	Mother	1	3	0	0
	Father	12	6	5	3
3	Mother	0	0	0	0
	Father	***34	12	**21	*14
4	Mother	***31	-	-	-
	Father	-	-	-	-
5	Mother	1	0	0	0
	Father	-	-	-	-
Overall Means	Both Parents	16.33 (14.51)	4.20 (5.02)	5.20 (9.09)	3.40 (6.07)

Depressive cutoff scores: 0-13 = minimal, *14-19 = mild, **20-28 moderate, ***29-63 = severe.

Table 10. Parenting Stress and Difficulty (Self-Report)

Participant	Measure	Baseline	Post-Treatment	1-Month Follow-Up	3-Month Follow-Up	Normative Data
1 (mother)	**Total Frequency**	**85**	-	-	-	
	Communication	20	-	-	-	
	Medical Care	8	-	-	-	
	Emotional Dist.	38	-	-	-	
	Role Function	19	-	-	-	
	Total Difficulty	**97**	-	-	-	
	Communication	21	-	-	-	
	Medical Care	8	-	-	-	
	Emotional Dist.	47	-	-	-	
	Role Function	21	-	-	-	
2 (mother)	**Total Frequency**	**49**	**53**	**42**	**42**	
	Communication	9	11	9	9	
	Medical Care	10	8	8	8	
	Emotional Dist.	20	20	15	15	
	Role Function	10	14	10	10	
	Total Difficulty	**49**	**46**	**42**	**42**	
	Communication	9	10	9	9	
	Medical Care	12	8	8	8	
	Emotional Dist.	18	17	15	15	
	Role Function	10	11	10	10	
2 (father)	**Total Frequency**	**61**	**47**	**44**	**79**	
	Communication	13	11	9	14	
	Medical Care	15	8	8	19	
	Emotional Dist.	20	18	17	29	
	Role Function	13	10	10	17	
	Total Difficulty	**55**	**44**	**44**	**63**	
	Communication	10	10	9	12	
	Medical Care	14	8	8	15	
	Emotional Dist.	20	16	17	25	
	Role Function	11	10	10	11	
3 (mother)	**Total Frequency**	**76**	**76**	**45**	**44**	
	Communication	20	21	12	11	
	Medical Care	15	13	8	8	
	Emotional Dist.	24	26	15	15	
	Role Function	17	16	10	10	
	Total Difficulty	**74**	**73**	**43**	**42**	
	Communication	21	14	10	9	

	Medical Care	19	17	8	8
	Emotional Dist.	23	28	15	15
	Role Function	11	14	10	10
3 (father)	**Total Frequency**	**79**	**75**	**100**	**95**
	Communication	15	18	22	18
	Medical Care	12	13	16	16
	Emotional Dist.	32	28	37	41
	Role Function	20	16	25	20
	Total Difficulty	**95**	**78**	**99**	**93**
	Communication	20	20	22	19
	Medical Care	18	13	16	15
	Emotional Dist.	36	28	38	40
	Role Function	21	17	23	19
4 (mother)	**Total Frequency**	**165**	-	-	-
	Communication	30	-	-	-
	Medical Care	35	-	-	-
	Emotional Dist.	68	-	-	-
	Role Function	32	-	-	-
	Total Difficulty	**162**	-	-	-
	Communication	27	-	-	-
	Medical Care	28	-	-	-
	Emotional Dist.	70	-	-	-
	Role Function	37	-	-	-
5 (mother)	**Total Frequency**	**44**	**42**	**42**	**42**
	Communication	9	9	9	9
	Medical Care	8	8	8	8
	Emotional Dist.	15	15	15	15
	Role Function	12	10	10	10
	Total Difficulty	**42**	**42**	**42**	**42**
	Communication	9	9	9	9
	Medical Care	8	8	8	8
	Emotional Dist.	15	15	15	15
	Role Function	10	10	10	10
Overall Means	Total Frequency	79.86 (40.59)	58.50 (15.92)	54.60 (25.41)	60.40 (24.95)	±94.00 (33.33)
	Total Difficulty	82.00 (41.38)	56.60 (17.40)	54.00 (25.17)	56.40 (22.39)	±112.40 (35.10)

Higher scores indicate greater frequency and difficulty

± population means and standard deviations reported in Streisand, Braniecki, Tercyak, & Kazak, (2001)

Table 11. Mean level changes between Baseline and Treatment using SMA

Dyad	Participant	Child PTSD		Parent PTSD		Child Coping Efficacy	
		Pearson R	p-value	Pearson R	p-value	Pearson R	p-value
1 (5)	Mother	-	-	-.747	†.055	-	-
	Child	-.522	.256	-	-	.618	†.055
2 (4)	Mother	-	-	-.616	.131	-	-
	Father	-	-	-.711	*.027	-	-
	Child	-.418	.196	-	-	.619	*.048
3 (4)	Mother	-	-	-.609	.184	-	-
	Father	-	-	-.593	.106	-	-
	Child	-.479	.130	-	-	.719	.143
5 (3)	Mother	-	-	N/A	N/A	-	-
	Child	-.048	.883	-	-	.689	†.094

Note: Numbers in parentheses indicate number of baseline points.

* indicates p < .05, † indicates p < .10.

Table 12. Best-Fitting Slope (Baseline to Treatment) using SMA

Dyad	Participant	Child PTSD		Parent PTSD		Child Coping Efficacy	
		Pearson R	p-value	Pearson R	p-value	Pearson R	p-value
1 (5)	Mother	-	-	-.845 (4)	*.015	-	-
	Child	-.772 (4)	*.040	-	-	.629 (2)	.056
2 (4)	Mother	-	-	-.610 (3)	.131	-	-
	Father	-	-	-.721 (4)	*.027	-	-
	Child	-.709 (3)	*.014	-	-	.777 (3)	*.008
3 (4)	Mother	-	-	-.868 (5)	*.003	-	-
	Father	-	-	-.835 (3)	*.004	-	-
	Child	-.730 (3)	*.011	-	-	.898 (4)	*.017
5 (3)	Mother	-	-	N/A	N/A	-	-
	Child	-.364 (3)	.254	-	-	.848 (2)	*.023

Note: Numbers in parentheses indicate the best-fitting slope vector.

* indicates p < .05, † indicates p < .10.

Figure 1. Child Participant #001 Posttraumatic Stress Symptoms & Coping Efficacy
(Self-Report)
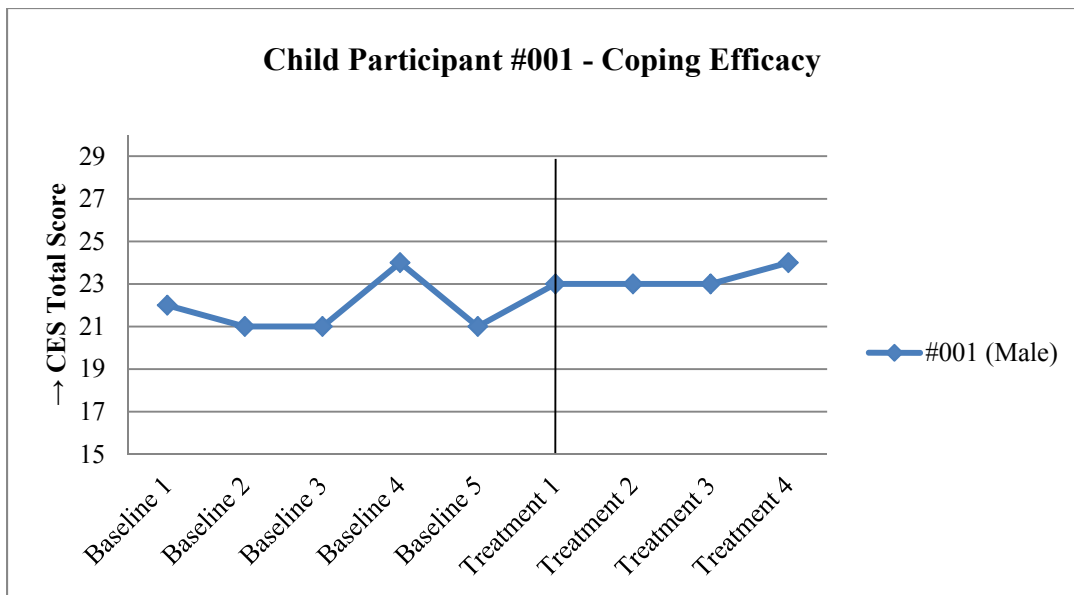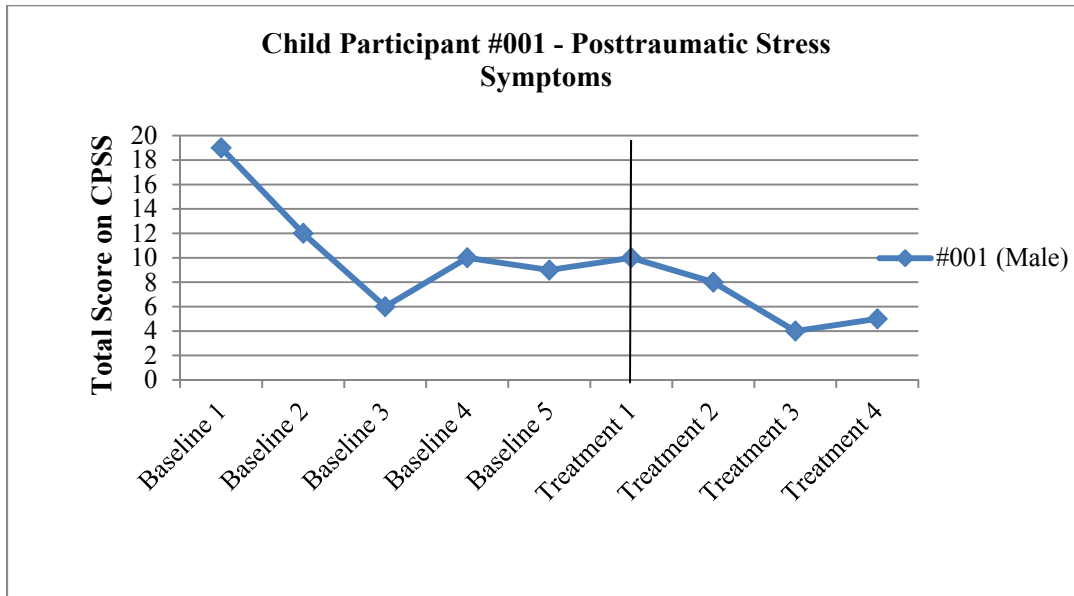
Figure 2. Child Participant #002 Posttraumatic Stress Symptoms & Coping Efficacy
(Self-Report)
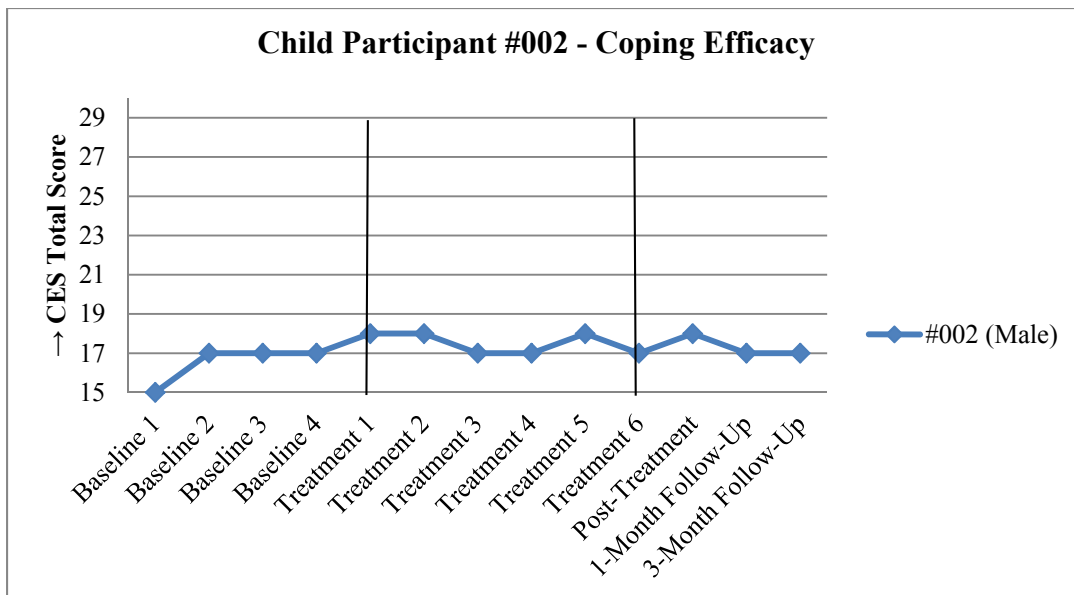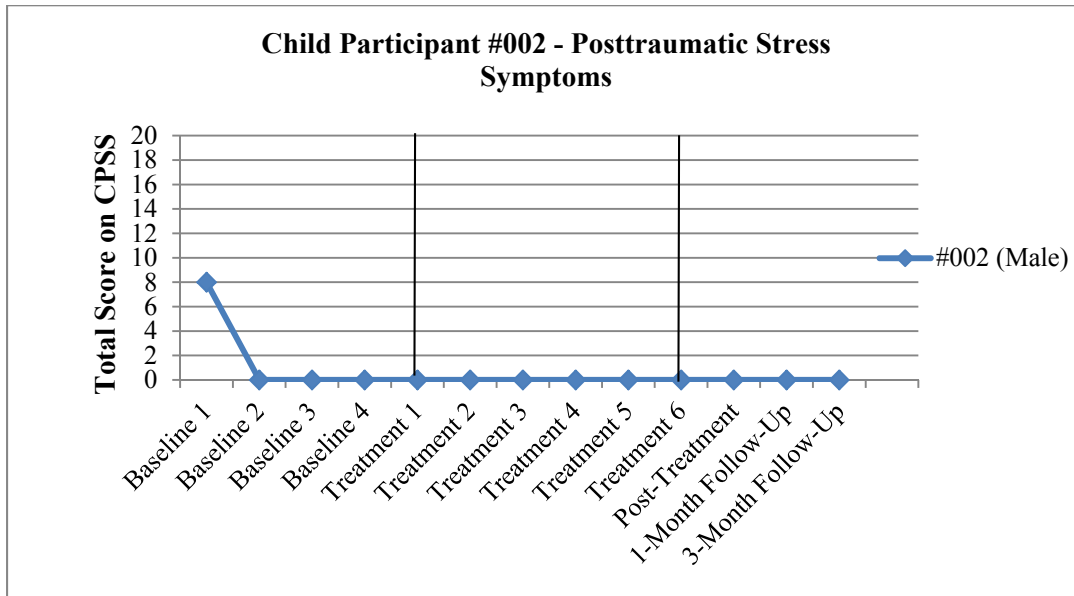
Figure 3. Child Participant #003 Posttraumatic Stress Symptoms & Coping Efficacy
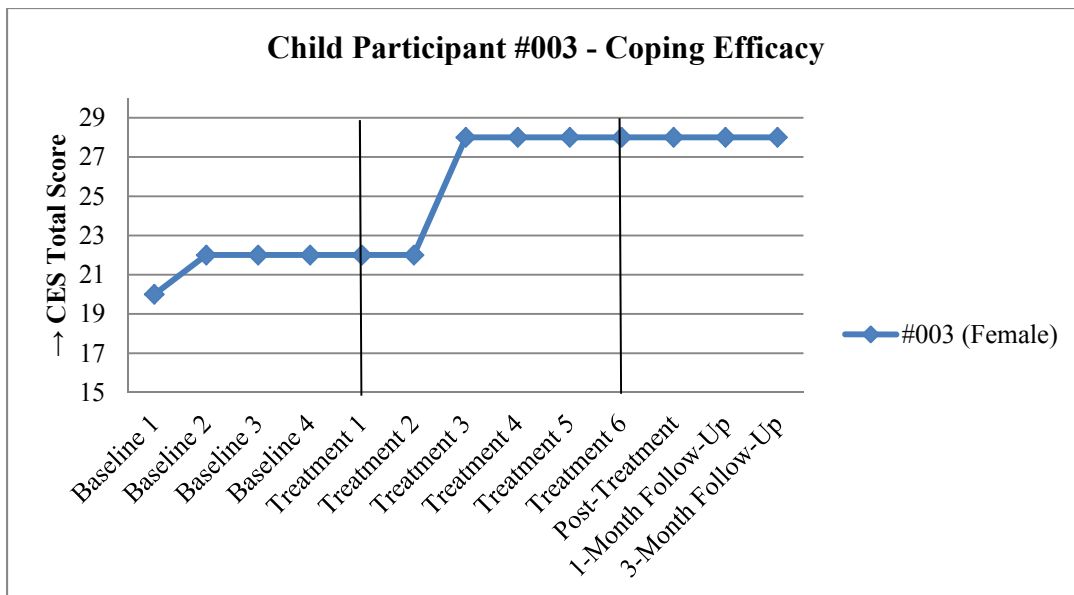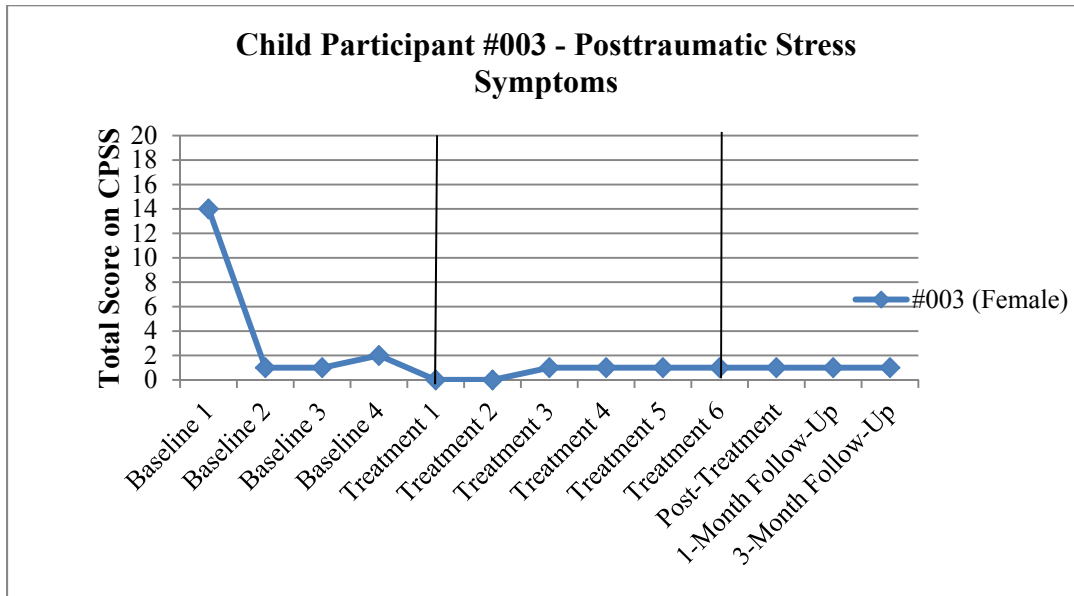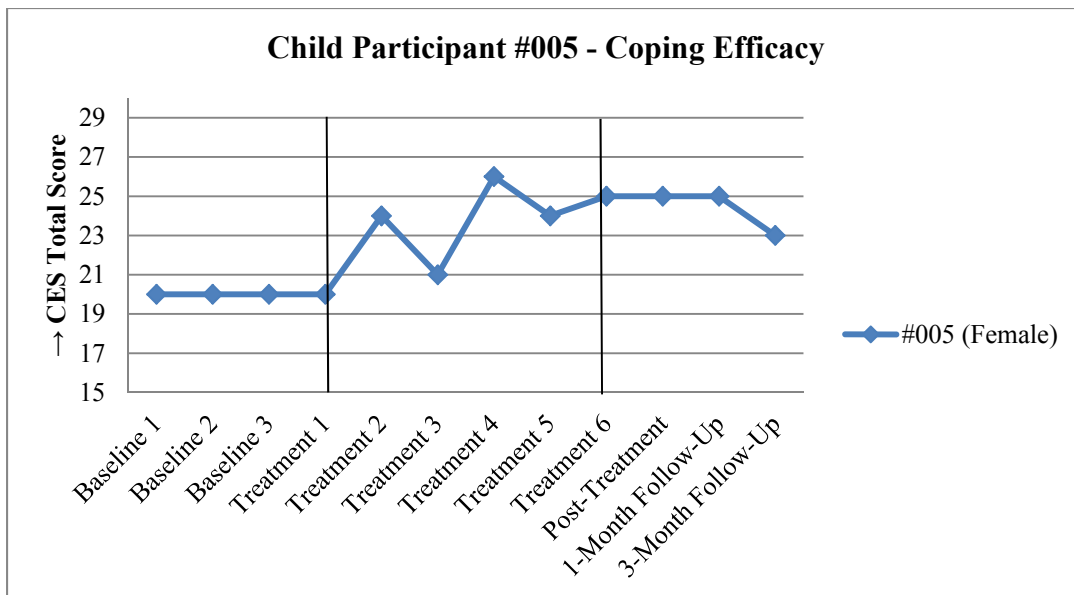(Self-Report)

Child Participant #003 - Posttraumatic Stress Symptoms

Child Participant #003 - Coping Efficacy

Figure 4. Child Participant #005 Posttraumatic Stress Symptoms & Coping Efficacy
(Self-Report)
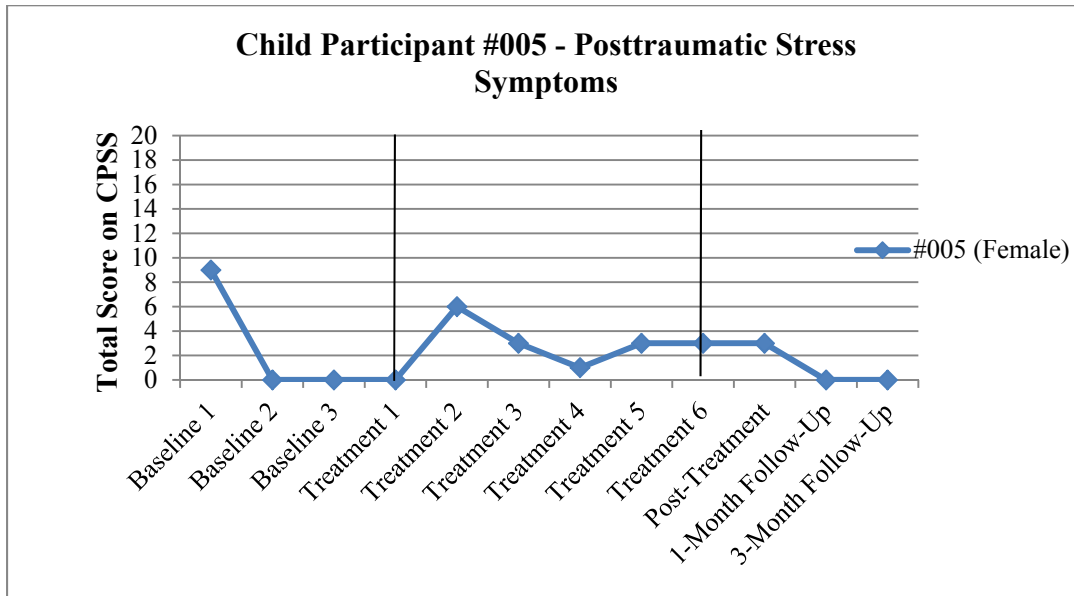
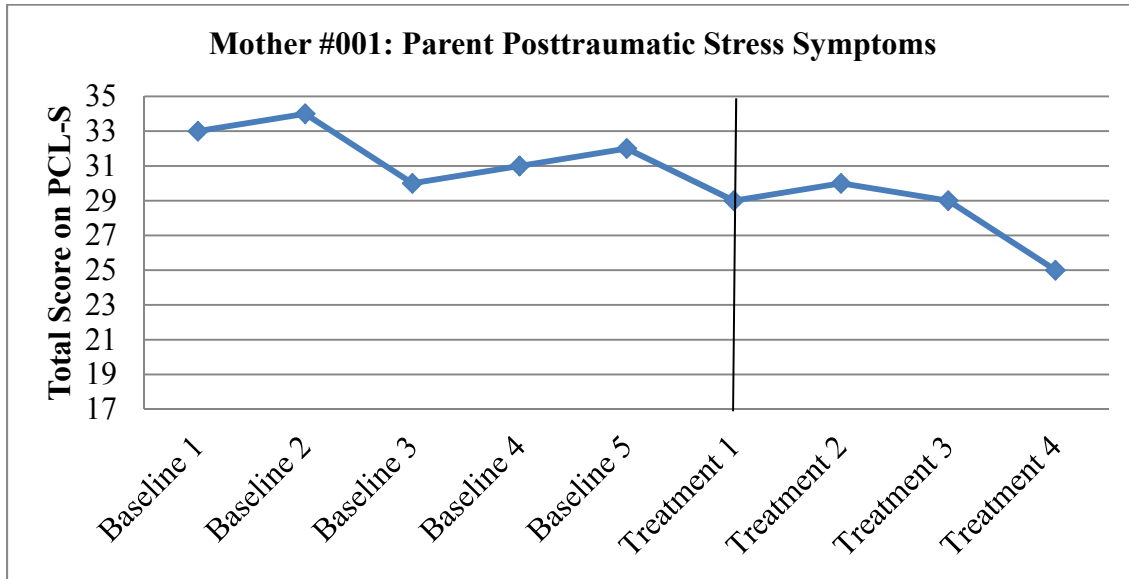Figure 5. Parent Participant #001 Posttraumatic Stress Symptoms

Mother #001: Parent Posttraumatic Stress Symptoms

Figure 6. Parent Participants #002 Posttraumatic Stress Symptoms

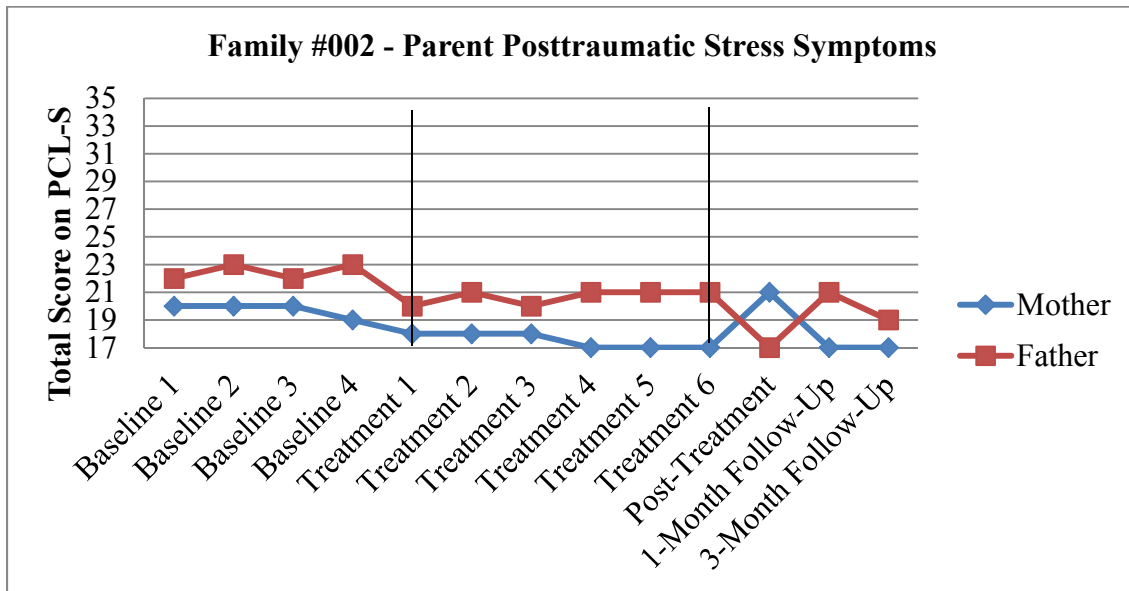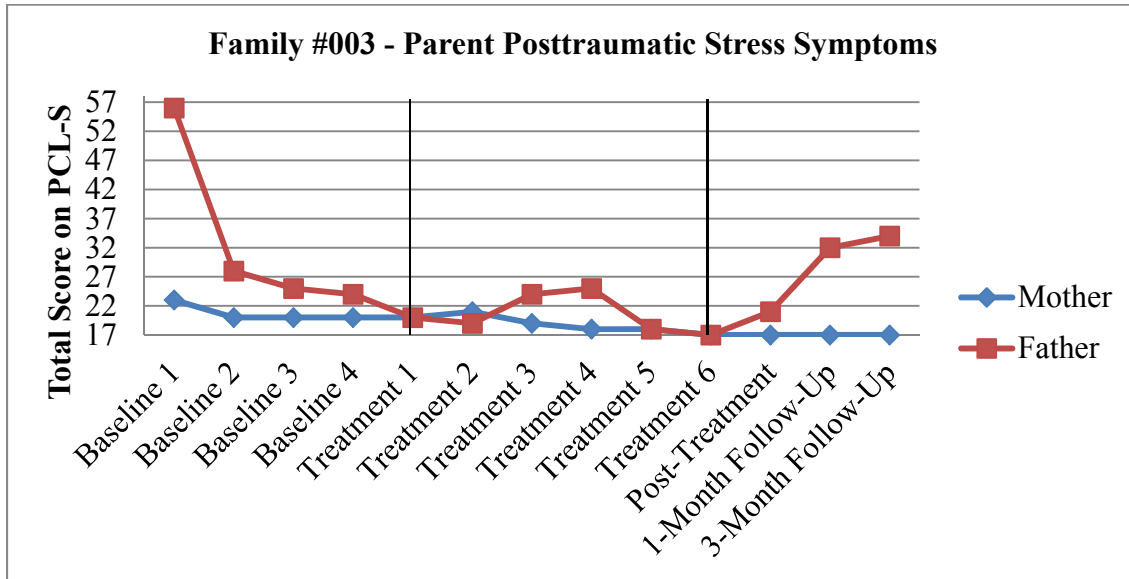Figure 7. Parent Participants #003 Posttraumatic Stress Symptoms

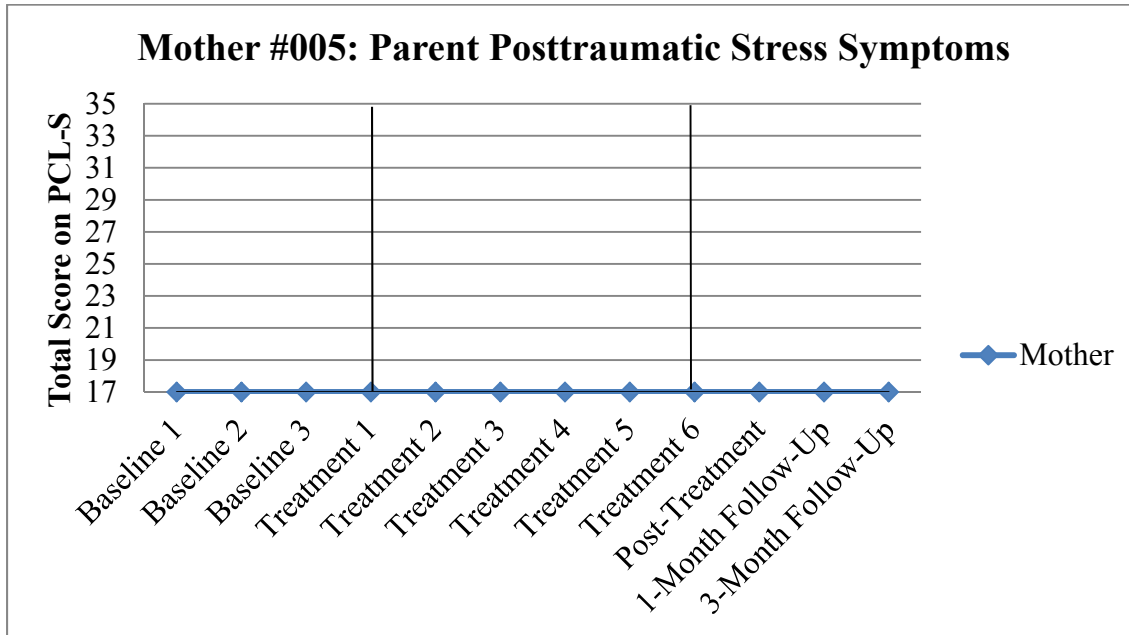**Family #003 - Parent Posttraumatic Stress Symptoms**

Figure 8. Parent Participant #005 Posttraumatic Stress Symptoms

Mother #005: Parent Posttraumatic Stress Symptoms

Appendix A

TF-CBT Component Objectives & Goals

1. **Psychoeducation:**
   a. <u>Primary Goal</u> = information provision to validate and normalize dyad's trauma reactions
   b. Initially provide general information to both parent and child about traumatic experience (e.g., frequency of trauma, who experiences it, what causes it)
   c. Provide information about common emotional and behavioral responses to the traumatic experience (e.g., empirical information)
      i. Stress that their reactions are not so unusual
      ii. Provides emotional validation for the dyad
      iii. Child – can use books to accomplish this goal
   d. Talk about TF-CBT as a treatment
   e. Provide strategies for dyad to manage current symptoms
2. **Parenting Skills**:
   a. <u>Primary Goal</u> = enhance proper use of relevant parenting skills
   b. Specific parenting skills to work on/enhance:
      i. Use of positive praise:
         1. praising specific good behaviors
         2. being consistent
         3. do not qualify praise
         4. high intensity of praise
         5. actively listen to child and engage in healthy conversations
      ii. Selective attention:
         1. Not reacting to negative behaviors (provide examples)
      iii. Effective time-out procedures:
         1. particularly relevant for children exhibiting behavioral problems
         2. goals:
            a. interrupt child's negative procedures, which allows them to regain emotional and behavioral control
            b. deprive the child of the opportunity to receive attention during this time
      iv. Contingency reinforcement schedules (e.g., behavior charts):
         1. Purpose is to decrease unwanted behaviors and increase desired behaviors
3. **Relaxation**:
   a. <u>Primary Goal</u> = reduction of physiological arousal

b. Psychoeducation RE: relaxation (e.g., can reduce physiological arousal), how our bodies react to stress (refer to TF-CBT handout), and the importance of practicing these techniques

c. For children:

    i. Focused breathing for younger children (see script, pp. 77-78)

    ii. Meditation for older children/adolescents (see script, pp. 78-80)

    iii. Progressive Muscle Relaxation (see script, pp. 81-83)

        1. Particularly helpful for children with sleep difficulties

d. For parents:

    i. Similar techniques (scripts can be found in *The Relaxation and Stress Reduction Workbook* (Davis, Eshelman, & McKay, 1988)

    ii. Provide option of exercise with aerobic activity

4. **Affective Expression & Modulation**:

a. <u>Primary Goal</u> = help dyad express and manage their feelings more effectively

b. For children:

    i. Feeling identification activities:

        1. Have child write down as many feelings he/she can think of

        2. Games: Emotional Bingo (Mitlin, 1998); Mad, Sad, Glad Game (1999); Stamp Game for older children/adolescents (Black, 1984)

    ii. For children with overwhelming trauma reminders – thought stopping/interruption and positive imagery techniques

    iii. Positive self-talk technique (e.g., "I can get through this")

    iv. Enhance their sense of safety

    v. Enhance problem-solving and social skills

c. For parents:

    i. Provide comfortable atmosphere for parents to share full range of emotions

    ii. Early on, it is important to validate his/her feelings, acknowledge that there are no right or wrong feelings but rather feelings that are more or less difficult to manage and/or endure

    iii. Thought interruption and positive distraction techniques

    iv. Positive self-talk – replacing pessimistic thoughts with positive self-statements

5. **Cognitive Coping & Processing**:

a. <u>Primary Goal</u> = challenge and correct cognitions that are inaccurate and/or unhelpful

b. Initial focus on helping dyad recognize and share internal dialogues

c. Explaining the "cognitive triangle" – relationship between thoughts, feelings, and behaviors

d. NOTE: cognitive processing of the actual traumatic experience does not occur until after the trauma-focused components below.

e. For children:

  i. Stories demonstrating inaccurate and unhelpful thoughts (pp. 112-113)

  ii. Use examples tailed to the child's interests, age, and gender

f. For parents:

  i. Cognitive coping to challenge pessimistic thoughts

   1. Use examples

   2. Have them practice using situations in which he/she was feeling bad (not related to the trauma) (i.e., what thoughts led to those bad feelings)

6. **Trauma Narrative**:

a. <u>Primary Goal</u> = to "unpair" thoughts, reminders, and discussions of the traumatic experience from overwhelming negative emotions

b. Before initiating this task, provide psychoeducation and theoretical underpinnings as to why it is important to engage in this process (refer to p. 121)

c. Progressively (i.e., over time) encourage dyad to describe more and more detail as well as their thoughts and feelings during this time.

d. For children:

  i. Can accomplish this task by having them create a book that tells the story of their traumatic experience

e. For parents:

  i. Focus should largely be devoted to his/her reading of the child's book and a discussion of his/her thoughts and reactions.

f. Cognitive processing technique specific to the traumatic experience.

7. *In vivo* **Mastery of Trauma Reminders**:

a. <u>Primary Goal</u> = assist the child in gradually overcoming avoidance, particularly to innocuous cues, and thereby allowing him/her to regain optimal functioning

b. NOTE: this component is especially helpful for children who have developed generalized avoidant behaviors

c. For children:

  i. Psychoeducation regarding the function of avoidance and how, through NOT avoiding the feared stimulus (i.e., by exposing yourself to it), fears and anxieties associated with this once-avoided stimulus begin to diminish

  ii. Steps:

   1. Step 1: identify the feared situation/stimulus

   2. Step 2: develop an in vivo exposure plan

   3. Step 3: gradually, yet progressively increase the child's exposure to the feared situation/stimulus

d. For parents:

      i. Provide psychoeducation regarding *in vivo* exposure and the importance for parents to be actively involved, comfortable, and in agreement with the plan.

8. **Conjoined Child-Parent Sessions**:
   a. <u>Primary Goal</u> = enhance the child's comfort in communicating with his/her parent about difficult issues (e.g., the traumatic experience)
   b. NOTE: typically occur after the dyad has completed the cognitive processing of the trauma experiences in individual sessions.

9. **Enhancing Future Safety & Development**:
   a. <u>Primary Goal</u> = teach skills that will increase feelings of self-efficacy and preparedness
   b. NOTE: cannot and should not assure children that they will never suffer another trauma again

Appendix B – Supplemental Chapter

From Research to Practice: Integrating Findings from the Current Study to Inform a Framework

for Mental Health Service Utilization

Aylward and colleagues (2009) define the field of pediatric psychology as "a multifaceted and integrated field of both scientific research and clinical practice that focuses on addressing a wide range of physical and psychological issues related to promoting the health and development of children, adolescents, and their families, with an emphasis on evidence-based methods," (p. 3). More simply stated, it is the field of child psychology where medical and mental health issues collide. The present study identified noteworthy findings following an examination of children previously diagnosed with cancer and their parents who participated in a trauma-focused CBT intervention. The key question then becomes, how might we incorporate important research findings into clinical practice? Therefore, the purpose of this supplemental chapter is to discuss the potential clinical application of the current study's findings. More specifically, the primary objectives are: (1) to review the current status of the field with regard to applying research findings into clinical practice; and (2) to identify a framework for how to implement a trauma-informed intervention (i.e., TF-CBT) in a real-world hospital-based setting, from early identification of at-risk families to effective intervention service provision, using a traumatic stress perspective.

Applying Research to Clinical Practice

In recent years, there has been a growing emphasis on evaluating and identifying evidence-based practices (EBPs). According to the APA Task Force on Evidence-Based Practice in Psychology (EBPP), EBP "is the integration between available research with clinical expertise in the context of pediatric characteristics, culture, and preferences," with a primary purpose of promoting "effective psychological practice and enhance public health by applying empirically supported principles of psychological assessment, case formulation, therapeutic relationship, and intervention" (APA, 2006). Simply put, EBPP supports the use of assessment techniques and interventions that evidence efficacy and effectiveness in both research and applied settings. Within a health care research model, Melnyk and Fineout-Overholt (2005) outlined a rating system that determines preferential levels of obtaining EBPs from research with systematic

reviews/meta-analyses and randomized controlled trials (RCTs) representing the highest level and single descriptive/qualitative studies and opinions from authorities/reports on expert committees representing the lowest levels.

Along these lines, leaders in the fields of pediatric and child clinical psychology have historically touted the development of treatment outcome research (e.g., Kazdin, Bass, Ayers, & Rogers, 1990; Roberts, 1992). Yet, Roberts and colleagues (2002) found that only 13% of articles published in the Journal of Pediatric Psychology were intervention and prevention related, whereas explicative and/or correlational research totaled 75% of published articles. Interestingly, Drotar (2010; 1997) noted that intervention research in pediatric psychology historically has not focused on populations commonly seen in clinical practice (i.e., due to research of experimental control and the problem of comorbid conditions, treatment fidelity, and obstacles conducting research in a clinical setting). Furthermore, the National Institute of Mental Health formed the Clinical Treatment and Services Research Workgroup, which produced a report entitled "Bridging Science and Service." This report stated that "clinical practices and services system innovations that are validated by research are not fully adopted in treatment settings and service systems," (Clinical Treatment and Services Research Workgroup, 1998, p. 9). Despite the common goal of improving clients' quality of life and decrease distress, there is a poor transfer of information from controlled research trials and treatment outcome studies to clinical settings. Simply put, these approaches are seldom used in clinical practice (Weersing, Weisz, & Donenberg, 2002).

In an effort to bridge this gap, the NIMH Workgroup (1998) classified four primary domains of treatment research, including (1) efficacy, (2) effectiveness, (3) practice, and (4) service system research. Efficacy research, according to Barlow (1996), is defined as a systematic evaluation of an intervention within a controlled clinical research context. Such research typically utilizes random assignment procedures, restrictive inclusion/exclusion criteria, double blind designs, and manualized treatments to determine whether a specific intervention has a specific measurable effect. Comparatively, effectiveness research takes interventions shown to be efficacious and applies them to much broader populations and settings to determine their generalizability. Third, the Workgroup (1998) defined practice research as examining "…how and which treatments or services are provided to individuals within service systems," and aims to "…examine variations in care and ways to disseminate and implement research-based

treatments," (Clinical Treatment and Services Research Workgroup, 1998, p. 11). Finally, the service system research domain includes issues such as financial, organizational, and policy questions, which are then linked to clinical outcomes and quality of care. The Workgroup proposed an "elaborate, multi-tiered fountain" with a "constant feedback loop" to bridge the gap between evidence-based interventions and clinical practice (pp. 30-31).

When considering the application of this model to the field of pediatric psychology, Roberts and colleagues (2002) noted that, not only has the field not focused enough on efficacy and effectiveness, they have done even less in the service system domain. Such research is even more relevant and necessary in pediatric psychology as clinical settings can range from inpatient medical center units, consultation/liaison services, outpatient clinics, and even camps and groups. Comparatively, Drotar (2010) cautioned against minimizing the real-world application of research from single subject designs and clinical case studies. He posited that such research is scientifically valuable in suggesting directions for future research and clinical care, as well as initiating the process of evaluating new practice-based interventions. In this spirit, the current study represented single subject design research that falls under the Workgroups (1998) "efficacy" domain as the primary aim was to examine the efficacy of TF-CBT intervention program for youth previously diagnosed with cancer and their parents.

Proposed Framework

The proposed framework detailed in this chapter suggests a comprehensive system of mental health services for a pediatric oncology population, from the initial screening process through intervention provision. It is largely based on the work by Kazak and colleagues' Pediatric Medical Traumatic Stress (PMTS) model (2006) and Kazak's Pediatric Psychosocial Preventative Health Model (PPPHM; 2006). Kazak and colleagues' PMTS model (2006) provides a solid foundation with regard to conceptualizing posttraumatic stress symptom development across time and as a function of medical disease stage. Phases identify key areas of focus in terms of conceptualizing the potential development and maintenance of posttraumatic stress symptomatology. As well, Kazak's PPPHM (2006) offers a tiered approach to providing the appropriate amount of services to families based on their individual level of need.

Screening process. In addition to individual differences, mental health issues can also vary as a function of illness course. This reality therefore has implications for appropriate identification of those in need and appropriate intervention strategies. Phase I of the PMTS

Model focuses on the peritraumatic period during and immediately after the medical traumatic event. The examination of pre-existing factors and characteristics of the medical traumatic event is considered to be vital in identifying those most at risk for developing subsequent posttraumatic stress symptoms and psychological distress. Indeed, early screening and identification of potentially at-risk families is essential and can lead to them receiving timely and appropriate mental health services. Kazak's PPPHM (2006) provides a conceptual framework for this process by proposing a tiered approach to determining the appropriate amount of services to families based on their level of need. As such, this model can assist the medical team in early and proper identification of those most in need. Thus, using the PMTS model to screen for potentially at-risk families, as identified by the PPPHM, is proposed as the first step of the process.

Appropriate and thorough screening procedures should include key demographic information previously found to be linked with poorer outcomes, such as trauma history, lack of social support, low socio-economic status, subjective experience of the traumatic event, as well as key constructs (e.g., PTSS, depression, coping strategies and utilization, quality of life, etc.). In addition, research has supported the inclusion of screening instruments for not only the affected child but for parents and siblings as well. There is ample evidence to suggest that parents of children newly diagnosed with a chronic illness report higher trends of initial distress and symptomatology than their afflicted child (e.g., Patiño-Fernanadez et al., 2008) with rates of parental PTSD ranging from 5-25% with even greater numbers meeting partial PTSD criteria (e.g., Brown, Madan-Swain, & Lambert, 2003; Manne et al., 2002). Specific to a pediatric oncology population, Kazak and colleagues (2004) found that 30% of mothers met full diagnostic criteria for PTSD at some point following their adolescent's cancer diagnosis.

As well, siblings of youth with chronic illness can develop feelings of being forgotten or "passed off" on other relatives. They may also develop somatic symptoms, school problems, social withdrawal, acting out behaviors, worry, and internalizing and externalizing behaviors in general (Barbarin et al., 1995). Menke (1987) noted that siblings often report that their parents provide them with less attention as their focus has shifted to the afflicted child. Additionally, siblings have to cope with daily life disruptions, family separations, and changes in family role expectations (e.g., Sargent et al., 1995). However, the impact of these changes on the sibling's mental health adjustment remains somewhat unclear. Nevertheless, screening family members,

in addition to the afflict child, is offered as a more thorough approach to identifying all individuals at risk for mental health sequelae.

This begs the question of how at-risk families presenting to a pediatric hematology/oncology unit might receive such screening services. The majority of children's hospitals offer Pediatric Consultation-Liaison services within the hospital setting. The primary reason for a consultation request is adjustment to a new medical diagnosis, treatment adherence issues, and a brief assessment of potential mental health concerns, including depression, anxiety, and suicide risk assessment (Carter, Kronenberger, Scott, & Ernst, 2009). According to Drotar and colleagues (2003), pediatric inpatient consultation generally follows a medical model wherein the requesting physician identifies a specific area of concern (e.g., depression, treatment/medication compliance, etc.), and the consulting psychologist responding to the specific concern in a time-limited and problem-focused fashion via clinical interview. The mental health consultant can also serve to coordinate care and facilitate communication between the patient, family, and team members (Williams & DeMaso, 2000). Despite how common pediatric consultation-liaison services are in a medical setting, there is a relative lack of research quantifying the use and effectiveness of such services (Carter & vonWeiss, 2005).

Comparatively, clients in an outpatient psychological clinic typically undergo a comprehensive evaluation process wherein presenting problems are assessed, as well as family issues, past history of mental health difficulties, and other potential mental health sequelae. This process frequently involves administration of standardized questionnaires and more formal assessment procedures. This is much less common in a pediatric consultation format (Carter, Kronenberger, Scott, & Ernst, 2009). Additionally, assessment of pediatric medical traumatic stress is presently less common and perhaps overlooked in both consultation and outpatient services. Given that a subset of pediatric oncology patients and their family members develop PTSS, and given the potential for avoidance symptoms to impact adherence to both medical treatment and mental health services, screening for PTSS is imperative. Whether PTSS screening occurs through Pediatric Consultation/Liaison or Outpatient Pediatric Psychology clinics, it should not be overlooked.

Assessment process. The screening process allows for identification of at-risk children and their family members. EBP practices in the assessment process have recently emerged (Cohen et al., 2008), with valid and sensitive techniques at the forefront. For youth, EBP for assessment should be developmentally appropriate, reliable, and multi-informant in nature.

Once these families are identified through Pediatric Consultation-Liaison services, follow-up and further assessment is integral to preventing the development of chronic psychopathology. Again, the majority of children's hospitals have access to outpatient Pediatric Psychology services.   Such services are prime for providing more intensive assessment of at-risk families. Indeed, assessment services are essential to the proper determination of intervention foci specific to each family's needs. Current pediatric psychology models underscore system-focused approaches with the assessment of multiple factors involved in case conceptualization, determination of intervention needs, and multidisciplinary treatment recommendations (Kazak, 2006). For instance, assessment data can provide additional data points to determine whether initial problems identified during the screening process represent a more typical and short-term acute stress response, or a precursor to longer-term distress, such as the development of PTSD.

Second, the inclusion of baseline cognitive functioning assessment of the afflicted child is also key for a more accurate determination of whether cognitive deficits develop over time (i.e., 5 years post-medical treatment). The primary cause of such deficits has been attributed to cerebral white matter injury and loss (i.e., demyelination and necrosis) among pediatric oncology patients as a result of medical treatments (Hudson, 1999). That is, volume of white matter is associated with IQ scores for patients undergoing radiation treatment (Mulhern et al., 1999), and loss in this area likely accounts for executive functioning deficits. As well, younger age at diagnosis (e.g., Maddrey et al., 2005; Palmer et al., 2003) and female gender (e.g., Brown et al., 1998) have been identified as risk factors for more severe cognitive impairment for youth with ALL or a brain tumor undergoing typical medical treatment. Notably, findings from longitudinal studies indicate that such deficits are the result of failure to keep up with age-appropriate skill trajectories rather than a loss of skills previously mastered (Palmer et al., 2003). Furthermore, youth exhibiting such neurocognitive deficits following cancer treatment are at an even greater risk for developing social, emotional and developmental problems (e.g., Aarsen et al., 2006).

Third, children suffering from chronic illness still experience all of the developmental changes associated with maturation, similar to other healthy children. In particular, emotional-behavioral responses and cognitive-developmental maturity are becoming more complex during these formidable years (e.g., Fields & Prinz, 1997) in addition to stressors associated with their illness. As such, accurate assessment of their distress and symptomatology must consider the developmental stage of the child. Young children in the stages of infancy through preschool have not yet developed the cognitive capacity to fully understand their illness and its implications. For them, medical procedures can be painful and very frightening, which can lead to the development of new fears and phobias. Baum and Baum (1989) noted that fears of separation and abandonment can also develop due to prolonged stays in an unfamiliar hospital setting and disruption of their daily routine.

Comparatively, afflicted children in their school-aged years must deal with the additional difficulties associated with their social development. Because of their illness, these children often experience a disruption in their school attendance, a significant decrease in opportunities to engage in peer activities, and an interruption in their academic studies.   The physical ramifications of their disease (e.g., hair loss, jaundice, weight loss, etc.) also become more apparent for these children (Baum & Baum, 1989), which further fuels their sense of isolation from peers. Individuals in the adolescence to young adulthood developmental stages face similar difficulties as school-aged children. Social relationships remain an important part of their growth and development, which is greatly affected by their disease. Nichols (1995) noted the significance of social support, which was found to be associated with engaging in more positive coping techniques among adolescents diagnosed with cancer. However, individuals in these stages must also cope with the added challenges associated with their cognitive maturity. In particular, while they are more likely to understand the full implications of their disease, positive adaptation is dependent on their ability to employ cognitive coping strategies in the face of challenging circumstances (e.g., Fields & Prinz, 1997).

In addition to the importance of developmental stages with regards to accurate assessment among these children, repeated assessments throughout the course of the illness are also imperative. Kupst and Bingen (2006) specified the differences in response and adaptation style in reference to disease stage among children with chronic illness and their families. Specifically, at the time of initial diagnosis, families often report a sense of shock and feeling

overwhelmed (e.g., Kupst, Patenaude, Walco, & Sterling, 2003) in addition to grappling with thoughts of blame (Eiser, Havermans, & Eiser, 1995). Additionally, children have not yet had the opportunity to become accustomed with the procedures associated with their illness (e.g., having blood drawn, lumbar punctures, etc.) along with adverse side effects, and therefore can react negatively. Findings from the current study also underscore resilience of this population. Repeated assessment can determine whether initial distress levels have remitted or have been exacerbated across disease stages. Finally, when possible, input from multiple informants is also proposed. While youth are capable of reporting on their PTSS, research supports the utility of collecting information from multiple informants, including youth self-report, parent-report, teacher-report, and clinician observation (Ferdinand et al., 2003). Such informants can uniquely contribute to a more accurate diagnostic impression and therefore determination of appropriate treatment services.

Intervention process. As previously stated, there is clear evidence to support the occurrence of PTSS among not only the individual child but also family members. Utilizing a traumatic stress framework to conceptualize the impact of pediatric cancer can help inform clinical care and its effectiveness. PTSS can also develop at varying points in the disease process.   In the acute phase of the PMTS Model (Kazak et al., 2006), health care providers can understand and appreciate such a conceptualization in the medical setting. Yet, the ongoing and longer-term psychological needs of this population are not typically conceptualized from a traumatic stress framework. The proposed framework, along with findings from the current study, supports Kazak's PPPHM (2006) to determine the level of service need. Specific to intervention approaches, it also supports Kazak and colleagues' (2006) PMTS model, which identifies the focus of intervention services for identified families. This model build on knowledge from both the pediatric psychology and traumatic stress literature, emphasizes the child's and family's experiences of the medical traumatic event, and highlights the importance of the timing of intervention services with regard to the progression of disease stages.   Readers are referred to the section entitled "Pediatric Medical Traumatic Stress (PMTS) Model" of the "Introduction" (pp. 20-23) for a detailed review of recommended intervention foci given varying phases of the disease and medical treatment process.

Findings from the current study also support the inclusion of adaptive coping strategies, a key component in trauma-informed CBT interventions, as a treatment component. Indeed

utilization of adaptive coping strategies may even serve as a buffer against the development of chronic psychopathology (Schmidt, Peterson, & Bullinger, 2003). It is also proposed that a trauma-informed intervention address barriers to both medical and mental health treatment. This could be particularly useful for those experiencing PTSS given the ubiquity of treatment avoidance and higher treatment drop-out rate. It is also recommended that intervention services for a pediatric oncology population be provided by clinicians in an outpatient Pediatric Psychology clinic, ideally located within the hospital where the child frequently receives medical treatments and follow-up care. When possible, treatment sessions should overlap with scheduled hospital visits to ease the burden on families (e.g., travel, time commitment, etc.) and potentially increase mental health treatment participation.

In support of a family-oriented treatment. The proposed framework also advocates for intervention services for pediatric oncology patients that involve the family unit. While the current study's intervention (i.e., TF-CBT) did not include siblings, several parent participants informally reported mental health difficulties among medically healthy siblings (e.g., eating disorder, increased externalizing behavior). In clinical practice, a family systems approach conceptualizes behavior as being at a broader level than simply the individual. While this approach can be applied to a wide range of issues, the underlying premise is that families are dynamic and interactive with shared experiences and history, and therapeutic change occurs at this broader family level (Kazak, Simms, & Rourke, 2002), whether it be change following a traumatic event or diagnosis of pediatric cancer. Theoretical underpinnings of a family systems approach following a trauma include attention to individual factors, relational issues, and the family as a unit, all of which are interrelated (e.g., Walsh, 2007). Mendenhall and Berge (2010) point out that treatment from this approach must be sensitive to

> …inter-member processes that are related to increased stress in the context of disaster (e.g., family conflict, over-functioning/under-functioning patterns) and trauma work, as well as opportunities to foster and push positive relational and family dynamics in both acute and long-term phases of support. (p. 45).

Researchers have begun to formulate a family systems perspective given literature and findings pertaining to a pediatric oncology population. For instance, Kazak and colleagues (2004) SCCIP intervention protocol included parents and found noteworthy reductions in

fathers' arousal symptoms. As well, utilization of effective, family-specific interventions aimed at psychosocial difficulties has been found to reduce extended or frequent hospitalizations, which is advantageous for both the family and the hospital (Aoki, Sato, & Hosaka, 2004). Likewise, Kazak, Simms, and Rourke (2002) proposed a therapeutic triad that characterizes this perspective, namely joining the afflicted child, family and health care team to facilitate positive outcomes. Thus, while both fields of child trauma and pediatric psychology recognize the intuitive need of incorporating multiple family members in their interventions, it has not yet been fully accomplished in practice; the majority of interventions are individual-based. Nevertheless, these findings clearly point to the importance of conceptualizing pediatric chronic illness from a multifaceted, family systems perspective; this could lend valuable information for effective interventions for families experiencing pediatric chronic illness. Findings from the current study also lend some support to this perspective given the involvement of parents in TF-CBT, some noteworthy reductions in parental PTSS, and informal reports of sibling distress.

Practical Considerations for Research and Service Provision

As previously indicated, cognitive-behavioral interventions have shown to be efficacious for trauma-related mental health sequelae in both adults and children. Pediatric medical traumatic stress is an emerging area of research, with initial research only dating back to the mid- to late-1990's (e.g., Kazak et al., 1999). As such, there is much less known about the effects of trauma-informed cognitive-behavioral interventions for this population. What research has shown is that this population demonstrates similar service provision barriers observed in more traditional trauma-exposed populations. Specifically, symptoms of avoidance are problematic for both research and clinical intervention as these individuals may either refuse participation or withdraw prior to treatment completion. This is especially problematic in research given that sound methodology requires assessment of PTSS and broad ranging symptoms prior to service provision. Through this assessment process, families with higher distress may become avoidant, as a function of their symptomatology, and ultimately withdraw from the study. This was observed in the current study, namely that they two families with the highest endorsement of PTSS and related distress at enrollment withdrew from the study. Additionally, low participation rates among this population have also been problematic. For instance, Lutz Stehl and colleagues (2009) examined the effects of a psychological intervention among pediatric oncology patients and their parents shortly after diagnosis (i.e., at a time when distress levels are likely to be at

their highest, approximately 4-6 weeks following diagnosis) and obtained a 23% participation rate. Again, this study also found differential attrition rates for the treatment group, compared to the control group. Moreover, these phenomena not only make it quite difficult to make inferences about treatment effects among individuals most in need, it also highlights the obvious problem of clinical service provision of highly distressed families.

The following suggestions are offered as considerations to potentially combat these barriers. First, it may be beneficial to incorporate a "pre-intervention" component where validation, normalization, and basic information provision regarding families' distress levels (e.g., acknowledging the tendency to want to avoid talking about their fears, memories, etc., and informing families of the therapeutic benefit of doing so) are provided either prior to or at the same time as initial assessment. Second, given that high levels of initial distress shortly after cancer diagnosis are predictive of longer-term adjustment, it makes sense to intervene early on in the treatment process. Yet, they appear to be least likely to avail themselves to treatment (e.g., compared to patients in remission). It makes sense to consider incorporating psychological evaluation and intervention into their overall treatment plan. That is, a joining of medical treatment with psychological treatment, offered together as standard care, may be necessary. This point also underscores ethical considerations, namely providing appropriate care to those who need it most. Third and specific to research, evaluation of psychological interventions among pediatric medical traumatic stress populations may not lend itself to RCT methodology given the aforementioned barriers, despite being considered the "gold standard." As an alternative, Drotar (2010) supports research utilizing single subject designs and clinical case reports to evaluate and document intervention effects among pediatric populations.

Additional Challenges in the Field

While not meant to be exhaustive, key challenges currently faced by the field are noted. Inherent in research and clinical service with all trauma-exposed populations, unusually high treatment attrition of those experiencing greater distress is concerning. Research shows that the avoidance cluster of PTSD is primarily responsible (e.g., Kazak et al., 2004). That is, individuals' desire to avoid potentially distressing thoughts and memories impedes the likelihood of them participating in treatment that focuses on such thoughts/memories. This challenge was clear in the current study with those families in most distress, including highest rates of PTSS,

ultimately withdrawing from the study. Again, this challenge underscores the need to sensitively approach avoidance symptoms, and more generally, the importance of effective treatment induction strategies.

Another challenge inherent in the EBP movement is dissemination and use of empirically supported interventions in real-world clinical settings. Connor-Smith and Weisz (2003) identified barriers to the real-world implementation of ESTs, including strict adherence to manualized treatments, treating comorbidity and other relevant psychosocial issues, and maintaining the therapeutic alliance. Notably, authors of TF-CBT emphasize a flexible approach to the provision of its intervention components. That is, while they offer specific treatment components to be used in order (i.e., P.R.A.C.T.I.C.E. acronym), session by session outlines are purposefully omitted. Such flexibility among intervention approaches might lend itself to improved dissemination and use in a clinic setting.

Research on family-based interventions within the field of pediatric psychology, to date, is limited. Many studies do not adequately meet the needs of the whole family but focus on each individual (Meyler, Guerin, Kiernan, & Breatnach, 2010). Several studies have attempted to evaluate the potential effectiveness of family-based approaches (e.g., Barakat et al., 2003; Lobato & Kao, 2005; Williams et al., 2003). Yet variability among studies has made it difficult to conduct a systematic review, and little is known about the pathways or mechanisms at work in such interventions (Woods, 2005). Logistical issues, such as cost-benefit ratios, resource utilization, methodological issues, and difficulty evaluating the overall impact, represent obvious challenges of a family-based intervention approach (Meyler, Guerin, Kiernan, & Breatnach, 2010). Nevertheless, the potential need and beneficial outcomes are evident.

Finally, McGrath Davis and Vuong (2005) also suggest continuity of care by the mental health professional, from medical diagnosis to intervention. Yet, this is challenging to achieve in a clinical health care environment given logistical issues, such as time-constraints, length of hospitalization stays, access to outpatient services, and potentially distinct roles of the Pediatric Consultation/Liaison and Outpatient Intervention service providers, all of which may affect rapport establishment and continuity of care. Despite these challenges, there are a number of fruitful areas of future research worthy of consideration.

Future Directions

Research has shown that the majority of children diagnosed with chronic illnesses, such as cancer, tend to report symptoms generally within normal limits and comparable to children without chronic illness (e.g., Soliday, Kool, & Lande, 2000). Despite these findings, there are other key issues to consider: First, chronically ill children do report an initial increase in psychosocial distress in the immediate aftermath of diagnosis. Second, parents tend to fare worse than their afflicted children with respect to distress and symptomatology, and PTSS in particular. Third, and most importantly, a small subset of children develop a broad range of symptoms and psychosocial distress that leads to functional impairment in their daily life. Given the chronic nature of their illness and medical treatment, a return to baseline functioning may prove even more difficult for these individuals. These reasons highlight the importance of a comprehensive framework for more accurately identifying those families at risk for mental health sequelae and the appropriate provision of intervention services. Future research aimed at evaluating models of care, such as the proposed framework, are needed given the difficulty inherent in identifying risk/resilience factors and underlying processes, on both an individual and family level, to more accurately determine level of need.

Finally, the recent initiative to publish single subject designs and descriptive case studies in the *Journal of Pediatric Psychology* is promising, particularly given challenges of RCTs (e.g., funding, resources needed, lack of heterogeneous samples and pediatric settings due to experimental control, etc.; Drotar, 2010). It is reasonable to suggest that such research will increase the field's knowledge of innovative and alternative interventions for pediatric populations, in addition to increasing publication of efficacy and effectiveness studies.