Examining the Effectiveness of Solution-Focused Art Therapy (SF-AT) for Sleep Problems of Children with Traumatic Experience

DISSERTATION

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Abstract

Many children experience traumatic events at a very young age, with some developing corresponding posttraumatic stress symptoms and sleep issues. The negative impact of these symptoms can be prolonged and sometimes irreversible in children and youth due to incomplete neurological, physiological and psychological development. Compared to adults, research has shown that children are more likely to develop posttraumatic stress disorder (PTSD) after experiencing a trauma. Although there are many effective evidence-based practices, there is a need for creative and complementary treatments emphasizing the nature and developmental level of the child population with stress- and sleep-related symptoms. In order to address this need, this dissertation conducted a pilot study that used randomized controlled trial with mixed methods research design to explore the efficacy of a Solution-Focused Art Therapy (SF-AT) intervention on treating PTSD and sleep symptoms among 41 school-aged children with traumatic experiences. SF-AT was built on several theoretical frameworks, including systems theory, neurosequential model, psychodynamic theory, and constructivism theory; and adopts solution-focused perspectives while using art activities as operational techniques and means of communication and expression. A detailed SF-AT manual was developed by the researcher with consultation of a group of experts in psychotherapy and intervention research.
Two-way repeated measure analysis of variance (RM-ANOVA) was conducted with comparisons between pre-post and treatment-control conditions to examine study outcomes using the Connecticut Trauma Screen (CTS), the Child Reaction to Traumatic Events Scale-Revised (CRTES) and the Sleep Self Report (SSR). An Applied Thematic Analysis (ATA) approach was used in order to explore the lived experience of SF-AT participation and perceived changes. Findings indicated that the SF-AT significantly alleviated PTSD and sleep symptoms, and is more effective than the control group on the CRTES and the SSR total score. Sleep behavior change, sleep time change, and daytime sleepiness change, partially mediated treatment effects of PTSD from pre- to post-treatment. Qualitative results from transcripts of twelve focus group participants showed that the SF-AT was enjoyed and recognized as useful by children. In addition, themes including general experience, perceived change, useful treatment elements, favorite activities, group format, therapeutic relationship and suggestions are presented.

Finally, detailed discussions of the study results on efficacy, mediation effect and lived experience; study limitations on sample, confounders, measurements, qualitative analysis, and fidelity; and implications for SF-AT treatment and for social work practice with traumatized children were discussed. Recommendations for future research and study conclusions were also presented.
Dedication

This dissertation is dedicated to those I love: my parents, my husband and my two cats.
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Chapter 1: Introduction

Although extensive research has been published regarding posttraumatic stress among the adult population, research regarding diagnosis of, and intervention for, posttraumatic stress in children has been understudied (Samuelson et al., 2010). Early studies related to posttraumatic stress disorder (PTSD) focused primarily on war veterans and victims of violent crime (Copeland et al., 2007; Ford, Fisher, & Larson, 1997). Subsequently, the diagnosis expanded to include trauma resulting from “natural disaster, serious illness, domestic violence and community violence” among the general population (Beimesch, 2009; Copeland et al., 2007; Turley & Obrzut, 2012). The most common belief in the past was that children did not develop PTSD whereas studies by Leonore Terr first demonstrated that children who survived kidnapping and other traumas exhibited PTSD symptoms (Terr, 1979, 1983; Dyregrov & Yule, 2006).

PTSD was first included in the Diagnostic and Statistical Manual of Mental Disorders (DSM) in 1980; however, no separate diagnostic criteria for children were included (American Psychiatric Association, 1980). In 1987, the American Psychiatric Association (APA) published criteria for the diagnosis of PTSD in children, in the DSM-III-R (1987). Subsequent research demonstrated that children are more likely to develop
PTSD than adults following trauma in the same environment and situation (Pfefferbaum et al., 2006). Studies have shown that approximately 15% to 43% of children have experienced at least one trauma during a one-year period (PTSD: National Center for PTSD, 2016). National studies have shown that 60% of children and adolescents report experiencing at least one traumatic event during the previous year, including physical abuse, property offenses, child maltreatment, sexual abuse, and witnessing violence or threats (Copeland et al., 2007; Finkelhor, Turner, Ormrod, & Hamby, 2009). In 2011, more than 600,000 children suffered from neglect (78.5%), physical abuse (17.6%) and sexual abuse (9.1%), according to reports submitted by government agencies regarding substantiated cases of child abuse (PTSD: National Center for PTSD, 2016). From 2011 to 2015, the number of substantiated maltreatment referrals increased by more than 16% (U.S. Department of Health & Human Services, 2017). Of those children who experienced trauma, as many as 15% of girls and 6% of boys develop PTSD (PTSD: National Center for PTSD, 2016). Gender differences are evident in both symptoms and diagnoses following trauma (Dyregrov & Yule, 2006). Girls are more likely to be diagnosed with PTSD, whereas boys are more likely to exhibit behavior symptoms that result in other diagnoses (Dyregrov & Yule, 2006; Green et al., 1991; Nemeroff, et al., 2006).

Traumatic experiences can negatively impact children’s mental health, physical health, and brain development in a profound way (Dyregrov & Yule, 2006). Although the
PTSD criteria for children applies to children under 6 in the *DSM-5*, older children should still be considered separately in research and treatment. Research has found that symptoms of PTSD in children after the age of 8-10 are similar to symptoms in adults (Dyregrov & Yule, 2006), and even a short period of posttraumatic stress reactions in children can delay normal development in a significant way without appropriate intervention (Dyregrov & Yule, 2006; Nemeroff, et al., 2006; Wethington, et al., 2008). The influences of trauma in children have been found to be detrimental in all physical, mental, behavior, personality, and social dimensions (Copeland et al., 2007; Terr, 2003). Children who have experienced trauma and extreme stress are more likely to have external behavior problems, mood issues, and school work failure (Samuelson et al., 2010; Wilson & Keane, 2004). Impaired development and lower overall functioning are common among traumatized children, and developmental delays can be sustained into adulthood (Cook, Blaustein, Spinazzola, & van der Kolk, 2003; Samuelson et al., 2010).

The relationship between sleep issues and the development and persistence of PTSD has been widely recognized in the past decades (Fan, Zhou, & Liu, 2016; Germain, McKeon, & Campbell, 2016). Sleep-related symptoms are commonly observed among children following a traumatic experience, and these symptoms may present as frightening/anxious dreams, re-experiencing of the event, being afraid of the darkness, and resistance to going to sleep or sleeping alone (APA, 2013; Germain et al., 2016; La Greca, Silverman, Vernberg, & Prinstein, 1996). Sleep disturbances appear to be the most
prevalent reaction to child abuse (Sadeh, 1996), and more than half of children who experience a terrorist attack suffer from sleep problems (Lavie, 2001). Sleep is essential for functioning and development in all human beings but especially for young children (Carno, Hoffman, Carcillo, & Sanders, 2003), and can significantly influence mental and physical health (Kheirandish & Gozal, 2006). Recent studies identify sleep issues as risk factors and predictors of PTSD (Fan et al., 2016; Germain et al., 2016), therefore, relieving sleep-related symptoms should constitute an important goal for trauma-focused treatment.

Since large numbers of children have experienced trauma and are at risk of many developmental concerns, researchers and practitioners should explore this mental health problem in a comprehensive and population-specific way. In order to prevent further development of PTSD, effective interventions for children with traumatic experiences have been investigated. For example, there is evidence that Trauma Focused–Cognitive Behavior Treatment (TF-CBT) is helpful for children with PTSD. However, the dropout rate with CBT is considered to be as high as 50% (Cohen, Mannarino & Iyengar, 2011; Schottenbauer et al., 2008). In addition, the literature shows that young children present with problems of avoidance, and have difficulty expressing experiences and emotions in words; they lack the fully developed, complex cognitive introspection that CBT may require (Rodenburg, Benjamin, de Roos, Meijer, & Stams, 2009). Another evidence-based practice that is recommended for symptoms associated with trauma is Eye
Movement Desensitization and Reprocessing (EMDR) (Rodenburg et al., 2009), which has been used for both adults and young populations. In a controlled and safe environment, EMDR helps to process dysfunctional cognition and negative affect associated with trauma through a series of stimuli during the treatment in order to create new healthy reactions (Maxfield, Melnyk, & Hayman, 2008; Rodenburg et al., 2009). However, EMDR involves trauma recall and stimulus, which raises concerns regarding potential negative effects such as intense re-experiencing of the traumatic memory, more emotional symptoms, as well as physical reactions to the treatment (Greenwald, 1994), that can be particularly problematic for a younger population.

Various modalities of treatment have been developed to treat sleep problems, which are a significant component of PTSD diagnosis. Although traditional psychotherapy typically does not fully consider the role of sleep issues or the importance of memory reintegration during sleep processes, Neurosequential Model of Therapeutics (NMT) is a treatment approach that more thoroughly addresses the needs of those experiencing sleep problems. NMT emphasizes the importance of taking developmental and neurobiological factors into account in therapeutic interventions. Consequently, the best intervention practices are not only integrative, convenient, creative, and developmentally-friendly, but they also include the NMT approach.

Solution focused brief therapy (SFBT) is an outcome-oriented and strength-based approach to psychotherapy that aims to find solutions to the problem (Berg &
The focus of this approach is solution-building that emphasizes empowering and utilizing existing strengths and resources rather than problem-solving, which aims to discover and address a problem (Berg & Steiner, 2003; Ginegerich & Eisengart, 2000; Sharry, 2007). SFBT emphasizes emotion expression and the therapeutic relationship by using creative techniques such as humor and playful interpretation, which have been found to be effective for children (Selekman, 1993). However, the large demand of verbal tasks required with SFBT does not fit the nature of young victims of trauma (Gantt & Tinnin, 2009). Thus, there is a need to implement SFBT in an alternative and creative way.

Utilizing art activities is a solution-focused approach that addresses sleep problems and posttraumatic symptoms together in a creative and developmentally appropriate way to treat children with traumatic experiences (Gantt & Tinnin, 2009; Oster & Gould, 1987). Art therapy (AT) is a creative, powerful healing tool for communication with visual assistance, and can be effectively integrated into the SFBT treatment model (Kelly, 2010; Malchiodi, 2003). AT, as operationalized in this dissertation refers to drawing and hand crafting as communication tools designed to promote the process of emotional expression, memory processing and solution finding. The integration of SFBT and AT takes into consideration the young population’s cognitive developmental level and provides a strengths-based, solution-building perspective for trauma healing. Thus, the intervention strategy designed for this study is Solution-Focused Art Therapy (SF-
AT. SF-AT is an intervention that adopts solution-focused perspectives while using art activities as operational techniques and means of communication. SF-AT, although not widely used at present, has gained popularity and has been proven to be effective for children and adolescents with psychological issues (Nims, 2007; Riley, 1999; Selekman, 2005).

Although SF-AT has been applied to various populations and mental health conditions, there is still a need for Randomized Clinical Control (RCT) studies to build evidence on its treatment effects (Bauer, Peck, Studebaker, & Yu, 2015; Franklin, Zhang, Froerer, & Johnson, 2017; Slayton, D'Archer, & Kaplan, 2010; Haire, 2009; Wethington et al., 2008). Outcome reviews of art-related treatments have suggested a need for more evidence and rigorous RCT studies (Bauer et al., 2015; Lyshak-Stelzer, Singer, Patricia, & Chemtob, 2007). Although sleep issues are common and important with PTSD, few researchers have studied the question of whether and how art therapy may reduce sleep problems for traumatized children. Specifically, there is a lack of RCT studies with mixed-methods design that have addressed this question (Campbell, 2010; Fan et al., 2016; Germain et al., 2016; Levrier et al., 2016; Miller, 2010). Furthermore, there is also a lack of research examining the mechanism between sleep-relief and other symptom-relief for mental disorders. This dissertation aims, by means of a rigorous study design, to capture the effects of SF-AT and the role of sleep as a mechanism of change among children with PTSD. SF-AT in this study was designed with reference to the following
theories and models: systems theory (Friedman & Allen, 2011); the neurosequential model of therapeutics; integration of multiple art-therapy approaches including psychodynamic and neurobiological perspectives (Malchiodi, 2011; Rubin, 2016). In addition, SF-AT relies heavily on the SFBT theoretical framework which emphasizes existing strengths and resources, a collaborative and empowering therapeutic relationship (Franklin, 2015; Kim, 2008a; Matto, Corcoran, & Fassler, 2003), together with strengths-based perspectives (Kim, 2008b).

**Research questions and hypothesis**

This study adopted SF-AT, which applies a solution-focused approach (Malchiodi, 2011) to art therapy to ameliorate sleep problems and other symptoms of posttraumatic stress in children. Based on a review of the literature, no study on SF-AT has been identified for traumatized children (Chapman et al., 2001; Malchiodi, 2011; Monti, et al., 2006; Miller, 2010; Odell, 2011), therefore this is a pilot study in this field. This intervention innovatively integrates art therapy and solution-focused therapy to facilitate traumatized children’s expression of feelings and experiences, and to find solutions for their posttraumatic sleep-related symptoms. The intervention involves creating visual pictures and handcrafts in order to express participants’ internalized fears, address underlying concerns, and identify solutions for their symptoms through a positive therapeutic relationship.
The purpose of this dissertation is to develop and examine an effective treatment model for children with traumatic experience and sleep disturbances by testing the efficacy of the SF-AT practice, and the importance of sleep in the underlying mechanism using a mixed methods approach. The study used a Repeated Measure Analysis of variance (RM-ANOVA) and a series of linear regressions to answer the following research questions:

1. Is SF-AT effective in relieving trauma symptoms for children with traumatic experience?
2. Is SF-AT effective in relieving sleep problems for children with traumatic experience?
3. Does SF-AT have better outcomes on both trauma and sleep than a treatment-as-usual control group?
4. Do sleep problems mediate the effectiveness of SF-AT on trauma symptoms?

The study hypotheses are as follows:

1. SF-AT will significantly reduce PTSD scores from pre-treatment to post-treatment;
2. SF-AT will significantly reduce sleep-problem scores from pre-treatment to post-treatment;
3. The SF-AT group will show superior treatment effects as compared to a control group on both sleep and PTSD.
4. Sleep problems significantly mediate the effect of SF-AT on trauma symptoms.

The study also used Applied Thematic Analysis (ATA) to explore the following research questions:

1. What is the experience of participating in SF-AT?
2. What do the participants think of the effect of SF-AT?

**Dissertation Organization**

This dissertation is organized as follows: Chapter 2 reviews background and current literature related to PTSD among children, identifies corresponding sleep problems associated with trauma, and describes SF-AT as an integration of Solution Focused Brief Therapy and Art Therapy; Chapter 3 introduces relevant theoretical frameworks and concepts for the intervention development and treatment mechanism; Chapter 4 describes research methodology including sample, measurements, study design, analysis of quantitative and qualitative data, and fidelity; Chapter 4 presents results of the dissertation; and Chapter 5 discusses the study results, provides the implications and limitations of the study, suggests directions for future work, and draws conclusions.
Chapter 2: Review of Literature and Theories

Children are common victims of trauma, and they suffer the symptoms of posttraumatic stress (Samuelson et al., 2010). Sleep problems for children with traumatic experience are a secondary but widespread symptom of PTSD (Kovachy et al., 2013). Studies have identified sleep disturbances including nightmares, insomnia, and parasomnias as risk factors and predictors for the development and persistence of PTSD (Fan et al., 2016; Germain et al., 2016; Levrier et al., 2016). There are several evidence-based behavioral practices for PTSD on children, including TF-CBT, EMDR, play therapy, art therapy and so on. SF-AT have gained its popularity and attention due to its unique and innovative therapeutic approach, perspective, technique and format. Models and theories have supported the importance of sleep on treatments of PTSD on traumatized children and the efficacy of SF-AT. Thus, this chapter reviews the background and current literature related to PTSD symptoms among children, identifies corresponding sleep problems associated with trauma and its importance, summarizes established evidence-based practices for PTSD treatment, and presents theoretical and conceptual framework of SF-AT.
2.1 Diagnoses and Statistics of PTSD

PTSD is a mental disorder in which a person displays characteristic psychological symptoms after experiencing traumatic stress or witnessing traumatic events. PTSD may be diagnosed after a person (1) directly experiences or witnesses one or more traumatic events such as actual or threatened death, serious injury, or sexual violence; (2) knows that traumatic events happened in a familiar place or to a close friend or relative, or (3) is repeatedly exposed to details of a traumatic event (APA, 2013). PTSD was first recognized as an established diagnosis in the *DSM-III* in 1980, and changes were made several times thereafter (APA, 1980, 1987, 2000). PTSD is currently under the classification of trauma- and stressor-related disorders in *DSM-5*, but was classified under anxiety disorders in the previous *DSM-IV* version (APA, 2000, 2013).

Symptoms of PTSD include: (1) intrusive symptoms associated with traumatic events, such as memories, flashbacks, distressing dreams, intense psychological distress and reactions; (2) persistent avoidance behaviors toward internal and external stimulus such as memories, thoughts, feelings, places, and people; (3) negative cognitions and moods, such as loss of memories and interests, pessimistic thoughts, inability to feel positive feelings, and detachment; and (4) obvious alterations in arousal and reactivity, such as sleep disturbances, emotional control issues, concentration issues, exaggerated reaction and hyper-vigilance (APA, 2013). Symptoms usually start appearing within three months of the original traumatic event. Among children, the event details and associated
memories may be re-experienced during play or dreams (APA, 2013). The required time duration of the above symptoms in order to receive a PTSD diagnosis is more than one month for people older than six years. Children who are six years old or younger have different diagnostic criteria; those criteria are not discussed in this study, in which the target population is limited to children 7 to 12 years old who have received a diagnosis of PTSD.

During the early years of research and intervention regarding PTSD, this disorder was studied mainly among two populations: war veterans and victims of major criminal violence, due to the high numbers of people suffering the effects of trauma sustained due to war, terrorism, and violent crimes (Copeland et al., 2007; Ford et al., 1997). Later, the diagnosis widened its scope to victims of “natural disaster, serious illness, domestic violence and community violence” among the general population (Beimesch, 2009; Copeland et al., 2007; Turley & Obrzut, 2012). When PTSD was first introduced in DSM-III in 1980, there was no specific classification of the child population, and none was included until 1987 in DSM-III_R (APA, 1980, 1987). The prevalence of PTSD among young children has not been fully appreciated until recently (Samuelson et al., 2010). It was once believed that children are not affected by traumatic experiences, though later it was recognized to be an incorrect assumption (Samuelson et al., 2010). In fact, research has shown that children are more likely than adults to develop PTSD in a similar environment or situation (Pfefferbaum et al., 2006). PTSD can occur at any time.
period of life, even in infants older than one year (APA, 2013). Approximately 15% to 35% of children have experienced a trauma; among those who have had a trauma, as many as 15% of girls and 6% of boys develop PTSD (PTSD: National Center for PTSD, 2016). Statistics from several study samples have shown that more than 60% of children and adolescents have experienced at least one traumatic event during the course of the reporting year, including physical abuse, property offenses, child maltreatment, sexual victimization, and witness violence or threats (Copeland, et al., 2007; Finkelhor et al., 2009).

The lifetime prevalence of PTSD in American adult patients is nearly 7% (Kessler et al., 1995, 2005). There is currently no national data about the exact prevalence of PTSD among the child population. However, there is a recent study using the Great Smoky Mountains longitudinal data to examine prevalence of high-risk children with external problems. The prevalence of PTSD among children aged 9 to 16, according to the study, was 0.5% (Copeland et al., 2007). Not all people who experience traumatic events will develop PTSD. Among children who have experienced traumatic events, more than 10% developed symptoms of posttraumatic stress (Copeland et al., 2007). Among all the traumatic events experienced by the child population, physical/sexual abuse and violence are the events most likely to lead to posttraumatic stress symptoms (Charuvastra & Cloitre, 2009; Copeland et al., 2007). Among children who have been maltreated, those receiving a PTSD diagnosis ranged from 20% to 50%, with children
experiencing both sexual and physical abuse showing the highest rates (Ackerman, Newton, Mcpherson, Jones, & Dykman, 2008; Charuvastra & Cloitre, 2009). Multiple exposures to trauma, previous anxiety/depression disorder, and family adversity are risk factors for PTSD (Copeland et al., 2007). According to Turley and Obrzut (2012), children who live in a stressful environment or community are more likely to develop PTSD.

2.2 Comorbidities and Developmental Impacts

Comorbidities of PTSD are common. Within the general population, PTSD is considered to be a high comorbidity rate disorder. In the 1990s, researchers reported that 60% to 90% of people with PTSD have another DSM diagnosis (Breslau, Davis, Andreski, & Peterson, 1991; Davidson, Hughes, Blazer, & George, 1991; Shore, Vollmer, & Tatum, 1989). The most common associated psychiatric comorbidities for PTSD are anxiety and depressive disorders (Copeland et al., 2007; Kessler et al., 2005; Kessler, Lane, Shahly, & Stang, 2012; Thabet, Abed, & Vostanis, 2004). Other high-correlated comorbidities are obsessive compulsive disorder (OCD), substance abuse, seasonal affective disorder (SAD), oppositional defiant disorder (ODD), and attention deficit hyperactivity disorder (ADHD) (Kessler et al., 2005; Wilson & Keane, 2004). Although the symptoms and features in children are different from those in adults, comorbidities are still an issue for children with PTSD (APA, 2013). Because brain development occurs from infancy through late adolescence, trauma can be more invasive
and influential for children than for adults. According to a report from the U.S. Department of Health & Human Services in 2017, trauma is one of the leading causes of death for children. PTSD can become a chronic, lifetime issue, with relapses (Deblinger, Lippmann, & Steer, 1996; King et al., 2000; Samuelson et al., 2010).

Practitioners and researchers have discovered that school-age children (ages 6-13) are different from adult patients regarding some symptoms and neuropsychological changes in the body. School-age children experience “time skew” (i.e. mis-sequencing traumatic events during memory recall) and “omen formation” (i.e. a belief of warning/predictive signs for the trauma) rather than experiencing visual flashbacks or amnesia as adults do (PTSD: National Center for PTSD, 2016). Symptoms of PTSD in children may not present obviously. Instead, re-experiencing symptoms among children can be observed when they are playing, drawing or talking (Landreth, 2002; Wethington et al., 2008; Piaget 1973; Roussou, 2004).

Children who have experienced trauma and extreme stress usually have development issues and lower overall functioning because of the interactive negative effects of stress and neuro-bio-psychological responses (Cook et al., 2003; Samuelson et al., 2010). They are more likely to have external behavior problems, mood issues, and failure in school work (Samuelson et al., 2010; Wilson & Keane, 2004). In a survey with a large sample of 1,700 children in 25 various communities, the children with traumatic experiences were reported to have impairments in several domains such as attachment,
neurobiological system, affect regulation, dissociation, behavioral control, cognition and self-concept (Cook et al., 2003).

Although the results of research regarding cognitive impairments are inconsistent across numerous studies, some researchers have found significant cognitive impairments in attention, verbal intelligence, learning, memory and executive functioning among children with PTSD (Samuelson et al., 2010; Turley & Obrzut, 2012; Yasik, Saigh, Oberfield, & Halamandaris, 2007). A recent study found that information learning by children with PTSD is slower and less effective than in the child population generally. Traumatized children exhibit verbal learning/functioning deficits such as being unable to generate a cohesive narrative about traumatic events (Samuelson et al., 2010). The major deficit occurs with information learning, but not with retrieving, which means the impairment areas are at the frontal lobe of the brain.

Although cognitive functioning deficits are believed to be associated with prolonged damage caused by PTSD, some researchers propose that the deficits are preexisting characteristics that constitute risk factors. Cognitive functioning deficits such as verbal learning and memory deficits among children are considered to be preexisting risk factors of developing PTSD by many researchers (Gilbertson et al., 2006; Samuelson et al., 2010; Vasterling et al., 2002, 2010). These verbal functioning deficits among young children may result in difficulty in organizing a cohesive narrative to externalize the traumatic event into words in order to help with emotional issues. It is well known
that when an organism is facing a trauma or danger, the subsequent stress response reactions are part of the fire-up process within the involved body systems, which allow the focus of energy allocation for survival (Wilson & Keane, 2004). If children endure a long-term period of this hyperactive vigilance status, their normal functioning is impaired. Brain-body development, cognitive learning, emotional formation, and daily functions will be severely impacted. From a biochemical perspective, people with PTSD have hyperarousal symptoms and increased levels of cortisol as stress responses; the neurobiological change sets the human body in an alert fight-or-flight status, which will influence the attention to learning function (Samuelson et al., 2010).

Attention problems are common among children with PTSD. They are more likely than control groups to be distracted (Beers & De Bellis, 2002), to have difficulty with concentrating (Beers & De Bellis, 2002), to exhibit lower semantic organization ability (Benton, Hamsher, & Sivan, 1994), to lack understanding of abstract reasoning, and to present poor problem-solving skills (Beers & De Bellis, 2002). These attention deficits result in poor school performance and classroom-behavior issues that need to be considered by the teachers. The hypervigilance symptoms and abnormal brain functioning were found to result in children’s attention preference for negative trauma-related words and threatening stimuli (Moradi, Doost, Taghavi, Yule, & Dalgleish, 1999; Dalgleish, Moradi, Taghavi, Neshat-Doost, & Yule, 2001).
Secure attachment is formed at a young age when the parents responsively and appropriately meet the child’s needs and demonstrate the parents’ availability (Lieberman & Van Horn, 2011). Insecure attachment types (anxious and avoidant) are considered to be risk factors for developing many psychological disorders such as depression, somatization, and PTSD (Dieperink, Leskela, Thuras, & Engdahl, 2001). The quality of the early attachment-building relationship is highly associated with development of children’s cognitive functioning and social-emotional capability (Lieberman & Van Horn, 2011). Other than a risk factor, the attachment type can also be seen as a result of the trauma. If the parents are unavailable when trauma or danger occurs, or if they neglect the children’s emotional needs, or if the origin of danger comes from the parents (child abuse, domestic violence), children in these circumstance are more likely to develop an insecure attachment type. This insecure attachment as a risk factor will become an obstacle in the path of PTSD recovery. Therefore, interventions that can address child-parent communication and relationships in addition to addressing PTSD symptoms will be more effective in the long run.

2.3 Trauma associated neuro-bio-psychological approach

PTSD is directly related to traumatic experiences. However, the underlying cause of PTSD is complicated and undiscovered. This study employs a bio-psycho-social approach to illustrate the mechanisms behind PTSD symptoms, and possible causes of PTSD among the general population, specifically among children. PTSD symptoms are
abnormal reactions to stress. In order to understand this mental disorder in a deeper way, the understanding of normal human neuro-bio-psychological reactions to stress and traumatic events is necessary.

Bruce Perry (2008, 2009) constructed a neuro-sequential model to explain trauma and treatment mechanism. The neuro-sequential model is based on the belief that neurodevelopment starts from structurally simpler and lower brain areas (e.g. brainstem and diencephalon) that manage basic regulatory functions, rather than more complex and higher brain areas (cortex) that manage higher cognitive functions (Barfield, Dobson, Gaskill, & Perry, 2012; Perry, & Hambrick, 2008). The earlier developed areas have more neural circuits to widely communicate with other brain areas in order to send signals for further development (Perry, 2009). After experiencing trauma, the primary focus of the brain shifts from higher cognitive functioning (e.g., regulation of emotion, rationale, comprehension, communication) to more primitive lower functioning as a stress-reaction response (Perry & Hambrick, 2008; Van der Kolk, 2006). The communication between the bottom and top brain areas may be interrupted and disconnected (Perry, 2006; Perry & Hambrick, 2008). Neuroimaging studies have proven the existence of abnormal connectivity in several brain circuits among victims of trauma (Gantt & Tinnin, 2009; Sripada et al., 2012). Dysregulations of brain functionings and disconnections among brain areas are the causes of most mental health issues, particularly PTSD (Van der Kolk, 2006). The dysfunction can be ameliorated by utilizing
somatosensory interventions such as visual art therapy, music, and movement through regulated, repetitive inputs and patterned neural inputs to the brainstem and diencephalon (Perry, 2009). This model supports the framework of a bottom-up (i.e., lower brain to higher brain) model of treatment (Perry & Hambrick, 2008).

La Greca and his colleagues (1996) constructed a conceptual model of how to predict children’s reactions to natural disasters. The model has shown how children’s preexisting characteristics (e.g., ethnicity, personality, social economic status) play an important role in predicting their reaction to traumatic events. Together with the nature of the traumatic events and posttraumatic recovery environment, these preexisting characteristics are factors that can influence PTSD development. Wilson and Keane (2004) summarized PTSD development in a comprehensive psycho-biological perspective. When experiencing a traumatic event, organismic processes will activate several stress-response systems in the human body; these processes involve the central nervous system, sympathetic nervous system, neuroendocrine system, and serotonergic system. According to all of the automatic responses and reactions, behavioral adaptations are developed as an external response to the trauma such as dysregulated emotional problems, personality change, altered interpersonal processes, psychosocial impacts, comorbidity, physical health effects, life-course trajectory and recovery. With most people, after a period of time, the alerted and fired systems will return to a normal level and stabilize.
The important affected systems that are associated with PTSD and trauma are the central autonomic nervous system (Wilson & Keane, 2004), and the hypothalamic-pituitary-adrenal axis (HAP axis) (Vermittent & Bremner, 2002; Wilson & Keane, 2004). Once the brain receives signals from the outside world that there is a threatening event, the neurons in the nervous system release neurotransmitters to send messages telling the body to become ready and to alter itself (Wilson & Keane, 2004). The HAP axis is a reciprocal neuroendocrine process that controls the human response to stress. The HAP releases hormones from the brain to the kidney. The hypothalamus releases corticotrophin-releasing hormones (CRH) that stimulate the release of adrenocorticotropic hormones (ACTH) to the blood system; then ACTH stimulate the kidneys to release a major stress hormone—cortisol, which will increase metabolic energy to meet the demands of trauma (Wilson & Keane, 2004; Yehuda, 2002). If the stress response systems are inappropriately activated or last for an inappropriate amount of time, posttraumatic stress symptoms will occur (Wilson & Keane, 2004). Normally, after the threatening period, the fired-up systems can return to their resting levels (homeostasis), but some people develop dysregulated affective responses. The functioning roles of the hippocampus in the brain are involved in working, declarative, episodic and verbal memories (Gilbertson et al., 2006; Turley & Obrzut, 2012). Prolonged and extreme stress can cause damage to the hippocampal neurons (Vermittten & Bremner, 2002). Volume decrease of the hippocampus has been observed in both
animal and human studies by several researchers (Carrion et al., 2001; Gilbertson et al., 2002, 2006). A decreased volume of the hippocampus will cause impairment of verbal memories and episodic memory processing, which is commonly associated with nightmares and flashbacks (Vermetten & Bremner, 2002). The amygdala is an important brain structure that is associated with the emotion of fear (Vermetten & Bremner, 2002; Shin, Rauch, & Pitman, 2006). The amygdala plays an important role in emotion, learning, and memory, which will become activated especially during fear and fear extinction, as well as during the process of learning not to fear by appraisal and feedback (Karl et al., 2006; Wilson & Keane, 2004; Vasterling et al., 2010). The prefrontal cortex can store extinction memories and inhibit the initial stress response. In the middle part of the prefrontal cortex, social, emotion, and fear conditioning are associated with this area (Richert, Carrion, Karchemskiy, & Reiss, 2006). As an advanced, high-level processor, the prefrontal cortex will send messages via neurotransmitters to the other brain areas, especially the amygdala, about the stress situation, and then the amygdala will process fear-response reactions. Volume changes of grey matter in the medial prefrontal cortex have been detected among children with PTSD (Richert et al., 2006). Reduced volumes of prefrontal cortex have been observed in several studies (Vasterling et al., 2010; Vermetten & Bremner, 2002). This phenomenon may explain the abnormal changes of the social, emotional functions after developing PTSD and the inability to restrain the stress response system. The two hemispheres of the brain should be symmetric, with
there being a dominant brain side. However, in children with PTSD, the brain
hemispheres are found asymmetrical in the frontal lobes, especially in the areas
associated with recognition and emotion processing (Turley & Obrzut, 2012). Lack of
brain symmetry can lead to a high possibility of trauma appraisal and emotional
functioning problems (Turley & Obrzut, 2012). The asymmetry can also explain why
children with PTSD have verbal, intrusive and attention problems.

2.4 Sleep among children with PTSD

Study have shown that PTSD symptoms are significantly associated with sleep
disturbances (Krakow et al., 2001; Ross et al., 1994; Thabet et al., 2004). Sleep is
essential to the physical and mental health of all human beings, so reviewing the sleep
issues among traumatized children is, therefore, an essential component of PTSD
research (Lavie, 2001). PTSD patients have sleep-related symptoms of hyperarousal (i.e.,
sleep difficulties) and repetitive, stereotypical anxiety dreams (APA, 2013; La Greca et
al., 1996; Ross et al., 1994). Sleep problems and nightmares are frequently studied among
war veterans with PTSD (Golub, 1985; Morgan III, & Johnson, 1995; Lind, et al., 2016;
Moldofsky, Rothman, Kleinman, Rhind, & Richardson, 2016; Phelps, Varker, Metcalf, &
Dell, 2017; Thabet et al, 2004; Van der Kolk, Blitz, Burr, Sherry, & Hartmann, 1984).
Statistics show that 70% to 90% of adults with PTSD have sleep disturbances
(Akinsanya, Marwaha, & Tampi, 2017). Sleep issues among children with PTSD are also
prevalent and critical (Kovachy et al., 2013). It has been found that more than half of
children who experience a terrorist attack have sleep problems (Lavie, 2001; Lind, et al., 2016). Sleep disturbances appear to be the most prevalent reaction to child abuse (Sadeh, 1996).

Sleep problems among people with PTSD are manifested in sleep disturbances, nightmares, insomnia, and other sleep interference. Specifically, sleep problems among traumatized children may be presented in frightening or anxiety dreams, re-experiencing of the event, being afraid of the dark, resisting going to sleep, or refusing to sleep alone (APA, 2013). According to parents’ reports, anxiety dreams are of the most concern (Lavie, 2001). Dreams are considered as thoughts during sleep time; thus, traumatic experiences, memories and perceptions are processed in the form of dreams (Wilson & Keane, 2004). Among school-age children, the reasons for having difficulty falling asleep can be fear of the dark, fear of separation from their parents, lack of sleep hygiene or because of emotional issues (Carno et al., 2003). Specifically, because of the issues of fear acquisition and extinction, children with PTSD have a higher level of fear even in their resting status as compared to children without traumatic experience or children with traumatic experience but without developing PTSD (Carno et al., 2003; Bremner et al., 2005). Thus, the sleep issues among children with PTSD are more common and severe (Charuvastra & Cloitre, 2009).

Sleep and PTSD symptoms are reciprocally and interactively influenced (Krakow et al., 2001). Although traditional treatment is based on the belief that sleep disturbances
can be relieved through regular PTSD treatment, increasing evidence shows the reverse: that relieving sleep symptoms is a key element of treatment for PTSD (Kovachy et al., 2013; Ross et al., 1994). Studies have found that improvement of sleep can actually promote recovery from other PTSD symptoms (Charuvastra & Cloitre, 2009), which means that better sleep can initiate the recovery process. Regulation of emotion and memory extinction processes during sleep may play a very important role during PTSD treatment. Understanding and preventing the dysfunctional rapid eye movement sleep mechanism were suggested to be a significant approach in treatment design for PTSD (Ross et al., 1994). Although the mechanisms still need to be further explored, it has been found that lack of adequate sleep is a pathway from trauma to PTSD (Kovachy et al., 2013).

Sleep is crucially important for human functioning and development, especially for young children (Carno et al., 2003). Sleep problems have prolonged impacts on adolescents that may last through adulthood. According to one study that reviewed the neurocognitive dysfunction in children with sleep problems, sleep is directly related to brain activity and neurocognitive development in children (Kheirandish & Gozal, 2006). Thus, sleep problems may directly cause emotional instability, memory deficit, behavior problems, and other cognitive dysfunctions (Kheirandish & Gozal, 2006). During sleep, the hippocampus encodes and consolidates episodic memories into long-term memories (Levin & Nielsen, 2009). Dreaming is a process of traumatic memory integration and fear
extinction, whereas having nightmares means interruption of the process (Levin & Nielsen, 2009). Abnormal dreaming indicates failure of emotion regulation and fear extinction; thus, sleeping well and dreaming well will help the process of reintegration of the traumatic memory, which is essential for PTSD treatment. Brain regions and systems that are associated with sleep and PTSD are highly overlapped.

Levin, Nielsen and their colleagues (2007, 2009) have developed a comprehensive neuropsychological and emotional model called AMPHAC/AN. (Levin & Nielsen, 2007; Nielsen & Levin, 2007; Levin & Nielsen, 2009). The model is a framework to explain the mechanism of sleep disturbances and nightmares among people with PTSD. AMPHAC is an acronym for the following words: amygdala (A), the medial prefrontal cortex (MP), the hippocampus (H), and the anterior cingulate cortex (AC). The letters ‘AN’ represent the Neurobiological Aspect of the model. The AMPHAC system plays a role in emotion formation, expression, regulation, fear formation, extinction, episode memory and reintegration (Gilbertson et al., 2006; Levin & Nielsen, 2007; Levin & Nielsen, 2009; Nielsen & Levin, 2007; Turley & Obrzut, 2012; Vasterling et al., 2010; Vermetten & Bremner, 2002). The cognitive aspect of the model includes affect network dysfunction (AND). The AND explains the dream formation process, and how traumatic memories are transformed into dreams and images during sleep.

Because children’s sleep problems are usually associated with family environment and psychosocial developmental issues, many studies have used the
attachment theory to explain their sleep disturbances (Benoit et al., 1992; Bowlby, 1973 & 1998; Morrell & Steele, 2003). The attachment theory and psychosocial development theory explain how children’s early development, maternal attachment, and family stressors influence and interact with their emotional and behavioral performance including sleep (Benoit et al., 1992; Morrell & Steele, 2003). Attachment theory explains children’s anxiety and fear of separation at bedtime, which causes sleep disturbances and nightmares, and also reveals the importance of parental interaction and comforting before bedtime (Anders, 1994). Researchers believe that difficulty to initiate and maintain sleep among children is caused by many attachment and family issues including insecure maternal attachment, child temperament, parental psychopathology, and stress (Anders, 1994; Morrell & Steel, 2003). Poor experiences of attachment from caregivers, such as child abuse and domestic violence, have proven to be a risk factor in children’s sleeping problems and have a long-term impact (Benoit et al., 1992; Morrell & Steel, 2003). On the other hand, evidence also shows that young patients with sleep problems are found more likely to be insecurely attached to their mother (Mrazek, Casey, & Anderson, 1987). Interactively, trauma or domestic violence might affect the relationship between the child and parents, in that trauma or violence may prevent the child from expressing emotions about the traumatic experience in order to regain the feeling of being safe and secure. The consequent lack of feeling safe and secure will then negatively impact sleep. In summary, issues with attachment and relationships between children and their
parents/caregivers is a factor that needs to be addressed during the therapeutic process in order to enhance communication, emotional expression, healing, a sense of safe environment, coping skills, and positive outcomes. Sleep problems result from the combined effect of biological, psychological and social factors. Sleep and PTSD symptoms are reciprocally, interactively influenced. Regarding treatment interventions, handling sleep problems and dreams are an essential component of treating PTSD (Lavie, 2001). Medications are commonly used to alleviate sleep problems of children of PTSD (Akinsanya et al., 2017). Sleep problems should be treated independently and specifically, not only as a byproduct of a PTSD intervention. Behavioral treatments that include consideration of sleep disturbances are needed for the child population with PTSD.

2.5 Treatments for PTSD

2.5.1 Trauma-Focused Cognitive Behavior Therapy (TF-CBT).

CBT is a behavioral model of therapy that was derived from psychological learning theories of perception and information-processing (Payne, 2005). CBT, as a developmental and integrative model of several theories, contains two major parts: social learning theory and cognitive theory (Payne, 2005). CBT, as a treatment intervention, is a process of recognizing people’s maladaptive thoughts and patterns, which maintain problem behaviors and negative emotions, to achieve behavioral changes and alleviation of emotional pain (Payne, 2005; Cully & Teten, 2008). The main components of CBT are
the stimulus-response pattern, operant conditioning, learning that the stimulus-response pattern is helplessness, social learning and modeling, and cognitive factors such as disorders of perception or attribution and catastrophic thinking (Payne, 2005). Scott and Dryden (1996) classified cognitive-behavior therapies into four categories: coping skills, problem-solving, cognitive restructuring, and structural cognitive therapy. CBT has superior advantages compared with pharmacotherapy in both long-term effectiveness and physical side effects (Swift et al., 2012). From a behavior and cognitive approach, CBT has no side effects, whereas medication can cause side effects.

A special CBT approach that was designed particularly for trauma-related issues is known as Trauma-Focused CBT (TF-CBT). TF-CBT is one of the most popular treatments designed to meet the psychosocial needs of people with PTSD or trauma-related problems by combining trauma-sensitive interventions with cognitive behavioral therapy (Child Sexual Abuse Task Force and Research & Practice Core, National Child Traumatic Stress Network, 2004). The major components of TF-CBT consist of trauma exposure, cognitive processing and reframing, stress management, and parental treatment (Cohen, Mannarino, Berliner, & Deblinger, 2000). In many rigorous studies, the treatment has been proven to be one of the most effective treatments for a variety of populations, especially children and their non-offending parents or primary caregivers (Child Sexual Abuse Task Force and Research & Practice Core, National Child Traumatic Stress Network, 2004; Cohen & Mannarino, 1997; Deblinger et al., 1996;
Deblinger, Stauffer, & Steer, 2001; Polak et al., 2012). TF-CBT was originally designed for, and most widely used with, treating victims of sexual abuse; however, it has also been used widely for various other traumas such as grief, domestic violence, disasters, terrorism, and multiple traumatic events. TF-CBT can significantly reduce major PTSD symptoms as well as anxiety, depression, dissociation, and behavioral problems, as well as significantly improve interpersonal relationships and social competence (Child Sexual Abuse Task Force and Research & Practice Core, National Child Traumatic Stress Network, 2004; Cohen, Deblinger, Mannarino, & Steer, 2004; Cohen & Mannarino, 1997; Deblinger et al., 1996, 2001). TF-CBT can be used for a wide age range of children, from 3 to 18 years old, because therapists can individualize the treatment plan for each case according to specific needs and situations (Child Sexual Abuse Task Force and Research & Practice Core, National Child Traumatic Stress Network, 2004; Jessiman, Hackett, & Carpenter, 2017).

Although TF-CBT has contributed significantly in the treatment of children with trauma-related issues, disadvantages have been noted regarding this well-developed intervention. Because children with PTSD usually have cognitive deficits such as lack of abstract reasoning, learning, concentration, and poor semantic organization ability (Beers & De Bellis, 2002; Benton, Hamsher, & Sivan, 1994), interventions that require high cognitive processing and information acquisition will be difficult for them. Consequently, the effectiveness of CBT is likely diminished where a child’s cognitive
capacity is insufficient for full and articulate participation in the treatment process. Another limitation of TF-CBT is the relatively high drop-out rate and low retention rate which are common issues of trauma-related interventions with children (Cohen et al., 2011; Imel, Laska, Jakupcak, & Simpson, 2013; Schottenbauer et al., 2008). A meta-analysis shows that exposure-based treatment such as TF-CBT has the highest dropout rate (33%) (Bradley, Greene, Russ, Dutra, & Westen, 2005), whereas the average dropout rate is 20% for all PTSD clinical treatments (Imel et al., 2013). The dropout rate for TF-CBT can be as high as 50% in some studies (Cohen et al., 2011; Schottenbauer et al., 2008). This high dropout rate may be caused by the mismatch between high cognitive processing requirements of CBT and deficient cognitive development of children with PTSD (Rodenburg et al., 2009). Literature has shown that young children lack the fully developed, complex cognitive introspection that CBT may require (Rodenburg et al., 2009). Another potential cause of the low retention rate during TF-CBT may be associated with the key component: trauma exposure (Imel et al., 2013; Hembree et al., 2003).

2.5.2 Eye Movement Desensitization and Reprocessing (EMDR)

EMDR is another evidence-based practice recommended for mental health issues associated with trauma for both adults and adolescents. Along with CBT, EMDR has been proven to be an effective and safe therapy for children and adolescents with PTSD (Rodenburg et al., 2009). As noted previously, memory integration and reprocessing may
be interrupted by acute stress reactions in some people (Levin & Nielsen, 2009). Particularly for children, the integration and reprocessing recovery procedures can be impeded by the avoidance behaviors and thoughts, as a consequence, the corresponding recurring and intrusive symptoms are further developed. The purpose of EMDR is to desensitize the traumatic event, and involves reprocessing the traumatic memory in a controlled way with a trained therapist to reduce affective distress and physiological arousal resulting from recall memories of the trauma or external triggers in the environment.

Meta-analysis has shown promising treatment effects for people with PTSD. However, there are still concerns about the use of EMDR among the child population, especially with regard to potential side effects. The process involves trauma recall and trauma stimulus, which can generate negative effects such as intense re-experiencing the trauma, increased emotional symptoms, or even physical reactions to the treatment (Greenwald, 1994). Thus, EMDR may not be safe with younger population.

2.5.3 The Neurosequential Model of Therapeutics (NMT)

Bruce Perry and his team (2008) developed a therapeutic model for children, known as the Neurosequential Model of Therapeutics (NMT). It is a “developmentally sensitive, neurobiologically informed approach to clinical work” (Perry & Hambrick, 2008, p 39). The NMT is not a specific intervention or technique. Instead, NMT can illustrate a comprehensive picture of the child’s problem by considering
neurodevelopment and traumatology factors into assessment and treatment. As reviewed previously, the Neurosequential model is based on the belief that neurodevelopment starts from structurally simpler brain areas rather than more complex brain areas (Barfield et al., 2012; Perry, & Hambrick, 2008). The earlier developed areas have more neural circuits to widely communicate with other brain areas (Perry, 2009). Stress-reaction responses (e.g. hypervigilance) usually result in a focus shift of the brain function from higher cognitive functioning to more primitive (Perry & Hambrick, 2008; Van der Kolk, 2006). Thus, as the persistence of the stress-reaction responses, the communication and cooperation between lower and higher brain areas may be interrupted and disconnected (Perry, 2006; Perry & Hambrick, 2008). Dysregulations or disconnections of brain functioning are the reasons for most mental health issues, particularly PTSD (Van der Kolk, 2006). The dysfunction can be ameliorated by utilizing somatosensory interventions such as visual art therapy, music, and movement through regulated, repetitive inputs and patterned neural inputs to the brainstem and diencephalon (Perry, 2009). In order to better understand current functioning within a developmental perspective, the model generates a functional brain map to help therapists to visualize the developmental history and risk of a child. The map can help with the intervention and therapeutic technique development (The Childtrauma Academy, 2012). Specific interventions such as play therapy and art therapy (Barfield et al., 2012; Malchiodi &
Crenshaw, 2015) can integrate the treatment model into the existing techniques and format.

2.5.4 Play therapy

Play therapy has been used for many decades as an important element of interventions with children. Play is a non-threatening and engaging way to work with children. Post-traumatic play is an intervention used for school-aged children who have experienced trauma (Axline, 2012; Bratton, Ray, Rhine, & Jones, 2005). It enables reenactment aspects of traumatic events in a flexible, creative way (Bratton, et al., 2005; Meany-Walen & Kottman, 2017; Meany-Walen, Kottman, Bullis, & Dillman, 2015). According to the DSM-5, children older than six may have repetitive play with themes or aspects of the traumatic event during playtime. Play therapy is considered a creative way to help children with trauma to express their feelings and externalize the traumatic experience (Landreth, 2002; Wethington et al., 2008). However, based on a meta-analysis study, play therapy is found to achieve desired effects in a long treatment period (Bratton, et al., 2005; LeBlanc & Ritchie, 2001; Malchiodi & Crenshaw, 2015). In order to achieve the maximum treatment effect, the length of the intervention should be 30 to 40 sessions (Bratton, et al., 2005). Studies demonstrate the particular effectiveness of play therapy for children’s behavioral, social and personality problems (Bratton, et al., 2005; Meany-Walen et al., 2015; Meany-Walen & Kottman, 2017). Other than the need for a long treatment period, the validity of the study is identified as a limitation (Bratton, et al.,
Researchers of play therapy studies have usually failed to provide a clear and detailed treatment process. The reason for this may be that treatment techniques are highly differentiated from therapist to therapist across cases (Bratton, et al., 2005).

2.5.5 Art Therapy

Art therapy is a “modality of psychotherapy that uses the visual creative process for healing” (Kelly, 2010; Malchiodi, 2003). The American Art Therapy Association defines art therapy as “a mental health profession in which clients, facilitated by the art therapist, use art media … and the resulting artwork to explore their feelings, reconcile emotional conflicts, foster self-awareness, manage behavior and addictions, develop social skills, improve reality orientation, reduce anxiety, and increase self-esteem” (American Art Therapy Association, 2013). Art is considered as an integrative body-mind intervention alliance with psychoanalytic theory that connects unconscious levels of information processing, and physiological changes (Malchiodi, 2011; Naumburg, 1950; Rubin, 2001). According to psychodynamic theory, PTSD symptoms are externalized form of overwhelming emotions experienced during the traumatic events (Malchiodi, 1997; Odell, 2011). Art therapy provides a safe environment for exploring and transforming overwhelming emotions through art-creation and achieving the wholeness of individual psyche (Odell, 2011).

Art is a powerful tool for communication and expressing emotions and thoughts that are difficult to express in words, and art therapy has been used as a method in
psychotherapy and counseling since the mid-twentieth century (Malchiodi, 2003; Rubin, 2001). Through art therapy, overwhelming thoughts and emotions ensuing from traumatic experiences can be expressed and externalized in a controlled and safe environment using a client–centered focus, in order to achieve the therapeutic effect of reducing mental health symptoms and improving general wellness (Monti et al., 2006). It is important not only because it is a creative method, but also because it can be widely used for all age populations (Malchiodi, 2003; Rubin, 2001). Like meditation, researchers have found that art activities not only enhance communication and expression of emotion, but can also change the brain structure and functional circuits (Bolwerk, Mack-Andrick, Lang, Dörfler, & Maihöfner, 2014; Gantt & Tinnin, 2009). One study concluded that the right hemisphere of the brain is probably the predominant storage site for traumatic memories, which means that art activities, which tend to activate the right hemisphere via kinesthetic and sensory simulations, can promote memory processing and integration (Lusebrink & Alto, 2004; Schiffer, Teicher, & Papanicolaou, 1995). It is well known that client engagement and therapeutic alliance are key components for a desirable outcome with any of the therapies discussed (Bachelor & Horvath, 1999; Brown, Parker, McLeod, & Southam-Gerow, 2014; Lambert & Barley, 2001; Pennington, 2016). In art therapy, using various art media and elements can be an innovative and developmentally appropriate way to understand the traumatic event and increase communication and self-awareness (Waller, 2006). Case studies were used widely in the existing research regarding the
experience, effectiveness and valuable therapeutic elements of art therapy (Kozlowska & Hanney, 2001; Waller, 2006).

Art-based therapy is being more widely used to assist in traditional therapies. For example, art activities are used as an assessment tool for discovering children’s coping styles, defense mechanisms, and strengths during the initial intake phase of treatment (Oster & Gould, 1987; Malchiodi, 2003). Using art in therapy can allow visual communication to help with clients’ function (Oster & Gould, 1987). Researchers have found that verbal memory and verbal ability are impaired in children with PTSD, which means it is difficult for them to form a coherent verbal narrative (Gilbertson, et. al., 2006; Turley & Obrzut, 2012). These verbal deficits can interfere with expression of emotion, reintegration of the traumatic experience, and recovery from the symptoms (Turley & Obrzut, 2012). Moreover, when psychotherapists learned that traditional verbal therapy was not well suited to expression of a complicated and unconscious dream scene, they began to use imaging activities to discover patients’ dreams (Oster & Gould, 1987). These analysts concluded that traumatic experiences are stored in the unconscious world and that the unconscious world is timeless, so the influence on our emotions and behaviors can persist as a life-long experience (Malchiodi, 1997). If this view of traumatic experience storage is correct, then a method for resolving unconscious conflicts and unresolved experiences is to bring the unconscious part of the trauma to the conscious level in order to resolve it and relieve PTSD symptoms.
Art therapy is a well-designed modality of treatment that is often used to treat the psychological issues that accompany AIDS, asthma, burns, cancer, chemical dependency, trauma, tuberculosis, and other medical and rehabilitation conditions (Vick, 2003). Several studies used art expression for children with crisis and trauma (Golub, 1985; Greenberg & van der Kolk, 1987; Molchiodi, 1997; Monti et al., 2006). A qualitative study for children traumatized by parental violence and separation (Kozlowska & Hanney, 2001) found that group art therapy is a useful adjunctive therapeutic intervention for traumatized children because of the ability to provide a safe context for the children, and to help them express their thoughts and experiences.

An art therapy intervention was developed by the Departments of Pediatrics and Psychiatry at the University of California at San Francisco General Hospital’s Chapman Art Therapy Treatment Intervention (CATTI) to reduce symptoms of acute stress in pediatric trauma patients (Chapman et al., 2001). The art therapy program, which was included in pre-discharge treatment, showed no significant superior effect at the time of discharge compared to the standard hospital treatment; however, all clusters of PTSD symptoms were reduced in the art therapy group at the one-week and one-month post-treatment follow-up assessments. Therefore, art therapy as a prolonged emotional and psychological treatment, after addressing acute physical and behavioral problems, merits testing. The non-threatening environment of art therapy without direct trauma re-

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exposure or reminders appears to be an important therapeutic advantage of art therapy for treating children who have experienced trauma.

Furthermore, an 18-month longitudinal RCT study on hospitalized youth (ages 7 - 17) compared an AT group with TAU control (Schreier, Ladakakos, Morabito, Chapman, & Knudson, 2005). The study adopted Chapman’s CATTI model (Chapman et al., 2001) with an individual one-hour session. The effectiveness of AT was identified as reducing numbing and avoidance symptoms in a short period of time, but not reducing re-experiencing and hyperarousal issues (Chapman et al., 2001). Another empirical study conducted by Lyshak-Stelzer and his colleagues (2007) examined the effectiveness of a 16-week program of group Trauma-Focused Art Therapy as an adjunct intervention compared with a TAU control group of 78 hospitalized youth (ages 13-18) with chronic PTSD symptoms. Results of the study supported the superior treatment effects (p=0.01) in the AT group’s reduction of PTSD symptoms over the control group. The treatment used art production as a way to open a conversation to explore traumatic experience and associated feelings in a supportive way that was safe, without any adverse reaction.

2.5.6 Solution-focused approach

Because people with PTSD have attention bias on negative words and traumatic themes, a positive-oriented, strength-based approach with future-focused intervention should be used to achieve the strongest therapeutic effects. Solution-focused brief therapy (SFBT) has been developed and researched for many years (Trepper et al., 2008). This
approach is different from the commonly used traditional psychotherapies that focus on problem-solving, past experiences, and cognition/behavior correction. In contrast, SFBT is an outcome-oriented and strength-based approach that focuses on solutions to a problem, with emphasis of solution-building rather than problem-solving. Techniques such as identifying past successes, forming positive perspectives, and rephrasing are included to help PTSD patients overcome their negative attention bias and gain hope and emotional resilience.

The core therapeutic elements of SFBT are: addressing clients’ goal, constructing new meanings of their existing problems and concerns, and forming a preferred future based on past successes and strengths (Franklin, 2011; Trepper et al., 2008). The unique and key elements of SFBT are asking miracle, scaling and exception questions, assigning homework tasks, defining goals, finding strengths and looking for solutions (de Shazer & Berg, 1997; Franklin, 2011; Gingerich & Eisengart, 2000; Kim, 2008a). One of the predicates of SFBT is that, although problems are not solved all the time, there must be exceptions; the central task of the process is to identify the exceptions in order to start changes through small specific steps, and several small increments of change lead to future larger changes (Trepper et al., 2008). Another predicate of SFB’s strength-based approach is that coping skills and resources already exist in the client’s system, so the client needs only to identify strengths and utilize them. Current or past successes is emphasized during cognitive thinking of an issue. This therapy does not focus on gaining
new skills and knowledge, but relies on building and utilizing the individual’s existing skills and knowledge, which is a particularly apt approach for the situation of children with PTSD. For example, the miracle question promotes a positive orientation and vision of the future by asking the child to think about questions such as, “If a miracle happened in the middle of the night when you’re asleep and you woke up and this problem had been solved, how would you know that,” and “How would you know when you don’t need to come here anymore.”

Therapeutic group work became popular and grew rapidly in the 1980s (Sharry, 2007). Group therapy promotes group power and group effects that are not present in individual sessions. The therapeutic factors of solution-focused group work are group support, group learning, group optimism, the opportunity to help others, and group empowerment, which were initially observed in general group work (Sharry, 2007; Yalom, 2005). Solution-focused group work has been applied to several settings and client populations, such as schoolchildren and adolescents (Corcoran, 2006; Franklin, Moore, & Hopson, 2008), patients in psychiatric hospitals (Knekt et al., 2008), parental groups (Lloyd & Dallos, 2008; Zimmerman, Jacobsen, Maclntyre, & Watson, 1996), substance abuse (Berg, & Miller, 1992; Pichot & Smock, 2011; Thompson, McManus, & Voss, 2006), and domestic violence offenders and victims (Babcock, Green, & Robie, 2004; Bond, Woods, Humphrey, Symes, & Green, 2013; Lee, Sebold, & Uken, 2003). According to the perspective underlying SFBT, individuals have the strength to solve
their problem themselves, but the advantage of a group format is that members can empower others in the group while simultaneously developing their own solutions. In order to have good, brief, group work, the group must have a clear goal, have group-member homogeneity to facilitate group cohesion, focus on presenting issues and recent problems, and focus on interpersonal rather than intrapersonal concerns (Budman & Gurman, 2002; Sharry, 2007).

2.5.7 SF-AT

SFBT and AT were first combined in 2003 for treating substance abuse (Matto et al., 2003). The integration created a new psychotherapy model, SF-AT, which reinforces the advantages and mitigates the disadvantages of the two different interventions. SF-AT, although not widely known, has gained popularity recently, and has been proven effective for children and adolescents with psychological issues (Nims, 2007; Riley, 1999; Selekman, 2005). Art therapy provides a holistic intervention that emphasizes interconnection in the body-mind system; it is based on the belief that a child’s art-related activities such as drawing and handcrafting are forms of emotional expression and processes of reintegrating and reprocessing traumatic memories into consciousness (Malchiodi, 1998). SFBT offers an emphasis on emotion expression and therapeutic relationship by using creative techniques like humor and playful interpretation (Selekman, 1993), which can be effectively combined with art therapy. In addition, since children with PTSD tend to think negatively and give more attention to negative aspects,
a positive shift and orientation is provided by using the solution-focused approach instead of focusing on trauma-exposure during all the sessions. Accordingly, this study adopted the solution-focused approach (Malchiodi, 2011) of art therapy to help children manage traumatic symptoms and sleep problems. In SF-AT, the particularly desirable elements of SFBT such as goal setting, exceptions, miracle questions, and scaling, have been integrated into the drawing and handcrafting activities of AT.

Figure 2.1 Compatibility of SFBT and AT, and features incorporated into SF-AT
SFMT and AT both emphasize the role of the therapeutic relationship on treatment effects (Riley & Malchiodi, 2003). They both emphasize a supportive relationship and safe environment to promote recovery, and both use metaphors as a start of communication (de Shazer, 1991, 1994; White, 1995; Matto et al., 2003). AT is considered suitable for the brief therapy format, which makes it compatible for integrating into SFMT (Matto et al., 2003). The solution-finding approach offers an objective perspective for viewing the traumatic experience through the art-making activities of AT. SFMT rarely addresses unconscious issues, but a strength of AT is its capacity to address them. The combination of verbal and visual interventions of SFMT and AT creates a multidimensional and flexible means of communication for expressing and interpreting trauma. Art activities operationalize solution-focused techniques such as goal setting, expectation and miracle questions. Trauma and problems can be explored in a tangible format through drawing and handcrafts. Moreover, AT is less threatening, which minimizes the obstacle of resistance, which has been a barrier to treatment with SFMT. SF-AT is a more flexible and advantageous model for treatment of the child population suffering from symptoms of traumatic experience (Figure 2.1).
2.6 Conceptual framework for SF-AT

2.6.1 Systems Theory

This study uses systems theory as a way to frame the design of SF-AT and elucidate the mechanism of change. The system theory describes “human behavior as the intersection of the influence of multiple interrelated systems” (Payne, 2015). The systems theory is not a direct guideline for practice but an approach that provides a means of organizing knowledge and a method to understand the world using an integrative perspective within a system (Payne, 2015). It was developed by biologist Ludwig Bertalanffy in 1968 and was further expanded by psychologist Uri Bronfenbrenner. The theory can be applied to any level of system from a single biological organism to the social systems. At the biological level, the inner neuro-bio-psychological system is seen as a whole system. For the individual, it can be understood as providing a person-in-environment perspective. When it applies to larger social systems, the system theory explains the interactions among social systems.
SF-AT in this study employs the biological level of system theory to achieve neuro-bio-psychological integration and incorporation. In addition, a person’s surrounding environment and social relationships are also taken into account in SF-AT. The stress reaction responses cause neurobiological and psychological change in the body system, resulting in different symptoms. As described in the previous sections, brain activities and endocrine secretion systems are highly interactive, and a change in either system can lead to change in another system. SF-AT uses the stated therapeutic elements such as (1)
art or verbal expression to promote reprocessing and reintegration of the traumatic experience (Vigneau et al., 2006) and improvement of sleep quality and behavior, and (2) kinesthetic activity of drawing or handcrafting to activate the limbic system (center for emotional and perceptual processes) and other brain areas (Champman et al., 2001) to open the pathway of change in the neurobiological system. The neurobiological changes can result in positive psychological and behavioral changes on attention, emotion, perspective, and self-regulation. Social improvements including social regulation, engagement, communication, and acceptance can also be obtained. Figure 2.2 presents the application of systems theory on SF-AT; and illustrates positive changes and adaptations in one system usually promote subsequent and recursive changes in other systems of a patient.

Art drawing and handcraft making are immensely complicated activities involving multisensory tasks that can activate many brain areas (Frith & Laq, 1995). Art is a shortcut to many brain areas and the unconscious (Malchiodi, 2011). For instance, although the main stimulus of art occurs in the right hemisphere, art activities can activate both brain hemispheres. It has been established that drawing and handcrafting can activate the right hemisphere via kinesthetic and sensory simulation (Lusebrink & Alto, 2004). Moreover the right hemisphere of human brain is thought to be the predominant storage site for traumatic memories (Lusebrink & Alto 2004; Schiffer et al., 1995). Therefore, the process of creating art can promote memory processing and
integration (Lusebrink & Alto, 2004; Schiffer et al., 1995). In addition, the brain hemispheres of children with PTSD are found to be asymmetrical in the frontal lobes, especially in the areas associated with recognition and emotion. Lack of brain symmetry can lead to a high possibility of trauma appraisal and emotional functioning problems (Turley & Obrzut, 2012). This abnormality can also cause verbal, intrusive and attention problems (Turley & Obrzut, 2012). The fact that art activities can activate both brain hemisphere may promote change in those brain areas. Language production occurs primarily in the left brain (Vigneau et al., 2006). Together with verbal techniques of SF, SF-AT can activate both hemispheres to achieve brain symmetry (Frith & Laq, 1995).

Volume changes in prefrontal cortex cause abnormal alterations of social and emotional regulation in children with traumatic experience. The impairment in brain cortex also lead to the inability to restrain the stress response system after the traumatic event (Vasterling et al., 2010). The communication throughout the whole brain is interrupted or disconnected for PTSD patients (Perry & Hambrick, 2008). Art making, through neurological processes, can access different areas of the brain in order to retrieve stored information and skills (Malchiodi, 2011; Perry & Hambrick, 2008). Thus, dysfunction and disconnection in brain areas can be remedied by utilizing somatosensory interventions such as visual art therapy (Perry & Hambrick, 2008).

Sleep wellness is associated with a variety of inner systems. Improvement of sleep tends to result in other positive changes. Attachment theory and the importance of
therapeutic alliance can be used as a specific framework at the individual level. PTSD symptoms are significantly associated with sleep disturbances (Thabet et al., 2004). From a biochemical perspective, people with PTSD have hyperarousal symptoms and increased levels of cortisol as stress responses, which influence the attention and learning function (Samuelson et al., 2010). This alert status influences sleep behaviors and shifts energy to stress-related responses. Lack of sleep or sleep quality causes distraction and inability to concentrate. Unlike traditional psychotherapy, art therapy is a process of creation and inner world activity, which can better attract the attention of children, and provide an opportunity to express their feelings in a relatively safe environment. Since children with PTSD tend to think negatively and pay more attention to negative factors, a positive orientation is advantageous, and is promoted by using the solution-focused approach. The SF-AT model includes child-parent joint sessions for creating artwork together. The working-together experience provides an opportunity to ameliorate attachment deficiencies. Regaining secured attachment with parents or guardians reduces anxiety, improves sleep, and thus reduces PTSD symptoms (Charuvastra & Cloitre, 2009).

2.6.2 Constructivism Theory

The constructivism theory was adopted by SFBT to support the belief that the comprehension of reality is constructed from social interactions and activities (Berg and deJong, 1996). Constructivism is a “post-structuralist psychological” theory (p. 34) grounded on several models of evolution and development (Fosnot, 2013,). The theory
assumes that learning is an “interpretive, recursive, non-linear building process by active learners interacting with their surround — the physical and social world” (Fosnot, 2013, p. 34). SFBT emphasizes construction of solutions using an individual’s past successes and existing resources (de Shazer, 1994). How people believe, and how they understand, are results of knowledge construction, deconstruction, and reconstruction through human activities and relationships (Matto et al., 2003). It is the therapeutic relationship and rephrasing that help an individual to construct solutions (de Shazer et al., 1986; Gergen, 1985; Hoyt, 1996).

There are two learning sources in the definition: the physical and the social world. Thus, it is not surprising that people have begun the debate over the two constructivism types. In the literature, cognitive constructivism and social constructivism are commonly seen (Powell & Kalina, 2009; Raskin, 2002). Along with that debate, there is a third opinion: decomposing the theory is erroneous. “The biological and the social are neither separable, nor antithetical, nor alternatives, but complementary,” according to Catherine T. Fosnot (2013, page 29). The reason for this conclusion is that “the process of construction is adaptive in nature and requires self-reorganization, cultural knowledge that is assumed to be held by members of the culture is in reality only a dynamically evolving, negotiated interaction of individual interpretations, transformations, and constructions” (Fosnot, 2013, p. 29).
SF-AT group therapy in this study adopts a synthesized version of the constructivism theory. The theoretical framework is built on the assumption that learning is an active process influenced by the person’s biological factors, their social and cultural background, and their interactions with others. The pioneer of the biopsychological aspect of constructivism theory is Jean Piaget which provides a framework for children’s learning process by integrating developmentally specific ways to promote change/learning in children (Ackermann, 2001; Wadsworth, 1996). In SF-AT, through the therapeutic alliance and developmental-friendly art activities for children, an
appropriate and positive integration of developmental features, current strengths, coping skills, desired future and social interactions deconstruct the negative, problem-focused believes; re-construct the traumatic experience and symptoms; and build new constructions of solutions and future (Figure 2.3). The learning and changing process can occur during social construction through therapist-client relationships, and/or in client-client relationships in a group format (Fosnot, 2013). Children in the SF-AT group interact with other group members, hear their stories, and learn from their successes via developmentally and neurobiologically appropriate art activities (Sharry, 2007).

2.6.3 Psychodynamic Theory

Psychodynamic theory is a generic term for a series of theories about how the human mind deals with inner forces through interacting structures inside. Psychodynamic theory consists of several theories including psychoanalysis by Sigmund Freud, analytical psychology by Carl Jung, and transactional analysis by Eric Berne (Rubin, 1999). Psychoanalysis theory, first developed by Sigmund Freud, was the major component although many theories were derived from it later. Psychodynamic psychotherapy has numerous emphases, including working on affect and expression of emotion, discovering and addressing avoidance, identifying recurring themes and patterns, focusing on interpersonal relationships including the therapeutic relationship, and exploring wishes and fantasies (Levy, Ablon, & Kächele, 2011). Some of the emphases are analogical with underlying beliefs of SFBT and art therapy, and have thus been integrated and modified
into modern art therapy. “An emotional disturbance can also be dealt with in another way, not by clarifying it intellectually, but by giving it visible shape,” according to Jung (Jung, 1916/1952 as cited in Rubin, 1999, p. 161). The mother of art therapy, Margaret Naumburg, as noted in the previous chapter, borrowed and modified Freud’s theory that psychological distress can be relieved after people bring the unconscious conflicts and fears to consciousness, thus ultimately achieving insight (Rubin, 2016). Her therapeutic framework of art therapy is based on the premise that the stress dynamic is unconscious, and thus the therapeutic goal is to make the unconscious conscious (Numburg, 1996; Rubin, 1999). Analysts believe that traumatic experience is stored in the unconscious world, and that the unconscious world is timeless, therefore the influence on our emotions and behaviors can be a lifelong experience (Molchiodi, 1997). Thus, to resolve the unconscious conflict and unresolved experience, bringing the unconscious part of the trauma to the conscious in order to resolve it is believed to be a way of relieving PTSD symptoms.

As discussed in the previous section, art is an instinctive, undistorted, and effective way of expressing emotions (Odell, 2011; Malchiodi, 1997; Perry, 2014; Wilson & Keane, 2004). Art activities can activate different brain areas simultaneously, which results in connecting the physical body and the cognitive mind as well as the conscious and unconscious mind (Mochiodi, 2011). Unlike cognitive thinking and verbal narrative, art is believed to use an alternative path of the brain (Wilson & Keane, 2004; Malchiodi,
Before art was introduced to therapy, therapists surprisingly and consistently found that clients already used art drawing as a form of expression spontaneously across many cultures (Rubin, 2016). This fact suggests that art is a primitive activity embedded in the human genetic structure as a way of self-expression. Among children with PTSD, impairment of verbal memory processing and episodic memory processing has been observed along with symptoms of nightmares and flashbacks (Gilbertson et. al., 2006; Turley & Obrzut, 2012; Vermetten, & Bremner, 2002). Therefore, non-verbal interventions are essential for the effective PTSD treatment in children.

Studies have shown that drawing and kinesthetic activity can activate the limbic system (the center for emotional and perceptual processing) and can constitute an accurate and appropriate way to express emotions that have been typically expressed by behaviors such as crying and screaming but which have been suppressed by children with PTSD (Champman et al., 2001). Art creating behavior, including drawing and handcrafting, is in itself a processes of integrating traumatic experience and gaining awareness of reality. Art therapy is believed to have a direct impact on brain volume and structure, and thus can reduce symptoms caused by deficits in the brain such as attention, cognition, and development issues (Turley & Obrzut, 2012; Vermetten & Bremner, 2002).
Figure 2.4 Conceptual map of therapeutic effect of SF-AT

- Use art activities and verbal replenishing techniques to externalize the feeling and reprocessing trauma.

- Use positive construction of traumatic event and symptoms
- Promote awareness of the reality and promote future hope

- Use art drawing as a start of conversation
- Objectivize the problem and the trauma
- Emphasize Solution finding instead of problem blaming

- Integrate multidimensional (verbal & nonverbal, conscious & unconscious, visual & kinesthetic) approaches to influence brain and facilitate sleep change
Chapter 3: Methods

Chapter 3 presents the overall methods of this study. First, the study sample, study design and the procedure of recruitment and screening are introduced. Second, the details of treatment conditions, the development of the treatment manual and the fidelity scale are included. Third, the information on measurement instruments, outcome variables, data collection and management are provided. Fourth, the method and process of quantitative data analysis are introduced in detail. Last, qualitative data collection, management and analysis are described.

3.1 Sample and procedure

Research Site

The study was conducted in the Directions for Youth and Families (DFYF) in Columbus, Ohio. DFYF is a mental and behavioral health organization serving youth and their families through counseling and education programs. DFYF has afterschool programs during school days and holds summer programs at several locations in Columbus. The children enrolled in the DFYF summer programs needed to be 6-18 years old and have Medicaid coverage. The program location was assigned based on their home area and school district. The study sample needed to be recruited in one location because
it was not possible to move one child from one site to another one. Thus, in order to meet the randomized control design as well as the sample size requirement based on the power analysis, the study selected the largest summer program location—the Ohio Ave. center in downtown Columbus. The Ohio Ave. center had more than 70 students enrolled in their summer program in past years and increased the number to 90 in the summer of 2016.

Sample and Inclusion/Exclusion Criteria

The study sample consisted of both child participants and parent participants, using a combination of convenient sampling and snowball sampling strategies. The child participants in this study were school-aged children recruited from a summer camp program. The inclusion criteria for the child participants were 1) school age (6-13 years old), 2) having one or more traumatic experience and, 3) having self- or parent-reported sleep related symptom(s), 4) having one parent or guardian as the parent participant. The study population was school-aged children who were in Piaget’s concrete operational cognitive and intellectual developmental stage (7-12 years old) (Piaget, 1976). Due to the reality, children at 6 or 13 who were still at primary school were included. The sleep-related symptoms needed to be associated with children’s sleep quality, sleep behavior, sleep habit, sleep resistance or total sleep time. Participants 1) without the behavioral and cognitive abilities to complete group activities of SF-AT, and 2) may harm their own or other group members’ safety during group participations were excluded from the study.
and referred to appropriate services. The Consent forms and parental permission forms were signed by the parent participants whereas the assent forms were signed by the child participants. Parent participants and the child participants completed the baseline assessment one week before the group session began.

**Power analysis and Sample Size**

The Sample size was determined by statistic power analysis software *G-power* 3.0. There were two group conditions: treatment—SF-AT and control—TAU; and there were two assessment points: pre-treatment and post-treatment. Based on *G-power*’s analysis, in order to achieve a result of power 0.8 and effect size 0.5, which is a moderate to high effect size for Repeated Measure ANOVA (Cohen, 1977), the total sample size needed to be 34. Considering an attrition rate of 15% based on previous studies of trauma-focused psychotherapies for children (Jaycox, et al., 2010), the final sample size was 41. In total, there were 49 eligible parents or guardians who signed up for the study and completed IRB forms and the pre-treatment assessments. Four of them (12.2%) dropped out before the session started because their child would not attend the summer program. Four of the signed-up families were excluded from the final study sample because the parents could never be reached or the children were not able to attend half of the sessions, resulting in an attrition rate from the baseline to post-treatment of 8.9%. The final included sample size consisted of 41 children and their parents. Some parents signed up more than one of their children for the study. There were some missing items or
missing reports for both parent participants and child participants. In order to maintain the power of the study, multiple imputation was conducted to statistically replace the missing data which is presented under the quantitative data analysis section later in this chapter.

Given the alpha level of .05, sample size of 41, and calculated effect size, post hoc power analyses were conducted to examine the actual power of the main study results. The power for significant main effects and interaction effects are as high as 99%, indicating the probability of finding true significance was powerful.

Randomization and Retention

Eligible participants were randomly assigned to either the treatment groups—SF-AT, or the control group—the summer camp program, using the SPSS randomization function. Each eligible participant was given a research code when they signed up to participate. The research code was inputted into the SPSS to process the randomization, which was allocated into two conditions (treatment condition and control condition). In order to maintain an effective group size 8-10 (Sharry, 2007), with the cooperation of the center teachers, participants in each condition were assigned to two groups, based on their age. Incentives were given to all the participants to maintain retention. Parent participants received a $20 gift card after completing the pre-assessment and another $20 gift card after the post assessment. Agency staffs and group facilitators provided food and treats as incentives to the child participants after each session to reduce the dropout rate.
Center points, prizes and awards were given to those children who had excellent performance on the purpose of encouraging attendance and engagement.

3.2 Treatment Conditions

*SF-AT Group Therapy-Intervention*

All children enrolled in the summer camp participated in regular group activities including art, music, sports, computer games, and dance. Specifically, in the treatment groups, the researcher and one art teacher from the center facilitated the two 8-session SF-AT groups which lasted for six weeks. Each SF-AT group session took over the entire 50 minutes of an art class. Groups were held in the art classroom twice a week at the beginning sessions and once a week at the end on Tuesday and/or Thursday afternoon. The group discussed solutions to the stress-related emotions and sleep issues through art activities. In these activities, children were asked to draw or make handcrafts to externalize their stress-associated reflections and dreams, to express their feelings and thoughts, and to identify their desired goals, successful coping skills, and existing resources (Appendix A). Although the direct and primary focus of this SF-AT was toward the future and solutions, topics about expressing traumatic experiences and bad dreams were covered in the treatment manual. However, those topics were carefully guided by the group facilitator in a solution-focus approach through creative art works to help the children externalize their emotions, visualize the unconscious and subconscious thoughts, distinguish the present and the past, and depict the best hope of the future.
A detailed SF-AT treatment manual was developed by the researcher after referring to several existing manuals and integrating consultations from a group of experts (Appendix A). The first session involved introducing SF-AT, clarifying confidentiality, familiarizing group members with each other, and setting group rules. In addition, the children were familiarized with the practice of spontaneous drawing to express their thoughts and feelings. The main task for the second session was goal-setting. This was done by showing them a cartoon picture of a bridge, then asking them to draw or write down their goal at one end of the bridge. The other end of the bridge represented any issue about the traumatic event; they were then asked to draw themselves on the bridge to rate how far they were from their goals. The homework was to share the goal with their parents. In the third session, stress solution wheels were made in order to introduce the solution focus perspective and identify past success and existing resources. The homework for the session was to discuss the solution wheel with the parents and start trying the identified solutions. In the fourth session, the children were asked to paint their facial expressions when they were feeling bad and when they were feeling happy/positive on two masks with desired colors and formats. The fifth session was targeted on sleep and dreams, where sleep hygiene was introduced and frightening dreams were drawn. The group was asked to share their dreams and then create a happy ending of the dream with existing resources. In session six, children were guided to imagine their life without symptoms and to make a stress ball. The emphasis of this session was on identifying the
positive aspect—the growth and the gain brought on by the traumatic experience in the development process. In the seventh session, a family portrait representing family relationships was made through drawing or paper folding in order to identify stories and helpful family members. The content of the last (8th) session was goal evaluation, and desirable future and best hope description, along with free drawing, paper-cutting, and paper folding. All drawings and handcrafts were stored in a file folder which was created at the beginning of the summer program, and all the artworks were reviewed and summarized during the last session. Parents were welcome to attend and observe the first session in order to get familiar with SF-AT, as well as the last session in order to review the art works and to plan for the future. Parent participants were requested to work together with their children on some of the after-session homework for the purpose of promoting child-parent interaction and communication. Throughout the intervention, the participants (under the guidance of the facilitator) rated the solution-focused scales, answered miracle questions, identified exceptions, progressed unresolved issues, and made future plans.

This intervention integrated art therapy and solution-focused therapy to encourage children to express their feelings and experiences, and find solutions for their traumatic and sleep-related symptoms. It allowed them to construct visual pictures in order to discover their unconscious fear, concerns, and possible reasons for their disorders. It also included parent participation in some of the sessions and homework in order to help build
supportive relationships and secure attachment between children and parents. Previous studies have shown that parent attachment, attachment experience in infancy, and bedtime interactions may influence children’s sleep (Morrell & Steel, 2003). Therefore, the child-parent joint sessions are an essential treatment component. The key purpose of those joint sessions and homework was to provide a safe, supportive, and familiar environment for children to express their feelings and to work on their issues in a creative way together with their parents. These parent-child interaction activities were also designed to build take-home skills and to maintain long-term effects of SFAT.

**Control group**

The control condition was treatment as usual (TAU), a design which, compared to no treatment control, has been shown to reduce the risk of severe impairment to the participants and to minimize the possibility of ethical issues (Reynolds et al., 2001). Child participants in the control group maintained their regular treatments including counselling and medications, while engaging the same group activities except the SF-AT treatment sessions compared to children in the intervention group. In order to address ethical issues, child and parent participants in the control group received information and materials of the SF-AT treatment after the conclusion of the study.

Regarding the ways which children reason and interpret the world, Piaget’s developmental theory suggests that children between the age of seven and twelve are in a concrete operational stage of intellectual development (Piaget, 1976). In this stage,
children can understand the world concretely and logically to some extent, but still feel confused about abstract or hypothetical concepts. Developmental differences exist not only across age groups, but also on the personal level within the same intellectual developmental stage. Thus, appropriate and individualized adjustments were made during the intervention delivery. In each group condition (treatment, control), children were assigned to two age groups 7-10 and 11-13. The group distribution ensured similar developmental level in each group, and allowed the facilitator to make appropriate and manageable treatment adjustment for each age group. The group facilitator used the following treatment guideline to accommodate the developmental needs of child participants: (1) describing interventions and information in a way that was meaningful and understandable for the children; (2) using cognitive-developmental perspectives to deliver treatment contents, and adjust treatment pace and expectations; and (3) acknowledging normal cognitive, intellectual developmental level at this age, in order to detect any severe developmental delays.

Fidelity

Fidelity is an important and essential component of evidence-based practice (McArthur, Riosa, & Preyde, 2012) for the purpose of clarity of treatment definition, identification of essential components for verification, manualized treatment, implementer training, supervision of treatment agents, sources of verification, sampling to ensure treatment consistency, and use of fidelity data (Naleppa & Cagle, 2010). In
order to objectively evaluate the fidelity of SF-AT in this study, a fifteen-item fidelity scale (Appendix B) containing two major components regarding art activities and solution-focused techniques was self-constructed and used. The first ten fidelity questions were selected and modified from a validated fidelity scale (McArthur et al., 2012) to evaluate the solution focus elements of SF-AT such as scaling, exception and miracle question. A detailed treatment manual was developed with the help of experts of intervention research and psychotherapy, and delivered by the group facilitators under supervision of the center supervisor for the purpose of monitoring the fidelity of the study. In previous art therapy studies, no known fidelity scale was published or used to evaluate the integrity of the treatment delivery, although some studies included detailed manuals for each session (Beebe, Gelfand, & Bender, 2010; Uttley et al., 2015). So the researcher self-constructed five questions to measure the treatment fidelity for the art therapy components with the consultation of experienced intervention researchers who have developed several fidelity scales. The researcher also reviewed several treatment manuals of AT and SF-AT to identify the key fidelity components including the format of delivery, accuracy of content, and compatibility with the SF approach. In order to measure intervention fidelity, audiotapes were taken from two selected sessions for each SF-AT group and rated by two independent raters. Fidelity scale checked by the group facilitators after each session and ensure the essential treatment components were delivered.
3.3 Measurements and Outcome Variables

*General demographic questionnaire*

Demographic information, including children’s gender, age, ethnicity, mental health diagnosis, and medication, as well as parent participants’ education level and marriage status were collected for preliminary analysis and factor control. Chi-square analyses was conducted on those demographic characters to ensure pre-treatment equivalent between control group and treatment group.

*The Child Reaction to Traumatic Events Scale-Revised (CRTES-R)*

CRTES-R is a 23-item child report self-administration scale to assess psychological responses to stressful life events in areas of feelings of intrusion, avoidance, and arousal (Jones, Fletcher, & Ribbe, 2002). Researchers suggest that brief self-report assessment tools may be more useful and realistic for children, especially when there is no one-on-one professional help with the assessment process (Foa, Johnson, Feeny, & Treadwell, 2001). The estimated time to complete the CRTES-R is ten minutes. A brief report also meets the solution-focused approach of this study by avoiding too much exposure and focus on the symptoms and past.

The CRTES revised version (Appendix C) derives from the CRTES original version (Jones, 1995; Jones, Ribbe, & Cunningham, 1994;) and the Horowitz Impact of Events Scale (Horowitz et al. 1979) as appropriate for collecting self-report information from children. Items are rated by a 4-point frequency scale: “Not at all=0”, “rarely=1”,

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“sometimes=3”, and “often=5”. The internal reliability ranged from 0.7-0.85 based on several studies (Napper, 2015; Stewart, Ebesutani, Drescher, & Young, 2015). There are two subscales: avoidance and intrusion. The reliability for a study sample of 206 6th- to 12th-grade adolescents was .95 (Stewart et al., 2015). The scale has acceptable concurrent validity of 0.63. The total score of CRTES is a sum of all the 23 items. A score between 0-14 indicates low distress; a score within 15-27 indicates moderate distress; a score above 28 is recommended for a diagnosis of PTSD (Jones et al, 2002).

**Sleep Self Report (Child’s Form)**

The Sleep Self Report (SSR) scale (Appendix D) is a self-administered 26-item questionnaire that has been used in many studies to examine sleep problem in school-aged children aged from seven to twelve years (Owens, Spirito, & McGuinn, 2000). The SSR is a short, widely-used self-report scale on sleep (Orgilés, Owens, Espada, Piqueras, & Carballo, 2012). According to the study population, a short assessment was necessary. Since sleep is a private activity, self-report can provide first-hand information on child participants’ sleep situation. The SSR is designed similarly, and corresponds with items in the Children’s Sleep Habits Questionnaire—a widely used parent report questionnaire (Owens et al., 2000).

The scale rating corresponds to the self-report of the children’s sleep habits, sleep behavior and daytime functioning in a typical past week. In the SSR scale, three questions concern basic sleep information, while the remaining 23 items are divided into
three subscales including bedtime (twelve items), sleep behavior (seven items), and daytime sleepiness (four items). Items are rated on a 3-point scale: usually = the sleep behavior occurred 5-7 times per week; sometimes = the sleep behavior occurred 2-4 times per week; and rarely = 0-1 time per week. The internal consistency coefficients of the entire scale are approximately 0.8 (Orgilés et al., 2012) across all scales and samples, and the test-retest reliability has also been verified (Owens et al., 2000). The total score is the sum score of the 23 items; a higher score indicates more problematic sleep, and vice versa. When compositing the sum scores, the scores of certain items were reversed according to the scale instruction to maintain the consistency of the outcome direction. The sum scores of the SSR and of each subscale (bedtime, sleep behavior and daytime sleepiness) were used as four sleep variables.

The Connecticut Trauma Screen (CTS)

The CTS was used to screen for traumatic events in the past and for reactions to those events (Lang, Campbell, & Vanderploeg, 2015; Lang, Cloud, Stover, & Connell, 2014; Lang, Franks, Epstein, Stover, & Oliver, 2015). The CTS is newly developed and is intended for children aged six to seventeen years. It is a standardized 10-item brief measurement with a parent version (Appendix E) and a child version. The CTS trauma symptom items are derived from several well-validated PTSD scales (e.g. Child PTSD Symptoms Scale and UCLA PTSD-index) and are highly correlated with the items in those scales (Lang, Cloud, Stover, & Connell, 2014; Foa, Johnson, Feeny, & Treadwell,
The CTS can be administered by clinicians or non-clinicians. The interval consistency across two samples are 0.83-0.84 (Lang et al., 2014). The convergent validity with the Child Post Traumatic Stress Scale (CPSS) total score is 0.94. There are four traumatic events (exposure) items, and six trauma symptom (reaction) items. Reaction items are rated on a 4-point scale: 0 = “None – never or rarely”, 1 = “little – 1-2 times per month”, 2 = “Some – 1-2 times per week”, and 3 = “A lot – 3+ times per week”. The total score of the trauma reaction items ranged from 0-18, and indicates the severity level of trauma reaction. A score of 5+ indicates at-risk, and trauma assessment is recommended. The total scores of the reaction items was an outcome variable for the PTSD symptom—CTS throughout the paper.

Although CTS is newly developed and not a comprehensive screening or clinical assessment, it is carefully designed, empirically-derived and suitable for the purpose of the present study. Since the study is a solution-focused intervention study which emphasizes solutions and future goals, a brief screening scale can avoid exposing the family to further trauma. Parents briefly assessed the functioning of their children. The CTS can be used in both clinical and non-clinical population, which meets the situation of the study population.

Recruitment

Approval from The Ohio State University Institutional Review Board was obtained prior to any recruitment process. The researcher sent out flyers and held
information sessions during the summer program recruitment events to identify potential child and parent participants who were interested in this study. Phones calls and scheduled meetings were conducted by the researcher and the center staff for the purpose of recruiting. After being interviewed by the researcher, potential parent participants whose child met certain criteria listed below were documented on the final list.

**Data collection and management**

After obtaining the parental consent form, parental permission, and child assent, assessments were conducted. Data were collected at two time points—pre-treatment and post-treatment—by researchers. Only one parent or care giver was required to complete the parent assessments for each child. The assessments were given to the same parent individually at both assessment time points. Researchers held a group session to distribute child assessments prior to the first session. Instructions and help were provided during the process. Child participants’ demographic information, CRTES, CTS-P, and SSR were collected (Table 3.1). Quantitative data were entered into SPSS 22 for further analysis by the researcher. Missing data were identified and dealt with by means of multiple imputation. After checking the original data materials in order to fill out possible missing data, multiple imputations were processed using SPSS. Names on the completed measurements were replaced by research codes. The codes for participants’ names were stored in a locked cabinet in a locked room. All data were secured separately from the
codes, and can only be accessed by approved researchers. Data were used only for research purposes.

Table 3.1 Instrument and Variable Summary Table.

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<thead>
<tr>
<th>Method</th>
<th>Outcome</th>
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<th>Respondent</th>
<th>Variable</th>
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3.4 Quantitative Data Preparation and Analysis

3.4.1 Exploratory Factor Analysis for Composite Score Validation

A series of Exploratory Factor Analyses (EFAs) was conducted during the data preparation in order to identify the dimensionality of each measurement scale at each time point, and to explore the appropriateness of using each item for the total composite score. The Principal Axis Factoring (PAF) was adopted as the extraction or estimation method. Factor solution was rotated in order to identify potential factors. EIGEN value is
a common factor loading indicator. A loading cutoff of .32 and higher was considered meaningful (Tabachnick & Fidell, 2007; Yong & Pearce, 2013). In this study, the loading cutoff for EIGEN value was set as .32. After general factor extraction, items with an EIGEN value below .32 and double loading were eliminated from the composite score of the measurement. EFAs results showed that pretests and posttests factor loadings were inconsistent, and a full confirmatory factor analysis or growth model could not be performed limited by the sample size, thus the factor solutions for a composite of the total scores were analyzed respectively over time (Marsh et al., 2009). Composite scores after EFA loading were converted based on the original total score of the instrument in order to refer to the same cutoff points. According to the EFAs, the constructs of CRTES and CTS were all unidimensional. The construct of sleep was identified as three factors based on SSR subscales: BT, SB, and DS. Thus, fifteen and nineteen items were included for the pre- and post-CRTES composite scores respectively; six and five items for BT; six and four items for SB; three and two items for DS. All items were well loaded and therefore included for CTS. Items that were deleted in EFAs were marked on each scale in the appendix section.

3.4.2 Missing data mechanism and multiple imputation

Missing data in the study was analyzed and imputed after composite scores were generated by EFAs. Missing data issues are common in intervention research, especially for a longitudinal design (Jeličić, Phelps, & Lerner, 2009). The reasons for missing data
vary from item nonresponse (e.g. items are missing because of fatigue, confusion, mistakes, and unavailability) to attrition (i.e. dropping out) (Enders, 2010; Jeličić et al., 2009). It is essential to analyze the mechanism of the missing data, which includes data missing completely at random (MCAR), data missing at random (MAR) and data not missing at random (NMAR). Missing data can be considered as MCAR if its omission is not related to the underlying values of the missing data itself, as well as being unrelated to any other measured variables in the data set (Jeličić et al., 2009; Rubin, 1976, 1987). Chi-Square tests referred to as Little’s MCAR tests were conducted in SPSS to examine the mechanism of the missing data (Enders, 2010; Little & Rubin, 2002). The Little's MCAR test resulted in a $\chi^2 = 70.7$ (df = 82; p = 0.809) indicating there was no difference between the missing data and non-missing data on other variables and itself. Therefore, the missing data in this study can be considered as Missing Completely at Random (MCAR).

To prevent any bias produced by a list-wise deletion, after MCAR was confirmed, the data was imputed using Multiple Imputation in SPSS after exploratory factor analysis (EFA) (Gugui & Gugui, 2016). Multiple imputation was first proposed by Rubin (1997, 1987) with the idea of “imput[ing] missing values using an appropriate model that incorporates random variation M times” and “averag[ing] the values of parameter estimates across the M samples to produce a single-point estimate” (Allison, 2000, p. 303). In this study, missing values within the composite scores were imputed five times.
by variables available including the outcome scores as well as the profile information (gender, ethnicity, age, grade, and diagnosis) in order to increase the robustness (Allison, 2000; Gugui & Gugui, 2016). Although SPSS 22 can perform many statistical tests with the imputed pooled data set directly (i.e., analyze the M imputed samples simultaneously in the background and then provide a pooled result), the pooled analysis cannot be used in a repeated measures analysis. A simple method which replaces missing data based on group mean, median or other group parameters was not considered, since it reduces the variance of the variable (Enders, 2010; Graham, Cumsille, & Elek-Fisk, 2003). Estimating one complete missing value based on average values of the M imputed samples was proposed and used for a long time (Allison, 2000; Graham et al., 2003; Gugui & Gugui, 2016; Rubin, 1987). For this study, multiple imputed samples ensured that the variance of the variable was not reduced, and so that the mean score of the imputed values allows the possibility of performing RM-ANOVA with a complete data set. Although the algorithm for analyzing a pooled data set is more accurate and complex then simple averaging for a RM-ANOVA test, the method (average several imputed data samples to replace the missing value) used in this study is a compromise between the simple replacing missing data method and pooled analysis after Multiple Imputation. Thus, one combined data set was created to perform RM-ANOVA. All other analyses were conducted on the original data set or the imputed pool dataset.

3.4.3 Descriptive and Exploratory Analysis
Demographic information such as child gender, parents/caregiver's gender, age, and ethnicity was analyzed by conducting mean, standard deviation, and percentage. Fidelity scales were analyzed using coherence rate (i.e. how many items in the fidelity scale have been met on average during sessions). An 80% coherence rate indicates good fidelity and quality (McArthur et al., 2012).

Pearson’s Chi-square was used at first to test pre-treatment group differences on all dependent variables in order to ensure equivalence. Then, two-way RM-ANOVA was used to analyze pre-, and post-treatment effects on sleep and PTSD variables. The within-subject factor is time (pre- and post-treatment), while the between-subject factor is treatment conditions (SF-AT, control group). The SPSS 22 was used for the ANOVA-related analysis. Effect size for ANOVA tests—partial eta squared ($\eta_p^2$) was calculated and presented in order to measure the strength and magnitude of the relationship between two variables (Cohen, 1973). A partial eta squared of 0.01 is considered as a small effect size, $\eta_p^2 = .06$ is a medium effect size, and $\eta_p^2$ of .14 is a large effect size (Pierce, Block, & Aguinis, 2004). Subsequent paired sample T-Tests were conducted for nonsignificant but significant trend results of group differences in order to further examine the group difference of treatment effects.

3.4.4 Repeated Measure two-way ANOVA

A series of Repeated Measure-analysis of variance (RM-ANOVA) was conducted to test whether there are group mean differences on the dependent variables (DV). Repeated
measure indicates that the same measurements are delivered several times and can be used with both ANOVA and multivariate analysis of variance (MANOVA). RM-ANOVA is usually used for the mean difference comparison among repeated measurements (O’Brien & Kaiser, 1985). RM-MANOVA is another option for the study, which is a complex statistical analysis derived from ANOVA, which tests two or more dependent variables simultaneously (Meyers, Gamst, & Guarino, 2006; O’Brien & Kaiser, 1985; Royes, 2007; Stevens, 2002). In general, MANOVA can reduce the Type I error when there are two and more DVs and can sometimes detects significant results which ANOVA cannot. In fact, in MANOVA analysis, the software also conducting the ANOVA tests after creating a new DV using linear combination of all the DVs (Tabachnick, Fidell, & Osterlind, 2001). However, there is no absolute advantage in statistics, when making a decision between RM-ANOVA and RM-MANOVA, an important suggestion to researchers is to carefully consider the complicated assumptions of RM-MANOVA and be aware that MANOVA “may not be quite the robust and safe alternative that it seems” (Lavori, 1990, p. 778). The most problematic issue is that even moderately correlated DVs diminish the power of MANOVA particularly with a small sample; in this study, several DVs are significantly correlated (as high as .8) with one or more DVs (Lavori, 1990; Tabachnick et al., 2001). The correlation estimates among DVs in MANOVA themselves increase error with a finite sample (Lavori, 1990). The power
of the results, which is extremely important for a pilot study with small sample size, would be significantly diminished for the study because of the correlations among DVs.

Thus, two-way (2x2) RM-ANOVA were used because there are two treatment conditions—SFAT and control, and the same measurements were delivered to the participants at two time points—pre-treatment and post-treatment—to assess the variations of DVs (O’Brien & Kaiser, 1985). Exploratory factor analyses were conducted to determine appropriate factors, then composite scores were calculated based on the factor loadings and used as DVs. The DVs are composite scores of the SSR and its subscales, CTS, and also CRTES. There are several assumptions for RM-ANOVA: the independence between groups, the normality and the equivalence of population distribution for each treatment condition, and the homogeneity of covariance. The assumption of homogeneity can be tested using Sphericity in RM-ANOVA is automatically met in this study design since there were only two conditions in each factor for the entire analysis (Field, 2013; Tabachnick et al., 2001). ANOVA is an omnibus statistic test, which means that the result cannot determine which particular group is different from the others. If research questions are related to specific differences between groups and within subject, further statistical tests are needed for specific target groups. Researchers usually use post hoc analysis to test each pair of variables (Tabachnick et al., 2001). However, the present study involved only two time points and two group
conditions, the results can directly show the direction and the difference of the factors. Therefore, a post hoc test was not necessary.

3.4.5 Mediation Tests

Although sleep issue is one of the common symptoms of PTSD, increasing evidence shows the reciprocal relationship between PTSD and sleep, and studies have found that improvement of sleep can actually promote recovery from other PTSD symptoms (Charuvastra & Cloitre, 2009). However, sleep issues were usually considered as by-product of trauma treatments and only evaluated by several items in PTSD scales. The present study emphasized the importance of sleep on the effect of trauma treatments by using an independent sleep scale in order to assess sleep in a comprehensive way and hypothesized sleep as a mediator of the treatment effect of SF-AT on other PTSD. Meditation analysis was conducted to explore the mediation effects.

Mediation is usually considered to be the causal intervening effect of variable M between the independent (X) and dependent (Y) variables. Mediation is a useful statistical analysis which can answer research questions such as how “some causal agents help X to transmit its effect on Y”, and “what is the mechanism of X that causes an impact on Y” (Hayes, 2013). In a mediation test, M is referred to as a mediator. There may be several mediators between the causal relationships of X and Y. The mediation effect should be conceptually supported by theories and previous studies. Exploring the mediation effect facilitates the discovery of the mechanism of change, and how effects
occur in the intervention process. In this study, M is sleep change scores, X is the pre-treatment PTSD scores and Y is post-treatment PTSD scores. If mediation effects exist, the intervening variables can explain a significant amount of effect between the independent and dependent variables, which means there is a path that variations in pre-treatment PTSD scores predict some changes in sleep; the changes in sleep can then cause the PTSD variation at post-treatment (Little, 2009). The direct relationship from pre- to post-treatment is called a direct effect. The effect that goes through intervening variables sleep change, which links pre and post-PTSD scores is indirect, and is referred to as a mediation effect.

A series of regressions was conducted in order to explore the mediation effect of sleep on the treatment effects of PTSD in the SFAT group. PTSD effects were represented by CRTES and CTS reaction score. The first step was to confirm the predictive relationships between pre-PTSD scores and post-PTSD scores respectively (Shrout & Bolger, 2002). The second step was to examine whether X can predict M. The third step was to regress X and M on Y simultaneously. The mediation effect can be seen by comparing the change of the coefficient of X before and after adding the mediator M in the regression equations. The magnitude of change can be presented by calculating the indirect effect by multiplying the regression coefficients of path a and path b (Hayes, 2013; Shrout & Bolger, 2002) (Figure 3.1). After considering the indirect effect, the direct effect is not significant anymore, and is referred to as the full mediation effect. A
partial mediation effect reduces the magnitude of the direct effect. The percentage of mediation effects ($P_m$) was calculated in this study in order to interpret the percentage of the effects accounted by the mediation on the total effect.

![Figure 3.1 Mediation Effect](image)

### 3.5 Qualitative Analysis

Qualitative analysis was conducted as a part of the mixed methods study design to explore the experience of the participation and effective elements of the SFAT group. The relationship between the quantitative and qualitative research in this study was identified as: the qualitative research is embedded within the larger Mixed Methods design, with the quantitative method being dominant (Guest, MacQueen, & Namey, 2011). The qualitative data were collected through semi-structured focus group interviews with the two SFAT groups after the intervention. Qualitative data were analyzed with Applied Thematic Analysis (ATA). Focus group recordings were transcribed by professionals and the transcriptions were checked by the researcher and group members. Data were coded and themes were identified. Together with quantitative
analysis, the mixed methods design provided a comprehensive picture of the
effectiveness of SFAT.

3.5.1 Qualitative data collection and preparation

Qualitative data were collected from 30-minute semi-structured focus groups instead
of in-depth interviews. Focus group interview is designed for qualitative inquiry for small
groups which can explore the conscious, semiconscious, and unconscious psychological
and sociocultural characteristics and processes among groups (Berg, 2001). The focus
group is an effective way of gathering qualitative information and evaluating a treatment
method (Berg, 2001). Group discussions and interactions are unique sources for
information gathering in a focus group interview (Guest et al., 2011). Group sharing is
also an effective way to gain experience and perception of young population (Horner,
2000). In a one-on-one interview, the validity of the qualitative data may be affected
because children may assume that “only a positive answer is the correct answer”
(Donaldson, 1978), but among a group of peers, they are more likely to share the facts
(Horner, 2000). Regarding the focus group size, suggestions have been made to limit
them to 7-10 members in order to ensure active interaction and the quality of the
discussion, or fewer members for a more in-depth purpose (Guest et al., 2011). Thus, in
this study, the focus group was conducted after the treatment sessions within the SFAT
groups which have 5-7 participants each group.
The focus group interviews were audio recorded and transcribed verbatim with the prior permission of the participants. A semi-structured interview was conducted instead of open discussion because of the young age and other characteristics of the participants (e.g. attention issues, self-regulation). Thus, an interview guideline (Appendix F) was developed and used by two group moderators to guide the focus group (Horner, 2000). Nine open-ended questions were asked to the groups, with the purpose of gathering information and insight about participation experience, the effectiveness of the intervention, and useful elements of the intervention. After the interview, the recordings were transcribed verbatim by a professional and confidential agency. In several processes, member checking was implemented to ensure the accuracy, credibility, validity, and transferability of a qualitative study. The narrative accuracy checking was done after the transcriptions were ready, while the interpretive validity checking was conducted after the themes were generated (Guest et al., 2011). The study used Atlas. ti 7 for the purpose of data management and data analysis.

The nine focus group questions were:

1. What is the experience of the SF-AT group participation?
2. If you have another chance to attend this kind of group, will you choose to participate again? Will you recommend SF-AT to your friends?
3. Which specific areas of the SF-AT do you like or dislike?
4. How is this SF-AT helpful or not helpful to the quality of your sleep?

5. How is this SF-AT helpful or not helpful to your trauma-related symptoms?

6. What changes have the group brought to you? Please provide examples.

7. Do you like to share your stories and feelings with others? Or do you prefer a one-on-one group format?

8. Regarding to two forms of a therapeutic group: one uses drawing and narrative interchangeably as a way of expressing your ideas and feelings, the other one only uses verbal talking, which one do you prefer? And why?

9. How do you like finding solutions and looking at the future instead of only talking about what has happened?

3.5.2 Applied Thematic Analysis (ATA)

Qualitative research, as an important research category, has numerous definitions. One definition that focuses on the analyzed data but not how to differentiate with quantitative research or with a list of techniques, is “Qualitative research involves any research that uses data that do not indicate ordinal values” (Nyamongo & Ryan, 2001, p. 1 as cited in Guest et al., 2011). There are several qualitative analytical approaches for various types of collected data. Applied Thematic Analysis (ATA) was used to analyze
the focus group qualitative data in this study. ATA is a qualitative data analysis method that composites several theoretical frameworks and techniques including grounded theory, positivism, interpretivism, and phenomenology (Guest et al., 2011; Marks & Yardley, 2004). ATA is a synthesized, inductive, and rigorous qualitative analysis method which borrows useful elements from other theoretical methods and can be applied to a wide range of research contents (Guest et al., 2011). ATA has the compliment of a “rigorous, yet inductive, set of procedures designed to identify and examine themes from textual data in a way that is transparent and credible” (Guest et al., 2011, Chapter 2). This method can identify key themes, explore new ideas, find solutions, and build a theoretical model. ATA can answer a wide range of research questions, including experience, understandings and perceptions, influencing factors, practice/account of practice, and construction (Marks, & Yardley, 2004).

The qualitative data analysis in this study followed the ATA steps: familiarization with the data, coding the data, searching for themes, reviewing themes, defining and naming themes, and producing the report (Marks, & Yardley, 2004). Open coding was conducted at the beginning of the analysis process to identify all possible codes followed by focused coding through narrowing down open codes by combining, synthesizing, and deleting in order to abstract themes and concepts (Lee, Uken, & Sebold, 2014). The analysis process was recursive in order to achieve more representative theme categories. Focus group transcripts were analyzed by an experienced researcher. To ensure the rigor
of the qualitative analysis, after the first researcher finishing all the coding, another researcher checked the segments of data and emergent coding frameworks. There were supervisory meetings to discuss the codes and themes from experienced qualitative researchers. Respondent validation by member checking was also conducted, in order to increase the rigor of the qualitative analysis. The researcher checked interim research findings with respondents and then made necessary changes (Mays & Pope, 1995).

3.6 Summary

This study employed a randomized controlled trial (RCT) study design with mixed methods. PTSD were measured by CRTES and CTS, sleep was measured by SSR. Pearson Chi-Square analyses were conducted to assess baseline equivalence. Two-way Repeated Measure Analysis of Variance (RM-ANOVA) was conducted with comparisons between pre-post and treatment-control conditions to examine the outcomes of the study. A series of regressions was used to explore the mediation effect of sleep on PTSD symptoms. The researcher subsequently conducted two focus groups for the qualitative inquiries in order to explore the experience and the insight of the participants in this SF-AT group, and identify useful intervention elements. Transcriptions of the focus groups were analyzed with the ATA approach.
Chapter 4: Results

Chapter 4 presents the study results in detail. First, descriptive statistics for both child and parent participants and treatment fidelity are introduced. Second, quantitative analysis results on baseline equivalence, RM-ANOVA, and mediation tests are presented. Last, qualitative results about lived experience and insights of the participants are described.

4.1 Descriptive Statistics and Fidelity

*Demographic information.* Table 4.1 presents demographic information for all participants. The final sample included in the analysis consisted of 41 children and 41 parent or guardian (N = 41). The mean age of child participants was 10.07 (SD=.51), and grade 4.43 (SD = 1.79). Among the children, 26.8% (n = 11) were girls, and 73.2% (n = 30) boys. Thirty-two (77.5%) of the participants identified as African American, eight biracial (20%), and one (2.5%) Caucasian. Twenty-two (51.2%) child participants had at least one diagnosis based on parent report. Among the reported diagnoses, attention deficit and hyperactivity disorder (ADHD) was the most frequent (n=12), followed by anxiety (n = 5), depression (n = 4), PTSD (n = 3), conduct disorder (n = 1) and disruptive mood dysregulation disorder (DMDD) (n = 1). Nine (22%) children were on medication
as reported by the parents. Regarding the living situation of the child participants, 63% of them lived in a single-parent family, 22% lived with both parents, 12.2% lived with their grandparent(s) or other relatives including aunt(s) and uncle(s), while one child lived with a court-assigned foster family. More than half (60%) of the parent participants were single, 35% were married, and the remainder (5%) were either divorced or widowed. Of the parent participants, 7.7% had attended graduate school, 33.3% had an undergraduate degree, 43.6% had a high school degree, and the remainder (15.4%) had an educational level below high school. Information about each child’s specific traumatic event was collected from both child and parent participants. All children included in the study had experienced a trauma, while four children had experienced multiple traumatic events. Of the total number of reported traumatic events, divorce/separation comprised 34.5%; the death of loved ones, 25.1%; the witnessing of violence, 17.2%; homelessness, 13.8%; bullying, 6.9%; and sexual abuse, 3.4%. Among child participants, 17.1% had a low level of stress (CRTES total score 0-14), 26.8% had a moderate level of stress (CRTES total score 15-27), and 56.1% had a severe level of stress and met the criteria for a diagnosis of PTSD (CRTES total score >= 28). In addition, based on the CTS reaction score (CTS over >= 5), 36.6% of child participants were at high risk for PTSD.

Fidelity. The group facilitator completed the fidelity scale after each session. In order to measure intervention fidelity, audiotapes were taken from selected sessions (a random selection of two sessions for each group: session 4 and session 6) and reviewed
by two independent raters—a center teacher and a researcher to evaluate the fidelity of the intervention delivery. An 80% coherence rate indicates good fidelity and quality (McArthur et al., 2012) while the study yielded 85-90% coherence rates. It was unnecessary to evaluate the fidelity of the TAU control group because the participants attended the regular summer program without any other intervention.
Table 4.1 Sample Characteristics (n=41)

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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct Disorder</td>
<td>1(2.4)</td>
<td></td>
</tr>
<tr>
<td>DMDD</td>
<td>1(2.4)</td>
<td></td>
</tr>
<tr>
<td>Medication</td>
<td>9(22)</td>
<td></td>
</tr>
</tbody>
</table>
4.2 Quantitative Results

Quantitative results of chi-square analysis for baseline equivalence, RM-ANOVA on PTSD and sleep outcomes, mediation effects of sleep are presented in this section. In addition, qualitative results on general group experience, favorite art activities, perceived changes, useful therapeutic elements, therapeutic relationship, preference of the group format, and suggestions are described.

4.2.1 Chi-Square analysis for baseline equivalence

Participants were randomly assigned to either the SF-AT treatment group SF-AT (n = 21) or TAU control group (n = 20). To assess baseline equivalence, Pearson Chi-Square tests were conducted on participants’ demographic information and on the pre-treatment scores. Chi-Square results indicated no significant group differences in the child participants’ age, $\chi^2 (6, N = 40) = 3.49, p = .745$; grade, $\chi^2 (7, N = 35) = 4.03, p = .776$; gender, $\chi^2 (1, N = 41) = .07, p = .796$; ethnicity, $\chi^2 (2, N = 40) = .94, p = .627$; diagnosis, $\chi^2 (1, N = 41) = .03, p = .867$; medication use, $\chi^2 (1, N = 41) = 1.1, p = .294$; and living conditions, $\chi^2 (3, N = 41) = 3.04, p = .385$. There was also no significant difference between the groups regarding the parents’ education level, $\chi^2 (4, N = 39) = 2.05, p = .726$; and marriage status, $\chi^2 (3, N = 40) = 2.17, p = .539$. Results demonstrated that between the treatment group and the control group, participants did not differ in their demographic information (Table 4.2).
To ensure no significant difference between the groups on the pre-treatment mental health conditions, Chi-Square tests were also conducted on children’s CRTES total score, subscales of SSR including bed time, sleep behavior and daytime sleepiness, total score of SSR, as well as parent’s CTS total reaction score. Results indicated no group difference on CRTES, $\chi^2 (31, N = 41) = 33.33, p = .401$; CTS, $\chi^2 (12, N = 41) = 9.31, p = .676$; SSR, $\chi^2 (35, N = 41) = 36.33, p = .406$; bed time, $\chi^2 (15, N = 41) = 18.82, p = .222$; sleep behavior $\chi^2 (13, N = 41) = 14.79, p = .320$; and daytime sleepiness, $\chi^2 (7, N = 41) = 5.93, p = .548$. The Chi-Square results demonstrated the statistical equivalence of the pre-treatment mental health conditions between SF-AT and control groups (Table 4.2).
Table 4.2 Chi-Square Tests for Demographic Information and Outcome Scores

<table>
<thead>
<tr>
<th>Demographic information</th>
<th>Pearson Chi-Square ($\chi^2$)</th>
<th>df</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>3.49</td>
<td>6</td>
<td>.745</td>
</tr>
<tr>
<td>Grade</td>
<td>4.03</td>
<td>7</td>
<td>.776</td>
</tr>
<tr>
<td>Gender</td>
<td>0.07</td>
<td>1</td>
<td>.796</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>.94</td>
<td>2</td>
<td>.627</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>.03</td>
<td>1</td>
<td>.867</td>
</tr>
<tr>
<td>Medication use</td>
<td>1.1</td>
<td>1</td>
<td>.294</td>
</tr>
<tr>
<td>Living Condition</td>
<td>3.04</td>
<td>3</td>
<td>.385</td>
</tr>
<tr>
<td>Parent education</td>
<td>2.05</td>
<td>4</td>
<td>.726</td>
</tr>
<tr>
<td>Marriage</td>
<td>2.17</td>
<td>3</td>
<td>.539</td>
</tr>
<tr>
<td>Assessment Scores at pre-treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRTES</td>
<td>33.33</td>
<td>31</td>
<td>.401</td>
</tr>
<tr>
<td>CTS Reaction</td>
<td>9.31</td>
<td>12</td>
<td>.676</td>
</tr>
<tr>
<td>SSR</td>
<td>36.33</td>
<td>35</td>
<td>.406</td>
</tr>
<tr>
<td>Bed Time</td>
<td>18.82</td>
<td>15</td>
<td>.222</td>
</tr>
<tr>
<td>Sleep Behavior</td>
<td>14.79</td>
<td>13</td>
<td>.320</td>
</tr>
<tr>
<td>Daytime sleepiness</td>
<td>5.93</td>
<td>7</td>
<td>.548</td>
</tr>
</tbody>
</table>

4.2.2 RM-ANOVA

Two-way RM-ANOVA analyses were conducted to assess group differences on PTSD outcome variables—CRTES total score, CTS reaction scores; Sleep outcome variables—SSR total score, BT, SB, DS; across the time from pre-treatment to post intervention. Interaction effects between time and group condition were also examined. The assumption of Sphericity for RM-ANOVA is automatically met in this study design since there were only two conditions in each factor for the entire analysis (Field, 2013). Effect sizes for F tests partial eta squared ($\eta_p^2$) were calculated and presented.
The main effect of treatment conditions yielded a statistically significant result at the 0.05 level with an F ratio of $F(1, 20) = 5.71, p = .027$, indicating that the mean CRTES score for SF-AT was significantly lower than the mean CRTES score for the control group. The analysis failed to detect a significant effect across time $F(1, 20) = 2.63, p = .121$, indicating that for each group there was no significant change from pre- to post-treatment. However, the interaction effect between group condition and time was significant with an F ratio of $F(1, 20) = 5.71, p = .027$ SF-AT group (pre-treatment: $M = 26.47, SD = 17.77$; post-treatment: $M = 19.38, SD = 10.8$) and the control group (pre-treatment: $M = 32.88, SD = 15.38$; post-treatment: $M = 33.99, SD = 10.80$) was significantly different across time (Table 4.3).

Figure 4.1 and the table 4.4 show the main effect and interaction effect on time and group condition. The effect size ($\eta_p^2 = .231$) for the significant group differences on the CRTES score was large. The effect size for interaction effects was also large ($\eta_p^2 = .199$). The effect size for the non-significant main effect of time was medium to large ($\eta_p^2 = .122$). The power of the main group effect and the interaction effect were both over 99%, indicating a high probability of true representation of significant results, meaning group differences on the treatment effects of PTSD between the SF-AT group and the control group based on the CRTES total score were not random.
Table 4.3 Descriptive statistics for CRTES total score

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-AT</td>
<td>pre</td>
<td>26.47</td>
<td>17.77</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>19.38</td>
<td>10.80</td>
<td>20</td>
</tr>
<tr>
<td>Control</td>
<td>pre</td>
<td>32.88</td>
<td>15.38</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>33.99</td>
<td>10.80</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 4.4 RM two-way ANOVA for CRTES total score

<table>
<thead>
<tr>
<th>Effects</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>group condition</td>
<td>1</td>
<td>5.71</td>
<td>.027</td>
<td>.231</td>
</tr>
<tr>
<td>time</td>
<td>1</td>
<td>2.63</td>
<td>.121</td>
<td>.122</td>
</tr>
<tr>
<td>group condition * time</td>
<td>1</td>
<td>4.71</td>
<td>.043</td>
<td>.199</td>
</tr>
</tbody>
</table>

Figure 4.1 CRTES total score
Although there was no significant main effect on time, there were observed between-group differences on the CRTES score change from pre- to post-treatment. Subsequent paired sample T-Tests were conducted to further examine within-subject differences across time. Findings demonstrated a significant decrease in the severity of PTSD symptoms based on the children’s report of CRTES for the SF-AT ($p = .007$) but not for the control group ($p = .699$) (Table 4.5). Cohen’s $d$ for the paired sample T-Test on pre- and post-treatment CRTES score was .82 for the SF-AT group, representing a large effect size (Table 4.5).

The results based on the RM-ANOVA and subsequent paired sample T-Test indicated that PTSD symptoms decreased for the SF-AT group post-treatment, based on the children’s self-report, while the control group remained at the same level regarding symptoms during this period.

Table 4.5 Paired Samples T-Test for CRTES

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>95% CI of the Difference</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Lower</th>
<th>Upper</th>
<th>t</th>
<th>df</th>
<th>Sig.</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-AT Pre-post</td>
<td></td>
<td>6.88</td>
<td>10.57</td>
<td>2.06</td>
<td>11.69</td>
<td>2.981</td>
<td>20</td>
<td>.007</td>
<td>.82</td>
</tr>
<tr>
<td>Control Pre-post</td>
<td></td>
<td>-1.12</td>
<td>12.69</td>
<td>-7.06</td>
<td>4.83</td>
<td>-.393</td>
<td>19</td>
<td>.699</td>
<td>.09</td>
</tr>
</tbody>
</table>
PTSD-CTS

The main effect on time showed a statistically significant result with an F ratio of
\[ F(1, 20) = 10.75, \ p = .004, \] indicating that the mean CRTES score was significantly reduced from pre- to post-treatment (Table 4.6). The analysis failed to detect a significant main effect across groups \[ F(1, 20) = 3.58, \ p = .557, \] indicating that for each time point there was no significant difference between the SF-AT group and the control group. The interaction effect between group condition and time was also non-significant \[ F(1, 20) = .028, \ p = .869, \] (Table 4.7). Figure 4.2 shows trends of the change on CTS reaction scores for both groups. The effect size \( \eta_{p}^2 = .361 \) for the significant time effect on the CTS reaction score was large. Effect sizes for the non-significant main effect on group condition and interaction effects were both small (group condition: \( \eta_{p}^2 = .019 \), interaction: \( \eta_{p}^2 = .001 \)). In addition, the power for the non-significant main effect and the interaction effect were about 40% and 6% respectively, indicating a lack of power to make true claims for results. Thus, accurate conclusions could not be drawn based on the results of the study for the CTS total score.

Table 4.6 Descriptive Statistics for CTS Total Score

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-AT</td>
<td>pre</td>
<td>6.18</td>
<td>4.27</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>5.14</td>
<td>4.36</td>
<td>20</td>
</tr>
<tr>
<td>Control</td>
<td>pre</td>
<td>7.01</td>
<td>4.27</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>5.77</td>
<td>4.85</td>
<td>20</td>
</tr>
</tbody>
</table>
Table 4.7 RM Two-Way ANOVA for CTS Total Score

<table>
<thead>
<tr>
<th>Effects</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>group condition</td>
<td>1</td>
<td>3.58</td>
<td>.557</td>
<td>.019</td>
</tr>
<tr>
<td>time</td>
<td>1</td>
<td>10.75</td>
<td>.004</td>
<td>.361</td>
</tr>
<tr>
<td>group condition * time</td>
<td>1</td>
<td>.028</td>
<td>.869</td>
<td>.001</td>
</tr>
</tbody>
</table>

Figure 4.2 CTS score over time between groups

Sleep-SSR total score

The main effect on time was statistically significant, with an F ratio of $F(1, 20) = 35.15, p = .000$, indicating that the mean SSR total score was significantly reduced from
pre- to post-treatment (Table 4.9). The analysis failed to detect a significant main effect on group condition $F(1, 20) = .071, p = .793$), indicating no significant difference between the SF-AT group and the control group for each time point. SF-AT. However, results yielded a significant interaction effect between group condition and time with an $F$ ratio of 5.23, $p = .034$, indicating that SSR score of the SF-AT group (pre-treatment: $M = 42.37, SD = 6.23$; post-treatment: $M = 33.61, SD = 4.71$) and of the control group (pre-treatment: $M = 39.73, SD = 6.81$; post-treatment: $M = 35.30, SD = 7.17$) was significantly different across time (Table 4.8).

Figure 4.3 shows the change on SSR total scores for both groups over time. The effect size ($\eta^2 = .649$) for the significant time effect on the SSR score was large. Effect sizes for the significant interaction effect between group condition and time was also large ($\eta^2 = .216$), while the effect size for the non-significant main effect of group condition was small ($\eta^2 = .004$). The power of the significant interaction effect was 99%, which means a group and time difference on the treatment effects of PTSD between the SF-AT group and the control group based on the SSR total score was not random.

Table 4.8 Descriptive Statistics for SSR Total Score

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-AT</td>
<td>pre</td>
<td>42.37</td>
<td>6.23</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>33.61</td>
<td>4.71</td>
<td>20</td>
</tr>
<tr>
<td>Control</td>
<td>pre</td>
<td>39.73</td>
<td>6.81</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>35.30</td>
<td>7.17</td>
<td>20</td>
</tr>
</tbody>
</table>
Table 4.9 RM Two-Way ANOVA for SSR Total Score

<table>
<thead>
<tr>
<th>Effects</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>group condition</td>
<td>1</td>
<td>.071</td>
<td>.793</td>
<td>.004</td>
</tr>
<tr>
<td>time</td>
<td>1</td>
<td>35.15</td>
<td>.000</td>
<td>.649</td>
</tr>
<tr>
<td>group condition * time</td>
<td>1</td>
<td>5.229</td>
<td>.034</td>
<td>.216</td>
</tr>
</tbody>
</table>

Figure 4.3 SSR Total Score over Time Between Groups
Sleep-bed time (BT)

The main effect on time demonstrated a statistically significant result with an F ratio of $F(1, 20) = 517.04, p = .000$, showing that the BT score decreased significantly from pre- to post-treatment (Table 4.11). The analysis also detected a trend of significant main effects on group condition ($F(1, 20) = 4.03, p = .059$), indicating that at each time point there was a significantly different trend between the SF-AT and control groups. However, results failed to provide a significant interaction effect ($F(1, 20) = 5.00, p = .453$). In summary, the results demonstrated that the children’s bed time score was significantly changed from pre- to post intervention, and the change in SF-AT group (pre-treatment: $M = 24.17, SD = 3.95$; post-treatment: $M = 18.59, SD = 5$) was larger than the control group (pre-treatment: $M = 21.47, SD = 3.92$; post-treatment: $M = 16.88, SD = 4.11$) (Table 4.10).

Table 4.10 Descriptive Statistics for BT Total Score

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-AT</td>
<td>pre</td>
<td>24.17</td>
<td>3.95</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>18.59</td>
<td>5.00</td>
<td>20</td>
</tr>
<tr>
<td>Control</td>
<td>pre</td>
<td>21.47</td>
<td>3.92</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>16.88</td>
<td>4.11</td>
<td>20</td>
</tr>
</tbody>
</table>
Table 4.11 RM Two-Way ANOVA for BT Total Score

<table>
<thead>
<tr>
<th>Effects</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>group condition</td>
<td>1</td>
<td>4.03</td>
<td>.059</td>
<td>.175</td>
</tr>
<tr>
<td>time</td>
<td>1</td>
<td>517.3</td>
<td>.000</td>
<td>.697</td>
</tr>
<tr>
<td>group condition * time</td>
<td>1</td>
<td>4.99</td>
<td>.453</td>
<td>.030</td>
</tr>
</tbody>
</table>

Figure 4.4 illustrates changes in BT scores for both groups over time. The magnitude of effect size ($\eta_p^2 = .697$) was large for the significant time effect on the BT score (Table 4.11). The effect sizes for the main effect on group condition was also large ($\eta_p^2 = .175$), while the effect size for non-significant interaction effect was small to medium ($\eta_p^2 = .03$). The power of the main group effect was 99%, indicating a high possibility of making a true claim of the significant trend result. Interaction effects demonstrated a lack of power (40%).
Figure 4.4 BT Score Over Time Between Groups

Sleep-Sleep behavior (SB)

RM-ANOVA failed to demonstrate any significant main effects (time: $F(1, 20) = 2.36, p = .141$; group condition: $F(1, 20) = 2.07, p = .167$), or interaction effect on sleep behavior scores between the groups across time ($F(1, 20) = 3.63, p = .072$) (Table 4.13). Figure 4.5 shows the change on BT scores for both groups over time. The magnitude of effect sizes for the main effects of group condition ($\eta_p^2 = .111$) and interaction effect ($\eta_p^2 = .160$) was large, while the effect sizes for the main effect on group condition was also
large ($\eta_p^2 = .175$), and the effect size on time was a medium to large one ($\eta_p^2 = .098$) (Table 4.12).

Table 4.12 Descriptive Statistics for SB Total Score

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-AT</td>
<td>pre</td>
<td>10.37</td>
<td>3.24</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>8.55</td>
<td>1.78</td>
<td>20</td>
</tr>
<tr>
<td>Control</td>
<td>pre</td>
<td>10.41</td>
<td>3.13</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>10.95</td>
<td>3.15</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 4.13 RM Two-Way ANOVA for SB Total Score

<table>
<thead>
<tr>
<th>Effects</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>group condition</td>
<td>1</td>
<td>2.36</td>
<td>.141</td>
<td>.111</td>
</tr>
<tr>
<td>time</td>
<td>1</td>
<td>2.07</td>
<td>.167</td>
<td>.098</td>
</tr>
<tr>
<td>group condition * time</td>
<td>1</td>
<td>3.63</td>
<td>.072</td>
<td>.160</td>
</tr>
</tbody>
</table>
Figure 4.5 SB Score over Time Between Groups

A subsequent paired sample T-Test was conducted to examine the group differences on with-in subject change over time. Based on the findings of the paired sample T-Test, there was a significant decrease on the sleep behavior score for the SF-AT ($p = .015$) but not for the control group ($p = .494$) (Table 4.14). Effect size was calculated using Cohen’s d for the paired sample T-Test on pre- and post-treatment SB score, demonstrating a large effect ($d = .61$) for the SF-AT group and small for the control group ($d = .16$). Although the RM-ANOVA analysis did not show any significant effect on the sleep behavior score between groups over time, the follow-up paired sample T-
Test detected a significant change for sleep behavior issues in the SF-AT group, but not in the control group from the baseline to post-treatment.

Table 4.14 Paired Samples T-Test for SB

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>95% CI of the Difference</th>
<th>t</th>
<th>df</th>
<th>Sig.</th>
<th>Cohen's d</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-AT Pre-post</td>
<td>1.98</td>
<td>3.40</td>
<td>.43 3.53</td>
<td>2.66</td>
<td>20</td>
<td>.015</td>
<td>.61</td>
</tr>
<tr>
<td>Control Pre-post</td>
<td>-.53</td>
<td>3.42</td>
<td>-2.13 1.07</td>
<td>-.70</td>
<td>19</td>
<td>.494</td>
<td>.16</td>
</tr>
</tbody>
</table>

Sleep-Daytime Sleepiness (DS)

The main effect on time yielded a statistically significant result with an $F(1, 20) = 6.46, p = .020$, showing that the DS score decreased significantly from pre- to post-treatment (Table 4.16). However, the analysis did not detect a main effect on group condition ($F(1, 20) = 1.15, p = .297$), indicating that at each time point there was no significant difference between the SF-AT group and the control group. In addition, results failed to present a significant interaction effect ($F(1, 20) = 1.73, p = .204$). Figure 4.6 illustrates change on DS scores for both groups over time. Table 4.15 shows that the magnitude of effect size was large for the time effect ($\eta_p^2 = .254$), medium for the time effect ($\eta_p^2 = .057$), and medium to large for the interaction effect ($\eta_p^2 = .084$).
Table 4.15 Descriptive Statistics for DS Total Score

<table>
<thead>
<tr>
<th>Group</th>
<th>Time</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF-AT</td>
<td>pre</td>
<td>7.82</td>
<td>1.90</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>6.48</td>
<td>2.04</td>
<td>20</td>
</tr>
<tr>
<td>Control</td>
<td>pre</td>
<td>7.86</td>
<td>1.29</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>post</td>
<td>7.47</td>
<td>1.93</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 4.16 RM Two-Way ANOVA for DS Total Score

<table>
<thead>
<tr>
<th>Effects</th>
<th>df</th>
<th>F</th>
<th>Sig.</th>
<th>Partial Eta Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td>group condition</td>
<td>1</td>
<td>1.15</td>
<td>.297</td>
<td>.057</td>
</tr>
<tr>
<td>time</td>
<td>1</td>
<td>14.89</td>
<td>.020</td>
<td>.254</td>
</tr>
<tr>
<td>group condition * time</td>
<td>1</td>
<td>1.73</td>
<td>.204</td>
<td>.084</td>
</tr>
</tbody>
</table>
Since the RM-ANOVA failed to detect a significant effect on group condition, a subsequent paired sample T-Test was conducted to further explore the group differences on with-in subject change over time. Based on the findings of the paired sample T-Test, there was a significant decrease in the daytime sleepiness score for the SF-AT ($p = .01$) but not for the control group ($p = .401$) (Table 4.17). Effect size Cohen’s $d$ calculated for the paired sample T-Test on the pre- and post-treatment BT score was large ($d = .63$) for the SF-AT group and small for the control group ($d = .17$). Although the proposed RM-ANOVA analysis did not detect a significant effect on the sleep behavior score between
groups over time, the follow-up paired sample T-Test indicated a significant change for daytime sleepiness in the SF-AT group but not in the control group across time.

Table 4.17 Paired Samples T-Test for DS

<table>
<thead>
<tr>
<th></th>
<th>Paired Differences</th>
<th></th>
<th></th>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig.</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Std. Deviation</td>
<td>Lower</td>
<td>Upper</td>
<td>df</td>
<td>Sig.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF-AT Pre-post</td>
<td>1.32</td>
<td>2.12</td>
<td>.35</td>
<td>2.28</td>
<td>20</td>
<td>.010</td>
<td>.63</td>
<td></td>
</tr>
<tr>
<td>Control Pre-post</td>
<td>.38</td>
<td>2.28</td>
<td>-.68</td>
<td>1.45</td>
<td>19</td>
<td>.461</td>
<td>.17</td>
<td></td>
</tr>
</tbody>
</table>

In summary, the results from both RM-ANOVA and paired sample T-Test demonstrated that children’s daytime sleepiness scores were significantly different from pre-treatment to post-treatment, and this change (pre-treatment: \( M = 7.82, SD = 1.90 \); post-treatment: \( M = 6.48, SD = 2.04 \)) was significant within the SF-AT group but not in the control group (pre-treatment: \( M = 7.86, SD = 1.29 \); post-treatment: \( M = 7.47, SD = 1.93 \)).

4.2.3 Mediation Effect

The mediation effect of sleep change on treatment effect of PTSD was examined using several steps of regression. Pre-treatment PTSD scores CRTES and CTS both significantly predicted their post-treatment scores (\( p = .000 \)). Mediation tests showed that SB change and sleep time change has partial mediation effects on the change of PTSD.
CRTES scores from pre- to post-treatment. DS change also partially mediated the PTSD CTS score change across time. The remaining sleep score changes, particularly SSR total score and BT score, failed to mediate any treatment effect of pre- to post-PTSD score.

In the mediation tests, the pre-CRTES score significantly predicted the post-CRTES score and the SB total score. After including the mediator—sleep behavior change—the coefficient of pre-CRTES changed from .472 to .463, resulting in a $P_m = .18$, indicating that 18% of the total variance on PTSD symptoms based on CRTES scores was accounted for by the indirect effect through sleep behavior change (Figure 4.7).

![Figure 4.7 Mediation Effect of SB Change](image)

In the mediation tests, the pre-CRTES score significantly predicted the post-CRTES score and sleep time change. After including the mediator—sleep time change based on change scores of item 17 in SSR scale—the coefficient of pre-CRTES
decreased from .472 to .444, resulting in a $P_m = .44$, indicating that 44% of the total variance on PTSD symptoms based on CRTES scores was accounted for by the indirect effect (figure 4.8).

In the mediation tests, the pre-CTS score significantly predicted the post-CTS score and the DS change. After including the mediator—day time sleep change—the coefficient of pre-CTS changed from .768 to .761, resulting in a $P_m = .27$, indicating that 17% of the total variance on PTSD symptoms based on CRTES scores was accounted for by the indirect effect through daytime sleepiness (Figure 4.9).
4.3 Qualitative Results

Focus group interviews were conducted, audio recorded, transcribed and analyzed by the research team. Among the 21 SF-AT group participants, twelve participated in the focus group interviews. Focus group participants were five girls and seven boys, ranging from 7-13 years old. The qualitative data analysis process was recursive with data familiarization, code generation, theme identification, review, categorization, and finalization in order to identify all meaningful themes and extract useful concepts (Appendix G).

Emergent themes illustrated that the experience of the group was “interesting”, “fun” and “useful” generally, although some participants pointed out their suggestions on certain aspects of the SF-AT group. Participants mentioned positive emotional, behavioral and relationship changes in their life, including stress management, anger...
control, sleep improvement, and relationship change with peers and families.

Specifically, some participants noticed the importance of sleep on their emotions and behavioral performance. Participants stated they enjoyed participating in art activities while simultaneously learning new things in the SF-AT group. Among their favorite identified activities were bridge goal setting, the solution wheel, the stress ball, and dream drawing. Shared common concerns included sharing their own stories with peers and talking about problems, while they preferred visual representation through drawing and keeping their stories relatively private. Participants mentioned several “liked” therapeutic elements, including characteristics of the group facilitator, and the therapeutic relationship. Table 4.18 shows the organization and details of the themes.

General group experience

Fun, interesting. Most of the participants shared that they “like drawing”. When asked about the general group experience, child participants pointed out that the group was fun and interesting: “I like our art activities.” Participants particularly enjoyed drawing their experiences and emotions. They indicated that they were glad they “get to draw [feelings]” because “… sometimes when people talk about stuff they get emotional”, indicating that they feel more in control and comfortable to illustrate through drawing rather than verbally expressing feelings.
| General experience                     | Fun, interesting |
|                                      | Helpful         |
| Favorite activities                  | Goal setting on the bridge picture |
|                                      | Dream drawing   |
|                                      | Solution wheel  |
|                                      | Stress ball making |
| Perceived changes                    | Emotional change|
|                                      | Behavior        |
|                                      | Relationship    |
|                                      | Sleep           |
| Useful treatment elements            | SF perspective  |
|                                      | Art itself      |
|                                      | Sleep knowledge |
|                                      | Expressing and sharing |
|                                      | Incentives      |
| Group format                         | Drawing vs. Talking |
|                                      | One-on-one vs. Group |
| Therapeutic relationship             | Nonjudgmental Acceptance |
|                                      | Nice            |
| Suggestions                          | Less talk and more draw |
|                                      | One-on-one therapy |
|                                      | Less review back |

**Helpful.** Participants considered the group “helpful”, and helped them “learn new things” including the “importan[ce] to get sleep”, and finding solutions.

- The helpfulness ranged from “It changed our lives” to “a little bit of changes”.
- “We learned better ways to go to sleep quicker and stuff”
Favorite art activities

When the participants were asked about their favorite art activities in the SF-AT group, they highlighted the goal setting bridge, the stress solution wheel, stress ball making, and general drawing tasks—particularly the dream drawing.

Figure 4.10 Goal Setting

Goal setting on the bridge picture. Participants mentioned that during the goal setting process, they were able to think about their goals and imagine a day without their concerned issues. The activity itself, designed to assess their positioning toward their own goal on the bridge picture at both the beginning and end, had positive effects (Figure 4.10).
**Dream drawing.** One participant who has re-experienced the same terrible dream, reflected strong preference for the dream drawing. Figure 4.11 shows his drawing of the dream. Positive effects were demonstrated during the treatment after the participant and the group facilitator developed solutions for reducing fear and stress in reality, built on past successes including parent involvement, and creating a possible happy endings diary.

![Figure 4.11 My Dark Room](image)

**Solution wheel.** Some participants also recognized that the solution wheel was useful by “writing everything that will make you not stressful…release your stress”, and indicated that it helped them “step by step by being good”. The goal-setting bridge was inspiring and innovative for them: “it’s interesting and made me actually see my goal and
where I am”. Figure 4.12 presents one of the stress solution wheel drawings from a group participant. Participants were able to identify possible stress solutions, and were asked to utilize those solutions in their daily life with existing resources.

Figure 4.12 Stress Solution Wheel

Perceived changes

Emotional and behavioral changes. Participants of the SF-AT identified several changes after attending this group. Emotion control and emotion changes were reported
by some participants. For example, one participant mentioned that the group helped her “get out some of our feelings”. Additional participant perceptions included:

- “It helps me deal with my stress”
- “It really helped [the names of two group participants] bury [means focus] a lot.”

**Relationship change.** Participants started to share their feelings with their parents. One of the parents shared that their son had brought all of his art work home and shared what he learned with his mother and grandparents. Another child participant stated “I share my feelings [with others]” when he was asked about the change. “And it let[s] some people be able to finally share their feelings.” Figure 4.13 shows examples of family portraits from participants, which were shared with their parents. The left drawing of figure 4.13 reflected the important role of the family dog in one participant’s life. The big house in the right of figure 4.13 was explained as a hope but not his real house by another participant.

![Figure 4.13 Family Portrait](image)
Sleep change. Some sleep improvements were revealed by the participants. “I stayed up all night a little bit and then I fell asleep”, “I did not stay up all night.”, “I did get extra sleep. I didn't feel sleepy.” Most shared the observation that the group raised their awareness of the importance of sleep, and that because of this awareness, they can take steps to improve their sleep. The participants shared their understanding of the relationship between sleep and mental health:

- “… I learned… that you need more sleep in order to pay attention because if you don't sleep a long enough time you'll wake up and you'll have trouble learning”

- “The [less] sleep you get the more angry you are”

Useful Therapeutic element

SF perspective. One participant shared how meaningful the solution-focused approach was in changing her perspective of bad moments, and how it helped her to manage these difficult moments: “Finding solutions help keep on going, taking it back”

Art itself and emotion expression. Art drawing was identified as a special and useful way to express feelings and communicate with oneself. When asked about the preferred way of feeling expression in daily life, one participant shared that “I don't do feelings. I do Kik and Instagram”. The answer indicated that children may tend to express their thoughts and feelings through visual images instead of cognitive processing:

- “…[Drawing makes it] easier to share your feelings and emotions”
- “Get out some of our feelings”
- “Like [to] draw stuff and say stuff that you normally wouldn't say to somebody else”
- “It let[s] some people be able to finally share their feelings”

Sleep knowledge. From the group sleep education session, participants gained knowledge about sleep hygiene, which was identified as beneficial to their sleep. The sleep change and learn something new were presented in the prior results.

Therapeutic relationship

Nonjudgmental Acceptance and Nice. Participants expressed their comments on the group facilitation style. Participants shared that the group facilitator’s nice, calm, and non-judgmental characteristics made them enjoy attending the group, and willing to share their feelings and emotions. They reflected the dislike of authority and ordering. They mentioned that a good therapeutic relationship was an important factor for them.

- “I like it when she's [i.e. the group facilitator] here. I don't like it when she's [i.e. the group facilitator] not here”
- “I liked it with you [the group facilitator] being here versus with somebody else being here”
- “You're really nice”
- “You was calm and you wasn't all, ‘you should hit! You sit down!’ … ‘you, shut up’”.

120
• “We don't like when [teachers] point people out”

**Group format**

**Drawing vs. Talking.** Most participants liked the art elements included in SF-AT instead of talking. “I like our art activities, instead of doing so much talking” The participants liked the general drawing format of the group. The primary reason was that it created an encrypted and safe way for participants to share feelings and emotions that they typically do not share with others. “[Only] you know what it means instead of...[everybody knows the meaning]”

• “It could mean something to you, but everybody won't know what it means”

**Individual vs. Group.** Child participants mentioned that “I don't like sharing my feelings (with others)”, but “if only with a therapist, then I am willing to.” Thus, reasons for preferring individual rather than group therapy, and the preference for drawing instead of talking about feelings was the same: fear and discomfort with sharing their stories and feelings with others.

**Suggestions and feedback**

At the end of the focus group interview, the participants expressed some concerns and made several suggestions for the SF-AT group. The children mentioned that more drawing activities and less talking with a one-on-one format would encourage participation and engagement in the intervention.
Less review back. Although the SF-AT intervention reduced trauma review and re-exposure components, one participant still mentioned that they don’t want a reminder of “bad memories” because “you know they cut it all like fact.” This confirms concerns of the trauma exposure-based and problem-solving treatments (Imel et al., 2013; Hembree et al., 2003), and may also explain the high drop-out rate of exposure-based treatment (Cohen et al., 2011; Schottenbauer et al., 2008).
Chapter 5: Discussion

Research has shown that school-aged children are vulnerable to various traumatic life events, and have higher risk of developing PTSD than adults due to ongoing physical and mental development (Pfefferbaum et al., 2006). Although there are several widely-used non-pharmacological treatments (e.g. TF-CBT, EMDR) that have demonstrated effectiveness among this population, there is no agreed superiority (Cohen et al., 2011; Greenwald, 1994). After identifying literature gaps and population needs, there is a need for creative and effective treatments for children with PTSD symptoms and corresponding sleep issues. This dissertation project included the development and implementation of an eight-session SF-AT group intervention for children who experienced stressful/traumatic life event(s). The purpose of the present study was to examine intervention effectiveness, mediating effects of sleep, and experiences of the SF-AT group participants on relieving PTSD symptoms and sleep disturbances. The study employed mixed methods, RCT design to examine within subject and between-group effects from pre- to post-treatment; and to explore lived experiences and insights from the group participants. Quantitative results showed that the SF-AT had positive effects on PTSD symptoms and sleep disturbances, and superior outcomes when compared with a TAU control group. Partial mediation effects of change in sleep behavior, sleep length,
and daytime sleepiness on PTSD were detected in SF-AT. This chapter summarizes study results, examines the research hypotheses, identifies limitations, and discusses implications of the study for future research, field practice, and intervention development.

5.1 Discussion of Findings

Hypothesis 1 – SF-AT will significantly reduce PTSD scores from pre-treatment to post-treatment.

The significant change on both self-report (CRTES) and parent-report (CTS-reaction) PTSD scales from pre- to post-treatment supported the first research hypothesis. Changes in PTSD symptoms across time were considerable (CRTES: $\eta_p^2 = .122$; CTS: $\eta_p^2 = .361$) and were consistent between the child and parent reports. The results suggest the effectiveness of a brief (8 sessions, 6 weeks) SF-AT group therapy on PTSD symptoms. This result aligns with prior research indicating that SF-AT can work effectively for children and adolescents with psychological problems (Nims, 2007; Riley, 1999; Selekman, 2005). Compared to other creative treatments such as play therapy (Bratton, et al., 2005; LeBlanc & Ritchie, 2001; Malchiodi & Crenshaw, 2015), SF-AT was able to achieve a large positive effect within a short treatment time. The study results contribute to existing SFBT, AT and SF-AT literature on PTSD symptoms among the traumatized child population. The positive effects were also supported by the qualitative results, suggesting that SF-AT addressed anger, stress, and emotional issues for children with
traumatic experience. Both quantitative and qualitative results revealed positive results for the use of SF-AT to treat PTSD symptoms of the study population.

Hypothesis 2 – SF-AT will significantly reduce sleep-problem scores from pre-treatment to post-treatment

The significant time effect on sleep scales supported hypothesis 2 of the study. The results demonstrated that SF-AT appeared to effectively improve general sleep wellness, and specifically improved bed times and reduced daytime sleepiness of children who had experienced trauma. However, there was no significant improvement in sleep behavior in the SF-AT group, which may be caused by the difficulty on observing own sleep behaviors and there was a lack of objective/observational reports. Participants shared their perceived sleep changes, including shortened latency time, less terrible dreams, improved sleep quality and appropriate time, yet, Sleep issues are common among children with traumatic experiences, but are generally not integrated into PTSD treatment interventions (Krakow et al., 2001; Lavie, 2001). Thus, the positive effect of SF-AT on several sleep aspects supports the future development of the intervention.

Although the summer camp hours were similar to school hours, post-treatment assessments were conducted 7-8 weeks into the summer break when the children’s bed times and sleep quality were likely different from school days, which could be a major confounding factor. The changes for TAU outcomes were not always significant as the case for SF-AT, the results appear “mixed”. Thus, the difference among the sleep sub-
scales may be explained by changes on daytime activities and bedtimes between the school term and summer break. Sleep time, pattern and quality are highly impacted by school activities including school start time, school work intensity, and homework load (Den Wittenboer, 2000; Gerber et al., 2015; National Sleep Foundation, 2017; Sadeh, Gruber, & Raviv, 2003). Children in the summer camp participated in multiple entertaining and interactive activities including art, music, dance, ball games, and gardening. This could also be a confounding factor and the effects of SF-AT group can be explained by the combination effects of summer and SF-AT intervention. Compared to typical sedentary school-day schedules, it is reasonable that the amount of daytime sleepiness would be decreased and even eliminated among summer camp participants. Considering the impact of context on sleep changes, additional research with controlling contextual factors is needed to further investigate the effectiveness of SF-AT on sleep.

**Hypothesis 3** - SF-AT group will show superior treatment effects to control group on both sleep and PTSD

The research results on group comparison provided evidence for hypothesis 3. The significant interaction effects (time x group) of PTSD (CRTES), and general sleep (SSR total score) demonstrated that the treatment effects of SF-AT were superior to the TAU group. Participants in the two conditions were not significantly different at the baseline assessments. Between-group results of RM-ANOVA support the positive within-subject effects of SF-AT. Although significant interaction effects were not detected in RM-
ANOVA, sleep behavior and daytime sleepiness were both significantly changed in the SF-AT group compared to the TAU group based on subsequent paired sample T-Tests which further demonstrated the superior effects of SF-AT on both PTSD and sleep symptoms. The inconsistency of the results between the two methods of statistical analysis may be caused by the small sample size. In summary, these results provide support regarding the effectiveness of SF-AT practice, and address a gap in the related literature: whether SF-AT can effectively treat school-age children with PTSD and sleep problems simultaneously in a short time.

However, there were no significant difference on the parent-report PTSD scores (CTS reaction score) between the two treatment conditions, suggesting that the significant improvement across time on PTSD symptoms reported by parents may be caused by other factors including the summer break and the summer camp activities rather than therapeutic effects of SF-AT. Studies have found that various factors can influence the accuracy of reports and explain the disparity, including reported characteristics, emotional and environmental factors, and the child-parent relationship (Burrows et al., 2013). In addition, the disagreement between the children’s self-report and the parents’ report may be a result of the use of different scales for the same outcome. Both scales were brief report and were still in the process of further developing and validating, thus the sensitivity, reliability and validity may be different in the study sample (Jones et al., 2002; Lang et al., 2014). In future research, studies could adopt different versions (child
and parent) of the same scale to minimize the scale-level differences. Moreover, perception differences may also exist between children and their parents and cause the different results. Past research has also reported disparities between children’s self-reports and parents’ reports (Burrows et al., 2013; Gotlib & Robinson, 1982). Future researchers should be aware of these factors and consider possible misinterpretation and misconception of the reports from both children and parents.

Hypothesis 4 - sleep problems will significantly mediate the effect of SF-AT on trauma symptoms

The fourth research hypothesis was partially supported by the study results. In the SF-AT group, the magnitude of the significant positive effects on PTSD was reduced after introducing several sleep factors: sleep behavior change, sleep time change and daytime sleepiness change, which demonstrated some level of the mediation effect of sleep. Although the study failed to detect a full mediation effect, the partial mediation results added evidence to support the current belief that sleep and PTSD symptoms are reciprocally and interactively influence each other (Krakow et al., 2001). Sleep should be considered part of the mechanism of change for SF-AT on PTSD symptoms (Kovachy et al., 2013). Previous research showed that sleep problems can be relieved after PTSD symptoms improve, illustrating the importance of sleep in the role of initiating and facilitating other mental health changes, particularly PTSD changes in terms of the traumatic memory reprocessing and reintegration during sleep (Charuvastra & Cloitre,
Qualitative interview data provided additional support for these mediating effects, better sleep was considered as an indicator of better mood and performance from the participants’ treatment experience. This contemporary conceptualization of the role of sleep was supported in this study, and suggested the inclusion of treatment components for sleep problems. Sleep improvement should not be considered merely as a by-product of PTSD treatments; instead, sleep problems should be addressed primarily by trauma treatments.

**Qualitative results**

The study used Applied Thematic Analysis (ATA) to explore research questions including “What is the experience of participating in SF-AT?” and “What do the participants think of the effect of SF-AT?” Several themes were generated from the focus group interviews and presented as supports to the quantitative results, and as insights to the lived experience of the participants. The general group perceptions from the child participants were enjoyable and helpful when participating in their favorite art activities including dream drawing, goal setting, and solution identifying. Art was identified as an effective, easy, and safe way of emotion expression, which is consistent with the therapeutic conceptual framework of art therapy as discussed in earlier chapters (Monti et al., 2006; Rubin, 2001). Art, as an integrative and creative activity engaging many brain areas in a positive way, improved different aspects of participant well-being such as emotions, behaviors, relationships and sleep in this study. Compared to verbal
expression, children preferred drawing when working on trauma-related issues. This preference confirms the challenges of traditional verbal therapies for children (Oster & Gould, 1987; Turley & Obrzut, 2012) and may explain high attrition rates of those therapeutic modalities (Cohen et al., 2011; Rodenburg et al., 2009). The study results supported the conclusion that verbal therapy is inadequate to express the complex, subconscious and even unconscious thoughts of traumatized children, whose narrative and cognitive abilities are limited (Samuelson et al., 2010). The helpfulness of introducing a solution focused perspective and enhancing sleep knowledge during treatment were mentioned by the participants, indicating that a degree of psychoeducation and learning in a creative way (art activities) can facilitate positive changes in this population. In addition to identifying the useful components of SF-AT, participants also identified the preferable characteristics of the group facilitators, which can be utilized in future intervention development and treatment delivery.

5.2 Limitations

Sample. Several limitations of the study should be noted. First, the diversity and size of the study sample were limited by the research design and the availability of resources. The study used an RCT design to provide group therapy for children, and this design resulted in specific requirements for the location and client-flow of the research setting, due to the availability of transportation and funding for attending the program. The summer camp recruited its students based on their school district, where students
were primarily African American from low-income families, residing in downtown Columbus. The inclusion of this minority and vulnerable population contributed to study implications of SF-AT on African Americans. On the other hand, this recruitment method limited the diversity of the study sample. However, a multiple-setting study was not possible at the time of the study for the following reasons: students were restricted in their assigned summer camp setting; but students from multiple settings would be in one sample pool and be randomized into different treatment condition; the randomization would result in group members of the same treatment condition were from different settings; because the treatment in this study was a group therapy, group members need to physically present in one setting and participate; however, due to the previous stated reasons, children from different settings cannot participate group sessions in another setting. Thus, it was not possible to increase sample diversity and size by using multiple-setting recruitment. Last, reasons for the limited sample size included the class arrangement, client flow of the research setting, and the eligibility of the study population, as well as the limited resources of the pilot study. In order to ensure the RCT design and study rigor, the researcher carefully screened all potential participants in the research setting, and recruited an acceptable number of participants based on a priori power analysis. Limitations of the sample diversity and sample size may restrict the extent to which the findings can be generalized. In summary, this study was a pilot study with limited resources, thus results are tentative, but promising. Additional studies with
larger samples and more diverse populations are needed to increase the generalizability of SF-AT for treatment of children with PTSD.

**Confounders.** Due to the nature of the participants’ environment, it is possible that changes in mental health conditions may have been significantly influenced by ongoing family issues and unexpected life events (Dyregrov & Yule, 2006). The study did not include measures to evaluate environmental factors and family functioning of participants. Lack of consideration of those factors may confound the study results. To ensure a higher attendance rate, the study was conducted during the agency’s summer camp when attendance was required, resulting in an attendance rate considerably higher than during after-school programs. The pre-treatment assessments were conducted during the first week of the summer camp when participants had just finished their school term and examinations, while the post-treatment assessments were conducted six or seven weeks into the summer break. School work strongly influences students’ stress levels and sleep wellness (Den Wittenboer, 2000; National Sleep Foundation, 2017; Sadeh et al., 2003). Research has found that mental health problems and sleep issues are less prevalent during breaks than school days (Gerber et al., 2015; Sadeh et al., 2003). The summer break itself may be a strong protective environmental factor to facilitate symptom relief and healthier sleep. The positive effects of SF-AT were shared by these factors, therefore, the within-group study results may lead to biased conclusions unless the group comparison is considered. Factors such as the weather and family vacation arrangements
also had a large impact on attendance and the completion of assessments. For example, some children missed 1-2 sessions due to family summer vacations or weather alerts; the completion of the parent assessments was limited to their work schedules and health condition.

**Measurements.** Two PTSD scales—CRTES-R and CTS were adopted as measurements with consideration of the study design and the needs of the populations involved. First, the study focused on school-aged children (6-13) who had experienced trauma and tended to have attention and cognition deficits because of the experience; and, second, their parents had relatively low levels of education, so that a lengthy and complicated scale was not suitable for these populations. Other widely used instruments (e.g. Child PTSD Symptoms Scale and UCLA PTSD-index) contain as many as 217 items and need more than 20 minutes to complete (James Bell Associates, 2015; Steinberg et al., 2004), and therefore not appropriate for the study population. In addition, children in this study were not required to have a formal PTSD diagnosis, thus, CTS and CRTES as brief screen scales met the study needs. However, the CRTES-R is a newly revised version, and the CTS newly developed, thus, the two scales may not be sensitive enough to measure PTSD symptom levels and may result biased conclusions. The development of these scales is ongoing, and psychometric properties continue to be validated by researchers. Accordingly, the measurements may not have the same validity and reliability as with other widely-used scales, therefore, results should be interpreted
with caution. In addition, group assessments were used because of time and personnel limitations, which may influence the validity of the measurements. One-on-one assessments with a facilitator should be considered for childhood populations in future studies.

Another limitation of this study was the use of self-report measurements to assess outcomes. Sleep is a personal activity and may not be observable by others and even oneself. The study utilized the self-report SSR as a measure of sleep behavior, sleep time, and daytime sleepiness without incorporating an objective measurement. Due to funding limitations, it was not feasible to use a biometric wristband to monitor sleep changes in the study. Similarly, in PTSD measurements, biomarkers such as cortisol level and heart rate were not collected to support study outcomes. The reliance on subjective self-report measures in this study may cause biased results. In the future, wristbands should be used, and biomarkers should be collected to accurately measure sleep and PTSD change during treatment.

*EFAs on composite scores.* EFAs were conducted to calculate the composite scores of each scale and sub scale to ensure the appropriateness and fitness on the study sample. However, the results of factor loading were different from pre-treatment to post-treatment for CRTES and SSR. Limited by the small sample size of the study, advanced factor analysis and growth modeling were not applicable. Thus, in order to ensure the appropriateness of the composite scores at each time point, the study used different items
for each time. The use of this method is a limitation of the study that may increase the
differences between the two-time measurements and influence internal validity of the
study.

**Qualitative.** Qualitative data were collected through brief semi-structured
interviews in order to explore the lived experience and insights of group participants. An
in-depth interview, which can explore research questions in detail was not feasible at the
time of the study due to the time constrain. There are many types of mixed-methods
research designs with different emphases of the two methods; in this study, the
quantitative method was prioritized, while the qualitative method was embedded within
the larger study design as supportive and supplementary information sources (Guest et
al., 2011). This basic mixed methods design synthesized both quantitative and qualitative
methods to examine each hypothesis and lived experience. In future studies, researchers
can use more comprehensive and complicated design of mixed-methods to examine the
effectiveness of SF-AT in greater depth.

In addition to the simple mixed-method design, the sample of the focus group
consisted of only half of the SF-AT group participants, which may lead to biased results.
The active participation in the focus group may be driven by the positive experience of
the participants. Thus, responses and feedback may be biased by the self-selection of the
participants in the focus group; that is, children who participated in the focus group may
not be representative of the entire SF-AT group. In addition, member checking was
conducted only after obtaining transcripts and the generation of initial themes. Further member checking after completion of the qualitative analysis was unavailable to the researcher due to the difficulty of reconnecting with the participants.

**Fidelity.** Another limitation of the study was associated with the intervention delivery. Although the fidelity of the study was closely monitored by the researcher, the group facilitator could have benefitted from additional professional experience and training in the newly-developed SF-AT. Additionally, although the treatment manual was developed in consultation with experts in SFBT and other psychotherapies, it was developed and piloted by the researcher. A further revised and validated manual, delivered by an experienced, trained facilitator, would improve internal validity and treatment effects.

Despite the limitations, the current study contributes to research and practice in several important ways. First, the present study extends the evidence on SF-AT with respect to relieving PTSD and sleep symptoms, and addresses the literature gap of the mediation effect of sleep in SF-AT treatment. Second, this dissertation project developed a detailed manual of SF-AT treatment and fidelity scale, which promotes treatment implementation and adherence. Third, the current study builds on previous SF-AT literature by using mixed methods with an RCT design. These two approaches support each other and yield comprehensive and multi-dimensional findings. Fourth, the study adds knowledge and evidence of SF-AT practice on African Americans in poverty. Fifth,
the study also contributes to the theoretical framework of SF-AT by synthesizing several theories and models, and testing this framework. Last, this intervention study generates innovative contributions to the field of social work practice, and the development of future social programs for children.

5.3. Implications

The current study has important implications for social work practice, for the development of SF-AT and other interventions, and for future research regarding children with traumatic experiences or other similar mental health issues. Based on the study findings, practitioners should reevaluate the importance of art activities as a means of expression and communication for children with traumatic experiences and other stress-related mental health issues, as well as sleep disturbances and nightmares. Social workers and researchers should be aware of the important and reciprocal role of sleep in the treatment of PTSD. In future intervention development, sleep should be included as a treatment component to initiate and facilitate the amelioration of PTSD symptoms. Future research should further explore the effectiveness of using SF-AT as treatment for PTSD symptoms, and further examine the mediation effect of sleep for PTSD treatment, while referring to the limitations of the current study.

5.3.1 Implication for SF-AT

The study found that participants prefer an individual and personalized format over a group format. The reasons mentioned by the participants were that they feel more
connected with the therapists, and more willing to share their feelings and experiences privately. Children with attention problems were observed to be more engaged if they were given more personal attention or worked with individually. This suggests that one-on-one treatments may be more effective and acceptable for children with traumatic experience than group formats, at least in the initial stages of treatment, and particularly for children with attention problems (Beers & De Bellis, 2002).

It was also observed that participants preferred drawing instead of speaking about their experiences and feelings during treatment. Children with traumatic experience tend to keep their experiences private to avoid discrimination, re-exposure and further harm, which is common among sexual-abuse victims (Alaggia, 2005). Although SF-AT allows them to express themselves through drawing instead of talking, the children in the study still preferred a more closed and private environment to address their trauma issues. Drawings should be adopted in group therapy as a less-threatening and coded way of expression that provides a safe environment for exploring and transforming overwhelming emotions (Malchiodi, 2011; Odell, 2011). Moreover, drawing can activate and coordinate different parts of the brain and resolve subconscious and unconscious issues with bringing them to consciousness naturally and less-threatening (Malchiodi, 2011; Numburg, 1996). Thus, art activities should be widely used for treatments for children with PTSD.
Treatment contents and activities should be designed in a way that can engage children. Children typically learn well and quickly through play, drawing, and other fun activities which can motivate them (Landreth, 2002; Wethington et al., 2008; Piaget 1973; Roussou, 2004). Many activities were identified as useful and meaningful by the participants. SF-AT integrated therapeutic skills and techniques from SFBT and AT, and educational purpose into specifically-designed art activities to obtain the participants’ attention and promote changes simultaneously with having fun. In addition, SF-AT allows both verbal and drawing representations in the same treatment, which expands the dimension of the communication and expression. This multi-dimensional treatment model can be used for any existing treatment. For treating stress, trauma, nightmares, and other sleep problems SF-AT can theoretically work well as an adjunct therapy to many interventions such as CBT, family therapies, psychoeducation for children, and even for adult populations. Implementation of SF-AT would provide a developmentally-friendly, integrative and alternative approach to treatment for children.

Two treatment components—between-session homework and parent interaction sessions—facilitated child-parent communications and improved relationships according to the qualitative reports. The reported improvements in relationships are especially important because attachment issues could be the cause, as well as the result of, many mental health challenges in children (Dieperink et al., 2001; Lieberman & Van Horn, 2011). In addition, SF-AT emphasizes that the problems are temporary, therefore it is
beneficial to engage and empower the parents in order to utilize existing resources and to extend the treatment benefits. In the future SF-AT should require participation by parents in the joint sessions and between-session homework activities during treatment delivery. The study further recommends that future interventions should include child-parent joint sessions and between-session homework for children to be completed with their parents to extend the therapeutic benefits to home.

The SF-AT groups were embedded in an existing summer-camp curriculum that can be implemented by many agencies that host summer programs. Results also confirmed that SFBT and AT are compatible in a brief format (Matto et al., 2003). The brief format SF-AT in the study achieved positive effects on PTSD symptoms and sleep issues during the participants’ summer break. This treatment model makes it possible to reduce mental health issues significantly within regular summer programs, meaning that the cost of SF-AT would be comparatively low. An analysis of cost-effectiveness should be conducted for SF-AT to further investigate the benefits and advantages of implementation.

5.3.2 Implications for Practice with Traumatized Children

Implications for practice with the child population were extracted from the process of recruitment, assessment, intervention delivery, and focus group. Practitioners who work with children are encouraged to find appropriate and effective strategies to elicit engaging and meaningful conversation. Emotion-driven behaviors were noted
during the treatment; current moods influenced the way child participants responded and engaged in the group. The literature includes findings that emotion-regulation deficits and impulsive behaviors are common among children with traumatic experience (Gaher, Hofman, Simons, & Hunsaker, 2013; Laporte, Paris, Guttman, & Russell, 2011; Weiss, Tull, Viana, Anestis, & Gratz, 2012). The researcher found that children who can engage in group activities on one day may refuse to participate or respond on another day when they were “not in the right mood,” often precipitated by prior activities or peer conflicts before a session. The results suggest that, in this circumstance, practitioners should express care, acceptance, willingness to help, and restate group norms if necessary. Individual discussion, compromise, and allowance of partial participation may be necessary in group therapy with children.

The study discovered that nonjudgmental acceptance and unconditional care played important roles to build rapport and facilitate change in the study population. Participants were willing to share their experience and feelings with a therapist who demonstrates an open mind, cares about them, and does not judge them. These findings indicate that a healthy and close therapeutic alliance itself can motivate and engage clients (Franklin et al., 2015; Kim, 2008a; Matto et al., 2003). Children with traumatic experience tend to engage in negative thinking and may receive many complaints, criticisms, and orders from authority figures. Thus, in addition to the therapeutic alliance, a practice promoting strength-based and positive perspectives may be more acceptable and engaging for this
population. Participants were empowered by the strength-based treatment, and learned how to positively construct information and experience. Based on constructivism theory, through positive cognitive construction and social construction, clients can build a new way of problem viewing and solving. These reconstructions, developed in a positive and collaborative way, can help with negative thoughts and social impairments.

5.3.3 Implications for Future Research

The study identified several limitations of the study instruments and the assessment administrations. First, in future research, researchers should consider using the same scale, but include different versions (child, caregiver, teacher, or case manager), as instruments for multiple reporters to minimize the scale-level differences and to screen out confounders caused by the use of different scales. Second, future researchers should also be aware of possible misunderstanding, misinterpretation, and misconception of the reports by both child and parent due to environmental factors and poor relationships. Pilot tests on study instruments can be conducted to address potential issues and predetermine factors that may influence the accuracy of the assessments. Control variables such as the relationship between child and caregiver, family functioning, and parental competence may be added in future analysis. Regarding the administration process of assessments, researchers can use one-on-one interview assessments to ensure the accuracy of the measurements. Traumatized children and caregivers with lower education levels, or with older age, may have difficulty understanding and interpreting the instruments, and
connecting and reporting reality. Thus, close administration in the process of assessments may be helpful. Third, the study only used subjective reports from self and caregivers. Reports from third party observers such as school teachers, case managers and therapists can be included as relatively objective observations. Other advanced and objective measurements such as polysomnography, brain-imaging techniques and biomarkers should be used to accurately measure sleep and PTSD changes during treatment. Finally, the study examined the short-term effects of SF-AT between the pre- and post-assessments without examining long-term effects. Because SF-AT included take-home skills for parents, in the future, follow-up assessments should be conducted to examine the long-term benefits of SF-AT.

Although this pilot study was able to demonstrate positive effects of SF-AT, the study method can be further improved in order to increase the generalizability and rigor of the study. Frist, generalizability of the study sample was limited due to the small sample size and diversity. Future research should focus on conducting a larger scale study to examine the effectiveness of SF-AT. In addition, the current study consisted mostly African American participants, thus, future studies should also expand to populations including Caucasian, Asian, Hispanic/Latino, Native American.

Second, with the availability of larger samples, researchers should consider more advanced and appropriate statistical analyses such as path analysis, structural equation modeling and multilevel modeling. Mediation effects of sleep and the mechanism of
change for SF-AT can be further explored with more advanced methods. Furthermore, the current pilot study employed a basic format of mixed methods in which qualitative data were supportive information for quantitative results. Future studies can use a more advanced and comprehensive design of mixed methods to examine the effectiveness of SF-AT. In-depth interviews should be considered to collect qualitative data in order to examine the research questions while integrating with the quantitative methods in a synthesized way. The use of mixed methods is not a simple aggregation of the two methods, but an integrative and synthesized study method to explore the research questions in multiple dimensions (Creswell, Plano Clark, Gutmann, & Hanson, 2003). Moreover, studies are needed to examine the effectiveness of SF-AT in school settings during school days on general mental wellness of children to expand the implementation of SF-AT.

5.4 Conclusions

The study has shown SF-AT is beneficial as a complementary treatment for PTSD symptoms and sleep issues in children with traumatic experience and corresponding symptoms. The mechanism of change on PTSD was preliminarily examined and partially explained by mediation effects of sleep in this SF-AT pilot study. The dissertation project integrated treatment components of SFBT and AT and developed a detailed treatment manual for SF-AT for the study population. The study was the first RCT study to investigate the efficacy of SF-AT on children with traumatic experience and sleep issues.
with a mixed-methods research design. The inclusion of joint sessions with parents and parent-interactive between-session homework was innovative in SF-AT. The study contributed to SFBT, AT and SF-AT literature and raised awareness of using art expressions simultaneously with verbal expressions to treat PTSD and similar disorders. The important role of sleep in PTSD treatments and the reciprocal relationship should be further investigated. Future studies can use sleep wristbands, polysomnography, brain imaging techniques and biomarkers to examine the effectiveness and mechanism of SF-AT on PTSD and sleep problems. Studies with larger scale and an individual-treatment format should be conducted, and the results compared. Because stress-related symptoms and sleep disturbances are common among the child population, it is recommended that SF-AT should be an adjunctive component of interventions to improve general wellness, and should be widely used. Future research on the effectiveness of SF-AT on the general child population will be valuable to build evidence for generalized utilization of SF-AT with other disorders and other populations. In sum, this study has demonstrated that SF-AT provides benefits in a summer-camp setting; in the future, researchers and practitioners may develop further evidence of utilizing SF-AT in school settings and other summer programs from the social welfare and policy level.
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doi:10.1186/1471-244X-12-166 [doi]


Appendix A: Solution Focused—Art therapy Manual
Solution Focused - Art therapy Manual

All sessions will contain two domains: externalizing the problem and finding solutions. The past experience associated with stress will be drawn on small white paper. The future solution contents will be drawn on colorful larger paper. All art works will be gathered as a collection and review at the end of the intervention (last session) together with the parents.

Pre-treatment meeting: Explain the study and process to parents. Let the parents sign the consent and permission forms. Pre-treatment assessments for children on the first day or second day of the camp.

Session 1: Forming (Thursday 6/21)

Elements of the First Session

Introduction

Method negotiation

The work of the session/group task

Therapeutic break

Social time

Post-session review

Parent joint session (parent welcome to join).

• Explanation art therapy and solution focused approach, talk about the reason they come this therapy group/things they want to improve.

• Greetings, introductions, explanation of AT for the participants, legal confidential issues and answer question.

• Creative way to introduce themselves (name, one positive thing about themselves/within the family: try solution/positive perspective: “secret talent they have” “hobby they would like to take up” “something they are proud of in their lives”).

• Ask the children to do some spontaneous art about what’s their goal of the thing they want to get help. Talk about what they draw and talk about the problem. Encourage parents’ opinion. Encourage externalizing the problem and the start of a narrative for the clients.

• “What will have to happen, as a result of you coming here today -- this afternoon, tomorrow, the day after tomorrow -- for you to feel that it's been somewhat useful to, to be here?”
Home work: goal preparation (notice what happens to you that you want to continue to happen); Planning/going forward.

Session 2: Establishing Goals: Tues 6/23

- Draw miracle question: “suppose that tonight while you are asleep there is a miracle and the problem is solved. How would you know? What would you be doing differently?” and encourage them to expand the miracle.
- Realistic goals: “now that we have an idea of what you would like to be different and since miracles aren’t likely, what will you be doing to get that to happen?”
- Student establish a/several concrete goal(s) for following week on a goal sheet. The sheet will be used for the following sessions.
- Initial solution focused scaling about current position to the goal (draw the issue, then the goal, and rate how far they are from the goal: give them a paper with bridge that connect their issue with the goal, let them rate how far they are right now). Motivate the client to discover small steps of change by exploring client strengths, resources, what occurred last week, and what worked in the past. Identify possible solutions when feeling stressed. Solution focused scaling.

Homework: draw/think positive thoughts or solutions together with parent/caregiver or show them the drawing.

Session 3: Keys to the solutions. 6/28

- So, what is better, even a little bit, since last time we met?
- Practice of viewing things positive: provide examples or real life stresses, let the kids provide possible positive interpretations of that.
- Mind-mapping drawing: e.g. mind map of a stressful day, mind map of a good day (draw something represent a good day or bad day, then draw some typical things compromise that days).
- Identify the coping skills, past success.
- What’s the first step toward their goal to change what they want to change? Addressing coping skill and helping others (group brain storm of solutions).

Homework: Do one thing special to the parents as every problem is gone (but not telling them at first). At night, talk with the parents, ask whether they noticed that, how do they feel. After that, together with the parents, come up with some more keys to the solutions. And start trying that.
Session 4: Initial progress to the solutions. 6/30

• Homework check-up. Share thoughts. Group feedback.
• Do more if it’s working, do something different if it’s not working.
• Paint their facial expressions with symptoms and without symptoms on two plain masks that can represent themselves. Paint on one mask first as the facial expression of themselves when they have the symptoms. Then shift the attention to paint a happy/positive facial expression with desired colors based on their past successful experience or imagining their future happiness.
  • How to have a facial expression of happy?
  • Solution focused scaling. Key to solutions and actual actions.

Homework: show the masks to their parent/caregiver and explain to them. Check the actual action to move forward.

Session 5: Dream session, sleep session 7/5

• Children will be asked to draw their terrible/traumatic/stressful dreams.
• Talk about how this reflect the real world events/experience.
• Express their fear, feeling and share with other kids.
• What will be helpful to reduce bad dreams and sadness after the dream? (share experiences and provide support to each other. Normalize this experience)
  • Talk about some sleep hygiene information.

Homework: tell parents their most terrible dreams, and think about a positive or release way to interpret that to eliminate the fear.

Session 6: Check progress to the solutions. 7/12

• Drawing lights of the stressful experience in the development process (what you have learned or grow from that experience: good aspects).
• Emphasize on good aspects and avoid unpleasant aspects.
• Stress ball making
• Checking on sleep problems.
• Solution focused scaling: how far do you think you moved toward your goal on the bridge.

Homework: Talk about what they have learned from the so far sessions with their parents. Talk about what’s their progress.

Session 7: drawing/making desirable future and best hope: boost the positive view of future 7/19
• Draw family portrait indicating family relationships to identify helpful family members.
• Ask the children to use paper-cuts and paper folders to present their desirable future and best hopes. Some paper-cutting and folding examples will be provided. Therapists will lead them to cut or fold what they wish to do. Encourage them to include surrounding people and resources.
• Solution focused scaling.

Session 8: Final session (Parent joint session) 7/26
• Free drawing, paper cutting, and paper folding. Review all the art works (drawing, masks, paper cutting, paper folding) during the previous sessions.
• Solution focused scaling. Identify progresses, unresolved questions, and future plan.
• Free talking, social talking.
• Celebration of the change

Focus group on 7/28
Appendix B: Solution Focused—Art therapy Fidelity Scale
SF-AT Fidelity Scale

1. I asked “what’s better” in today’s session.

2. The client’s stated needs for today’s session were related to overall goal(s) for therapy.

3. I complimented the client’s strengths/resources during today’s session.

4. I asked exception/difference questions during today’s session.

5. I asked scaling questions during today’s session.

6. I asked coping questions related to the client’s abilities that emerged during today’s session.

7. I asked for feedback on the helpfulness of the session today from the client.

8. I asked the client the miracle question.

9. I asked the client “what else” was better in today’s session.

10. I complimented the family about their contributions as the session ended.

11. I asked the client draw what they wish to draw/make but related to their problems.

12. The drawings or the handcrafting are related to the intervention goal.

13. I elicit the client to talk about the drawing and express their feeling.

14. The session’s drawing is focused on future, positive, and brightness.

15. I embed most the solution focused questions and skills in the art making process and guide the conversation.
Appendix C: Child’s Reaction to Traumatic Events Scales – Revised (CRTES-R)
Below is a list of comments made by people after stressful life events. Please check each item, indicating how often these comments were true for you DURING THE PAST SEVEN DAYS. If they did not occur during that time, please mark the “Not at all” column.

<table>
<thead>
<tr>
<th>Item</th>
<th>Not at all</th>
<th>Rarely</th>
<th>Some times</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I thought about it when I didn’t mean to. *</td>
<td></td>
<td></td>
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<tr>
<td>2. I stopped letting myself get upset when I thought about it or was reminded of it. *</td>
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<tr>
<td>3. I tried not to remember. *</td>
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<tr>
<td>4. I had trouble falling asleep or staying asleep because pictures or thoughts about it came into my mind.</td>
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<tr>
<td>5. I had strong feelings about it. *</td>
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<tr>
<td>6. I had dreams about it.</td>
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<tr>
<td>7. I stayed away from things that reminded me of it. @</td>
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<tr>
<td>8. I felt that it did not happen or that is was make-believe. @</td>
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<tr>
<td>9. I tried not to talk about it. @</td>
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<tr>
<td>10. I kept seeing it over and over in my mind.</td>
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<tr>
<td>11. Other things kept making me think about it.</td>
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<tr>
<td>12. I had lots of feelings about it, but I didn’t pay attention to them. *</td>
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<tr>
<td>13. I tried not to think about it. *</td>
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<tr>
<td>14. Any reminder brought back feelings about it.</td>
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<tr>
<td>15. I don’t have feelings about it anymore. *</td>
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<tr>
<td>16. It was easy to make me angry and upset. @</td>
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<tr>
<td>17. Loud noises made me jump in surprise.</td>
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<tr>
<td>18. I would act like it was happening all over again.</td>
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<tr>
<td>19. I had trouble keeping my mind on what I was doing.</td>
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<tr>
<td>20. Thinking about it made my heart beat faster.</td>
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<tr>
<td>21. Thinking about it made it hard for me to breathe.</td>
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<tr>
<td>22. Thinking about it made me sweat.</td>
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<tr>
<td>23. I kept checking to make sure nothing else bad would happen.</td>
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</tbody>
</table>

* item was deleted from pre-assessment data based on EFA results.
@ item was deleted from post-assessment data based on EFA results.
Appendix D: Sleep Self Report (SSR)
SLEEP SELF REPORT (Child Form)

These questions are about your sleep. The researcher will explain the form and read you the questions in class. Please mark your answer to each question in the box. There are no right or wrong answers. Please ask if you do not understand a question. Thank you!

1. Who in your family sets the rules about when you go to bed?
   - [ ] Mom
   - [ ] Dad
   - [ ] You
   - [ ] Other: ______

2. Do you think you have trouble sleeping?  [ ] Yes  [ ] No

3. Do you like to go to sleep?  [ ] Yes  [ ] No

(3) Usually (5-7)/week  (2) Sometimes (2-4)/week  (1) Rarely (0-1)/week or never

BEDTIME

4. Do you go to bed at the same time every night on school nights? **(R)
   [ ] Yes  [ ] No  [ ] Don’t know

5. Do you fall asleep in the same bed every night? *(R)
   [ ] Yes  [ ] No  [ ] Don’t know

6. Do you fall asleep alone? (R)
   [ ] Yes  [ ] No  [ ] Don’t know

7. Do you fall asleep in parents’, brothers’, or sisters’ bed? *
   [ ] Yes  [ ] No  [ ] Don’t know

8. Do you fall asleep in about 20 minutes? *(R)
   [ ] Yes  [ ] No  [ ] Don’t know

9. Do you fight with your parents about going to bed? **
   [ ] Yes  [ ] No  [ ] Don’t know

10. Is it hard for you to go to bed? *
    [ ] Yes  [ ] No  [ ] Don’t know

11. Are you ready for bed at your usual bedtime? *(R)
    [ ] Yes  [ ] No  [ ] Don’t know

12. Do you have a special thing (doll, blanket, etc.) you bring to bed?
    [ ] Yes  [ ] No  [ ] Don’t know

13. Are you afraid of the dark? *
    [ ] Yes  [ ] No  [ ] Don’t know

14. Are you afraid of sleeping alone? *
    [ ] Yes  [ ] No  [ ] Don’t know

15. Do you stay up sleeping late when your parents think you are asleep? **
    [ ] Yes  [ ] No  [ ] Don’t know

SLEEP BEHAVIOR

16. Do you think you sleep too little? *
    [ ] Yes  [ ] No  [ ] Don’t know

17. Do you think you sleep too much? *
    [ ] Yes  [ ] No  [ ] Don’t know

18. Do you wake up at night when your parents think you’re asleep?
    [ ] Yes  [ ] No  [ ] Don’t know
19. Do you have trouble falling back to sleep if you wake up during the night? *

20. Do you have nightmares?

21. Does pain wake you up at night? Where is that pain?

22. Do you sometimes go to someone’s bed during the night? If yes, who? @ ____________________________

**DAYTIME SLEEPINESS**

23. You have trouble waking up in the morning?

24. Do you feel sleepy during the day? *

25. Do you take naps during the day? @

26. Do you feel rested after a night’s sleep? (R) @

* item was deleted from pre-assessment data based on EFA results.
@ item was deleted from post-assessment data based on EFA results.
Appendix E: Connecticut Trauma Screen—Parent Version (CTS-P)
Information Sheet

**If you have already filled the information sheet at the pre-treatment assessment, you only need to update any information that is changed. No need to complete the whole information sheet.**

1. Child gender: __ Female  __ Male

2. Birth date (Month/Day/Year): ____/____/____

3. Ethnicity: _____ Caucasian American  _____ African American
   _____ Hispanic/Latino American  _____ Asian American
   _____ Native American  _____ Biracial or Multiracial (please specify):
   _____ Other (please specify) : ________________________________

4. What is your education level?
   □ High School  □ Undergraduate School
   □ Graduate School  □ Post-graduate School
   □ Others (please specify): ____________________________________

5. Are you currently:
   □ Single  □ Married
   □ Divorced  □ Widowed

6. Does the child have any mental health diagnoses? Check all that apply.

   ___ Attention Deficit and Hyperactivity Disorder  ___ Conduct Disorder
   ___ Oppositional Defiant Disorder  ___ Depression
   ___ Anxiety  ___ Bipolar Disorder
   ___ Adjustment Disorder  ___ Post-traumatic Stress Disorder
   ___ Disruptive Mood Dysregulation Disorder  ___ Others. Please specify __________________________________________

7. Is the child currently on any medications for mental health problems?
   ___ Yes  ___ No

8. The child is currently living with: ________________________________________________
Connecticut Trauma Screen

Caregiver Report (Age 6+)

EVENTS: “Sometimes, scary or very upsetting things happen to people. These things can sometimes affect how we think, what we feel, and what we do. I am going to read off a list of things that may have happened to your child in the past, and I'd like you to tell me if each happened to him/her.”

1. Has your child ever seen people pushing, hitting, throwing things at each other, or stabbing, shooting, or trying to hurt each other? [ ] Yes [ ] No

2. Has someone ever really hurt him/her? Hit, punched, or kicked him/her really hard with hands, belts, or other objects, or tried to shoot or stab him/her? [ ] Yes [ ] No

3. Has someone ever touched him/her on the parts of his/her body that a bathing suit covers, in a way that made you or your child uncomfortable? Or has someone had him/her touch them on his/her parts of their body that a bathing suit covers? [ ] Yes [ ] No

4. Has anything else very upsetting or scary happened to your child (loved one died, separated from loved one, been left alone for a long time, not had enough food to eat, serious accident or illness, fire, dog bite, bullying)? What was it? [ ] Yes [ ] No

REATIONS: “I would like to know how your child has been feeling and thinking recently. I'm going to read some statements and I'd like you to tell me how often these things happened to him/her over the last 30 days.”

None = Never or rarely; Little = 1-2 times per month; Some = 1-2 times per week; A lot= 3+ times per week

<table>
<thead>
<tr>
<th>[Omit words in brackets if child has not reported any events]</th>
<th>None</th>
<th>Little</th>
<th>Some</th>
<th>A lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. He/she has strong feelings in his/her body [when he/she remembers what happened] (sweating, heart beats fast, feel sick).</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>6. He/she tries to stay away from people, places, or things [that remind him/her about what happened].</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>7. He/she has trouble feeling happy.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>8. He/she has trouble sleeping.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>9. It’s hard for him/her to concentrate or pay attention.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>10. He/she feels alone and not close to people around him/her.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>
Appendix F: Focus Group Guideline
Focus Group Guideline

1. What’s the experience of the SF-AT group participation?

2. If you have another chance to attend this kind of group, will you choose to participate again? Will you recommend your friend to try this?

3. Which specific areas of the SF-AT do you like or not like?

4. How is this SF-AT helpful or no helpful with you sleep?

5. How is this SF-AT helpful or no helpful with your trauma related symptoms?

6. What kind of changes have the group brought to you? Please provide examples.

7. Do you like to share your stories and feelings with others use your drawings?
   The two forms of group: one is draw your ideas and then share your feelings with others, the other one is only talking during the whole time, what are the differences based on your experience?

8. How do you like finding solutions and looking at the future instead of only talking about what has happened?
Appendix G: Code List
Code list

Code-Filter: All

Change_emotion-stress
Change_emotion_anger
Change_express feeling and emotion
Change_relationship and share

Change_sleep latency
Change_sleep quality
Change_sleep resistance
Change_sleep time

General experience_helpful
General experience_interesting

Experience_like learning new things
Experience_like drawing

Favorite art activity_dream drawing
Favorite art activity_goal setting bridge
Favorite art activity_stress ball
Favorite art activity_stress solution wheel

Group format_drawing
Group format_one on one

Recommendation_less talk more draw
Recommendation_less review back
Recommendation_privacy

Therapeutic element_method to express and share
Therapeutic element_art drawing
Therapeutic element_incentives
Therapeutic element_solution focused perspective
Therapeutic element_sleep knowledge
Therapeutic element_therapeutic relationship

Therapeutic relationship_non-judgemental acceptance
Therapeutic relationship_therapist's characteristics
Therapeutic relationship_nonjudgmental acceptance