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A Mixed Methods Evaluation of the Effectiveness of a Group Yoga Intervention as an Adjunctive Trauma Therapy for Adolescent Girls

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Abstract

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This embedded mixed methods study expands the literature by evaluating group data regarding a yoga psychotherapy group based on the Healing Childhood Sexual Abuse with Yoga (HCSAY; Lilly & Hedlund, 2010) curriculum as an adjunctive treatment for trauma conducted at two outpatient programs. Data were collected at pretest and post-test through questionnaires. Qualitatively, data were collected through a weekly Yoga Experience Form completed during the group, follow-up interviews, and the author's field notes. The Yoga Experiences Form was designed to help participants reflect on the themes and awareness gained in the group. The quantitative questionnaires measured both general symptoms through the Youth Outcomes Questionnaire-Self Report (YOQ-SR; Wells, Burlingame, & Lambert, 2005) and trauma-related symptoms through the Child PTSD Symptom Scale (CPSS; Foa, Johnson, Feeny, & Treadwell, 2001). In addition, participants' beliefs in the group's themes were assessed through the Affirmation Questionnaire developed by the author.

Outcomes were evaluated using repeated measures ANOVA and content analysis. Findings indicated that yoga was helpful in decreasing behavioral, mood, and avoidance symptoms associated with trauma. Similar gains were seen in two samples with differing levels of symptom severity across mental health symptoms, though the group with higher initial symptom severity demonstrated a smaller decrease in trauma-specific symptoms. While the physical postures were discussed most frequently as respondents' focus about what was helpful and difficult about the group, over half the group members also noted that components of the breath work were helpful and 39% noted that the meditative and mindfulness components were helpful. Themes related to safety, strength, trust, and community had the most impact for participants. Overall, while trauma presents differently in youth than in adults, the findings from the current study are similar to recent findings from studies with adult female survivors of trauma that suggest yoga is a helpful adjunct to talk therapy.

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reflect on the themes and awareness gained in the group. The quantitative questionnaires measured both general symptoms through the Youth Outcomes Questionnaire-Self Report (YOQ-SR; Wells, Burlingame, & Lambert, 2005) and trauma-related symptoms through the Child PTSD Symptom Scale (CPSS; Foa, Johnson, Feeny, & Treadwell, 2001). In addition, participants' beliefs in the group's themes were assessed through the Affirmation Questionnaire developed by the author.

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Prevalence & Symptoms of PTSD & Trauma

Traumatic experiences are prevalent in our society. Research shows that over half the United States population has experienced a traumatic event at some point (Koenigs & Grafman, 2009). Of those individuals, one in 12 individuals develop Posttraumatic Stress Disorder (PTSD), and over a third of those diagnosed with PTSD fail to fully recover from symptoms (Koenigs & Grafman, 2009). In a nationally representative, epidemiological study of PTSD in Canadian adults, the lifetime prevalence rate was estimated at 9.2% with a current rate of 2.4% (Van Amerigen, Mancini, Patterson, & Boyle, 2008). Exposure to traumatic experiences capable of causing PTSD was reported in 76.1% of individuals involved in the study (Van Amerigen et al., 2008). In a study of a large national sample of American adolescents, 61.8% had experienced a potentially traumatic event during their lifetimes (McLaughlin et al., 2013). Of those, 7.3% of females and 2.2% of males developed PTSD for a combined prevalence rate of 4.7%. One-third of individuals continued to meet criteria for PTSD 30 days after their initial interview. Prior exposure to potentially traumatic events, especially interpersonal violence, and prior fear and distress disorders predicted PTSD diagnosis (McLaughlin et al., 2013). Due to the significantly higher prevalence rates in girls, interventions directed specifically towards girls are needed.

Complex childhood trauma involves children's experiences of multiple traumatic events either simultaneously or sequentially, including emotional abuse, neglect, sexual abuse, physical abuse, and witnessing domestic violence, beginning in early childhood and often occurring within the caregiving system (Cook, Blaustein, Spinnazola, & van der Kolk, 2003). Complex childhood trauma is linked to negative long-term functioning across domains, including impaired interpersonal relationships and insecure attachment styles (D'Andrea, Ford, Stolbach, Spinazzola, & van der Kolk, 2012). Initial traumatic experiences often lead to subsequent exposure (D'Andrea et al., 2012). A meta-analysis found significant associations between sexual abuse and anxiety, anger, depression, revictimization, self-mutilation, sexual problems, substance abuse, suicidality, impaired self-concept, interpersonal problems, obsessions and compulsions, dissociations, posttraumatic stress responses, and somatization (Neumann, Houskamp, Pollock, & Briere, 1996). The Adverse Childhood Experiences (ACE) study further confirmed that there was a highly significant relationship between adverse childhood experiences of all types of trauma and depression, suicide attempts, alcoholism, smoking, drug abuse, sexual promiscuity, domestic violence, obesity, and physical inactivity (Felitti et al., 1998). In addition, the higher number of adverse childhood experiences an individual reported, the more likely that person was to develop heart disease, cancer, stroke, diabetes, and liver disease (Felitti et al., 1998).

Though trauma is prevalent, only small portions of those who experience adverse events develop PTSD. In fact, trauma-related disorders are often not the most-diagnosed disorders in children who have experienced trauma (Zelechoski et al., 2013; D'Andrea et

al., 2012). Youth who have experienced abuse may be at greater risk for developing behavioral and social difficulties than PTSD (Pelcovitz et al., 1994), and 40% of youth who have a trauma history meet criteria for another mood, anxiety, or disruptive behavior disorder (Copeland et al., 2007). At the National Child Traumatic Stress Network, fewer than 25% of children in treatment for trauma-related sequelae meet full criteria for PTSD (Pynoos et al., 2008). Other researchers have reported that PTSD is the 5th (Ackerman, Newton, McPherson, Jones, & Dykman, 1998) and 10th (Copeland, Keeler, Angold, & Costello, 2007) most commonly diagnosed disorder in youth who have experienced trauma.

The reason that PTSD may not be the most prevalent disorder amongst children being treated for traumatic experiences is that expressions of trauma-related distress in youth may present differently in children than adults (Spinazzola, Rhodes, Emerson, Earle, & Monroe, 2011). Researchers, led by van der Kolk (2005), have argued that a developmentally appropriate trauma diagnosis for children who have experienced chronic maltreatment would be most appropriate to capture the experiences of traumatized youth (Spinazzola, et al., 2011). Well-documented trauma symptoms presenting in children include dysregulation of affect and behavior, disturbances of attention and consciousness (including dissociation), distortions in cognitive attributions, and interpersonal difficulties (D'Andrea et al., 2012). Similarly, Perry (2003) described anxiety, depression, and behavioral impulsivity as reflective of core changes related to experienced trauma. In criminal populations, PTSD has been conceptualized as manifesting as a conduct disorder

involving externalizing, action-oriented adaptation, rather than anxious withdrawal (Roach, 2013).

According to the *Diagnostic and Statistical Manual of Mental Disorders* (5th edition; DSM-5; APA, 2013), in order to be diagnosed with PTSD, one must have experienced a traumatic event that involved actual or threatened death, serious injury, or sexual violence. Secondary trauma was also added to the list of events capable of eliciting PTSD. In order to meet criteria for PTSD in the *DSM-5*, a person must experience at least one intrusion (experiencing) symptom, at least one avoidance symptom, at least two changes in cognition and mood, and at least two changes in arousal and reactivity (APA, 2013).

The *DMS-5* maintained the general symptom clusters of the *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition, Text-Revision* with some changes in language, such as describing experiencing symptoms as intrusion, adding reckless and self-destructive behavior to the arousal symptom cluster, and reducing the avoidance symptom cluster to two symptoms. The remaining avoidance symptoms were re-categorized in a new symptom cluster, negative alternations in cognitions and mood. Sense of a foreshortened future was removed entirely. Two new symptoms were added to this category: "Persistent and exaggerated negative beliefs or expectations about oneself, others, or the world" and "Persistent, distorted cognitions about the cause or consequences of the traumatic event(s) that lead the individual to blame himself/herself or others" (APA, 2013, p.145). Separate criteria are now specified for children six and younger. A dissociation specifier was also added, and it is also notable that PTSD was

moved from within the anxiety disorders category to a separate category of Trauma and Stressor-Related Disorders.

Recall that trauma symptoms presenting in children include dysregulation of affect and behavior, disturbances of attention and consciousness (including dissociation), distortions in cognitive attributions, and interpersonal difficulties (D'Andrea et al., 2012). The new *DSM-5* criteria capture the distortions in cognitive attributions and dissociative features more clearly than the *DSM-IV-TR*. However, the alterations in arousal category focuses on hyperarousal, and hypoarousal is only effectively captured if someone becomes dissociative. Hallmark behaviors of children with PTSD largely fall under one symptom out of a symptom cluster. For instance, interpersonal difficulties are captured to some extent under alterations in cognition and mood's symptom of "feelings of detachment or estrangement from others." Likewise, behavioral dysregulation is captured under arousal symptoms with "Irritable behavior and angry outbursts… typically expressed as verbal or physical aggression toward people or objects" (APA, 2013, p. 145).

Complex diagnostic presentations of youth can interfere with treatment of traumatic stress (Spinazzola et al., 2011), leading children to be under or over-treated (D'Andrea et al., 2012). Trauma-exposed youth who do not meet symptom criteria for PTSD may still warrant trauma-related treatment, and treating their traumatic exposure may result in reductions of other symptoms. Given the way trauma symptoms in youth who have experienced complex trauma map onto diagnostic criteria, it is not surprising

that youth often do not receive PTSD diagnoses. As a result, this study evaluated the intervention as it relates to both trauma symptoms and global symptom severity.

Trauma symptoms manifest differently in individuals who experience single-event traumas, often known as Type I traumas, or chronic, multiple event traumas (complex traumas), known as Type II traumas. Herman (1992) posited that trauma recovery for individuals who have experienced chronic Type II trauma occurs in three stages: 1. Safety and Stabilization, 2. Remembrance and Mourning, and 3. Reconnecting. The primary goal of the first phase is to help the client regain internal and external control. The clinician helps the client learn skills to decrease internal distress and assists the client in establishing a safe environment. In the second stage of trauma recovery, the client reconstructs the trauma story in great detail while the clinician bears witness to the client's story. The final stage of trauma recovery involves redefining oneself in the context of meaningful relationships, and regaining a secure sense of self, independent of external events and interactions (Herman, 1992).

Unless safety and stabilization can occur, the individual cannot progress through the subsequent stages of trauma recovery. Well-researched models of trauma treatment, such as Trauma-Focused Cognitive Behavioral Therapy, may not sufficiently address trauma-related dysregulation necessary for safety and stabilization due to burgeoning evidence regarding the effects of trauma on the body. A wealth of recent neuroscience evidence has led psychologists to seek greater integration of mind and body in trauma-oriented treatments (Perry, 2009; van der Kolk, 2006). While the integration of mindfulness has grown and Westerners have increasingly practiced yoga to cope with

stress and enhance well-being, psychologists have begun to explore the implications of yoga as one such somatic or body-oriented intervention.

Yoga as a Trauma Treatment

Centuries before the development of Zen Buddhism from which many mindfulness practices derive, yoga was practiced in India. Yoga is estimated to be 4,000 to 5,000 years old, and "can actually be thought of as the original body-inclusive psychotherapy" (Duros & Crowley, 2014, p. 241). Yoga is a Sanskrit word that means "union" or "to yoke." The practice of yoga involves connection of the body and the mind. While many Western practitioners think of yoga primarily as *asana*, the physical postures associated with yoga, physical asanas, were developed to prepare the body for stillness and meditation. Asanas are merely one arm of an eight-limbed process described by Patanjali in *The Yoga Sutras*. Breath work, physical postures, and meditation are all components of yoga that are thought to be beneficial in reducing trauma symptomology (Spinnazola, Rhodes, Emerson, Earle, & Monroe, 2011; van der Kolk, 2014).

Much like other mindfulness interventions, yoga has the capacity to reduce avoidance symptoms of PTSD by focusing attention on the present moment and attending to thoughts and emotions without judgment to decrease avoidance symptoms of PTSD (Mitchell et al., 2014). Yoga is expected to be able to down-regulate the stress response so that it positively affects PTSD and comorbid symptoms (Mitchell et al., 2014). Further, yoga offers a safe container for developing body awareness needed in individuals who have experienced trauma, and cultivating the ability to be in the body

can help an individual to move forward in therapy (Duros & Crowley, 2014). Yoga provides the experience of both exercise and mindfulness at once. Exercise itself has been shown to decrease difficulties in engaging in goal-directed behaviors when experiencing negative emotions, improve self-esteem, and decrease symptoms of anxiety, depression, and PTSD in those who have experienced child abuse (Carroll, 2014).

Though research is lacking regarding yoga with traumatized youth, recent studies demonstrate the benefits of yoga to address trauma symptoms with adult females. Dale et al. (2011) found that women with abuse histories as either children or adults who engaged in frequent yoga practices reported more positive self-concepts and improved coping. Their findings were connected to the extent to which the women incorporated yoga into their lives independent of abuse severity. Van der Kolk (2006) reported a study where eight adult subjects participated in a yoga group and found decreases in re-experiencing (intrusion) and avoidance symptoms. Another pilot study described in the same article yielded decreases in the frequency of intrusions and severity of hyperarousal symptoms (van der Kolk, 2006). In a randomized controlled trial regarding yoga as an adjunctive therapy, van der Kolk and colleagues (2014) assigned women to either a trauma-informed yoga group or a supportive women's health group, which each ran for 10 weeks. At the end of the groups, 52% of women in the yoga group, compared to 21% of women in the control group, no longer met PTSD criteria. While both groups experienced significant decreases in PTSD symptoms during the first half of treatment, the yoga group maintained the gains while the control group relapsed after initial gains (van der Kolk et al., 2014).

In this writer's careful review of the literature, there is only one quantitative study of yoga with adolescents who have experienced trauma, which addresses trauma symptoms in juvenile sex offenders (Lee-Kin, 2013). That study demonstrated a decrease in symptoms following the yoga intervention using the Child PTSD Symptom Scale, which was also used in the current study. Likewise, there is a relative lack of developed models of yoga interventions for traumatized adolescents. Therefore, additional research regarding the effects of yoga with adolescents who have experienced trauma is needed.

Healing Childhood Sexual Abuse with Yoga (HCSAY)

The field of yoga psychotherapy is in its infancy, and even fewer empirical studies and models have emerged regarding yoga as a trauma treatment with children and adolescents. Created by Lilly and Hedlund (2010), the HCSAY model, is the only published model for treatment of trauma through yoga with youth. They created the HCSAY model to help restore childhood sexual abuse victims to "wholeness and a life of greater joy" (p. 120). Their model is an eight-week curriculum with weekly 90-minute sessions, which has been utilized with clients of both genders and varying age groups. Each session in the curriculum involves a theme, a mantra or affirmation that goes with the theme, a body scan to orient clients to the practice, asanas (physical postures) to promote strength, a final relaxation exercise, and a formal closing involving sound. In keeping with the tripartite model of trauma recovery (Herman, 1992), this is a Phase I treatment. The group initially focuses on themes like safety and boundaries, and then moves to establishing other concepts involved in a secure sense of self, including strength

and assertiveness. Themes associated with the group are safety, boundaries, strength, assertiveness, power, intuition, trust, and community. Yoga postures are chosen that correspond to the session's theme (Lilly & Hedlund, 2010). For example, child's pose and returning to a safe and protected place if feeling triggered is emphasized during the focus in week one on safety. Warrior poses are emphasized in week three with the theme of strength.

Thus far, research regarding the HCSAY model has been informal. The authors surveyed seven participants in the 13 to 18-year-old girls' group about their experiences following the completion of the group. Of those surveyed, 85% agreed that yoga made them feel more energetic, happier, more focused, and less nervous and tense. Seventy-one percent of girls reported practicing on their own once a week. Eighty-five percent agreed that they had learned techniques to allow themselves to feel safe in their bodies and that they gained more emotional, physical, and mental strength.

More research is needed to support this model, but the model appeared to be relatively grounded in previous trauma theory. While the HCSAY curriculum was studied with one group of girls, all data were collected following the group experience. A larger sample is needed to determine if the results are generalizable, and qualitative data should be collected during the intervention to gain an understanding of which portions of the intervention are perceived to be helpful. Also, exploration with clients who have experienced other forms of trauma aside from sexual abuse will be beneficial, as children who have experienced all types of complex trauma are believed to follow similar trajectories. Quantitative evidence supporting the effectiveness of the group yoga

intervention is needed. Therefore, this study will expand on the research using the HCSAY model by studying the effectiveness of the model as an adjunctive trauma intervention with adolescent girls who have experienced varying forms of trauma in a mixed methods design across two sites.

Statement of the Problem

Many trauma theorists and neuroscientists have acknowledged the effects that trauma has on the body. Theories point to a need to address trauma from both a cognitive and body-oriented perspective, and evidence-based models, such as the Neurosequential Model of Therapeutics (Perry, 2009), argue that the developmental point at which trauma occurs affects where to intervene in the brain's development (Brainstem, limbic system, cerebral cortex). Body-oriented psychotherapies have conceptualized trauma as stored in the body, and have posited that this body-oriented view of trauma explains a lack of success of talk therapy treatments for some traumatized individuals (Ogden, Minton, & Pain, 2006) or partial success with a high degree of residual symptoms. The majority of evidence-based studies of trauma treatment are related to Cognitive Behavioral Therapy, even though neuroscience studies demonstrate limitations in the brain's ability to effectively process trauma cognitively. There is a high need for empirical investigation of body-oriented trauma interventions that are capable of providing decreased distress and increasing regulation.

Concurrently, third-wave cognitive therapies have been developing that promote mindfulness. A natural extension of such mindfulness-based therapies and body-oriented trauma treatments, particularly given the increased popularization of yoga, is the

integration of yoga with psychotherapy. Though these related lines of inquiry have led to the current investigation, the use of yoga as an adjunctive treatment to address trauma symptoms in the field of psychology is in its infancy, and quantitative data regarding outcomes from yoga psychotherapy remain sparse in the literature. To date, there are only two randomized controlled studies for treatment of trauma-related yoga symptoms with adult women, both of which were published in 2014 (van der Kolk et al., 2014; Mitchell et al., 2014). The only currently reported studies of yoga to treat childhood trauma in adolescents are extremely preliminary in nature and discuss the development of programs for yoga psychotherapy with youth (Lilly & Hedlund, 2010; Spinazzola, Rhodes, Emerson, Earle, & Monroe, 2011), with the exception of one dissertation study with 11 participants from a very specific population (Kee-Kin, 2013). There is a clear need for continued investigation into body-oriented trauma treatments that can provide regulation from the bottom-up, and yoga is one potentially promising body-oriented intervention (Perry, 2009; van der Kolk, 2006).

Significance of the Study

The current study extends the adult literature on the effectiveness of yoga as an adjunctive trauma intervention to adolescent females who have experienced complex trauma. While still a preliminary investigation, the sample size is more substantive than any studies on yoga with adolescent trauma survivors to date. The study also enriched the qualitative and quantitative data available on yoga with traumatized youth through data collection at two different sites across two countries, studying the experiences of several different groups. The design provides a view of how participants' responses to the group

changed across weeks, as well as integrated qualitative and quantitative findings. The current intervention was modeled on the Healing Childhood Sexual Abuse with Yoga (Lilly & Hedlund, 2010) curriculum with the aim to obtain quantitative outcomes regarding the effectiveness of the treatment coupled with qualitative data gathered during and after the intervention, which clearly describe the experience of clients participating in such a group. The qualitative data collected by Lilly and Hedlund (2010) only captured the experiences of seven clients within one group following the group experience. While preliminary studies typically focus on developing a model or curriculum, this step has already been accomplished with the HCSAY curriculum. Therefore, the aim was to establish evidence for the effectiveness of the intervention and increase understanding of what makes the group effective through the use of mixed methods.

The goal of this study was to use the framework from the HCSAY curriculum in a mixed methods study with adolescents to determine the effectiveness of a group yoga intervention across types of complex trauma. The study was conducted at two different outpatient sites, one of which is in the United States and one in Canada. The study consisted of four different groups, two at each site. In addition, archival data was available for three additional groups, leading to a total sample of seven groups with 34 individuals. Both trauma symptoms and global mental health symptoms were measured at pretest and post-test using the Child PTSD Symptom Scale (CPSS) and Youth Outcome Questionnaire-Self Report due to the divergent nature of trauma expression in youth. Additionally, affirmations related to group content were measured to assess the connection between the cognitive and body-oriented themes. Youth who have

experienced complex trauma, even if they had subclinical PTSD symptoms, were accepted as referrals for the group, based upon literature demonstrating that traumatized youth often have other primary diagnoses.

An embedded mixed methods design was utilized to obtain an understanding of the effects of the group through complementary data and the integration from comparing both quantitative and qualitative findings. A within and between group comparison between pretest and post-test levels of symptoms was conducted to explore the effectiveness of a trauma-focused group yoga intervention for adolescent girls through Repeated Measures ANOVA with study site was also included as a between-subjects factor. Participants completed weekly yoga experience forms (see Appendix F) to capture the working mechanisms of the group and increase mindfulness of participants regarding their experiences. In addition, interviews were conducted following the completion of the yoga groups to address additional questions related to the qualitative and quantitative data gathered during the groups.

Hypothesis

1. There will be a significant decrease in both general mental health symptoms associated with trauma and trauma-specific symptoms from pretest to post-test, as measured by scores on the Youth Outcome Questionnaire-Self Report and the Child PTSD Symptom Scale, when controlling for covariates including number of yoga sessions attended, diagnosis, group cohesiveness, and therapeutic alliance.

Additional Research Questions

1. What mechanisms involved in the yoga group does the qualitative research support as helpful and unhelpful?
2. What areas of coping with trauma and mental health symptoms will both the qualitative and quantitative data point to changes in as a result of the yoga intervention?

Definition of Terms

1. *Yoga*: a Sanskrit word that means "union" or "to yoke." It involves breath practices, physical postures, meditation, and general mindfulness. Physical postures are most commonly practiced as yoga in the Western world.
2. *Complex childhood trauma*: children's experiences of multiple traumatic events either simultaneously or sequentially, including emotional abuse, neglect, sexual abuse, physical abuse, and witnessing domestic violence, beginning in early childhood and occurring within the caregiving system (Cook, Blaustein, Spinnazola, & van der Kolk, 2003). Initial traumatic experiences often lead to subsequent exposure.
3. *Dual-process model* (LeDoux, 1996): a model that describes a low road in the brain that processes information quickly to respond to threats that is typically mediated by a high road that analyzes information more thoroughly and signals the low road regarding the additional acquired information to return the body to a resting state.
4. *Top-down trauma approach*: Trauma approaches that work from the top-down start by addressing trauma in the highest, most sophisticated areas of the brain before addressing trauma in less complex regions.

5. *Bottom-up trauma approach*: A method that treats trauma from addressing the least complex areas of the brain (brainstem) to the most complex (cortical areas).
6. *Heart-rate variability:* the interval between heartbeats, which is correlated with capacity for self-regulation (Duros & Crowley, 2014; Hanson, 2009).
7. *Expressive suppression*: an ineffective emotional regulation technique in which an individual masks facial cues to hide a current emotional state. As defined by Gross and Levenson (1993), "the conscious inhibition of emotional expressive behavior while emotionally aroused" (p. 970). Emotional suppression can reduce some negative experiences associated with intense emotions, including heart rate and somatic experiences, but concurrently increases sympathetic nervous system responses (Gross & Levenson, 1993).
8. *Hyperarousal*: A chronic state of increased arousal (altered baseline) following a traumatic experience. These symptoms can make a person more stressed or angry. Hyperarousal includes being easily startled, tension, difficulty with concentration, etc. (Ogdon, Minton, & Pain, 2006).
9. *Hypoarousal*: At the other end of the regulation continuum, a person who has experienced trauma may develop a pattern of decreased arousal that appears similar to depression. Hypoarousal is associated with avoidance, and potentially, dissociation. The hypo-aroused individual experiences little emotion, low affect, and/or low energy (Ogdon, Minton, & Pain, 2006).

Summary

The majority of individuals in the population have experienced a potentially traumatizing event during childhood, and though a minority of those meet criteria for PTSD, a greater number receive other diagnoses. Effects of childhood trauma can manifest in adult physical and mental health symptoms, and appropriate diagnosis and treatment is needed that addresses the constellation of symptoms associated with complex trauma in children and adolescents. Establishing safety and stability is the first step proposed by Herman (1992) in treating complex trauma, and developmental neuroscience studies indicate the need for a bottom-up approach to treating complex trauma. Yoga is one proposed method to this end. Research regarding the benefits of yoga to address trauma is in its infancy, but preliminary studies with adult female trauma survivors point to benefits in the reduction of PTSD symptoms. Only one model has been proposed previously to treat complex trauma in adolescents, the HCSAY model (Lilly & Hedlund, 2010). Preliminary qualitative data are available regarding its effects that cannot be generalized. This mixed-methods study sought to examine the effects of the intervention across two sites in two countries to qualitatively determine the mechanisms involved in yoga that are effective, as well as themes related to increased coping, and quantitatively measure symptom change from pretest to post-test.

Chapter Two: Literature Review

This chapter reviews a range of relevant literature that informs the current investigation. Initially, theories of emotional processing that contribute to the neuroscience evidence regarding PTSD symptoms will be reviewed. Next, trauma theories that address symptomology from either top-down or bottom-up approaches are reviewed, and brain structures affected by trauma and the effects of trauma on those structures are discussed. Specific neuroscience studies that provide additional information about trauma-specific approaches are discussed, and conclusions are drawn about the need to address trauma from the bottom-up to disrupt trauma's effects on the cerebral cortex. The increase in mindfulness in psychological interventions is discussed, as well as the limitations of addressing mindfulness from a cognitive, rather than an experiential, approach. Yoga is discussed within the context of mindfulness, and finally, currently available studies regarding yoga as a trauma treatment are reviewed.

The Road to Emotional Processing

To understand how PTSD symptoms manifest, understanding how emotions are processed is important. The *high road* versus *low road* dual-process model (LeDoux, 1996) is important in understanding emotional processing, and how these paths connect to trauma responses. On the low road, information is processed quickly but less accurately to protect an individual, and takes a pathway from the thalamus directly to the

amygdala. Concurrently, on the high road, information processing passes from the thalamus to the sensory cortex and then to the hippocampus. In the hippocampus, it might pick up on additional information being relayed, before circling back to the amygdala. Back at the amygdala, if the amygdala had initiated a fear-based fight-or-flight response, the hippocampus then signals the amygdala that there is no danger, and the amygdala relays this information to the hypothalamus.

Control and regulation of negative emotions, associated with the low road, are emotional functions affected by PTSD (Koenigs & Grafman, 2009). PTSD involves a "fundamental dysregulation of arousal modulation at the brain stem level," (p. 285, van der Kolk, 2006). Based upon the stimulus-response model of behavior, individuals experience trauma triggers when stimuli remind them of the trauma stimulus. This response leads to a heightened stress response through the low road response between the amygdala and thalamus (LeDoux, 1996). The high road in the brain should regain control (LeDoux, 1996), but PTSD reflects a disturbance of these processes in that cognitive distortions may prevent the high road from regaining effective cognitive controls. When fear-based regulatory systems go awry, hypo and/or hyperarousal results. According to Ogden, Minton, and Pain (2006), a sympathetic fight or flight response, likely brought on by the low road, causes hyperarousal.

The high road is also affected by PTSD symptoms. Foa, Steketee, and Rothbaum (1989) argued that humans develop PTSD when a traumatic event either violates a closely held belief, or in complex trauma, as a result of avoidance associated with a stimulus-response pattern and its ascribed meaning. While it is typical for traumatized

individuals to experience self-blame for the trauma, these views are inaccurate and unhelpful in trauma recovery (Smith et al., 2007; Spaccarelli, 1994). According to Spaccarelli (1994), cognitive appraisals and coping responses mediate effects of traumatic events. If the high road can change the meaning of the traumatic event, top-down cognitive processes can reduce hyper/hypoarousal and the body can return to homeostasis.

Brain Development in Context

The Neurosequential Model of Therapeutics (NMT; Perry, 2009) is a developmental theory that addresses the dysfunction of fear-based regulatory systems found in individuals with PTSD. NMT also accounts for contributions from brain development at the time the traumatic event occurred and attachment relationships that contribute to internal regulation. It is a neurologically-informed trauma model that argues that the brain develops from the bottom up, and intervention should be individualized based upon what level of development was interrupted when the trauma occurred (Perry, 2009). This theory is informed by research that indicates that developmental trauma and maltreatment increase the risk of dysfunction in any brain-mediated function, such as speech, motor control, social skills, and emotional or behavioral regulation (Perry, 2001; Perry, 2002). Perry (2009) described this hierarchy as including four main structures: the brainstem, diencephalon, limbic system, and cerebral cortex. To influence a higher-level system, the lower levels must first be well regulated (Perry, 2009).

Perry (2009) noted that the brain organizes in a use-dependent fashion. For instance, early developmental experiences with caregivers create a roadmap of

experiences with other humans as either safe or unsafe that is carried over into future relational interactions. For this reason, protective attachments are a significant mediator of functioning in children who have experienced trauma. When a child is threatened, and the stress response is activated in a prolonged manner, the neural networks involved undergo a use-dependent alteration. The end response is an alteration in baseline activity and reactivity of a stress response to respond as if the brain is under persistent threat. As such, efforts to make changes during therapy must provide patterned, repetitive activation in the neural systems that mediate the function or dysfunction that is the target of therapy. Perry noted that many clinical interventions primarily target the *innervated* cortical or limbic systems, rather than the *innervating* source of dysregulation, which are the lower stress-response networks.

Therapy through the NMT aims to replicate the normal sequential process of development. At the lowest level of intervention, the focus is on a poorly organized brainstem and diencephalon and related difficulties with self-regulation, attention, arousal, and impulsivity through patterned, repetitive somatosensory activities. Perry suggests (2009) activities such as music, movement, yoga, and drumming as activities capable of improving self-regulation. Following regulation at this level, therapeutic work can move to relational-related problems associated with the limbic system through play or art therapies. Treatment culminates at the highest level of brain functioning, the cortical level of invention, involving cognitive-behavioral or psychodynamic methods (Perry, 2009). Perry (2009) noted that interventions that regulate the brainstem and diencephalon, such as yoga, warrant study.

Bottom-Up Trauma Theories

Body-oriented or somatic psychotherapies tend to see trauma and development from a bottom-up perspective while cognitive psychotherapies seem to take a primarily top-down perspective. Philosopher Thomas Hanna first applied Somatics to psychology in the 1970's and sought to integrate the traditional Western split between the mind and body (Caplan, Portillo, & Seely, 2013). While some have described "Soma" as meaning body, Hanna reportedly described it as "Me, the bodily being" (Hanna, 1970, p. 35, as cited in Caplan, Portillo, & Seely, 2013). Backed by neuroscience evidence, recent trauma theorists have conceptualized trauma as stored in the body. They have posited that this body-oriented view of trauma explains the lack of success of talk therapy treatments for PTSD to fully resolve symptoms (Ogden, Minton, & Pain, 2006). While somatic psychotherapy is primarily a bottom-up focus, it involves both the body and the mind (Caplan, Portillo, & Seely, 2013). Eye Movement Desensitization and Reprocessing (EMDR) (Korn, 2009), Sensorimotor Psychotherapy (Odgen, Minton, & Pain, 2006), the Neurosequential Model of Therapeutics (Perry, 2009), Body-Mind Centering (Bainbridge Cohen, Nelson, & Nelson, 2003), Integrative Body Psychotherapy (Rosenberg, Rand, & Asay, 1985) and Somatic Experiencing (Levine, 1997) are body-oriented treatments for PTSD. Body-oriented therapy involves three main constructs: psychological well-being, physical well-being, and body connection (Price, 2005). Individuals become aware of the connection between emotional symptoms and sensations (proprioception) to increase a sense of control (Caplan, Portillo, & Seely, 2013).

Warner, Spinazzola, Westcott, Gunn, and Hodgdon (2014) recently published a quasi-experimental study supporting the use of Sensory Motor Arousal Regulation Treatment (SMART), a model that targets somatic regulation to increase regulation. The study was limited by a small sample (10 experimental and 21 control subjects), but found a trend approaching significance ($p = .06$) in decreased arousal symptoms in the experimental group compared to the control group. They also had greater reductions in re-experiencing symptoms in the treatment group compared to the control group. Finally, significant differences were found between internalizing symptoms from pre-treatment to post-treatment in the experimental group (Warner, Spinazzola, Westcott, Gunn, & Hodgdon, 2014). Additionally, Price's (2005) study indicated significant improvement in a body-oriented psychotherapy study for sexual assault recovery. Though the findings are preliminary, they support the potential benefits of somatic-based interventions with youth to decrease hyperarousal symptoms, particularly within the early stabilization and skill-building phase of complex trauma treatment (Hermann, 1992).

Top-Down Trauma Theories

Trauma-Focused Cognitive Behavioral Therapy (TF-CBT) and other cognitive approaches to trauma are leading the way in evidence-based treatment. These therapies work primarily from a top-down framework. TF-CBT, developed for treating childhood and adolescent trauma, includes four major components: exposure, cognitive processing and reappraisal, stress management, and parent training (Cohen, Mannarino, Berlinger, & Deblinger, 2000). Stress management involves teaching coping skills like deep breathing to help with emotional regulation, the component of CBT that works with bottom-up

processes. Reworking of cognitive distortions related to the trauma using cognitive reappraisal is important to make sense of what has occurred (Cohen et al., 2000), and it recruits the high road via top-down processing. Both of these techniques are available during gradual exposure to traumatic stimuli, which will hopefully be allowing an individual to use top-down processes effectively without getting stuck in bottom-up, fear-based responses. Parent training teaches parents TF-CBT skills to assist children in regulating at home. According to a meta-analysis by Carey and McMillen (2012), TF-CBT is more effective than attentional control, standard community care, or waitlist conditions in reducing symptoms of PTSD following treatment and at 12-month follow-up.

Foa and colleagues (2005) have heavily researched Cognitive-Behavioral methods of PTSD treatment with adults. In a randomized trial of female sexual assault survivors, Foa and colleagues (2005) found prolonged imaginal exposure and prolonged exposure plus cognitive restructuring had equivalent outcomes. Previously, best outcomes were typically found using a variety of CBT methods. This finding called into question the active ingredients of CBT and its mechanisms for success. McLean, Yeh, Rosenfield, and Foa (2015) recently demonstrated that change in negative trauma-related cognitions is a mechanism of prolonged exposure in an adolescent-only sample, consistent with recent findings in the adult literature.

Top-down modalities, like CBT, primarily address stress management and relaxation skills in therapy by teaching breath work and progressive muscle relaxation. Few nuances are involved in approaching bottom-up regulation based on an individual's

needs, except in newer third-wave CBT methods like Dialectical Behavior Therapy, Mindfulness-Based Cognitive Therapy, and Acceptance and Commitment Therapy. According to trauma expert Ron Siegel:

> It's important to note that breath awareness practice is actually often contra-indicated for folks with trauma. At least at the beginning, breath awareness has the potential to attune us to internal thoughts and feelings, and a lot of folks who have suffered from trauma are busy pushing a lot of thoughts and feelings out of their awareness (N.D., p.5-6).

An individualized approach to addressing mindfulness and relaxation is needed, individualized to what each client can tolerate.

Neural Differences Associated with PTSD

As the current focus is on a bottom-up versus top-down conceptualization of trauma, only relevant brain structures to these concepts are discussed. These include limbic system, including the hippocampus and amygdala, and the frontal lobe, including the medial prefrontal cortex (mPFC) and the ventromedial prefrontal cortex (vmPFC), will be discussed. The limbic system is associated with the processing of trauma-related events and encoding those events into long-term memory.

The hippocampus plays an important role regarding memory encoding and consolidation in the high road, helping to decrease fear responses in the amygdala. According to consolidation theory, the role of the hippocampus is to consolidate memories, which are stored in the cortex (Hutterer & Liss, 2006). Some studies have demonstrated that decreased hippocampal volume can lead to increased risk of PTSD (Gilbertson et al., 2002). Other studies have not found differences in hippocampal volume in PTSD versus those who do not develop PTSD (Bonne et al., 2001). Thomaes

et al. (2009) found increased blood flow to the left hippocampus during encoding and recognition of emotionally involved words. A Stanford study of adolescents showed poorer hippocampus function related to PTSD symptoms, not necessarily hippocampus size (Anonymous, 2009). As the hippocampus is also involved in memory retrieval, smaller or dysfunctional hippocampi are thought to recall memories in a way that is too fast and unspecific, leaving an individual susceptible to trauma-related flashbacks.

The amygdala is a subcortical collection of nuclei that projects to regions that execute physiological, autonomic, and visceral components of emotional responses (Koenigs & Grafman, 2009). It is the primary structure associated with processing feared stimuli, and it mediates acquisition and expression of conditioned fear (Koenigs & Grafman, 2009). Increased amygdala activation is associated with flashbacks in PTSD (Hutterer & Liss, 2006) and PTSD overall (Liberzon & Martis, 2006). Amygdala differences associated with trauma include the sublenticular extended amygdala (SLEA) where increased response has been found in threat-related, but not trauma-specific, stimuli in individuals with PTSD (Liberzon & Martis, 2006). These findings indicate that trauma conditions the amygdala towards increased activation related to trauma-related cues or the perception of threat in general, indicating that the amygdala contributes to hyperarousal and difficulties with regulation.

Some regions of the frontal lobe play an important role in cognitive processing of trauma. The ventromedial prefrontal cortex (vmPFC) extinguishes conditioned fear and regulates emotional expression when functioning effectively (Koenigs & Grafman, 2009). The left ventrolateral PFC (Broca's area) is associated with creating verbal

expression (McRae, Ochsner, & Gross, 2011), which can develop slowly following trauma (Lindauer et al., 2008). Research indicates that the medial prefrontal cortex (mPFC), thought to be involved in determining the outcomes of actions (Alexander & Brown, 2011), displays less or no activation in individuals with PTSD (Liberzon & Martis, 2006). Impaired blood flow patterns to the mPFC, anterior cingulate cortex (ACC), and vmPFC in individuals with PTSD appear to impair these regions and their ability to reframe or restructure emotionally charged experiences (Liberzon & Martis, 2006).

LeDoux's dual-process model indicates that an association between the amygdala and vmPFC may contribute to the development of PTSD. According to Koenigs and Grafman (2009), there are dense connections between the vmPFC and the amygdala, which facilitates bidirectional communication between the two areas. Top-down inhibition of the vmPFC dampens amygdala activity in healthy brains, decreasing experiences of subjective distress and causing regulation. Deficits in the vmPFC failing to inhibit the amygdala lead to PTSD (Koenigs & Grafman, 2009) as the amygdala remains overactivated. The less activated vmPFC and mPFC are not able to engage top-down processes to extinguish conditioned fear. Amygdala activity goes unchecked and distress becomes chronically heightened.

Imaging the Brain

Most of the studies that directly follow involve the use of functional magnetic resonance imaging (fMRI) to measure brain activity. Brain activity is detected by changes in blood flow to the brain, based on the relationship between neuronal activation

and cerebral blood flow. The blood oxygen level dependent (BOLD) contrast is used with fMRI, and measures the change in magnetization between oxygen-rich and oxygen-poor blood through small magnetic waves while a person is carrying out a given task (Wright, 2010). fMRI has become popular, as it does not require contrasts to be used in order to detect changes in blood flow, unlike other methods, such as single photon emission computed tomography (SPECT) and positron emission tomography (PET). fMRI can also be repeatedly conducted to measure changes from treatment, as there is no concern regarding exposure to radiation (Wright, 2010). PET scans are highly sensitive, but can only be conducted once due to the high level of radiation involved. SPECT scans involve a low level of radiation, but require an individual to lie completely still in a scanner and have an injection with a tracer (Wright, 2010).

Neuroscience and Cognitive Implications for Treatment

Keeping in mind that cognitive processes in therapy primarily work from the top-down model, Hariri, Bookheimer, and Mazziotta (2000) conducted a study in which a cognitive task was investigated to determine its effects on emotional processing by comparing healthy subjects on Blood Oxygen Level Dependent (BOLD) response while performing three tasks: an emotional matching task, an emotional labeling task, and a control task. Matching was associated with increased activation in right and left amygdala while labeling was associated with a decrease in amygdala activity (Hariri, Bookheimer, & Mazziotta, 2000). This finding supports the theory that emotion is modulated cognitively via interpretation and labeling (Liberzon & Martis, 2006). Lieberman et al. (2007) argued that affective labeling, in which the right ventrolateral

prefrontal cortex (RVLPFC) decreases activity in the amygdala, as mediated by the mPFC, decreases intensity of emotional impact of adverse events on current experience. The RVLPFC helps deactivate the amygdala in labeling, which is a potentially less intense activity than cognitive restructuring. This finding provides valuable information about how and why labeling or restructuring might work, but whether or not it can be accomplished with individuals with PTSD is important as well.

Emotional regulation through cognitive reappraisal, a top-down process, has also been studied. Gross (2002) hypothesized that humans regulate emotions either through cognitive reappraisal or regulation, which involves attending to and reinterpreting stimuli, or through suppression, which involves stifling emotions without change in intensity. Considering this within the context of the Hariri, Bookheimer, and Mazziotta (2000) study and the tendency for individuals with PTSD to engage in trauma-related avoidance, individuals with PTSD are more likely to use suppression than cognitive reappraisal. This choice is likely to lead to steady, rather than decreased, levels of amygdala activation.

Phan and colleagues (2004) extended Gross's idea by studying responses to highly aversive pictures when healthy subjects were instructed to either maintain affect or suppress through rationalizing or reframing. Decreased negative affect was associated with increased activation of the dorsal mPFC, dorsal ACC, dorsolateral PFC, lateral OFC, and ventrolateral PFC, as well as areas of the cortex involved with top-down processes that are associated with successful fear extinction. Decreased negative affect was also associated with decreased activation in left nucleus accumbens, left lateral PFC, and left amygdala, consistent with expected inverse relationships. Unfortunately, this study was

only carried out on healthy controls, so the differences between healthy individuals and individuals with PTSD were not observed when they attempted to either rationalize or reframe. However, this study demonstrates that reframing is a helpful concept and lends support to top-down cognitive approaches.

Cognitive distortions in acute trauma were examined in a recent study of individuals with PTSD (Daniels et al., 2011). The authors found that cognitive distortions were correlated with Blood Oxygen Level Dependent (BOLD) signal strength. Affected brain regions were associated with visual processing, imagery, and autobiographical memory recall. Intrusion appears related to cognitive distortions, and subjects who have stronger cognitive distortions re-experience traumatic events more vividly and in greater detail than those who do not have stronger cognitive distortions (Daniels et al., 2011). Cognitive distortions were the best predictors of current diagnostic status, but they were not necessarily related to the individual's future trajectory. There was no significant, negative relationship between cognitive distortions and emotional activation areas (Daniels et al., 2011). This finding was not explored in depth, but the authors noted that trauma victims initially struggle to put memories into words and visually reliving the memory is an important piece. The expected inverse relationship between the amygdala, RLVPFC, and mPFC may not hold as expected in individuals with PTSD. McRae et al. (2011) noted that neuroimaging evidence is not as strong for the inverse relationship between prefrontal regions and amygdala for those who have experienced PTSD, and that those with PTSD are less successful when using reappraisal to reduce negative affect.

This finding highlights a key limitation in the use of cognitive methods for individuals with PTSD.

An additional study of recently traumatized individuals used Brief Eclectic Psychotherapy (BEP), which incorporated some top-down components of CBT, such as cognitive restructuring and writing tasks. In addition to these cognitive exercises, this study incorporated imagery and imaginal exposure, as well as a focal psychodynamic approach (Lindauer et al., 2008). Single Photon Emission Computed Tomography (SPECT) scan was used to study the effects of therapy on regional cerebral blood flow (rCBF) during trauma script-driven imagery (Lindauer et al., 2008). Brief eclectic psychotherapy (BEP) effects were assessed through rCBF during trauma imagery, and they found that BEP significantly reduced all trauma symptom clusters. At baseline, subjects with PTSD had greater activation in dorsolateral PFC (area connected with the hippocampus and which tells the brain how to interact with stimuli) compared to controls, but following psychotherapy, activations were significantly decreased (Lindauer et al., 2008). They attributed this finding to working memory no longer being occupied by unwanted traumatic memories. Combining imagery, which may allow survivors to visualize their experiences, with writing tasks that require individuals to convert memories into words (Daniels et al., 2011), may create changes in how their memories are stored.

Koenigs and Grafman (2009) studied Vietnam veterans who had experienced both brain lesions and PTSD, which allowed them to investigate causality of PTSD. They compared groups of veterans with vmPFC damage, amygdala damage, and lesions in

other areas to groups with PTSD without lesions. They expected that amygdala lesion would decrease risk of PTSD, while vmPFC lesion would increase risk of PTSD since amygdala is hyperactive in individuals with PTSD, and defects in mPFC impairs amygdala inhibition. Amygdala damage could cause resistance to PTSD through impairment of threat detection due to a lack of fear condition, decreased fear expression, or decreased emotional memory enhancement. Results indicated that individuals with lesions in amygdala (0% who developed PTSD) or vmPFC (18% who developed PTSD) were less likely to have developed PTSD than those without lesions. Veterans who had other lesions had a PTSD prevalence rate of 32%, similar to the overall rate of PTSD within the larger sample of Vietnam veterans (40%; Koenigs & Grafman, 2009). The finding that an amygdala lesion completely prevented PTSD indicates a causal role of the amygdala in PTSD (Koenigs & Grafman, 2009). The low levels of veterans with PTSD with vmPFC lesions calls into question the strength of the dual-process model where vmPFC mediates amygdala hyperactivity. Results indicated vmPFC hypoactivity in PTSD might be a consequence of chronic distress or an effect of amygdala dysfunction. Additionally, vmPFC may provide self-insight and self-reflection. Targeting vmPFC through treatment could reduce distress and negative affect associated with PTSD (Koenigs & Grafman, 2009).

According to Hutterer and Liss (2006), input processed when the individual is under stress may not be processed by high road conscious memory systems, such as the cortex and hippocampus, but instead by earlier developing and faster acting low road systems, causing traumatic material to be less accessible to words. Van der Kolk (2006)

noted that in a neuroimaging study of PTSD in his lab using a trauma script-driven imagery symptom provocation paradigm, subjects had rCBF increases in the right medial orbitofrontal cortex (similar to vmPFC), insula, amygdala, and anterior temporal pole. Relative deactivation was found in the left anterior prefrontal cortex, specifically Broca's area (left ventrolateral PFC). While many of these findings replicate other studies, the additional report of deactivation in Broca's area is notable. Broca's area is the center of expressive speech, important in cognitive interventions, and if Broca's area is deactivated chronically, intervening on a cognitive level may not be feasible, leading to a need for other modalities to treat PTSD. In the search for appropriate interventions, van der Kolk (2006) argued that since PTSD involves dysfunction of arousal modulation, interventions that target physiological arousal, such as yoga and other mindfulness-based interventions, are needed.

Conclusions on Neuroscience Findings related to Trauma

Top-down cognitive therapies and bottom-up body-oriented therapies have been reviewed, as well as neuroscience research relevant to trauma treatment. CBT has been considered the evidence-based treatment of choice, given the relationship between cognitive distortions and PTSD diagnosis. Research indicates that cognitive labeling and restructuring modulates emotion in healthy individuals (Liberzon & Martis, 2006; Lieberman et al., 2007), as a result of mPFC modulating amygdala, which supports the basis of cognitive therapies. Lindauer et al. (2008) found decreased symptoms of PTSD in recently traumatized individuals after eclectic psychotherapy that included cognitive components and decreases in the dorsolateral PFC associated with decreased symptoms

that also implicate effectiveness here. However, neuroscience evidence demonstrates limitations of the traumatized brain's ability to put memories into words (Daniels et al., 2011; Hutterer & Liss, 2006; van der Kolk, 2006) and for the cognitive centers in the brain to inhibit the emotional centers through top-down processes (Koenings & Grafman, 2009; McRae et al., 2011), demonstrating the need for alternative modalities that can create change in the brain's lowest regulatory centers first (Perry, 2009).

Based upon what we know about how memories are coded, reorganization of traumatic content to become more cognitive and less emotionally charged could be beneficial before memories have been moved to long-term storage (Schiller et al., 2011). Once memories are stored as emotionally charged with greater activation in the amygdala and decreased activation in the mPFC, changing this pattern through the top-down cognitive approach may be more difficult. If the high road can be activated and mPFC can be recruited during memory consolidation, if these memories are accessible verbally, enduring traumatic stress could be minimized.

Current research indicates that the amygdala is overactive while the vmPFC is underactive in individuals with PTSD, and if vmPFC can be recruited, cognitive reappraisal and emotional regulation can be accomplished. Koenigs and Grafman (2009), Daniels et al. (2011), and McRae et al. (2011) indicated that the inverse relationship between emotional and cognitive centers might not be as strong as expected in individuals with PTSD. This rewiring of the brain in individuals with PTSD could create problems when attempting to restructure cognitively, as recruiting vmPFC may not effectively modulate the amygdala. Koenigs and Grafman (2009) also indicated that

vmPFC hypo-activation could be linked to subjective distress in trauma. If hyperactive amygdala and hypoactive vmPFC with disrupted connections become an enduring pattern of activation associated with chronic PTSD, attempting to use cognitive methods may not yield desired treatment results. Evidence of deactivation of language centers like Broca's area during trauma exposure indicates that creating verbal representations of trauma memories may be difficult for some individuals with PTSD, and top-down cognitive treatments may not be indicated when beginning therapy. The lack of an inverse relationship between cognitive and emotional centers, as well as deactivation of language areas in the brain associated with trauma, supports the idea of a bottom-up treatment for PTSD where individuals first work on bodily awareness and regulation before attending to or attempting to create verbal representations of trauma (van der Kolk, 2006). Such a treatment approach is also consistent with Herman's triphasic model (1992).

The Lindauer et al. (2008) study involved recently traumatized individuals without comorbidity, and may not be representative of individuals experiencing chronic, complex trauma. Koenigs and Grafman (2009) speculated that vmPFC deactivation might be a consequence of chronic distress, but longitudinal research is needed to make this determination and evaluate if further structural changes in the brain occur with chronic traumatic stress reactions. Single event traumas (Type I traumas) have likely caused less disruption to cortical processes, and individuals with single event traumas who have had otherwise appropriate trajectories may be more likely to respond to cognitive restructuring in ways similar to healthy individuals.

Neuroscience evidence indicates potential limitations of cognitive treatments of PTSD due to difficulties with restructuring. Alternatively, neuroscience research appears to support a bottom-up approach via body-oriented psychotherapies. While the currently investigated yoga treatment for trauma is body-oriented and bottom-up, cognitive components are included through the use of affirmations, allowing for the combination of mind and body. As such, this study is a critical exploration of an intervention that may serve as a helpful adjunct to traditional cognitive methods. Now, additional information on how the amygdala connects to other centers of the brain that contribute to PTSD is warranted.

Other Bodily Effects of Chronic Amygdala Activation

When the amygdala activates the brain's threat response system through the low road (LeDoux, 1996), the thalamus signals the brainstem, which begins releasing norepinephrine (Duros & Crowley, 2014). Signals are then sent by the sympathetic nervous system (SNS; the part of the Autonomic Nervous System that activates the stress response) to all major organs to prepare the body to fight or flee. The hypothalamus then prompts the pituitary gland to signal the adrenal glands to release cortisol and adrenaline (stress hormones; Hanson, 2009). The release of cortisol creates a feedback loop where the brainstem further stimulates the amygdala, which leads to more stimulation of the SNS and production of even more cortisol. Increased cortisol suppresses the hippocampus, which prevents the hippocampus from suppressing the amygdala through the high road, which leads to more cortisol production. The vagus nerve, the leader of the

Autonomic Nervous System (ANS), disengages, leading to intensified emotional reactions and hyperarousal (Hanson, 2009).

This process is natural and instinctual as the brain seeks to protect the individual from threats to ensure survival. When a person feels like she is under constant threats, either due to experiences of trauma or mild chronic stress associated with today's civilization (traffic, city life), the amygdala becomes more sensitized and more activated, leading to ongoing hyperarousal (Hanson, 2009). As the hippocampus is worn down by repeated SNS activation, its ability to form explicit or declarative memories that can be easily verbalized becomes compromised. This pattern leads individuals to store trauma memories in implicit memory, information that individuals recall unconsciously. Memories can be fragmented, out of sequence, or exist without access to language (Duros & Crowley, 2014; Hanson, 2009). Implicit memory explains how many clients who have experienced trauma dissociate from their trauma, but react strongly to trauma-related triggers. To balance out the response of the SNS, the other half of the ANS, the parasympathetic nervous system (PNS), must be recruited and activated (Duros & Crowley, 2014). The PNS calms the body's stress response and returns the body to homeostasis. Body-oriented or somatic psychotherapy methods can be utilized to activate the PNS to restore balance to the ANS.

While neuroscience evidence regarding trauma being stored in the body and against the treatment of trauma solely through cognitive means has been developing, a parallel interest in mindfulness in third wave behavioral therapies has developed. The

literature review will now focus on the development of mindfulness interventions in psychology, and then to current literature regarding yoga as a psychological intervention.

Mindfulness in Psychology

In addition to body-oriented trauma interventions, third-wave cognitive interventions have recognized the importance of a contextual perspective regarding the development of thoughts and beliefs (Hayes, 2005). Behavior therapy descended from psychoanalysis, in reaction to the emphasis of examining largely unseen phenomenon. To change this paradigm, behavior therapy committed to empirical evaluation of clearly defined interventions for clearly defined problems, using basic psychological processes (Hayes, 2005). The first generation of behavior therapists drew on basic behavioral principles developed in labs, but realized they needed to expand upon operant principles to cognitive processes. This development established cognitive therapy or cognitive behavioral therapy as the second wave behavior therapy paradigm. The cognitive models of the time were largely mechanistic, focused on the nature and evolution of cognition and how cognition affects action, rather than the context in which they were applied. One example of the challenges of second wave behavior therapy is trying to identify differences between cognitive distortions and apply specific labels to distortions as they occur. Contextual arguments indicate a given distortion could be either black and white thinking or overgeneralization, and that these terms may have been created in a laboratory vacuum. These third generation approaches have been defined as follows (Hayes, 2004):

> Grounded in an empirical, principle-focused approach, the third wave of behavioral and cognitive therapy is particularly sensitive to the context and functions of psychological phenomena, not just their form, and thus tends to

> emphasize contextual and experiential change strategies in addition to more direct and didactic ones. These treatments tend to seek the construction of broad, flexible and effective repertoires over an eliminative approach to narrowly defined problems, and to emphasize the relevance of the issues they examine for clinicians as well as clients. (p. 658).

Mindfulness has been embraced as part of the positive psychology movement and third-wave behavioral approaches. Kabat-Zinn (1990) devised one of the most popular Western definitions of mindfulness that includes paying attention on purpose and without judgment. Further, Kabat-Zinn (1990) defined seven attitudinal foundations, which are the foundation for mindfulness and can be seen in other mindfulness therapies. They include non-judging, patience, having a beginner's mind, trust, non-striving, acceptance, and letting go. These attitudes depend upon the cultivation of each other to execute mindfulness successfully in a synergistic way.

Mindfulness-Based Stress Reduction. Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 1990) is the most-researched form of mindfulness established with medical patients and co-occurring mental health concerns, and over 18,000 patients have participated in MBSR to date (Lawson, 2011). MBSR is notable because it addresses stress related to medical procedures, which has been recognized as one form of trauma, and was the first psychological intervention that integrated mindfulness and yoga directly. MBSR involves a seated meditation/deep breathing practice with a focus on awareness of body sensations and thoughts, a body scan, and yoga postures. The positive effects of MBSR have led to the development of Mindfulness-Based Cognitive Behavioral therapy (Lawson, 2011; Williams, Russell, & Russell, 2008). MBSR has had significant, positive effects on chronic pain, psoriasis, insomnia, and other medical

conditions (Lawson, 2011). Research has also demonstrated evidence for the effectiveness of MBSR in the treatment of generalized anxiety and panic disorder (Kabat-Zinn et al., 1992).

Carmody and Baer (2008) studied the relationships between mindfulness, medical and psychological symptoms, and well-being in a study of 174 participants in a MBSR program. They found that practicing formal mindfulness exercises led to increased mindfulness (awareness and monitoring) in daily life, which led to symptom reduction and increased well-being. Of note, even though yoga is introduced after the body scan (but before seated meditation) and clients reported practicing it for less total time than the body scan and seated meditation components of MBSR, the strongest associations in the study were found between the practice of yoga and increased mindfulness, reduced symptoms, and improved well-being. Yoga was the only practice that was significantly related to increases in the non-judgment component of mindfulness and significant decreases in global symptom severity. The authors posited that it may be easier for individuals to give mindful attention to the body while moving, and that the use of movement, as opposed to stillness, may facilitate the transfer of mindfulness skills to daily life (Carmody & Baer, 2008).

Mindfulness-Based Cognitive Therapy. Mindfulness-Based Cognitive Therapy (MBCT; Williams, Russell, & Russell, 2008) was developed as a manualized group treatment for individuals with recurrent major depression. Teasdale, Segal, and Williams (1995) developed MBCT to decrease susceptibility to depression recurrence in between episodes. In 2001, the intervention was published as a formal manualized treatment

(Segal, Williams, & Teasdale, 2001). MBCT combines CBT for depression with MBSR (Kabat-Zinn, 1990) by teaching individuals to become more aware of and to relate differently with their thoughts, feelings, and bodily sensations. Rather than teaching individuals to change the content or specific meanings of negative automatic thoughts, MBCT aims to "decenter" the individual from their thoughts and to become more aware of thoughts and feelings as mental events, rather than as reflecting the self or reality (Teasdale et al., 2000). Across a 60-week period, Teasdale et al. (2000) found that in individuals who had had three or more previous episodes of depression, MBCT was effective in preventing recurrence of depression.

Dialectical Behavior Therapy. Dialectical Behavior Therapy (DBT), developed by Marsha Linehan (1993/2014), was one of the first evidence-based third wave cognitive behavioral approaches to integrate mindfulness with cognitive restructuring. DBT includes acceptance and awareness skills deriving from Buddhism. DBT was originally developed to treat individuals with Borderline Personality Disorder and chronically suicidal individuals, teaching them skills to balance their emotions and rational thinking regarding distress tolerance, interpersonal effectiveness, and emotion regulation. The core of the DBT modules involves first learning to observe, describe, and participate in one's life nonjudgmentally and effectively (Linehan, 2014).

Research evidence has demonstrated that DBT can be adapted to treat individuals with Borderline Personality Disorder and co-occurring disorders, and reduces dysfunctional target behaviors, reduces psychiatric hospitalization, and enhances treatment retention (Koerner & Linehan, 2000). Similarly, Linehan et al. (2006) found

that when DBT was compared to treatment by expert therapists in a randomized controlled trial, individuals receiving DBT were half as likely to make a suicide attempt, required less hospitalizations for suicidality, engaged in lower risk suicide attempts and self-harming behaviors, and were less likely to drop out of treatment.

Acceptance and Commitment Therapy (ACT). Cognitive-behavioral therapy posits that thoughts, feelings, and behaviors are connected. When an individual changes his or her thoughts, it affects emotions and associated behaviors. ACT, on the other hand, suggests that a person can make changes without first changing or eliminating feelings, but accepting and tolerating them (Dewane, 2008). ACT was founded by Hayes, and involves a functional contextual approach to self in situation by separating a client's sense of self from her thoughts and behavior (Hayes et al., 2006). ACT is based on Relational Frame Theory, including the belief that psychopathology derives from the desire to avoid negatively viewed private events (thoughts and feelings). ACT is an acronym that describes the process of therapy where clients: 1. Accept the effects of life's hardships, 2. Choose directional values, and 3. Take action (Dewane, 2008).

The goal of ACT is to help clients choose to act effectively in the presence of difficult private events through use of a contextual model, rather than a focus on specific content (Hayes et al., 2006). The initial work involves acknowledging what can and cannot be changed (Dewane, 2008). ACT involves facing the current situation by discussing what they have already tried and creating space for something new to happen in a state of "creative hopelessness" (Dewane, 2008; Hayes et al., 2006) Acceptance is then used to reduce motivation to avoid certain situations. Cognitive defusion, a

descendant of cognitive distancing, is used to demonstrate that thoughts are only thoughts and not realities. Emphasis is placed on the client's values, and discussion of how values connect to goals allows the client to set tasks linked to his or her values. Finally, there is an emphasis on self as context that allows the client to view her identity as separate from her experience (Dewane, 2008). Hayes and colleagues (2006) reported that in a dataset of 21 ACT studies, ACT was found to have a moderate effect on psychological outcomes. They also found that higher levels of psychological flexibility contribute to better subsequent mental health.

Summary of Neuroscience & Behavioral Literature

This literature review has explored two lines of scientific study that have led to the incorporation of body-oriented and mindfulness approaches being integrated into psychological practice. The first stream of study, trauma theory and neuroscience, established a gap regarding the limitation of cognitive methods in resolving trauma due to the weakened inverse relationship between the amygdala and PFC regions and due to difficulties that trauma survivors have in creating language to describe their experiences. The chronic effects of an overactive amygdala in suppression of the hippocampus and in chronic arousal of the SNS, leading to implicit trauma memories and hyperarousal in trauma survivors, were discussed. This research supports the need for somatic/body-oriented treatments for PTSD. The second stream of literature tracked the development of behaviorism to the third wave contextual modalities that emphasize mindfulness as a skill in making cognitive changes. Yoga is intrinsically connected to mindfulness practices, and with the call for additional somatic interventions, developing yoga psychotherapy as

a treatment intervention is a natural course. While literature regarding yoga in psychotherapy remains limited, these studies are developing, and flow naturally out of both these streams of research.

Yoga as a Body-Oriented (Somatic) Psychotherapy

Centuries prior to the development of Zen Buddhism, from which many mindfulness practices derive, yoga was practiced as a mindfulness practice. Yoga is estimated to be 4,000 to 5,000 years old, and "can actually be thought of as the original body-inclusive psychotherapy" (Duros & Crowley, 2014, p. 241). Yoga is a Sanskrit word that means "union" or "to yoke." The practice of yoga involves connection of the body and the mind. While many Western practitioners think of yoga primarily as *asana*, the physical postures associated with yoga, physical asanas were developed to prepare the body for stillness and meditation. They are one arm of an eight-limbed process described by Patanjali in *The Yoga Sutras*. Breath work, physical postures, and meditation/mindfulness are components of yoga that are thought to be beneficial in reducing trauma symptomology (Spinnazola, Rhodes, Emerson, Earle, & Monroe, 2011).

Much like other mindfulness interventions, yoga has the capacity to reduce avoidance symptoms of PTSD by focusing attention on the present moment and attending to thoughts and emotions without judgment to decrease avoidance symptoms of PTSD (Mitchell et al., 2014). Yoga is expected to be able to down-regulate the stress response so that it decreases PTSD and comorbid symptoms (Mitchell et al., 2014). Further, yoga offers a safe container for developing body awareness needed in individuals who have experienced trauma, and cultivating the ability to be in the body can help an individual to

move forward in therapy (Duros & Crowley, 2014; van der Kolk, 2006). Yoga provides the experience of both exercise and mindfulness at once, and exercise has been shown to decrease difficulties in engaging in goal-directed behaviors when experiencing negative emotions, improve self-esteem, and decrease symptoms of anxiety, depression, and PTSD in those who have experienced child abuse (Carroll, 2014).

General Yoga Studies

Yoga has been increasingly applied in the treatment of a variety of mental health conditions, including depression, anxiety, and PTSD. Iyengar yoga was used in a three-arm randomized controlled trial to treat women experiencing distress (Michalsen et al., 2012). Seventy-two participants were assigned to a weekly yoga condition, a twice-weekly yoga condition, or a wait list control group. Although larger gains were expected in the twice-weekly yoga condition, adherence issues interfered, and adherence was stronger in the weekly group. There were no significant differences between the two yoga groups, but there were differences between the yoga groups and the control groups in severity of back pain, general severity of reported symptoms, depression scores, and state-trait anxiety (Michalsen et al., 2012).

A number of recent studies demonstrate the benefits of yoga to address trauma symptoms in re-experiencing/intrusion, avoidance, and hyperarousal. Van der Kolk (2006) studied eight subjects who simultaneously participated in a yoga group. Surveys in this study showed decreases in re-experiencing and avoidance, while another study by van der Kolk yielded decreases in frequency of intrusions and severity of hyperarousal symptoms (van der Kolk, 2006). Van der Kolk (2013), as cited in Duros and Crowley

(2014), also found that yoga changed heart rate variability in individuals who have experienced PTSD as effectively as any medication. Heart rate variability is the interval between heartbeats, and is correlated with capacity for self-regulation. As individuals increase the ability to cope and regulate with the help of yoga, it makes sense that this would be demonstrated through the nervous system with greater heart rate variability.

In addition to core trauma symptoms, yoga has been associated with gains in other associated symptoms, including self-concept, emotional suppression, and psychological flexibility. Dale et al. (2011) found that women with abuse histories as either children or adults, who engaged in frequent yoga practices, reported more positive self-concepts and improved coping. Their findings were independent of abuse severity, but were connected to the extent to which the women incorporated yoga into their lives. Recently, another study found that expressive suppression decreased for yoga participants compared to those in an assessment control group (Dick, Niles, Street, DiMartino, & Mitchell, 2014). This finding indicates that yoga participants were more capable of tolerating distress and the somatic experiences in their body as a result of their yoga practice. The study also reported that yoga group participants who experienced increases in psychological flexibility also experienced decreases in PTSD symptoms (Dick et al., 2014).

Under the direction of van der Kolk while using a trauma-sensitive yoga model, Emerson, Sharma, Chaudhry, and Turner (2009) conducted a 16 participant pilot study where either the participants were randomly assigned to 8 sessions of a 75-minutes yoga class or Dialectical Behavior Therapy (DBT). Results were promising, but statistically insignificant due to the small sample. Participants in the yoga group improved regarding

all dimensions of PTSD, increased positive affect, decreased negative affect, and increased physical vitality and body attunement. Compared to the DBT group, the yoga group reported greater reduction in frequency of all PTSD symptoms and severity of hyperarousal symptoms, and greater gains in vitality and body attunement (Emerson, Sharma, Chaudhry, & Turner, 2009).

Two randomized controlled trials on the effects of yoga interventions for adult women trauma survivors were published in 2014. Building on their earlier research, in a randomized controlled trial regarding yoga as an adjunctive therapy, van der Kolk and colleagues (2014) assigned women to either a trauma-informed yoga group or a supportive women's health group, which each ran for 10 weeks. At the end of the groups, 52% of women in the yoga group, compared to 21% of women in the control group, no longer met PTSD criteria. While both groups experienced significant decreases in PTSD symptoms during the first half of treatment, the yoga group maintained the gains while the control group relapsed after initial gains (van der Kolk, 2014). Mitchell et al. (2014) conducted a randomized controlled study of yoga as an adjunctive treatment of PTSD using 38 women with clinical or subclinical PTSD symptoms who were assigned either to a Kripalu-style yoga group or an assessment control group. There were significant decreases in re-experiencing and hyperarousal symptoms in yoga group participants, but control group members also had decreased symptoms in re-experiencing and anxiety symptoms, yielding small to moderate between-groups effect sizes overall.

As previously noted, the literature is lacking in studies involving adolescents, but one quantitative study was found. Lee-Kin (2013) studied the use of a trauma-sensitive

yoga group to reduce trauma symptoms in juvenile sex offenders. Juvenile sex offenders were selected for the study because they are underrepresented in the psychology literature, and they experience high rates of abuse and neglect. Their treatment is usually not focused on their trauma symptoms, but on their offenses, which can leave underlying problems related to their behavior unaddressed. Eleven individuals completed two sessions of yoga per week over five weeks, and their symptoms were assessed pretest and post-test via the Child PTSD Symptom Scale using dependent t-tests. Results demonstrated significant decreases in trauma symptoms from pretest to post-test (Lee-Kin, 2013).

Current research is beginning to generate support regarding the benefits of yoga to address trauma symptoms including hyperarousal, intrusion symptoms, re-experiencing symptoms, avoidance, heart rate variability, emotional suppression, psychological flexibility, and self-concept. Early randomized controlled studies indicate greater benefits for individuals receiving yoga over a control group, and one study demonstrated that yoga was beneficial in reducing trauma symptoms for juvenile sex offenders. Despite this early research, only one quantitative study found in this writer's literature review addresses adolescents, specific to the juvenile sex offender population. There is clearly a need for additional research regarding the potential benefits of yoga for trauma-exposed adolescents. Specific yoga psychotherapy models for use with trauma in the literature will now be described.

Trauma-Sensitive Yoga

Under the direction of van der Kolk, Emerson and colleagues (2009) established a trauma treatment program at The Trauma Center in 2003. In their 2009 article, they recommended trauma-sensitive yoga principles based upon their experiences. Variables of key importance include: creating an environment where participants can feel safe and less vulnerable, the need to give several options about yoga postures, and a need to be careful and progressive when incorporating hip opening postures (Emerson et al., 2009). Many individuals in the yoga community believe that emotions are stored in the hips, and hip opening is particularly vulnerable for individuals who have experienced sexual abuse. *Invitatory Language*, where clients are invited to try something, is emphasized, rather than commands issued by teachers. Students should always have the option not to participate in a posture that is uncomfortable or to take child's pose instead. Physical assists, in which the teacher uses her hands or body to guide a student to experience the pose more deeply or with improved alignment, are not recommended when clients are in a time-limited group, but they can have therapeutic value in long-term classes (Emerson et al., 2009).

The literature also provides recommendations for trauma-sensitive yoga teachers. Teachers should be present, positive, engaged, welcoming, and approachable. They should also invite feedback and go at a slow pace (van der Kolk et al., 2009). Additionally, van der Kolk recommended that teachers keep the focus on the breath and the flow of the postures, and refrain from "excessive talking, explaining, or preaching" ("Yoga and Post-Traumatic Stress Disorder," 2009, p.13). van der Kolk also noted that

triggering material will come up during class, and teachers should be prepared to help participants regulate through the breath and quieting postures ("Yoga and Post-Traumatic Stress Disorder," 2009). In contrast, Lilly and Hedlund (2010) noted that with careful planning, triggering poses could be avoided. These general principles are useful and can be generalized to providing a yoga class for individuals of all ages who have experienced trauma.

Yoga in Trauma Treatment with Adolescents in Residential Treatment

Spinazzola, Rhodes, Emerson, Earle, and Monroe (2011) described a model of using trauma-sensitive yoga principles with at-risk youth between the ages of 12 to 21 in residential treatment. Their article focused on literature review regarding the somatic impact of trauma and provided case studies regarding the integration of yoga into residential treatment (see Spinazzola et al., 2011 for additional detail). Their results included case studies and clinical observations, including one client who experienced a 50% decrease in behavioral incidents after three months of practicing yoga. They noted that the complexity of symptoms presented by many at-risk adolescents often leads to the misdiagnosis and mistreatment of those symptoms. This report is consistent with a number of other authors cited and discussed in chapter one, and the reason that this study will address both general mental health and trauma symptoms. Given their application to residential care, and the use of several very brief yoga encounters throughout different parts of a client's day, it would be difficult to transfer this model to other settings.

Healing Childhood Sexual Abuse with Yoga (HCSAY)

Lilly and Hedlund (2010) created the HCSAY model to help restore childhood sexual abuse victims to "wholeness and a life of greater joy" (p. 120). Their model is an 8-week curriculum, and they have used this curriculum for 90-minute classes. Groups have been led for 8 to 12 year old girls, 13 to 18 year old girls, and boys ages 7 to 12. The curriculum is based on and supports existing models of treatment, particularly Trauma-Focused Cognitive Behavioral Therapy (TF-CBT). With each session, the room is carefully set. Yoga mats are carefully arranged to promote safety, water and snacks are placed in front of each mat, candles are lit, intention words are laid out, essential oils are made available, and the room is decorated with secular elements, including tapestries, candles, stones, and other natural elements. Each session involves a theme, a mantra or affirmation that goes with the theme, a body scan to orient to the practice, asanas to promote strength, a final relaxation, and a formal closing involving sound. Other activities, especially art, are incorporated. They reported that the final relaxation might involve activities other than the traditional final savasana (Sanskrit for corpse), as lying in stillness can be a trigger for some individuals who have experienced abuse. Themes include safety, boundaries, strength, assertiveness, power, intuition, trust, and community. Yoga postures are chosen that correspond to the week's theme (Lilly & Hedlund, 2010).

Research regarding the HCSAY model has been limited. The authors surveyed seven participants in the 13 to 18 year old girls' group about their experiences following group. Of those surveyed, 85% agreed that yoga made them feel more energetic, happier,

and more focused and less nervous and tense. Seventy-one percent of girls reported practicing on their own once a week. Eighty-five percent agreed that they had learned techniques to allow themselves to feel safe in their bodies and that they gained more emotional, physical, and mental strength. More research is needed to support this model, but this is currently the only yoga psychotherapy model for use with traumatized adolescents. Therefore, this study will expand on the research using the HCSAY curriculum by studying the effectiveness of the model as an adjunct trauma intervention with adolescent girls that have experienced varying forms of trauma in a mixed methods design across two sites.

Summary of Literature Review

Neuroscience evidence supports the need for bottom-up trauma approaches due to research that implicates the amygdala as playing a causal role in the development of PTSD, that individuals who have experienced trauma have a weakened relationship between the regions of mPFC and amygdala, and that language centers in the brain experience deactivation during traumatic events. Yoga has been proposed as one such bottom-up intervention (Perry, 2009; van der Kolk, 2006). Concurrently, third-wave behavioral interventions are incorporating mindfulness, and yoga is growing in popularity in the West, leading to a natural inclusion of yoga within some of these therapies. Existing investigation of yoga as a psychotherapeutic intervention is preliminary. Currently available data are promising. Van der Kolk and colleagues' (2014) preliminary randomized controlled study found over 50% of yoga participants no longer met PTSD symptoms following a 10-week intervention, and Carmody and Baer (2008) found that

yoga-based interventions in MBSR impacted the widest range of symptoms. No quantitative investigations of trauma-related yoga treatment for adolescents have been conducted, other than one dissertation with juvenile sex offenders. Additional study of yoga as an intervention for traumatized adolescents is needed.

Chapter Three: Method

Mixed Methods Design

A mixed methods design was chosen for this study due to the study representing a new stream of literature, and a desire to capture the fullest picture possible regarding the participants' responses to the intervention. The purpose of this mixed methods study was to generate quantitative and qualitative data that assessed the level of trauma and general mental health symptoms following a yoga psychotherapy intervention for trauma, and to collect qualitative data during and following the intervention that provided a picture of the mechanisms that allow the intervention to be effective. This can be thought of in two basic questions: 1. What makes yoga work? 2. How (in terms of symptoms impacted, coping skills) does yoga help? Consistent with the pragmatic approach to research design, the quantitative and qualitative data were of equal importance in the study.

This embedded mixed methods study (Creswell & Plano Clark, 2011) involved collection of quantitative data before the intervention, primarily qualitative data during the intervention, and quantitative post-tests followed by qualitative interviews after the intervention (See Appendix F for procedural diagram of study design). The quantitative data gathered before, the qualitative data gathered during the intervention, and the quantitative data gathered after the intervention informed the follow-up qualitative interviews. In mixed methods, the mixing strategy (how to combine the data) and point of

interface (point at which qualitative and quantitative data are combined) for data are important considerations. The study involved mixing data during data collection, as the results of the quantitative and qualitative data together informed the follow-up qualitative interviews. The mixing point of interface occurred at the design level since this was an embedded mixed methods study. However, mixing also occurred during analysis to inform the qualitative interviews, and during interpretation. Convenience sampling (clients who were interested in the research and consented to participate) was used for the quantitative strand, and purposive sampling was used for the qualitative strand. Due to preliminary nature of the research, a control group was not used. A subsection of total group participants from one site were selected based upon whether or not they responded optimally and whether or not they met full criteria for PTSD.

Sites & Facilitators

Data were collected at the Denver Children's Advocacy Center in Denver, Colorado and from McMaster Children's Hospital in Hamilton, Ontario, Canada. The Denver Children's Advocacy Center works with children and families who have experienced sexual abuse and violence, as well as those at high risk of experiencing traumatic events. They provide prevention programs, forensic interviews, training and community education, and outpatient treatment of children between the ages of two and 18.

McMaster Children's Hospital is a part of the Hamilton Health Sciences family of hospitals. It was founded in 1988, and is a top pediatric health science center in Canada, engaging in a family-centered model of care, evidence-based care, and collaborative

research. The child and youth mental health program at McMaster Children's Hospital includes a psychiatric emergency room, an inpatient program, a mental health day hospital, a regional mental health program, an eating disorders program, a specialty trauma program (Child Advocacy and Assessment Program), and the outpatient child and youth mental health program (Child and Youth Mental Health Outpatient Service). One research group was run in the Child and Youth Mental Health Outpatient Service and a second group was run in the day hospital program.

The primary facilitators for the groups were female therapists and 200-hour trained yoga instructors. One primary facilitator was a master's level therapist, and the other primary therapist was a doctoral candidate. Initially, both primary facilitators developed the curriculum together, using the HCSAY (Lilly & Hedlund, 2010) model by retaining the themes, affirmations, and key poses described in the model. The facilitators supplemented the group with additional activities and removed activities they were not familiar with or that did not seem appropriate for their groups, as their groups only included adolescent clients. After developing the group, the facilitators ran the first two groups at the Denver Children's Advocacy Center together. Kristen Chamberlain has continued to facilitate the group at the Denver Children's Advocacy Center with Jessica Gershwin, a dually trained social worker and yoga instructor.

After Kristen reduced her hours at the Denver Children's Advocacy Center, Jessica Gershwin became the primary facilitator for the Summer 2015 group. Given that Kristen trained Jessica, and based upon the principal investigator's conversations with both, fidelity to the original group concept has been retained. Melissa Houser, principal

investigator for the study, was the primary facilitator for the group at McMaster Children's Hospital. She was the primary facilitator for the group within the Child and Youth Mental Health Outpatient Service at McMaster Children's Hospital with a master's level social worker who has a mindfulness background. Due to the small group in the day hospital program, she facilitated that group individually. The primary yoga facilitators had taught yoga for over two years at the time of running the groups.

Recruitment

Referrals for groups at both study sites were solicited from current individual therapists, and therapists completed brief referral forms. Participants for the DCAC groups and the outpatient group at McMaster Children's Hospital were contacted at the phone numbers listed on their referral forms to discuss the group and provide additional information about the group. Participants at the day hospital group at McMaster Children's Hospital were met directly at the day hospital program after being referred by their Most Responsible Clinician, the clinician responsible for overseeing all aspects of their care. All clients who were recruited to participate in the group were enrolled in the research study. The yoga group intervention was intended to be an adjunctive method and did not replace traditional mental health treatment, so clients who were enrolled in individual therapy continued to have that additional monitoring and support. See Appendix I for consent and assent forms and Appendix J for the recruitment brochure. A recruitment script provided to therapists is available in Appendix K. Individual interviews after the intervention discussed the similarities and differences between the group and the individual services the clients received.

The Denver Children's Advocacy Center has been running the yoga group for female adolescents with complex trauma histories since early 2013. Since it is an ongoing group, special procedures were not necessary for recruitment, but obtaining appropriate consent for participants for the research study was a consideration. Recruitment at the Denver Children's Advocacy Center began January 2015, following the Institutional Review Board application. Data were available from five groups at the Denver Children's Advocacy Center, two of which were run in 2015, and three for which archival data were available, run between Spring 2013 and Fall 2014. Of the three groups for which archival data was used, this writer and Kristen Chamberlain led two of them together. Kristen Chamberlain and Jessica Gershwin ran the third. Of the two groups run in 2015, Kristen Chamberlain and Jessica Gershwin facilitated one, and Jessica Gershwin facilitated the second.

Due to the clinical nature of these groups, the length and format have varied slightly, but they have retained the basic structure and themes from the HCSAY curriculum. Prior to beginning the current study, the principal investigator spoke with the Denver facilitators about how they were running their group and how they were structuring the themes so that the Denver and Hamilton groups would be structured similarly. In addition, she spoke with them every couple weeks throughout the group process. This writer also spoke with Jessica Gershwin about her facilitation process and changes that she made to the structure of the group after she took over the role as the primary facilitator in Denver.

At the Denver Children's Advocacy Center, during the three groups for which archival data were available, the group leaders had a meeting with the parents to obtain informed consent for participation in the group and releases indicating that de-identified data could be used for research purposes. For the 2015 groups, prior to the beginning of the first group session, individual therapists explained the research, obtained informed consent, and assisted clients in completing the pretest questionnaires. Prior to the first group, assent from the youth participating in the group and parental consent were obtained in writing. Written consent and assent were obtained for all participants, and copies of consent and assent forms were provided to participants and parents.

Recruitment at McMaster Children's Hospital began in May 2015, following ethics approval at the University of Denver, the Hamilton Integrated Regional Ethics Board (HiREB), and the Research Advisory Committee within the Child and Youth Mental Health Program at McMaster Children's Hospital. The yoga group was a new group at McMaster Children's Hospital, and incentives for research participation were included in the ethics application. Child and Youth Mental Health Outpatient clients received five dollars a session to assist with transportation to group. They also received a ten-dollar gift card at the end of the group, and a ten-dollar gift card if they participated in a follow-up interview. Day hospital participants were already at McMaster when the group occurred, but were provided with a $10 gift card at the completion of the group.

Group members were contacted for the screening appointments through phone numbers listed on the referral paperwork. At that time, the group process and associated research components were explained to participants and their parents. Informed consent

regulations in the United States and Canada differ. Since institutions in both countries oversaw this study, an attempt was made to balance the consent laws. In the United States, all individuals under the age of 18 must have parents provide consent for research. In Ontario, informed consent for mental health services and research participation is based upon the client's capacity to consent (i.e., being able to explain in age-appropriate language the risks and benefits of a service and express willingness to engage). Some systems require that a child be 16 years of age or older to provide consent, while schools require parental consent until age 18. According to Health Canada (2015), consent should be obtained from parents for children under 16 years of age, except for mature minors. Mature minors are those with the capacity to consent independently. To balance the regulations between Canada and the United States, parents provided permission and consent for all youth under 16 years old, while youth provided assent. Youth 16 years and older independently provided consent to participate in the research and group. Written consent and assent were obtained for all participants, and copies of consent and assent forms were provided to participants and parents. See Appendix I for copies of all consent and assent forms used in the study.

Procedure

Data collection procedures for this embedded study can be thought of in terms of components that will occur before, during, and after the group yoga intervention (See Appendix F for a procedural diagram of the study design). Pretests completed before the group included the Child PTSD Symptom Scale (CPSS), the Youth Outcomes Questionnaire Self-Report (YOQ-SR), and Affirmation Questionnaire. Pretests were

completed during an individual therapy session prior to the first group session at the Denver Children's Advocacy Center and during the group screening meetings at McMaster Children's Hospital. During each session of the yoga group, participants also completed a qualitative Yoga Experiences Form that was used to process their experiences and increase awareness on a cognitive level of their experiences in the group. Post-tests were completed at the end of the sixth group meeting at the McMaster Children's Hospital site. Post-tests for the 2015 Denver Children's Advocacy Center clients were completed at the first individual treatment session following completion of the group. Post-tests included all the pretest questionnaires, as well as the Therapeutic Factors Inventory- Cohesiveness Scale and the Working Alliance Inventory-Short Form-Bond Scale. The archival data only included the Youth Outcomes Questionnaire-Self Report and the Affirmation Questionnaire.

Figure 1. **Group Room at McMaster Children's Hospital.**

During the group, the room was carefully set up with mats, props, water and snacks for clients, pens and markers, and affirmation cards, per recommendations from Lilly and Hedlund (2010; see picture in Figure 1 above). At the beginning of each

session, clients rated their moods before starting the group. Then each session began with a check-in or brief mindfulness exercise. Next, the group theme was discussed and the affirmation and related quote were read. The quote was only used at the McMaster groups. After this, a breathing exercise or body scan was used to help the clients begin to tune into their bodies. Then the physical yoga practice was conducted using poses that matched the current theme for the group. During or following the physical practice were either group activities or art activities that matched the theme. Each group ended with final relaxation and a traditional yoga closing (Namaste).

Each participant was assigned a study code at the beginning of the study. Participants at the Denver site were assigned a code beginning in D, and then numerical codes increased chronologically (D1, D2, etc.). Participants at the Hamilton site were assigned a code beginning in H, and numerical codes increased chronologically (H1, H2, etc.). After the final group session, pretest, within group, and post-test data were coded and analyzed. These data were used to determine participants for the follow-up interviews, and to generate additional insights regarding the key elements of the group and what themes had the most impact. During the consent process, all participants in the outpatient group at McMaster Children's Hospital were asked if they were willing to participate in follow-up interviews. Three participants from McMaster Children's Hospital who consented to be interviewed were asked to complete follow-up interviews with the investigator that were approximately 30 minutes in length based upon their responsiveness to the treatment and whether or not they had PTSD diagnoses. The follow-up interviews were audio recorded. Willingness to be audio recorded was

necessary for participation in the follow-up interviews, but not for participation in the larger group.

As noted above, all groups were run with clinical samples, and the yoga intervention structure and intensity changed over time based on clinical needs. Some of the variations in the group structure were made based upon clinical needs relevant to the particular site or population (day hospital). The first group at the Denver Children's Advocacy Center ran for 8 weeks for 60 minutes a session (n= 7), for a total time commitment of 480 minutes. The second group at the Denver Children's Advocacy Center (DCAC) ran for 8 weeks for 75 minutes a session (n= 6), with a total time commitment of 600 minutes. Following this group, the DCAC group leader made the decision to combine themes and run a 90-minute 6-session group, which she noted increased adherence. Under this model, the time commitment for the group was 540 minutes. Due to the needs of day hospital (short-term stay) and the group being run within their six-hour day with other treatment requirements, the group sessions were 60 to 75 minutes each across six sessions in a condensed time period. The study did not involve additional post-treatment follow-up, aside from clients who volunteered to participate in the follow-up interviews. A total of seven treatment groups were included in the study.

Use of Relevant Theory

The group was based on the curriculum developed by Lilly and Hedlund (2010) with a focus on a different trauma-related theme and mantra each week, allowing the

physical poses/postures to be connected to cognitive themes (group curriculum available on request). This allowed the yoga psychotherapy group to be a helpful adjunct to traditional treatments, such as TF-CBT. The curriculum also used Herman's (1992) understanding of the three phases related to complex trauma recovery by incorporating an emphasis on establishing safety and security. Adolescents at McMaster Children's Hospital primarily receive CBT or DBT treatments for individual therapy, and adolescents at DCAC primarily receive TF-CBT. Though the format and length of the group varied during the iterations of the intervention, group themes have consistently included safety, boundaries, strength, power, assertiveness, trust, intuition, and community (Lilly and Hedlund, 2010). As noted above, DCAC chose to condense the group into a 90-minute 6-session format. The Child and Youth Mental Health Outpatient Service group at McMaster Children's Hospital was run in the same format to mirror the group at DCAC. The day hospital group retained the same 6-session structure and combination of themes, but ran on a condensed format. See Appendix G for a diagram providing an overview of the group's themes, affirmations, and key components.

Participants

Inclusion Criteria. All clients referred to the groups were female adolescents with a history of complex trauma. Complex trauma was defined as experience of emotional, physical, or sexual abuse; neglect; or exposure to domestic violence. Given the tendency for adolescents who have experienced complex trauma to manifest symptoms across a spectrum of disorders, a PTSD diagnosis was not required for participation in the group, based on research that indicates that adolescents in need of

treatment for trauma are more likely to meet criteria for depression, other anxiety disorders, and externalizing disorders like Attention-Deficit/Hyperactivity Disorder or Oppositional Defiant Disorder (Ackerman, Newton, McPherson, Jones, & Dykman, 1998; Copeland et al., 2007; D'Andrea et al., 2012; Pelcovitz et al., 1994; Pynoos et al., 2008; Zelechoski et al., 2013).

Use of an internal referral model allowed for screening through a participant's individual therapist, as they were able to evaluate referral criteria and make appropriate referrals. For example, a youth who was exposed to domestic violence early in life who subsequently experienced physical and emotional abuse diagnosed with Separation Anxiety, Social Anxiety, Persistent Depressive Disorder, and externalizing behaviors but not PTSD was an appropriate referral. Group members needed to read or speak English to participate in the group and complete the questionnaires. If individuals had lower academic functioning impacting reading skills, they had the option to have the questionnaires read to them or have items explained that they did not understand since they completed the questionnaires with the group facilitators or a therapist.

Exclusion Criteria. History of inpatient hospitalization, self-harm, or suicidal ideation was not exclusionary. Clients who were actively suicidal or homicidal, dependent on substances, or actively psychotic at recruitment were excluded from the group. Clients who did not speak English were also excluded from participation.

A power analysis was conducted using G*Power 3 to estimate the required sample size for repeated measures between and within factors ANOVA with a medium effect, Type I error probability of .10, and a correlation between measures of .7. The

power analysis yielded a required sample size of 24. Two groups from McMaster Children's Hospital and two groups from the Denver Children's Advocacy Center were run for the study. In addition, data were available for three previous groups at the Denver Children's Advocacy Center. Sample sizes for the study groups were smaller than hoped, but altogether, a sample of 34 participants was obtained.

Culturally and racially, the compositions of the two study sites varied. The racial composition of the sample from McMaster Children's Hospital was significantly different, reflective of the different cultural composition of Southern Ontario. Demographic information on race was more difficult to track in Ontario, and was not typically asked on standard intake forms used by the outpatient mental health program in which the principal investigator worked. The primary referral source typically commented on cultural factors relevant to new referrals at the time of referral. Canada is located adjacent to the United States, but is part of the Commonwealth of Nations and has significant French influences in Quebec. The culture has a heavy European influence.

Canada's total population is much lower than that in the United States, around 35 million, and immigration from throughout the world is common. Canada's census tracks individuals based on country of origin and individuals who identify as European Canadian, Aboriginal or First Nations, or as self-identifying as a "visible minority" (Statistics Canada, 2015). While there are many diverse areas of Canada, including Toronto, which is split evenly between European Canadians and those identifying as a visible minority group, over 82% of the population of Hamilton is European Canadian. There is also a significant refugee population in Hamilton and great diversity among

those who do not identify as European Canadian. Just over one percent of Canada's total population is made up of individuals originating from Latin America, while this is a very large portion of the population served by the Denver Children's Advocacy Center.

In the overall sample, 54.5% of participants were Latina (n=18), 24.2% were White (n = 8), 12.1% were Black (n = 4), 6.1% were Native American/Aboriginal (n = 2), and 3.0% were Asian (n = 1). Of the sample from the Denver Children's Advocacy Center, 75% were Latina (n = 18), 12.5% were Black (n = 3), 8.3% were White (n = 2), and 4.2% were Native American (n = 1). Of the sample from McMaster Children's Hospital, 66.7% were White (n = 6), 11.1% were Asian (n = 1), 11.1% were Black (n = 1), and 11.1% were Aboriginal (n = 1).

In order to capture symptom reduction characteristic of complex, developmental trauma, analyses assessed reduction of both general mental health symptoms (depression and behavior dysfunction) and trauma-specific symptoms. Even if full PTSD criteria were not met, decreases in subclinical trauma symptoms were possible. Groups were developed based upon age-appropriate referrals. All clients at the Denver Children's Advocacy Center were participating in outpatient treatment, and the investigator recruited two similar groups at McMaster Children's Hospital.

Attempts were made to match the groups regarding number of participants, diagnoses, and age, but were limited by availability of participants. Of the four participants in the Winter 2015 group at DCAC, two had PTSD diagnoses and two did not. Of the participants in the July 2015 group at McMaster Children's Hospital, three had PTSD diagnoses and two did not. Of the Summer 2015 group at DCAC, all four

participants had PTSD diagnoses. Of the August 2015 day hospital group at McMaster Children's Hospital, two participants had previous PTSD diagnoses and two did not. Despite not all McMaster Children's Hospital clients having previous PTSD diagnoses, their overall symptom severity on both outcome measures was more severe. The mean age of participants in the McMaster Hospital groups (M = 15.89, SD = 1.36) was slightly older than the participants in the DCAC groups (M = 13.68, SD = 1.70). Symptoms were more severe and more variable for the McMaster Children's Hospital groups for both general mental health symptoms (YOQ-SR pretest M = 113.33, SD = 44.77) and trauma symptoms (CPSS pretest M = 35.00, SD = 10.68) than for the DCAC groups (YOQ-SR pretest M = 65.58, SD = 38.37; CPSS pretest M = 24.44, SD = 8.19).

Measures

While it may seem intuitive to include a measure of mindfulness, previous studies have demonstrated that mindfulness scales tend to measure mindlessness (Siegel, N.D.). That is, individuals with little experience in mindfulness practices generally report that they are very mindful, but those with some experience tend to notice how difficult it is to practice mindfulness (Siegel, N.D.). Therefore, mindfulness questionnaires have limited utility to predict true change. As this study is focused on decreasing trauma-related and global symptomology through yoga, assessing symptom change directly was expected to be most beneficial. Demographic questions were limited, and obtained via the group referral forms. Trauma symptoms, overall symptoms, and specific targets of the group were measured before and after the group.

Affirmation Questionnaire. The author developed an affirmation questionnaire corresponding to the affirmations used in each group. For example, affirmations included "I believe that I have the right to be safe," "I can tell others 'no' when they intrude in my personal space," and "I feel that I am strong." See Appendix A for all items. In addition, two general questions were included that asked about the client's ability to regulate her emotions and having skills that help her cope with her trauma. Responses were scored on a 5-point Likert scale with scores ranging from *1= strongly disagree* to *5= strongly agree*. Total scores for this questionnaire range from 10 to 50. Cronbach's alpha was .908 for pretests and .914 for post-tests. This measure was given at pretest (before) and post-test (after) the group intervention.

The Child PTSD Symptom Scale (CPSS). The CPSS assesses PTSD symptom severity in children ages 8 to 18 based on DSM-IV diagnostic criteria (Foa, Johnson, Feeny, & Treadwell, 2001). It can be read to younger children, and is available in many languages. The CPSS includes 17 items that map onto diagnostic criteria, and seven items assessing functional impairment caused by PTSD symptoms. The CPSS was intended to either stand alone as a diagnostic tool in assessing PTSD or to be included in part as a broader diagnostic battery. Completion time for the measure is 10 minutes. Part one of the questionnaire involves a 4-point Likert-like scale (from *0 = not at all or only at one time* to *3 = 5 or more times a week/almost always*), and part two involves dichotomous questions assessing impairment. The measure yields a total score from 0 to 51 where 0-10 = below threshold, 11-15 = subclinical, 16-20 = mild, 21-25 = moderate, 26-30 = moderately severe, 31-40 = severe, and 41-51 = extremely severe (McLean et al., 2015).

It also provides subscale scores for re-experiencing (intrusion), avoidance, and hyperarousal. The measure is time-sensitive, asking respondents to indicate how many times a problem has bothered her in the last two weeks. Questions include, "Trying not to think about, talk about, or have feelings about the event," "Having bad dreams or nightmares," and "Not feeling close to people around you." See Appendix B for complete measure. The measure was given before and after the group intervention.

One disadvantage of the CPSS is that its items map directly onto DSM-IV items, and it has not yet been updated to reflect the DSM-5 criteria. The only currently available measure that maps onto DSM-5 symptom criteria is the UCLA PTSD Reaction Index (Pynoos & Steinberg, 2014). However, psychometric validity data are not yet available for this newly updated measure. In addition, the UCLA PTSD Reaction Index is longer and more complicated to administer, and measures symptomology during the past month. In order to capture change during a 6-week group, an outcome measure that assessed symptoms within the last two weeks, rather than the last month, was preferable to capture recent change. If clients were measuring symptoms for the last half of the group, rather than the last two weeks, some of the effect could have been lost.

Psychometric reliability and validity of the CPSS is quite strong. Internal consistency scores ranged from .70-.89 for total and subscale symptom scores, and the test-retest reliability was .84 for total score, .85 for re-experiencing symptoms, .63 for avoidance symptoms, and .76 for hyperarousal (Foa et al., 2001). The CPSS correlated at .80 with the Child Posttraumatic Stress Reaction Index, an earlier version of the UCLA PTSD Reaction Index, establishing convergent validity (Foa et al., 2001). Additionally, in

a discriminant function analysis, the CPSS subscales correctly classified 94.7% of cases (Foa et al., 2001). Internal consistency was .83-.89 in a recent study (McLean et al., 2015). Cronbach's alpha was .88 for total at pretest and .89 for total at post-test in the current study.

Youth Outcomes Questionnaire- Self Report. The Youth Outcomes Questionnaire-Self Report (YOQ-SR) was used to evaluate treatment outcomes based on global symptom reduction (Wells, Burlingame, & Lambert, 2003). The YOQ-SR was given before and after the group. The YOQ is very sensitive to change, and individuals were asked to report on their symptoms within the last seven days. The 64-item questionnaire produces a total score of -16 to 240 (due to negative scores being awarded for reverse-scored items, a negative score is possible). The YOQ-SR takes five to seven minutes to complete. It was designed for adolescents age 12 to 18 years old, and requires a 5^{th} grade reading level. The YOQ-SR can also be read to children who are having difficulty with the language requirements, and it is available in several language translations. Symptoms are rated on a 5-point Likert scale from *Never or Almost Never* to *Almost Always or Always.* Questions include, "I want to be alone more than others my same age," "My emotions are strong and change quickly," "I am calm," and "I don't forgive myself for things I've done wrong." The YOQ-SR was chosen due to its ease of use, brief administration time, sensitivity to change, and previous data supporting strong reliability and validity (Wells, Burlingame, & Lambert, 2003). The measure is available from oqmeasures.com. A total score of 47 was set as the clinical cut-off score (Wells, Burlingame, & Lambert, 2003).

The YOQ contains 6 subscales that include: Interpersonal Distress (ID), Somatic (S), Interpersonal Relationships (IR), Critical Items (CI), Social Problems (SP), and Behavioral Dysfunction (BD). These domains align nicely with areas identified in the literature that are affected for youth who have experienced trauma. Interpersonal Distress is a measure of overall emotional distress, including anxiety, depression, and hopelessness. The Somatic scale assesses bodily symptoms, including headaches, dizziness, nausea, and pain or weakness in joints. Low somatic scores can indicate either absence or unawareness of symptoms. The Interpersonal Relationships scale addresses the client's relationship with parents, other adults, and peers. The Critical Items scale assesses change in paranoia, obsessive-compulsive behaviors, hallucination, delusions, suicide, mania, and eating disorders. The Social Problems scale measures conduct problems and aggressive behaviors. Finally, the Behavioral Dysfunction subscale measures change in the adolescent's executive functioning, task-related frustration, inattention, hyperactivity, and impulsivity (Wells, Burlingame, & Lambert, 2003).

The YOQ-SR was chosen, in part, due to its strong reliability and validity. Ridge et al. (2009) found internal consistency estimates of the YOQ-SR of .95 for total score and ranging from .71 to .91 for its subscales. In addition, moderate to good concurrent validity was calculated based upon other commonly used self-report measures (Child Behavior Checklist-Youth Self-Report, Behavior Assessment System for Children, Self Report of Personality-Adolescent Version). Test-retest reliability was very good for the total score (r = .89; Ridge et al., 2009).

Therapeutic Factors Inventory- Cohesiveness Scale. This measure was chosen to address potential effects of group cohesion that contributed to the study outcomes to control for this effect. It was given after the group intervention. The nine-item Cohesiveness scale measures socio-emotional aspects of group cohesion (MacNair-Semands & Lese, 2000), drawing on Yalom's (1995) therapeutic factors. Responses are rated on a 7-point Likert-like scale from *strongly disagree=1* to *strongly agree=7*. Items include "I feel accepted by the group," "I feel a sense of belonging in the group," and "We trust each other in my group." See Appendix C for items in this measure. Previous test-retest reliability of 0.93 was reported, as well as a previous internal consistency level of 0.90 (MacNair-Semands & Lese, 2000). Cronbach's alpha was .91 for the current study.

Alliance. The Working Alliance Inventory – Short Form (WAI-S) (Tracey & Kokotovic, 1989) is a 12-item 5-point Likert measure derived from the original 36-item version (Horvath & Greenberg, 1989) that assesses the three dimensions of agreement on pertinent therapeutic tasks (Tasks), agreement on therapeutic goals (Goals), and development of affective bonds between client and therapist (Bond). Items include "I believe ___ likes me," and "I feel that ___ appreciates me." See Appendix D for additional items. Tracey and Kokotovic (1989) reported evidence supporting the construct validity of the WAI – Short Form, as well as high internal consistency estimates from .83 to .98 for its three factors. Cronbach's alpha was .83 for the current study. This study used the 4-item bond scale in order to control for the effects of the therapeutic alliance on the group. This measure was given after the group intervention.

Yoga Experiences Form. During each session, clients filled out a Yoga Experiences Form (see Appendix E) rating their levels of calmness versus distress on a scale of 1 to 10 prior to the group and then following the group, commented on content of the group that they found helpful and difficult, what they would remember about the theme from each group, what they became aware of while practicing, what they learned from other group members, and what they wanted to practice again.

Follow-up Qualitative Interviews. Follow-up semi-structured qualitative interviews were conducted with a subset of group participants from the McMaster Children's Hospital site. Attempts were made to balance the number of participants with PTSD diagnoses and with subclinical symptoms and those who benefited from the group and did not. Participants for the follow-up qualitative interviews were selected a) based upon participant willingness to be audio taped for the interviews and b) following the intervention based upon the results of the qualitative and quantitative measures up until that point. See Appendix H for interview questions.

Time Burden for Questionnaires. The YOQ-SR takes approximately five to seven minutes to complete, and involves 64 simply worded questions written at a fifth grade reading level. The CPSS takes 10 minutes to complete, and involves 24 total questions. While the measure is intended for children ages eight to 18, the wording is slightly more complex. Younger children may need assistance with the CPSS. The final pretest measure was the Affirmation Questionnaire, which involves 10 questions, based upon the themes of the group. It takes about five minutes to complete. Therefore, the pretest questionnaires were completed in 20 to 22 minutes, and contained 98 total

questions. It was expected that the participants would be able to complete the measures easily in one sitting. The PI, an individual therapist, or the Denver group leader supervised participants when they completed the measures. If the participants needed a break or need assistance with the questionnaires, it was provided to them. Occasionally, participants asked questions about what certain items meant, but they were able to complete the questions within the time rates noted above. Two participants requested assistance from the PI.

The Yoga Experience Questionnaire is a largely qualitative process measure that was completed each session in approximately five minutes. The pretest measures were repeated at post-test, along with two brief group measures that were used to control for cohesion and alliance effects. The additional measures add a total of 13 questions (111 questions total at post-test), and were expected to add an additional five minutes, compared to the 20 to 22 minutes required to complete the questionnaires at pretest. The clients completed the questionnaires supervised by the PI, their individual therapist, or the group facilitator, so they had the opportunity for assistance or to take breaks as needed while completing the questionnaires.

Data Exploration

Preliminary quantitative analysis was conducted by running descriptive statistics, such as Explore statements and Frequencies, in SPSS, Version 22. The researcher checked skewness and kurtosis to determine normality. Both were within acceptable limits for all target variables once outliers were adjusted. Additional assumptions for Repeated Measures Analysis of Variance and Repeated Measures Analysis of Covariance

were also checked. Preliminary qualitative analyses were conducted by reading through the qualitative data collected during the intervention using the qualitative questionnaires. Field notes were written immediately following each group session and qualitative interviews, and analytic memos were written as the researcher read through the data and began developing categories. A graphical display of interview findings was also created (see Appendix L). Categories from qualitative questionnaires and interviews converged and were developed into a codebook (see Appendix M).

Data Analysis

Quantitative Analysis. The selected alpha level for the study was $p < .10$, given that this is a preliminary evaluation with a small sample. Benjamini-Hochberg was selected as an appropriate Type I error correction method since its stepwise process allowed for greater retention of power (Myers, Well, & Lorch, 2010). Preliminary analyses were conducted to examine demographic information and properties of each of the scales used in the study. The two sites were also compared regarding demographic variables, though differences in race were expected. As the primary purpose of the study is a preliminary evaluation that compares levels of symptoms from pretest to post-test, quantitative data were analyzed using between and within repeated measures ANOVA for the YOQ-SR and CPSS with covariates (length of previous treatment, group cohesion, therapeutic alliance). ANOVA was evaluated for statistical significance, and effect sizes were calculated. Total scores on the Affirmation Questionnaire were also correlated with the symptom inventories to determine the degree of a relationship between the development of affirmations and the level of overall symptoms. In addition, the reported

levels of distress versus relaxation reported on the Yoga Experiences Form were plotted for each participant from the beginning of the group until the end of group. It was expected that levels of distress would reduce from the beginning to the end of each group session.

Qualitative Analysis. Qualitative data were expected to demonstrate which aspects of the yoga intervention were helpful. Qualitative data were also expected to support findings from the quantitative data demonstrating how yoga affects trauma symptoms. A combination of summative content analysis (counting the number of codes for key words), directed content analysis based on theory, and conventional content analysis based on emerging categories in the participants' texts were combined to capture the strengths of each approach (Hsieh & Shannon, 2005). Summative content analysis was used to identify the frequency with which participants identified themes from the group. This technique was used for the group themes, components of yoga, and emotions/sensations experienced categories. Directed content analysis was selected due to its fit with the current study's goal of supporting existing theory (Hsieh & Shannon, 2005), including the use of the HCSAY curriculum that delineated group themes and Spinnazola, Rhodes, Emerson, Earle, and Monroe's (2011) assertion that physical asanas (poses), breath work, and meditation are the three components of yoga practice that are beneficial to trauma clients (components of yoga category). Conventional content analysis was used to capture additional meaningful categories that were not planned based upon theory (Hsieh & Shannon, 2005). The three forms of content analysis were combined to code content from the weekly qualitative questionnaires, interview

transcripts, and the author's field notes across eight categories organized in two clusters describing what makes yoga work, and how yoga helps reduce trauma symptoms. Qualitative data from how yoga helps reduce trauma symptoms were integrated with quantitative results.

Reporting Results

Teddlie and Tashakkori (2009) established seven guidelines for credible inferences that guided the results and discussion of the study. The first two involve reporting of results. The first guideline involves keeping the research purposes and questions in the foreground in all analyses and results. The purpose of the study was to generate quantitative data that demonstrates a decrease in trauma and general mental health symptoms following a yoga psychotherapy intervention for trauma (through the YOQ-SR, CPSS, and Affirmation Questionnaire), and to collect qualitative data during the group process and following the group that provides a picture of the mechanisms that allow the intervention to be effective. This purpose was clearly discussed through the research questions that were addressed and will be addressed in the discussion.

The second guideline involves stating each question separately and then summarizing results relevant to that question. The quantitative strand examined the amount of trauma and mental health symptom change occurring following the trauma psychotherapy group. The quantitative results were reported through the Repeated Measures ANCOVA results and through accompanying tables. The amount of change in trauma and general mental health symptoms from pretest to post-test was examined, and significant decreases in symptoms were expected.

There were two goals of the qualitative portion of the study. First, the qualitative strand examined in what ways the written qualitative and interview data showed changes in trauma symptoms and coping. Second, the qualitative portion was used to elicit feedback from participants about which elements of the yoga group were most and least beneficial through both the Yoga Experiences Form and the follow-up qualitative interviews. The Yoga Experience Form and interviews were expected to support the quantitative hypothesis that trauma and mental health symptoms decreased following the yoga psychotherapy group. The qualitative results from the Yoga Experiences Form and the interviews were discussed in relation to derived categories. Quotes from participants were used to support the categories, and visual models were created that illustrate the findings. The qualitative results were expected to partially integrate with the quantitative results, demonstrating the benefits of the yoga intervention, while also explaining limitations of the group to inform future treatment using this method.

Interpreting Results

The quantitative and qualitative results were discussed in relation to the hypotheses and literature using Teddlie and Tashakkori's (2009) guidelines for credible inferences. Literature and theory were used to discuss and support findings from the study. Discussion drew on literature relating to trauma symptoms, top-down versus bottom-up models, the complex nature of trauma in adolescents, and previous yoga studies. The qualitative data interpretation focused on which aspects of the intervention were perceived to be most and least helpful, ways the intervention has helped participants cope, skills they are applying to their lives from the group, and suggestions about what

could be done differently in the future. Personal experiences reported by participants and assessment of the meaning of the findings were integrated.

Teddlie and Tashakkori's (2009) third guideline involves making a tentative interpretation about each part of the results in the answer to a research question. The quantitative findings were expected to demonstrate that the yoga psychotherapy group was effective in decreasing trauma symptoms and general mental health symptoms. The qualitative findings were expected to demonstrate changes in the participants' ability to demonstrate awareness, ability to tolerate distress, engage in positive coping, and increase positive self-perception associated with participation in the group. These hypotheses are further addressed in the results and discussion section. The fourth guideline involves combining interpretations. This was expected to occur through mapping qualitative data provided by participants about their experiences in the group through the Yoga Experience Form onto their reported quantitative changes. In addition, overall categories were sought, and it was expected that these categories would align with a decrease in trauma symptoms for most participants.

The fifth guideline involves attending to the strength of inferences from both qualitative and quantitative strands. Meeting this guideline depended on the writer's ability to integrate the results and make sense of them together. The embedded design allowed for quantitative change to be measured while detailed qualitative experiences were reported each session, which together explain the results. For instance, a client who experienced some changes qualitatively during the group process might still feel she is

experiencing significant symptoms due to other setbacks. Therefore, the follow-up qualitative interviews sought to further explain discrepant findings.

The sixth guideline indicates that the strength of a good mixed methods study depends on the extent that it fulfills the purpose for using mixed methods. The purpose of using mixed methods was to generate quantitative and qualitative data supporting a yoga psychotherapy intervention, while also obtaining detailed qualitative data that demonstrated the mechanisms by which the group achieved success. The study was designed so that qualitative and quantitative data each explain pieces of what was being studied, which should ultimately lead to fulfilling a purpose that could not be accomplished by either quantitative or qualitative research alone.

Finally, Teddlie and Tashakkori's final guideline involves attending to inferences based upon the particular design. This study was an embedded design with components that occur before, during, and after the intervention. The purpose of the study was known from the start. The qualitative follow-up interviews that were conducted after the intervention were expected to help explain the earlier findings, and they served to provide additional insight regarding how participants responded to the group themes, skills they were continuing to practice, and how the yoga intervention changed their experiences of trauma.

Validation

The YOQ-SR and CPSS were checked for reliability and validity prior to use. The Affirmation Questionnaire was developed for this intervention. Alpha levels were run for the current study to check internal consistency (pretest $a = .908$; post-test $a = .914$). To

address internal validity, analyses were run to compare demographic and test variables of the clients from the two sites. The results of the author's field notes, the qualitative questionnaires, and the interviews were triangulated with each other. In addition, a second researcher coded the interviews and qualitative questionnaires, and inter-rater reliability (80.1%) was obtained. As noted above, Teddie and Tashakkori's (2009) guidelines for credible inferences were used.

Joint Display

Joint displays integrating the results were created. A display that links quantitative results, qualitative results, and diagnosis of participants who were purposefully selected for the follow-up interview was used. Displays were also created that link qualitative categories to quantitative results to explain the results in related areas (mood/emotions versus awareness, trauma-related symptoms, and the perceived effects of judgment on outcomes).

Summary

Data from two different samples, one from the Denver Children's Advocacy Center (n = 25) and one from McMaster Children's Hospital (n = 9), were merged for analysis. In both samples, the participants were adolescent females receiving trauma-focused treatment through a yoga psychotherapy group led by clinicians dually trained as therapists and yoga instructors. Participants completed the CPSS, YOQ-SR, and Affirmation Questionnaire at pretest and post-test, as well as the Therapeutic Factors Inventory-Cohesiveness Scale at post-test. Participants completed a Yoga Experiences Form during each session that connects to the Affirmation Questionnaire and focused the

participants on awareness of their yoga practice. Data from the Yoga Experiences Form, interviews, and field notes were analyzed to derive categories, while pretests and post-tests on the quantitative measures were analyzed using within groups (repeated measures accounting for time) and between groups ANCOVA to calculate differences between symptoms from pre-treatment to post-treatment while controlling for group differences, group cohesion, and therapeutic alliance. Ultimately, the covariates did not contribute to the analyses, so they were removed and ANOVA was selected as the primary outcome measure.

Chapter Four: Results

This chapter will first present the quantitative findings of the study, then the qualitative results of the study, and then they will be integrated in a mixed methods results section. The quantitative results are divided between results relevant to the general mental health symptoms and results pertaining to the trauma-specific symptoms. For each set of symptoms, the repeated measures analysis of covariance, repeated measures analysis of variance, and then follow-up dependent t-tests are presented. Secondary quantitative analyses are then presented using the Affirmation Questionnaire and change in levels of calm from before each group to after each group. Next, the results of the qualitative content analysis results are presented. The content analysis is categorized around the two major research questions. Four categories address how yoga helps reduce trauma symptoms and four categories describe what makes the yoga intervention work. Finally, both the qualitative and quantitative results are integrated in a mixed methods section with a joint display of the findings in both areas.

Quantitative Results

Data were available from four groups that occurred in 2015, two of which occurred at the Denver Children's Advocacy Center and two of which occurred at McMaster Children's Hospital (n = 18). Due to the sample being at the lower end of anticipated range, archival data were also included from three additional groups at the

Denver Children's Advocacy Center. Altogether, data were available for 34 participants. Descriptive analyses were run to analyze characteristics of the sample, and were discussed in Chapter 3. Differences between the samples were evident; therefore, study site was included as a fixed factor in the analyses. The primary variables for the analyses were further examined in Explore statements, checking for normality and outliers. Due to the small sample size and the nature of the study as a preliminary investigation, a significance level of $p < .10$ was selected for the study.

Mental Health Symptoms.

Repeated Measures ANOVA. Post-test data were available for the YOQ-SR for 27 out of 34 participants (79.4%) who participated in the study. This number was further reduced when covariates were introduced, as therapeutic alliance was only assessed in the 2015 groups. Originally group cohesion and therapeutic alliance were both going to be included as covariates, but due to the small sample, and the fact that the group structure is more experiential than process-oriented, it was decided that group cohesion could be removed from the model. Post-test data were available for 13 out of 18 participants in the 2015 groups (72.2%).

Changes in general mental health symptoms were tested in two ways in relation to the first hypothesis. First, a between and within-subjects repeated measures analysis of covariance (RM-ANCOVA) was run with site as a fixed factor and alliance, diagnosis (0 = other primary diagnosis, 1= PTSD), and number of yoga sessions attended as covariates. RM-ANCOVA was evaluated for both significance level and effect size. In ANOVA, .10 is considered a small effect, .25 is a moderate effect, and .40 is a large

effect (Myers, Well, & Lorch, 2010). Assumptions were tested and met, with an exception of a violation of Levene's (indicating an inequality of variances) regarding pretest and post-test YOQ-SR. Due to a relatively balanced design (6 vs. 7), ANOVA is considered robust to this type of violation (Myers, Well, & Lorch, 2010). Additionally, linearity of regression in which the covariate relates to the dependent variable in a linear manner was violated, but this assumption is not considered critical. Outliers were adjusted for therapeutic alliance and number of groups attended, and normality was met. In the analysis, time had a significant main effect on overall mental health symptom severity, $F(1, 9) = 4.66$, $p = .059$, $p\dot{\eta}^2 = .34$. A moderate effect size was found. Mental health symptom severity decreased significantly from pretest to post-test. There was also a significant interaction between time and therapeutic alliance, $F(1, 9) = 4.74$, $p = .057$, $p\dot{\eta}^2 = .35$. See Table 1 below. No between-subjects effects were found (see Table 2 below).

Table 1. **RM-ANCOVA Tests of Within-Subjects Effects for YOQ-SR.**

Measure: YOQ

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	813.711	1	813.711	4.661	.059	.341	4.661	.636
Time * Dx	319.473	1	319.473	1.830	.209	.169	1.830	.349
Time * Alliance	828.110	1	828.110	4.743	.057	.345	4.743	.643
Time * Site	276.765	1	276.765	1.585	.240	.150	1.585	.318
Error(Time)	1571.226	9	174.581					

a. Computed using alpha =.10

Table 2. **RM-ANCOVA Test of Between-Subjects Effects for YOQ-SR.**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	2817.484	1	2817.484	1.083	.325	.107	1.083	.252
Dx	757.227	1	757.227	.291	.603	.031	.291	.142
Alliance	982.868	1	982.868	.378	.554	.040	.378	.154
Site	7842.501	1	7842.501	3.014	.117	.251	3.014	.484
Error	23417.905	9	2601.989					

a. Computed using alpha = .10

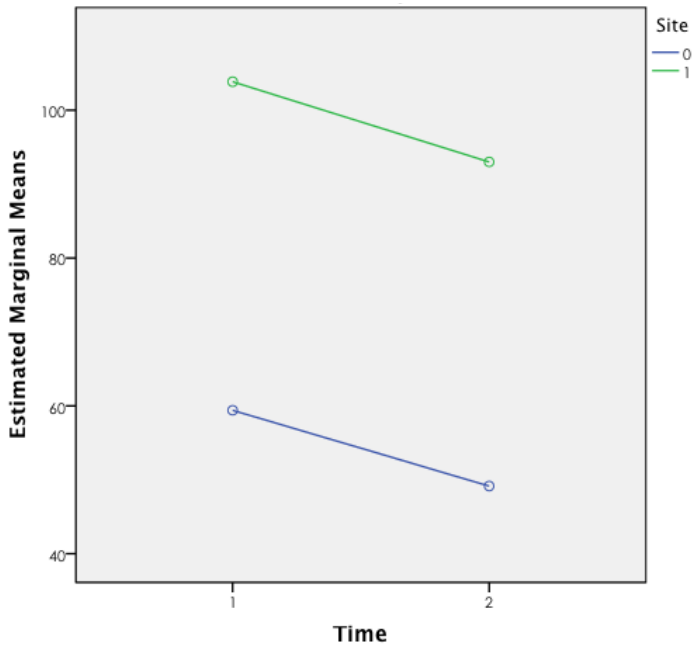
Next, a between and within-subjects repeated measures analysis of variance was conducted to compare differences between general mental health symptoms on the YOQ-SR while accounting for differences in sites without the covariates. The covariates were removed, as they were not significant, and thusly, RM-ANOVA was selected as the primary analysis. This allowed for the inclusion of the archival DCAC data, increasing sample size and power. Assumptions were tested and met. In the analysis, time had a significant main effect on overall mental health symptom severity, $F(1, 25) = 5.50$, $p = .027$, $p\eta^2 = .18$. See Table 3 below. A small effect was found. A significant between-subjects effect was found between sites, $F(1, 25) = 7.90$, $p = .009$, $p\eta^2 = .24$. Again, a small effect was found. As can be seen in Figure 1 below, while both sites had decreases of approximately 10 points each on the YOQ, initial symptom severity at the McMaster site was significantly more severe ($M = 103.8$, $SD = 46.83$) compared to that at DCAC ($M = 59.40$, $SD = 32.24$). As a result, the best post-test results were found at DCAC (estimated marginal mean = 49.15), followed by McMaster Children's Hospital (estimated marginal mean = 93.00).

Table 3. **RM-ANOVA Test of Within-Subjects Effects for YOQ-SR.**

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Time	1155.030	1	1155.030	5.499	.027	.180	5.499	.738
Time * Site	.956	1	.956	.005	.947	.000	.005	.101
Error(Time)	5251.304	25	210.052					

a. Computed using alpha =.10

Figure 1. **Estimated Marginal Means of YOQ-SR.**



Dependent T-Tests. Dependent t-tests were conducted to further evaluate each site's data. Data were evaluated based on significance levels and effect sizes. The inclusion of effect sizes offers a critical piece of information in the interpretation of the real-world meaning of changes in scores. Effect sizes were calculated using the Cohen's *d*. The following benchmarks were used to determine the size of the effect: small effect = .20-.49, medium effect = .50-.79, and large effect = >.80 (Cohen, 1988). For general

mental health symptoms, when the McMaster group was compared, scores from pretest (M = 103.86, SD = 46.82) to post-test (M = 93.00, SD = 42.90) decreased, but findings were not significant, $t(6)$ = 1.09, p = .318. However, a small effect was obtained (d = .41). When the DCAC groups were compared regarding general mental health symptoms, scores decreased significantly ($t(20)$ = 2.51, p = .021) from pretest (M = 59.40, SD = 32.24) to post-test (M = 49.15, SD = 36.50). A moderate effect size was obtained (d = .58).

Dependent t-tests were also conducted to examine differences between subscales on the YOQ. Type I Error correction was employed using Benjamini-Hockberg's correction for stepwise error control (Myers, Well, & Lorch, 2010; See Table 4 below). Assumptions were tested and met. Significant results were found for change in scores on the Behavior Dysfunction (BD) subscale, $t(26)$ = 3.06, p = .005, EC = .035, d = 0.59, and on the Intrapersonal Distress (ID) subscale, $t(26)$ = 2.40, p = .024, EC = .056, d = .46. A medium effect size was found for change in behavioral symptoms (BD), while a small effect size was found for changes in mood symptoms (ID). Significant changes were not found for the Interpersonal, Somatic, Critical Items, and Social Problems subscales, though the Interpersonal subscale was approaching significance. A high score on the Critical Items scale would lead a referral to be screened out for the group, so few differences were likely to be found here. See Table 4 for additional information.

Table 4. **YOQ Dependent T-Tests.**

Paired Samples Test							
	Paired Differences						
	Mean	Std. Dev.	Std. Error M	t	df	Sig. (2-tailed)	Benjamini-Hockberg
Pair 1: Pre-Post OQTot	10.41	20.10	3.87	2.69	26	.012	.042
Pair 2: Pre-Post MoodSx	3.52	7.62	.81	2.40	26	.024	.056
Pair 3: Pre-Post Somatic	1.04	4.19	.81	1.29	26	.210	.210
Pair 4: Pre-Post Interper	1.67	4.41	.85	1.96	26	.060	.105
Pair 5: Pre-Post SocialProb	.59	2.35	.45	1.31	26	.203	.237
Pair 6: Pre-Post BehavDys	2.56	4.34	.83	3.06	26	.005	.035
Pair 7: Pre-Post Critical	1.04	3.28	.63	1.65	26	.112	.157

Trauma Symptoms.

Repeated Measures ANOVA. To address the second half of the first hypothesis regarding symptom change in trauma-specific symptoms, the CPSS was examined using

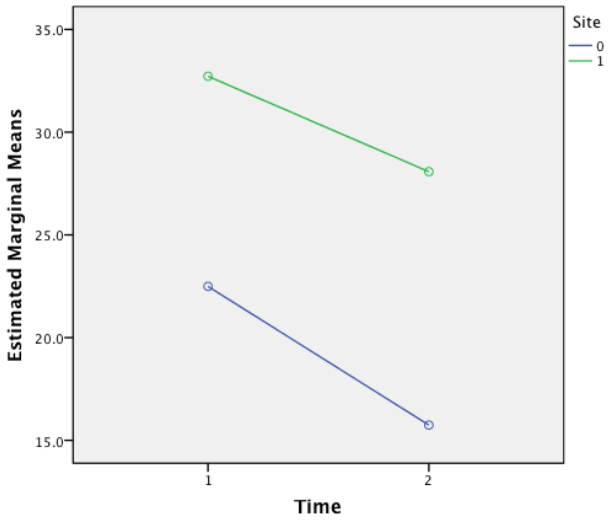
repeated measures ANOVA. As the CPSS was not administered to the groups at DCAC for which archival data were available, a sample of 18 participants from the 2015 groups was available for the analysis. Post-test data were available for 13 out of 18 participants (72.2%). First, a between and within-subjects repeated measures ANCOVA was run with site as the factor and therapeutic alliance, diagnosis (coded 1 = PTSD and 0 = other primary diagnosis), and number of yoga sessions attended as covariates. ANCOVA assumptions were tested and met. No significant main effects were found within factors, $F(1, 9) = 0.63$, $p = .448$, $p\dot{\eta}^2 = .07$. However, a significant main effect was found for the between-subjects analysis, indicating that differences were observed between sites, $F(1, 9) = 4.06$, $p = .075$, $p\dot{\eta}^2 = .31$, and a medium effect was found. This finding is consistent with differences found above between sites.

Between and within factors repeated measures analysis of variance was tested without the covariates, as they were not significant in the previous analysis. Study site was included as a between-subjects factor. Repeated measures assumptions were tested and met. A significant main effect was found between time points (see Figure 2 below), indicating that there was a significant change in trauma symptom severity from pretest to post-test, $F(1, 11) = 7.45$, $p = .020$, $p\dot{\eta}^2 = .40$. A large effect size was found. Significant differences were again found between sites, $F(1, 11) = 5.13$, $p = .045$, $p\dot{\eta}^2 = .32$, and a medium effect was found. As can be seen in Table 5, the McMaster site started off with greater symptom severity ($M = 32.14$, $SD = 10.04$) compared to DCAC ($M = 23.17$, $SD = 9.04$). Greater symptom decreases were also seen in the DCAC sample, which had a mean of 15.33 ($SD = 9.83$), in the subclinical range.

Table 5. **RM-ANOVA Site x Time for CPSS.**

3. Site * Time					
Measure: CPSS					
				95% Confidence Interval	
Site	Time	Mean	Std. Error	Lower Bound	Upper Bound
DCAC	Pre	23.167	3.919	14.541	31.792
	Post	15.333	3.875	6.804	23.862
McMaster	Pre	32.143	3.628	24.157	40.129
	Post	28.429	3.588	20.532	36.325

Figure 2. **Estimated Marginal Means of CPSS.**

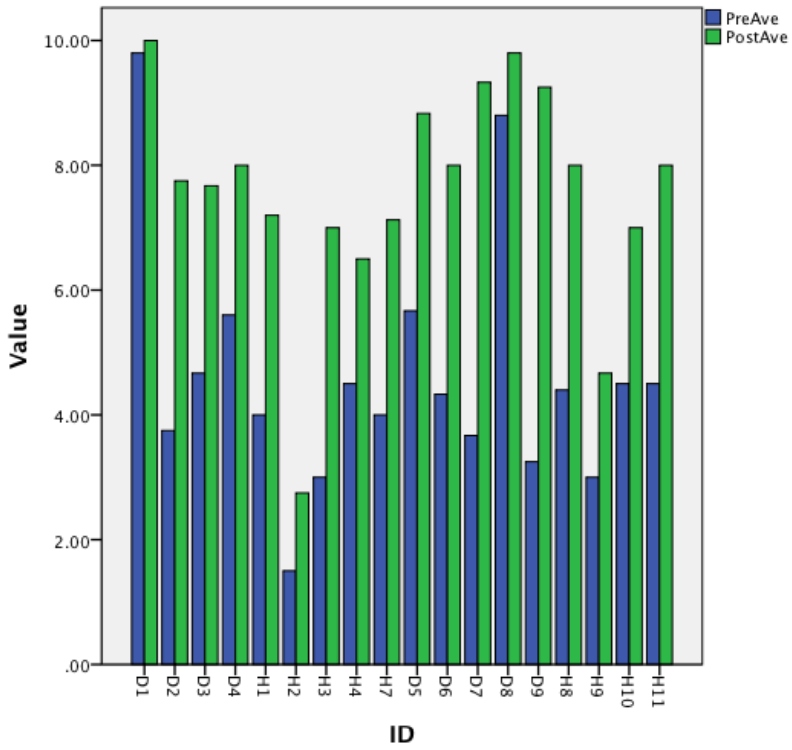


Dependent T-Tests. Dependent t-tests were also used to examine the data from each site in isolation. Data from the McMaster site indicated a decrease in total trauma symptoms from pretest (M = 32.14, SD = 10.04) to post-test (M = 28.43, SD = 9.20), but results were not significant ($t(6)$ = 1.09, p = .317). A small effect was found (d = .30). Clinically, the results shifted from the severe symptom range to the moderately severe range (McLean et al., 2015). Data from DCAC also indicated decreases from pretest (M

= 23.17, *SD* = 9.04) to post-test (*M* = 15.33, *SD* = 9.83), and changes were significant (*t(5)* = 3.58, *p* = .017). A large effect was found (*d* = 1.45), and clinically, the DCAC group moved from the moderate symptom range to the subclinical range. The CPSS subscales were also analyzed with data from both groups together. Significant differences were also found for change in avoidance symptoms (*t(12)* = 2.55, *p*= .026, *d* = .71) from pretest (*M* = 11.62, *SD* = 3.78) to post-test (*M* = 8.23, *SD* = 4.53). Significant differences were not found for re-experiencing or arousal symptoms.

Secondary Analyses.

Figure 3. **Change in Calm from Pre to Post Sessions.**



Participant IDs: IDs starting with D indicate a Denver participant, and IDs starting with H indicate a Hamilton participant. Participants are organized here chronologically.

Weekly Mood Ratings. In addition, scores were calculated for levels of distress to calm for clients before and after group for the 18 participants for whom these data were available. Participant D1 had difficulty evaluating her mood state, and she reported little variation between moods. Overall, participants reported an average increase in calm of 3.04 points (*SD* = 1.53) from before yoga to after yoga when all participants are included (see Figure 3 for detailed comparisons).

Trauma-Related Cognition. The Affirmation Questionnaire measured belief in the group-related affirmations, which were expected to relate to trauma-related cognitions. Three response patterns were demonstrated in the Affirmation Questionnaire. About a third of the overall sample had very similar scores from pretest to post-test (those with an absolute value of <3 in a change score; n = 11), a small group had higher scores at pretest and lower scores at post-test (n = 4), and one half had lower scores at pretest and higher scores at post-test (n = 15). After adjusting outliers for two participants at post-test, the sample was normally distributed, and a dependent t-test was run. Significant differences were found from pretest to post-test on the Affirmation Questionnaire across the sample, $t(29) = 2.86$, $p = .008$. Means increased from pretest ($M = 37.10$, $SD = 7.99$) to post-test ($M = 40.71$, $SD = 6.10$). There was also a strong negative correlation between post-test scores on the Affirmation Questionnaire and post-test total scores on the YOQ-SR, $r(24) = -.697$, $p < .001$, as well as post-test scores on the Affirmation Questionnaire and post-test scores on the CPSS, $r(11) = -.661$, $p = .014$. This indicates that when people report a high number of trauma and general mental health symptoms, they are also likely to report lower scores in positive affirmation and the ability to cope with their trauma

assessed in the Affirmation Questionnaire. The Affirmation Questionnaire was also highly correlated with group cohesion, $r(14) = .792$, $p < .001$, and therapeutic alliance, $r(13) = .733$, $p = .002$.

Summary of Quantitative Results

Data indicated significant differences on both general mental health symptoms and trauma symptoms in the primary analyses with RM-ANOVA. Results also indicated significant differences between the two study sites, with initial symptom severity being more severe at the McMaster site. Significant differences between time points were found in mood-related symptoms and behavioral symptoms. In terms of trauma-related symptoms, significant differences were found in avoidance symptoms. Significant changes were found in Affirmation Questionnaire scores from pretest to post-test as well. Finally, participants experienced increases in calm from before to after yoga sessions by an average of 3.04 points on a scale ranging from one to 10.

Qualitative Results

Qualitative results were derived from weekly qualitative questionnaires, interview transcripts, and the author's field notes. The author recruited qualitative follow-up interview participants from McMaster Children's Hospital who met full criteria for PTSD (H7 and H8) and those who did not (H4), and those who benefited significantly (H7 and H8) versus those who only experienced low to moderate benefits (H4) based upon quantitative data. Semi-structured interviews were conducted using 12 primary questions, with follow-up questions used as necessary by the interviewer to understand the interviewee's perspective. Following transcription of the interviews, the interviews were

organized in a graphical display based upon the 12 primary questions (See Appendix L). From there, meaning condensation (Kvale, 1996) was used to compress the text for each question into shorter statements. This method was used to assist the principal investigator in deriving categories. The transcripts were used for deriving codes.

The qualitative questionnaires, qualitative interviews, and field notes were coded across the two domains and eight categories (described below). A qualitative coding guide was created regarding all codes and categories used with descriptions, exemplars, and exceptions (see Appendix M). The principal investigator coded data, and a recent PhD graduate who had experience in qualitative data coding independently coded the qualitative questionnaires and the interviews. Inter-rater reliability of 80.1% (474/592 codes) was achieved for the qualitative questionnaire and interview data. The biggest discrepancy between raters was that the author double-coded more frequently, resulting in a higher number of total codes.

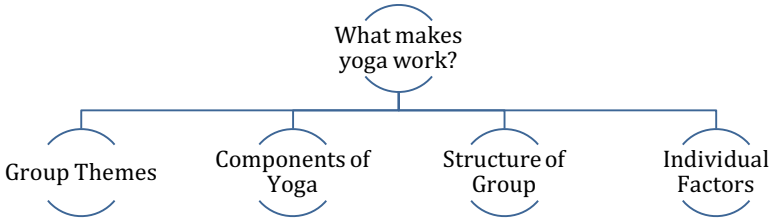
Content analysis was chosen for the analyses as a method that would lead to partial quantization, which can assist with the integration process for the mixed methods study. Directed content analysis was selected for use in the analysis due to its fit with the current study's goal of supporting existing theory, including the use of the HCSAY curriculum (Lilly & Hedlund, 2010) and the assertion of Spinnazola, Rhodes, Emerson, Earle, & Monroe, (2011) that physical asanas (poses), breath work, and meditation are the three components of yoga practice that are beneficial to trauma clients. Directed content analysis was combined with conventional content analysis to code data across eight categories that were divided across the two research questions (what makes yoga

work and how yoga helps reduce trauma symptoms). Directed content analysis was used to code the two categories chosen based on existing theory: group themes and components of yoga to the end of determining if the participant report would support existing theory. Summative content analysis was used to create tallies for certain categories that lent themselves to this approach most easily (number of times group themes discussed by participants, components of yoga discussed by participants, and emotions/sensations discussed by participants; see Appendix N for tables).

In exploration of the active ingredients that contributed to the effectiveness of the intervention, responses were coded as group themes, active components of yoga practice, additional components of the group process, and individual factors. In exploration of the areas where yoga contributed to symptom reduction, four categories were also derived: three that were found to be helpful and one that was found to detract from symptom reduction. These positive categories were emotions associated with the yoga practice, acceptance, and positive coping. Judgmental statements about self or concerns about being judged by others was the last category in this cluster that seemed to limit a participant's ability to participate mindfully in the yoga and benefit optimally.

What Makes Yoga Work? As noted above, content analysis categories were clustered around the two qualitative research questions. The first question was what mechanisms were reported by which yoga assisted with alleviation of trauma symptoms. The categories associated with this cluster are displayed visually in Figure 4 below.

Figure 4. **Cluster 1: What Makes Yoga Work?**



Group Themes. The group themes category was pre-derived using directed content analysis based upon the curriculum developed by Lilly and Hedlund (2010). Group themes included the codes of safety, boundaries, strength, assertiveness, power, trust, intuition, and community (Lilly & Hedlund, 2010). The goal was to examine which of the pre-determined themes were salient to the participants. See Appendix N for a frequency count using summative content analysis. Seventeen out of 18 participants directly or indirectly identified and described elements relating to at least one theme. Thirteen out of 18 total participants wrote about safety and strength, 12 wrote about trust, and 13 wrote about the benefits of support from either community or props during their practices. The theme of community may better fit under the theme of support, if it were reorganized from the directed content analysis approach to conventional content analysis. Three participants discussed the benefits of props and the wall to assist in their yoga practice, in addition to the benefit of community. Acknowledging the benefit of support through props before participants are ready to seek support from others may help facilitate this transition from support from objects to others. Six participants discussed boundaries, including two out of three clients interviewed, and three discussed power. Only two group members directly discussed intuition, and one of those noted that what she would remember about the theme from that week was "The meaning of intuition."

Another group member described intuition as connected with trust, and used the word "instincts," rather than intuition, which may be more comprehensible and accessible for teens.

Some participants made reference to themes in relation to each other. Two participants discussed the importance of safety in establishing trust. For example, one participant said, "When I felt safe, I trusted myself more." Strength, boundaries, and assertiveness were also often discussed together. For instance, one interviewee described "Being strong enough to make it stop when it gets too much," in relation to knowing her limits (boundaries), having strength, and standing up for herself (assertiveness). Safety was the only theme that was mentioned throughout the group, though strength and community appeared outside the weeks they were covered as well. Based upon frequency of mention and depth of participant descriptions, safety, strength, trust, and support were best understood, especially initially following the group. Interestingly, assertiveness was mentioned substantially during the follow-up interviews (7 codes), indicating that some of the themes may need time for participants to assimilate them. This appeared to be particularly true when a theme was challenging to participants, and required significant effort for them to shift their existing beliefs. None of the participants interviewed were able to describe other themes that they thought would be relevant that were not covered in the group.

While some of the themes appear to have been less understood and less commented upon, the less understood themes are strongly related to the primarily identified themes. For instance, boundaries are a component involved in maintaining

personal safety. Power and strength are strongly related, as well. Intuition can likely best be understood through the idea of "trusting your instincts," as described by one participant. When these relationships are taken into account, participants appeared to grasp the core content associated with the group.

Components of Yoga. The second category was components of yoga described as beneficial in reducing trauma symptomology, which included physical postures, breath work, and meditation (Spinnazola, Rhodes, Emerson, Earle, & Monroe, 2011). This category was derived through directed content analysis, meaning the codes within the category were predetermined. The vast majority of the comments related to this category dealt with the physical yoga postures (161/246 = 65.4%). See Appendix N for a frequency count of codes across the components of yoga. One interviewee who struggled with the physical postures reported being able to experience mindfulness and meditation in a new way through the hands-on nature of the yoga class. A second interviewee stated that the physical practice of yoga "made me concentrate on my goal for that class, and just be in the moment. It's very mindful." This comment nicely illustrates the link between the components of yoga, as the physical postures are part of the mindfulness and meditation aspect of yoga, though attempts were made to differentiate between these two components as distinct.

Sixteen out of 18 participants discussed postures that they found helpful or wanted to practice again, and 15 out of 18 commented on aspects of the physical practice that they found difficult. This points to an awareness of their experiences, which will be discussed further in a subsequent category. The following poses were described as

helpful and things that participants wanted to practice again: tree, warrior poses, half moon, child's pose, dolphin, mountain, butterfly, downward dog, frog, handstand, mirror hands, crow, tripod, wheel, cobra, cat/cow, and headstand. The following were described as poses that were described as difficult: crow, balancing poses, standing up back to back, lizard on a rock, poses with eyes closed, dolphin, poses with chest against one's face, poses on hands and knees, and warrior poses. Some poses appear on both lists. One participant wrote, "Being a warrior reminds me of violence," while another described the "Warrior poses" as her favorite poses. One youth wrote that she found "Coming back to the butterfly pose, whenever uncomfortable with the other poses" to be helpful.

Ten participants discussed finding aspects of the breath work helpful or things that they would want to practice again, and two commented on elements of the breath work that they found difficult. For example, one participant noted that she found "breathing and paying more attention to my breath" helpful. The author's field notes discussed comments from one participant regarding the breath, and she had stated, "I always forget to breathe," to which the author noted, "It's easy to do. That's why we (yoga teachers) remind you."

Seven participants commented on finding the meditation and mindfulness aspects of class helpful and wanting to practice them again, while six commented on finding these elements difficult. Most frequently, participants noted that staying still mentally and physically was difficult. One participant noted that when she focused on trying to fix a more difficult pose, it caused her to "lose focus." Occasionally, participants commented that they did not find anything difficult about the practice (n = 12) or that they enjoyed

and wanted to practice everything again (n = 4; see Appendix N for Summative Content Analysis frequencies for this category). The physical postures involved in the yoga practice were the largest component of the intervention, and it was most represented in comments about what the participants found helpful and difficult. Several participants commented that they wanted to practice some of the poses they found difficult again. However, significant subgroups of clients discussed both of the other components of yoga as well, lending credence to the theory that physical postures, breath work, and meditation/mindfulness are all components of yoga that have the potential to impact trauma survivors.

Interviewees reported mixed perspectives regarding which components were most helpful. Whether they found the physical postures most helpful or other elements tended to be related to how much they benefited from the intervention as a whole. One client reported, "I prefer the poses that we did" to the other elements, though she was able to describe unique benefits from each component. One client who benefited less from the overall intervention reported, "(The poses weren't) really my thing. I think more the meditation side of it, I will (continue to practice), but the actual poses probably not because I do have really bad joints and stuff, and a lot of them are really hard for me to do." Both described that the experiential practice of yoga allowed them to experience mindfulness in a new way. For example, one stated, "for the past… well, over a year now, I've had countless people talk to me about mindfulness. It didn't really stick with me until after being in the group. I can't exactly put my finger on it about what about the

group made the mindfulness techniques stay with me, but something did, and now I'm able to practice it whenever I need to."

From the author's field notes, the participants were observed to be "a bit fidgety" in meditation and that initially, in one group, "they predominantly did not close their eyes (McMaster group 2, Week 1)." Despite this, "their feedback appeared to indicate that they liked the activity and found it relaxing." By the end of the practice during final relaxation, the field notes indicated, "They all also seemed able to be comfortable during final relaxation, and chose options of either legs up the wall or savasana. They did not need the mindful drawing activities: they were able to stay present in their bodies. Most of them were able to close their eyes (McMaster Group 1, Week 1)." Notes from Week 4 indicated, "They seemed more comfortable in Savasana again (also did last week), and now are choosing the option to lie on their backs (rather than legs up the wall pose). 2 of them actually stayed in it until I cued them to come out, which was in contrast to previous classes when they seemed ready to leave the pose even before I cued the pose to end. This seems to be an indication of increased comfort with the group and ability to relax when they are lying on their backs (McMaster Group 1, Week 5)."

Structure of Group. In addition to the three components of yoga that cause the intervention to work, there were additional structural components related to the group that did not fall in the category of yoga components. These components were initially structured into elements that were helpful, challenging, and recommendations for future groups. The helpful category was subcategorized into instructional aspects, cognitive components (affirmations, quotes, thought-provoking nature of the group), and group

factors. Participants described instructional strategies that provided them with choice and control of their practice as helpful, including "That I was allowed to tell everyone when I wanted to stop doing a pose," "I got to suggest how many breaths to hold a pose," "the options for harder or easier poses," "putting our hand on our hips (self-adjustment)," and "closing eyes for certain poses." Another participant commented, "Every pose was carefully demonstrated and walked through" and another appreciated "the music" that was playing during the physical practice.

In terms of cognitive factors, three participants reported the affirmations were helpful, and another reported finding the activity of writing a fear down and letting it go to be helpful. Another described the themes as helpful in general, and another participant commented on the fact that the themes were helpful to people who have experienced trauma without it being directly related to a specific experience. Other creative activities incorporated into the group were also cited, including making eye pillows and bracelets during the final week of the group. Finally, the clients described aspects of the group process as helpful, including the group being small, that it allowing them to feel comfortable opening up, and the hands-on nature of the group. One interviewee reported, "Well, you'd expect to feel really uncomfortable, but it wasn't like that at all. It was a very supportive group, and you get to experience it with other people, which was nice. And we had times when we were laughing and having fun."

Each of the participants who were interviewed described being challenged by one of the themes because that theme challenged the participant to see the concept in a new way. One noted, "I'm not a very assertive person, so I thought that was very interesting

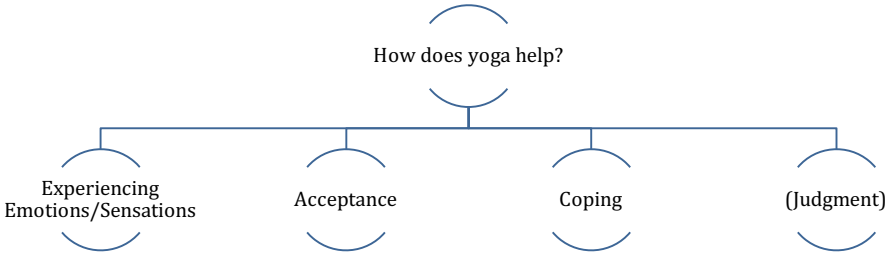
… because I never really thought of it as a strength to be assertive." She went on to describe changes that others observed with her standing up for herself more frequently as a result of being challenged in this way. Another participant reported that she was challenged, "… to trust yourself. I like that one a lot. It's something people don't really think about. When you think of trust, you're not really thinking about 'Do you trust yourself?' You're thinking about, 'Do you trust others? Do people trust you?' And that was a really interesting way of looking at it." The third interviewee reported that, "(Strength) was difficult for me because I don't think of myself as a very strong person, physically, mentally, or emotionally…. I feel a little more assertive, obviously, because I was able to talk about a recent experience and not wait as long. I feel more assertive in terms of what I have to say, but in terms of feeling strong mentally, physically, emotionally, I still really don't."

Individual Factors. The individual factors category was divided into three subcategories: whether the participants practiced or not during the group, the relationship between the group content and their individual therapy sessions, and whether or not they experienced a new trauma event during the group. Since the yoga intervention was adjunctive to traditional therapy, how the concepts the participants are addressing therapeutically aligned was important to support successful outcomes. This category was assessed only for the interviewees. These data will be discussed further during data integration. See Table in Appendix N for more information.

How Does Yoga Help? The second cluster of content analysis categories was clustered around the second qualitative research question of gaining an understanding of ways in

which yoga helps with symptom reduction (see Figure 5 below). All the categories in this cluster were derived through conventional content analysis. Summative content analysis was also used to tally the number of codes in the experiencing emotions/sensations category (See Appendix N).

Figure 5. **Cluster 2: How Does Yoga Help?**



Experiencing Emotions/Sensations. The first category was emotional content and physical sensations associated with the yoga group, including relaxation (quiet, peace, calm), tiredness, happiness (happy, fun, excitement, energetic, feeling good), balanced/neutral, and confidence. This category was expected from the beginning, but conventional content analysis was used to cluster emotions into sub-categories from the range of emotions that were initially coded. As it has been suggested that there is an overlap between mind/body experiences (Levine, 1997; Ogden, Minton, & Pain, 2006; van der Kolk, 2006), through the process of coding, it became apparent that there was an overlap between emotions and sensations in some areas. Both are important areas of experience that are likely to indicate a decrease in avoidance symptoms. In addition, while it was initially expected that participants would report experiences of increased relaxation, calmness, and happiness, the coding process indicated that participants

sometimes reported negative experiences as well. As a result, the perceived positive emotions and sensations were coded and tallied, as were the perceived negative emotions and sensations for comparison purposes (see Appendix N). Feeling balanced and confidence were less frequently endorsed emotions/sensations within this category than relaxation and happiness. For example, after repeatedly commenting on the need to work on her balance and finding balance difficult, one youth reported feeling "tired, relaxed, kinda balanced" during week five. Another participant reported feeling "calm, confident, and aware" in her body while practicing yoga.

The most commonly described feeling was some variation of relaxation, which was described by 16 of 18 participants. Between the qualitative questionnaires, interviews, and field notes, 145 separate responses were assigned the relaxed code. Three participants also reported feeling tired in addition to relaxed. Fourteen out of 18 participants also endorsed experiences of happiness. For example, during week six, one participant reported, "I was just really relaxed and had fun." The author's field notes described a number of experiences of happiness and fun. For instance, during week 6 of the second McMaster group, "The high energy clients dominated with their laughter and silliness. The theme of community and the many partner poses that we did during the class may have also encouraged fun and silliness. I have never seen kids laugh so much and have so much fun in yoga. H8 and H10 were so giggly that it was hard to get them settled down for meditation." In addition, during the second McMaster group, "When I cued the class that they could also rock back and forth if they wanted, H8 giggled and exclaimed, 'Oh my goodness! It's a happy baby,' feeling the nature of the pose." While

relaxation is an experience that participants reported throughout the group, their reports of experiencing happiness increased in the last third of the group. Happiness was coded 11 times during the first two sessions of group, eight times during the next two sessions of group, and 18 times during the last two sessions of group.

As clients reported on their physical and emotional experiences, they also noted negatively-valanced sensations and emotions at times, including pain, feeling stretched (can arise naturally in yoga, but in meaning, is similar to tension), discomfort, awkwardness, tension, and feeling "not good." When the number of negative emotions and sensations were compared to the number of positive emotions and sensations (n = 25), participants endorsed positive emotions much more frequently (n = 175). However, this inclusion of the negative emotions is also important because it appears to indicate that the participants are not just describing relaxed and positive experiences, while discounting negative feelings and sensations that come into their awareness. As a whole, this indicates that they are able to attend to emotional and physical sensations during their yoga practice. As this skill evolved, they became more able to describe why they rated their initial mood a certain way at the beginning of their practices as well.

Acceptance. The category of acceptance was derived through conventional content analysis based on statements from participants that emerged in the data. Acceptance included codes of self-acceptance, acceptance of others, and acceptance from others. This category is best illustrated by quotes from participants. Group members discussed self-acceptance regarding their yoga practices, including "that I have to fall and wobble in order to learn it," "falling is okay," and recognizing "(I) have to struggle to

learn." In addition, another participant commented about her practice, "It felt better because I didn't force anything this time." Another group member learned, "I'm not the only one who doesn't have the greatest balance and it's okay." Finally, perhaps the most far-reaching comment about self-acceptance learned from the yoga practice was gleaned from an interview: "I can trust myself and love myself, despite everything."

Acceptance of others was coded when participants made a statement that was accepting of their group members, and acceptance from others was coded when participants made a statement that indicated they felt accepted by their group members. One statement was coded for both. Examples of statements including acceptance of others included "Trusting the right people isn't that hard," and "There are other people like me." Examples of acceptance from others included "I don't have to worry about being stared at or judged," and "I was aware of the people surrounding me and how mindful and non-judging everyone was."

Coping. The third category in the second cluster was yoga-related coping, which included decreases in avoidance/ability to tolerate distress, reduced intrusion symptoms, improved self-concept, awareness, and examples of specific coping skills employed. This category was derived through conventional content analysis when the principal investigator noticed that several participants made statements about their ability to cope that aligned with post-treatment coping for adult women in previous yoga studies. Several components of the sub-category address PTSD symptoms. The examples demonstrate how yoga-related coping assists with trauma-related symptoms. Eleven out of 18 group members (61.1%) were able to give examples of yoga-related coping

strategies that fell in one or more of the subcategories. While 10 of 11 participants gave examples focused on their experiences and trauma, two also gave examples related to coping with pain. The most responses were made in relation to improved self-concept, and secondly, a decrease in intrusion symptoms. Codes in this category emerged largely from the middle to the end of the group in the qualitative questionnaires, and they were also prominent during the follow-up interviews.

This category is illustrated by examples from the questionnaires, field notes, and interviews. Related to decrease in avoidance and tolerating distress, one group member who noted at the beginning of the session that she had a bad day, noted that through the practice she had been "relaxing and thinking about good things and how to face my problem." Another group member stated, "I'm more able to deal with things because I know that if I can't, there's always something that I can fall back on." H4 reported that practicing mindfulness had allowed her to decrease substance use and self-harming behaviors. In relation to distress tolerance, H4 reported in her interview, "Being in the group, at first I was nervous, but then it got easier to open up because I knew how to calm myself down and just focus on me."

A number of statements were coded under a decrease in intrusion symptoms. For example, one participant stated, "Balance helps me focus and takes away focus from bad thoughts. Similarly, another participant noted, "When I was breathing, it helped me to clear my mind." Another participant noted that the poses "distracted her" from what she had been thinking about before the group. Finally, another participant (H7) noted that

following the practice, she was, “Not as stressed and more mindful. Not worrying about things from earlier.”

As noted above, the most prominent coping-related sub-category was related to an increase in positive self-concept for participants based upon positive statements they made about themselves. For instance, D4 stated, “I feel strong when I find my balance,” and H7 reported, “I am stronger than I think.” In response to what had changed for her following the yoga group, H8 responded, “I feel stronger as a person. Mentally, physically. I learned to trust myself.” More simply, H2 reported, “I can do poses!” and when asked what she became aware of, during one class H11 responded, “My strengths!”

Awareness was also coded as a coping skill, as awareness is highly related to mindfulness. Awareness was further divided into proprioceptive awareness, exteroceptive awareness, and interoceptive awareness. Exteroception, awareness of the outside world, was demonstrated by H1, who reported, “I could hear other people breathing, and that helped to relax me,” as well as, “I was aware of the people surrounding me.” One example of proprioception, perception of movement and spatial orientation, was, “I became aware of how much force I could put into the pose.” Another client noted awareness of her body position in space regarding discomfort lying down. Interoception is awareness of sensation, pain, hunger, and the movement of internal organs. Interoceptively, several clients commented on noticing experiences of pain, tension, or stretching. Most commonly, clients noted tension in their bodies at first, but that their bodies eventually relaxed during the class. Also, clients commented on awareness of their breathing, and one client commented on being aware of “my heart beat, the rate of it just

kept increasing." Finally, participants indicated, "My body feels awake," and "I'll do (the body scan) before bed now. Because it makes me feel more one with myself." As such, these comments indicate a general awareness of their internal sensations.

Interview participants were asked to comment on what skills from the group they are continuing to practice. As noted above, two out of three participants reported practicing yoga during the group and beyond. In addition, H4 reported, "It's mostly the body scan, but a lot of breathing that we did. When I start to get anxious, I start to do some breathing. And mindfulness, too." H8 reported that she practices, "Realizing my strengths and trusting myself and safety. And, of course, the poses. I'm practicing a lot of yoga. Lion's breath. I go to the bathroom at school and do it. (demonstrates) Meditation before sleep." Aside from yoga, H7 reported that she took the affirmation slips of paper that had the affirmations from each class on them and "I started coloring them the colors of the rainbow. So I taped them on my wall in the order of the rainbow. So they really help. I love those." She reported practicing the Rainbow Meditation with the cards.

Judgment. Just as the participants reported comments that indicated they felt comfort and support from the group and that they were feeling more positively about themselves, they sometimes reported comments that were judgmental in terms of negative thoughts about themselves, their physical problems, and discomfort with attention from others and concerns about the reactions of others to their behavior. While some of the comments about physical problems may have been indicative of a genuine medical concern, what is important here is what attribution the participants made about themselves and their abilities to practice yoga as a result. These data were examined in

regards to when during the group these comments arose. Some participants engaged in judgmental comments towards themselves in one of the three areas, but also engaged in other thoughts to accept themselves or change their thoughts. Others did not exhibit such change, and either discontinued the yoga group prematurely or may not have benefited optimally as a result.

Attributions about their ability to participate in yoga based upon physical concerns were also coded in this category and examined longitudinally across the group. For instance, one participant talked about having a headache, and another participant helped her with a breathing exercise to help ease pain. Two participants discussed back pain. One participant noted that the group facilitator "helped me with my back pain," and that she learned "how to cope with my back pain." In subsequent sessions, she commented about not experiencing pain. D6 reported "everything that had to do with my back" was difficult during her first class, and "my back hurt a little." During the subsequent class, she reported, "I felt better because I didn't force anything this time."

In contrast, the same participant who reported the headache during Week 2 experienced wrist pain from some of the poses in Week 4. The author's field notes indicated, "H2 reported some concerns about her wrists hurting in some of the poses in which we were supporting our bodies with our arms. As a result of her sharing this during the group, I found ways to modify the poses so that we did more on our forearms. I also demonstrated some wrist stretches that can decrease pain, and my co-facilitator shared one too, but she was hesitant to participate in these. She appeared to take breaks when she needed them, avoiding poses that involved the wrists despite the modifications and

options. She participated in the poses again when we were cooling down." At the end of the class, she reported feeling "not good," and while the options to stretch her wrists or participate in the poses in a way that was more accessible to her may not have changed that rating, it is possible that it would have.

Discomfort with attention and concerns about the reactions of others were coded within this category. When participants were asked about how the intervention would have been different if it had happened individually, H7 noted that "I feel like I would look silly if I were just on my own doing it (negative thought). And with a group, I feel like I don't look as bad (discomfort with attention), whereas it's easier to do with other people, especially people who know what they're doing, because at least then I know that I'm doing it right (positive statement) and I don't look like a fool." She was able to voice reasons that the group intervention would be more supportive, and was able to use the group format to her advantage to gain confidence. When H4 was asked if a different stretch would have been more comfortable than a pose that was triggering for her during the interview, she responded, "Probably, but I feel kind of uncomfortable if I'm not going with the group, so I just do everything to the best of my abilities (discomfort with attention)." While H7 was able to overcome her discomfort with attention due to the group format, H4 did not shift her concerns about how she would be perceived.

Finally, participants reported negative thoughts about themselves or situations at times. One participant (D2) noted in Week 2, "I need to practice my balance." In Week 4 she noted that "Trying things again after wobbling" was difficult. However, she was able to persevere and tolerate the difficulty. By Week 5, she reported feeling "tired, relaxed,

kinda balanced" at the end of class. Another participant (H2) noted, "My balance was not good," but provided a more accepting, balancing thought the same class, "I'm not the only one who doesn't have the greatest balance, and it's okay."

Six participants were not able to provide themselves with more accepting and positive statements to balance their concerns. Three of these participants' judgments were related to physical problems, and three were related to negative thoughts and discomfort with attention. Negative thoughts and discomfort with attention appeared to have the greatest effects on participation. H9 discontinued attending the yoga group because she indicated that it reminded her of too many negative thoughts. She was observed to need to take breaks during the sessions, and it is suspected that gave her mind time to wander, despite attempts to engage her in mindfulness and grounding poses during that time. H4 missed two sessions of the group, and returned for the final session. She reported in the interview that she did not think she would continue to practice yoga "because I have really bad joints, a lot of them are really hard for me to do…. Like plank, I couldn't do that," and "Having to be on my hands and knees, I wasn't comfortable with that… Being on my hands and knees made me feel like a dog. It makes me feel docile, like I'm lesser (negative thoughts)." Finally, a third participant (D7) reported, "Posture. I feel like I make it difficult." She missed the remaining classes after this statement, though it is uncertain whether this was due to her experience of yoga or other factors.

Summary of Qualitative Results

Content analysis was used to develop two category clusters directed towards both research questions. Group themes, the active components of yoga, structural factors, and

individual factors were the first cluster that addressed what makes the yoga intervention work. Participants described safety, strength, trust, and support from others as group themes that were most salient and meaningful following sessions. Assertiveness was also reported to have an impact in the qualitative follow-up interviews. While the physical poses, breath work, and meditation/mindfulness aspects were all discussed as having an impact by participants, the physical poses were more frequently discussed and commented upon. Participants also described the physical practice of yoga as helping them understand mindfulness in a new way. Structurally, group members appreciated specific components about how the class was taught, other creative activities, the hands-on nature of the class, and the sense of connection with other group members, though many struggled to report specific concepts that they learned from other group members. While "individual factors" might not seem like a category that brings together qualitative data, this category demonstrated differences between clients who reported significant benefits from the group and those who benefited moderately. Clients who benefited highly from the group were practicing outside the group and working on mindfulness skills in other therapies, whereas a client who reported less benefit did not practice outside the group and was receiving supportive counseling.

The second content analysis cluster was derived via conventional content analysis, and addressed the second research question of what areas of coping and symptoms were impacted by yoga. This category included experiencing emotions/sensations, acceptance, and trauma-related coping. Participants reported experiences of relaxation throughout the group, and reported increasing feelings of

happiness towards the end of the group. Participants reported statements that were indicative of improved self-concept, decreased avoidance/improved distress tolerance, awareness, decreased intrusion, and active use of coping skills learned in the group. In contrast, judgmental thoughts about one's self, their physical capacity to participate in yoga, and about discomfort with attention when not resolved by self-acceptance or positive self-statements may lead to poorer outcomes.

Integration of Qualitative & Quantitative Findings

In addition to the quantified qualitative data included in the qualitative results section via summative content analysis, the results were integrated by comparing change in mood symptoms with qualitative data related to mood and change in trauma symptoms with qualitative data related to trauma-related coping. Results of change in mood (ID) on the YOQ-SR were compared with total number of positive emotions (M = 8.67) reported during the group and total number of awareness codes per participant on the qualitative questionnaires (see Table 6 below). Change in mood was calculated by subtracting post-test mood symptoms from pretest mood symptoms. While the majority of participants who reported a substantial number of positive emotions during the group reported improved mood following the group, for those who did not (bolded), this result may be partially attributed to increased experiences of awareness.

Table 6. **Visual Display of Emotions vs. Awareness Findings.**

Participant	Total positive emotions	MoodChange	Aware Sum
D1	7		5
D2	8	2	0
D3	**10**	**-3**	**4**
D4	**11**	**-2**	**2**
H1	**12**	**-8**	**7**
H2	3		2

H3	3		1
H4*	7	4	5
H7*	21	3	6
D5	15	10	0
D6	4		0
D7	6	1	1
D8	14		0
D9	7	13	0
H8*	18	24	6
H9	4	4	2
H10	1	9	1
H11	**5**	**-8**	**0**

*Interview and qualitative questionnaire data combined

Qualitative and quantitative results were displayed by comparing the quantitative change in trauma-related symptoms on the CPSS with qualitative reports of trauma-related coping in the qualitative questionnaires (see Table 7 below). This qualitative category included statements by participants relating to positive self-concept, decreased intrusion, increased ability to tolerate distress/decreased avoidance, awareness, and yoga-related coping. The number of codes specifically assigned to awareness is also separated out. PTSD change was calculated by subtracting post-test symptoms from pretest symptoms. As can be seen in Table 9, only three participants reported an increase in symptoms from pretest to post-test. Of those three, one reported a significant number of awareness symptoms, which may partially account for the increase in symptoms. The other two reported few trauma-related coping skills in the qualitative data, and attended less than the average number of sessions. Since they did not actively report changes to their coping during the group, they may have been less able to generalize the skills outside the group and experience differences in their overall trauma-related symptoms.

Table 7. **Visual Display of Trauma-Related Change.**

Participant	PTSD change	Awareness Sum	Qualitative coping with trauma
D1		5	6
D2	6	0	2
D3	16	4	5
D4	6	2	4
H1	**-7**	**7**	**8**
H2		2	4
H3		1	0
H4*	6	5	12
H7*	17	6	14
D5	4	0	0
D6		0	0
D7	2	1	2
D8		0	0
D9	13	0	0
H8*	14	6	11
H9	**-2**	**2**	**2**
H10	1	1	1
H11	**-3**	**0**	**1**

*Interview & questionnaire data combined. Awareness is included in "qualitative coping with trauma, " but also listed separately for comparison purposes.

To further evaluate the effect that unresolved judgments from the judgment category might have had on outcomes, a visual display was created (see Table 8). Based upon the in-depth longitudinal descriptions of judgments in the last section, they were coded for whether or not they were resolved through the use of another skill, such as self-acceptance, support from others, or positive statements. Then they were plotted against the other ways yoga was helpful qualitatively and the quantitative change scores. As can be seen in Table 8 below, those who had an unresolved negative judgment were more likely to have quantitative scores change in the opposite direction from the intended

effect (resulting in a negative change score). Judgments about physical problems, negative thoughts, and discomfort with attention were all included.

Table 8. **Effects of Unresolved Judgments on Outcomes.**

ID	Judge Resolv	Judgment Unresolv	Aware Sum	Qual coping	Total + emotion	Affirm change	YOQ Chg	PTSD Chg
D1	**1**	**1**	**5**	**6**	**7**	**-18.5**		
D2	1	0	0	2	8	-7	-13	6
D3	0	0	4	5	10	10	5	16
D4	0	0	2	4	11	13	3	6
H1	**0**	**1**	**7**	**8**	**12**	**3**	**-12**	**-7**
H4 *	**1**	**10**	**5**	**12**	**7**	**7**	**-10**	**6**
H7 *	5	1	6	14	21	15	17	17
D5	0	0	0	0	15	3	22	4
D6	1	0	0	0	4	11		
D7	**0**	**1**	**1**	**2**	**6**	**5**	**-2**	**2**
D8	**0**	**1**	**0**	**0**	**14**	**-1**		
D9	0	0	0	0	7	7	28	13
H8 *	0	0	6	11	11	20	62	14
H9	**0**	**2**	**2**	**2**	**4**	**-6**	**2**	**-2**
H10	0	0	1	1	1	5	24	1
H11	0	0	0	1	5	4	-7	-3

*Interview & questionnaire data combined. Awareness is included in "qualitative coping with trauma, " but also listed separately for comparison purposes.

Finally, a visual display with data from the interviewees was created to further evaluate the interview data for additional information about what may have caused differences between strong outcomes and small to moderate outcomes (see Table 9). All three interviewees cited benefits of the group format and the experiential nature of the group, but one struggled with tolerating triggers and made negative judgments more than

the others. She also reported fewer positive emotions (happy, relaxed, etc.), and described fewer themes in both the interview and the qualitative questionnaires than the other two interviewees. While all three described important things they learned from the group, H4 reported fewer changes about how she thought about herself than H7 and H8.

Table 9. **Visual Display of Results for Interviewees.**

ID	H4 Low to moderate benefits	H7 High benefits	H8 High benefits
Diagnosis	Anxiety, Seasonal Affective Disorder	PTSD	PTSD
Other Treatment	Supportive counseling	Trauma-focused, Mindfulness-based	Mindfulness-based
Number of groups attended	4	5	5
New Trauma during group?	Yes	No	No
Practiced yoga outside group?	No	Yes, 3-4x/wk	Yes, 5x/wk
Practiced mindfulness outside group?	Yes	Yes	Yes
Would do the group again?	No	Yes	Yes
Group format helpful?	Yes	Yes	Yes
Challenged by theme?	Strength	Assertiveness	Trust
Important things you learned?	Internalized mindfulness, more assertive.	Learned she is strong & can trust herself. More assertive.	Stronger physically & mentally. Learned to trust self. Thinks more positively about herself.
Triggered by poses?	Yes, being on hands and knees, warrior	No	No
Recs for future groups?	More reminders that it is okay to come out of a pose	Run year-round, change day to Wednesday	More mindfulness, having more space & longer classes
Total themes described	12	31	32

Unresolved judgments	10	1	0
Total positive emotions reported	7	21	18
Positive coping	11	14	11
Awareness	5	6	6
Mental health symptom change	-10	17	62
Trauma symptom change	6	17	20
Affirmation change	7	15	14

Summary of Results

Participants achieved positive changes in general mental health symptoms, trauma symptoms, and group-related affirmations. Qualitative results indicated that clients experienced more happiness in the last third of the intervention, consistent with decreases in negative mood-related symptoms quantitatively. Significant changes were reported in trauma-related avoidance quantitatively, and participants' qualitative data suggested change in avoidance/increased distress tolerance, an increase in positive self-concept, a decrease in intrusion, an increase in awareness, and the use of yoga-related coping skills. The amount of decrease in intrusion symptoms and changes in arousal outside yoga were not great enough for significant findings independently, but similar concepts, such as arousal, load on the behavior dysfunction subscale, where significant changes were found. Clients who reported fewer positive emotions associated with the yoga, less internalization of the themes, and a greater number of unresolved judgments were less likely to benefit. An increase in awareness, which is likely associated with decreased avoidance and greater distress tolerance, may have increased symptoms in some cases.

Chapter Five: Discussion

The current study sought to evaluate whether a group yoga intervention as an adjunctive treatment for youth would decrease trauma and general mental health symptoms for adolescent girls. In addition, through mixed methods, the study sought to determine which components of the intervention were helpful and unhelpful to participants, and to further examine how the qualitative categories derived connected to the quantitative data regarding symptom reduction.

The hypothesis stated that there would be a significant decrease in both general mental health symptoms (that are thought to encapsulate the way trauma symptoms are expressed in youth) and trauma-specific symptoms from pretest to post-test when controlling for number of yoga sessions attended, diagnosis, group cohesiveness, and therapeutic alliance. The hypothesis was supported. Group cohesiveness was ultimately excluded as a covariate due to the author's determination that it was less relevant to the experiential nature of the group that involves little processing, and was thus less affected by Yalom's (1995) group factors than a traditional group would be. Previous treatment was also excluded due to the experiential nature of the group being different from other types of treatments participants were receiving. Even clients who were receiving mindfulness-based therapies noted that the group was a very different experience of mindfulness. The covariates ultimately were not related to changes in symptoms. Despite having a small sample, the study demonstrated statistically significant and clinically

meaningful results. A statistically significant change in overall mental health symptoms was found from pretest to post-test on the YOQ-SR, and a statistically significant change in trauma-specific symptoms was found from pretest to post-test on the CPSS. This finding is consistent with the results from Lee-Kin (2013) who also reported significant decreases from pretest to post-test following a yoga intervention for traumatized youth.

In addition to overall changes in the CPSS, participants had significant decreases on the avoidance subscale from pretest to post-test. This is consistent with the findings of Mitchell et al. (2014) who noted that yoga has the capacity to reduce these symptoms by focusing attention on the present moment and to attending to thoughts and emotions without judgment. This study is also consistent with the findings of van der Kolk (2006), which indicated that yoga decreased avoidance, but not hyperarousal. However, van der Kolk (2006) and Emerson and colleagues (2009) examined the severity of hyperarousal symptoms and found a decrease in these symptoms. While the current study found decreases across total PTSD symptoms, only the avoidance subscale was also significant in addition to total symptoms. Despite this, qualitative results found evidence that participants reported decreased intrusion symptoms. It seems intuitive that hyperarousal symptoms would also decrease if yoga helps individuals experience increased regulation and relaxation. However, since individuals are becoming more aware and less avoidant concurrently, they may be monitoring hyperarousal that they experience outside their practice more closely. Additional practice of the yoga-related skills may be needed to decrease hyperarousal. These changes may be more evident in a slightly longer intervention.

The subscales of the YOQ-SR were examined in closer detail to address previous literature that suggested that trauma symptoms present in children include dysregulation of affect and behavior, disturbances in attention and consciousness, distortions in attributions, and interpersonal difficulties (D'Andrea et al., 2012; van der Kolk, 2014). A significant change was found for the Behavioral Dysfunction subscale of the YOQ-SR. The Behavioral Dysfunction subscale measured change in executive functioning, task-related frustration, inattention, hyperactivity, and impulsivity (Wells, Burlingame, & Lambert, 2003), capturing the disturbances in attention and behavior category described by D'Andrea and colleagues (2012). Trauma frequently manifests as affecting behavior in youth (Perry, 2003), and many traumatized youth are diagnosed with disruptive behavior disorders (Copeland et al., 2007; Pelcovitz et al., 1994). As clients increase awareness and ability to self-regulate, as was reported consistently during the weekly distress ratings, it follows that their behavior problems would decrease as a result of the skills learned. Consistent with that finding, clients reported an increase in coping skills in the qualitative questionnaires and interviews. The current findings are consistent with case study data presented in Spinazzola et al. (2011).

A significant decrease in mood-related symptoms was also found for the Intrapersonal Distress subscale on the YOQ-SR. Interpersonal Distress is a measure of overall emotional distress, including anxiety, depression, and hopelessness (Wells, Burlingame, & Lambert, 2003). Due to the high degree of comorbidity between trauma and other mood disorders (Copeland et al., 2007; Neumann, Houskamp, Pollock, & Briere, 1996) and that trauma symptoms may present in adolescents primarily as a mood

or anxiety disorder, it was expected that mood and anxiety symptoms would also decrease following the yoga intervention. This is consistent with findings from Michalsen and colleagues (2012) who found that depression and state-trait anxiety decreased following a yoga intervention.

Yoga group participants discussed a range of emotions that came up during the group. From the beginning of the group until the last session, the group members became increasingly able and willing to describe why they were rating their levels of distress to calm the way they did. In addition, they identified a range of emotions from positive emotions to relaxation and tiredness. The intervention is intended to create feelings of calm and cause the parasympathetic nervous system to activate. From the beginning of the intervention, youth reported an increase in calm (reduction in distress) following each session. As the group progressed, youth also reported experiencing more happy emotions on the qualitative measure. This is consistent with the findings of Emerson and colleagues (2009) that adult female participants in a yoga group experienced increased positive affect. It is also consistent with findings from Lilly and Hedlund (2010) who indicated that 85% of their participants reported experiencing more positive emotions as a result of the yoga intervention.

Change in interpersonal relationships on the YOQ-SR was approaching significance ($t(26) = 1.96$, $p = .060$, EC = .105, $d = .35$), and a small effect was found. Interpersonal relationship difficulties were another one of the difficulties noted by D'Andrea and colleagues (2012). The adult yoga literature has not focused on a change in interpersonal relationships, as the literature has focused on core trauma symptoms. When

there is a change in the way that one relates to herself, it is likely to have an impact on how one relates to others as well. For this reason, the group focused first on trust of self, then on trusting others and establishing a sense of community. Understanding personal boundaries, strength, and assertiveness are all concepts that can help individuals who have experienced trauma to better relate to others by first focusing on themselves.

The Affirmation Questionnaire was developed to assess differences in trauma-related cognitions associated with the group. Overall, significant changes were found in participants' beliefs in trauma-related affirmations from pretest to post-test. Distortions in attributions are the final area of trauma symptoms that present in children discussed by D'Andrea and colleagues (2012), and the newest symptom cluster for PTSD in the *DSM-5*. Arguably, the most important finding in the CBT literature is that changes in trauma-related cognition are related to decreases in PTSD symptoms (Daniels et al., 2011; McLean et al., 2015). In contrast to similar studies (McLean et al., 2015), the current study assessed positive attributions about self, as opposed to negative trauma-related cognitions. However, there is consistency between the current study and previous studies in that change in cognition appears to be important in decreasing overall symptoms. Those participants who engaged in negative, judgmental attributions about their ability to do yoga or about the themes being true about them had worse outcomes.

While the yoga intervention is a bottom-up intervention, it is an integrated mind-body approach that addresses experiences of trauma physically and mentally. Qualitatively, the results demonstrated shifts in data consistent with a bottom-up approach. Participants first noticed feeling calm or relaxed following the group, then they

began to develop awareness of changes in their body and emotions from tense to relaxed (capacity for interoception, van der Kolk, 2006), and then they began to verbalize statements of self-acceptance and positive self-concept, as well as other forms of trauma-related coping. The majority of statements involving self-acceptance, positive self-concept, and positive coping occurred in session three or later. The ability to calm the nervous system appears to have opened individuals up to experiences of interoception and body attunement (Emerson et al., 2009). Being able to tolerate experiences in the body led individuals to understand that discomfort and difficult experiences are temporary situations with which they can cope (van der Kolk, 2006). This sense of confidence, strength, and being in control appears to have led participants to develop positive self-concepts and a more secure sense of self as they internalized the themes, creating cognitive change.

This process is consistent with neuroscience evidence and bottom-up trauma theories that indicate that the lower levels of the brain need to first be regulated before cognition intervention can achieve change successfully. Yoga is a means by which this regulation can be achieved (Duros & Crowley, 2014; Mitchell et al., 2014; Perry, 2009; van der Kolk, 2006). Yet, participants who were able to internalize the themes most frequently and apply them as true for themselves had better outcomes. When participants internalized the themes, they were able to change their behavior (standing up for themselves as a function of assertiveness), pointing to enhanced psychological flexibility. Further, participants who were able to acknowledge difficult parts of the practice, and then engage in coping through the use of a safety pose, through self-acceptance, or

another skill had better outcomes. When participants continued to display high levels of judgment, and in particular, negative thoughts about themselves, they had poorer outcomes in the yoga intervention based on changes in general mental health and trauma symptoms. This finding highlights the relevance of cognitive distortions as a predictor of diagnostic status found by Daniels and colleagues (2011).

Participants reported qualitative experiences of awareness, acceptance, increased positive self-concept, and positive coping in connection to their experiences in the group. This supports the research of Emerson, Sharma, Chaudhry, and Turner (2009) that participants experienced increased bodily attunement, and the research of Dale et al. (2011) that yoga was associated with improved coping and greater positive self-concept. The current findings are also in line with van der Kolk's (2006) theoretical argument based on neuroscience that traumatized individuals need to learn that it is safe to have feelings and sensations and that attention to these inner experiences will help them realize the fluidity of their experiences and emotions, of which they can partially control. The derived categories of acceptance as something that supports success in yoga and judgment as something that hinders align with the attitudinal factors of mindfulness (Kabat-Zinn, 1992).

Finally, it is important to note that differences were found between study groups. While both the DCAC and McMaster's Children Hospital groups had decreases in mental health symptoms based on YOQ scores, the McMaster Children's Hospital group had much higher initial symptom severity. While both groups had decreases in trauma symptoms assessed via CPSS scores, the McMaster Children's Hospital group again had

much higher initial symptom severity and had a smaller change in trauma-specific symptoms (decreased from severe to moderately severe), while DCAC decreased from moderate to the subclinical range. At DCAC, the primary reason for referral to treatment is due to the traumatic event experienced by clients. Some clients at DCAC have significant protective factors and strong developmental trajectories up until the time that they experienced trauma. While both populations have experienced complex trauma (at least one type of ongoing trauma that occurred during an early childhood period; Cook et al., 2003), the McMaster Children's Hospital group represented the subsection of individuals with significant comorbid diagnoses, and often, multiple types of traumatic events (Neumann, Houskamp, Pollock, & Briere, 1996). Such populations are often excluded from research due to their complexity (Spinazzola, Blaustein, & van der Kolk, 2005). Yet, their complex symptoms can be treatment-resistant, and these clients may be one of the groups that need an intervention like this one the most. Therefore, the current findings are promising; i.e., while symptoms may continue to be present following treatment, significant changes can occur through such a treatment.

The second primary objective of the study was to evaluate the curriculum, the components of yoga, and the processes that participants found helpful and unhelpful to generate further understanding of what makes the group effective and to provide recommendations for future groups. In general, the group themes were supported as a helpful component of the yoga process. This was particularly the case for safety, strength, trust, and community. Assertiveness was not discussed frequently in the group members' qualitative writings, though it found to be an important theme during the interviews. Even

more meaningful were the comments from group members that showed the relationship between the themes and how they built upon each other (feeling both strong and safe, first needing to feel safe to trust, how boundaries, strength, and assertiveness helped group members to know their limits and stand up for themselves). Safety was discussed by 13 out of 15 group members who were present for the session involving safety, which underscores the importance of establishing Safety and Stability during Phase 1 of trauma treatment (Herman, 1992).

The structure of the intervention contributed to how participants found it helpful and challenging. Most often, participants described aspects related to the way the class was taught that are consistent with trauma-sensitive yoga principles (Emerson & Hopper, 2011; Emerson et al., 2009). These included options for easier or harder poses, choosing how many breaths to hold a pose, choosing when to stop doing a pose, and learning how to use one's body to make adjustments in the poses. Participants also appreciated the multi-faceted nature of the group, including the music, the creative activities tied to the themes, and the affirmations. These components allowed the participants to experience the benefits of the group through multiple senses and through both mind and body. The group experience allowed the participants to have a shared experience, and to feel supported, though one participant explicitly noted, "Yoga is more intimate for yourself." While the participants had a sense of support from the group, the process was more about doing their own work. This may explain why cohesion was needed for support and therapeutic alliance was needed for perceived safety, but neither was significantly related to outcomes.

Spinazzola et al. (2011) identified physical postures, breath work, and meditation as the three active components of yoga that make it effective, though other researchers have warned against incorporating too much meditation and breath work early in trauma work (Siegel, N.D.). Qualitative results looked for evidence of the benefits of all three components. Sixteen out of 18 participants consistently described poses that they found helpful, and the physical postures were discussed most frequently in the qualitative questionnaires of the three components of yoga. Notably, two out of three interviewees reported that the hands-on nature of the yoga group helped them understand mindfulness in a new way. This supports the benefit of the physical asana as an accessible form of mindfulness, similar to Carmody and Baer's (2008) finding that it is easier to give mindful attention to the body while moving. In addition, combining all three elements in the group provided an offering for individuals who had greater difficulty with judgmental thoughts during the yoga poses to experience relaxation and mindfulness. While too much focus on meditation early in trauma work has been found to be problematic for some individuals (Siegel, N.D.), participants in the current study were able to respond well to a body scan when it was applied in a brief, directed way to increase interoceptive awareness. Since different participants benefit from different components of the yoga practice, integrating all three elements, with a significant focus on physical postures is recommended.

Finally, individual factors were taken into account when interpreting results. Since the HCSAY curriculum and yoga psychotherapy with trauma survivors have been used as adjunctive interventions to date, the type of individual therapy a client was

participating in was a relevant factor. Participants who reported participating in either mindfulness or a cognitive therapy, rather than supportive therapy, were more successful in the current group. Participants who practiced yoga outside the group also experienced more significant changes in symptoms overall based on data from interviewees. This supports the findings of Dale and colleagues (2011) that women who engaged in frequent yoga practices and incorporated yoga into their lives most highly reported more positive self-concepts and improved coping. Future studies may wish to focus on how yoga can be most effectively combined with other interventions and how much outside practice is necessary to benefit optimally.

Overall, participants experienced decreased mental health symptoms, decreased total trauma symptoms, decreased behavioral problems, increased positive emotions (relaxation and happiness), increased awareness, increased self-acceptance and positive self-concept, increased coping, and decreased avoidance. Some evidence supported change in intrusion and hyperarousal, but these changes were not statistically significant. Working with clients on a body-oriented level is becoming increasingly supported in the literature, and the current study demonstrates similar findings to those found with adult women who have experienced trauma. In addition, the qualitative examination of change in participants' reports between sessions demonstrated the process by which they began to experience relaxation, began to attune to their bodies (interoceptive awareness), and then began to increase self-acceptance and positive self-statements, which supports neuroscience research (van der Kolk, 2006) and bottom-up trauma theories (Perry, 2009).

Limitations

A number of limitations are present that warrant discussion. The current study is an initial investigation in an attempt to begin to generate empirical evidence for the effectiveness of yoga as a therapeutic intervention for complex childhood trauma. This is a small study, and the results may not be generalizable to the broader population due to insufficient power for the RM-ANOVA analyses for trauma symptoms. Studying the yoga intervention at two different sites in two different countries was planned both due to availability of participants in those locations, but also in the hope that similar results would be found despite racial and cultural differences. There were differences related to client age and initial symptom severity, limiting the population's potential to be used as one sample group. As such, study site was included as a factor in the analyses, and the differences between the sites can be used to illustrate how two different clinical populations may respond to such an intervention.

As a preliminary investigation, the study does not have a comparison group. As a result, the investigator is not able to rule-out all potential causes of observed changes in symptoms, though she controlled for diagnosis, number of group sessions attended, and therapeutic alliance. In addition, data were collected regarding amount of previous treatment and group cohesion, but these variables were not ultimately included in the RM-ANCOVA for the study, as they did not contribute significantly during preliminary analyses. Since the adult literature has piloted yoga as an adjunctive treatment for trauma, the current study has done the same. Therefore, the observed effects may be due to the combination of both yoga psychotherapy and talk therapy. As a result, attempts have

been made to discuss how this intervention is similar to and different from clients' experiences in individual talk therapy. There was also some missing data due to missed classes by some participants.

Trauma inhibits Broca's area of the brain (van der Kolk, 2006), the area related to language, and trauma survivors sometimes have difficulty describing their experiences verbally. This is one of the reasons that a body-oriented intervention is helpful. However, studying the body-oriented intervention qualitatively required the participants to put their experiences with the intervention into words. The process of doing so serves as another mindfulness practice often used in Dialectical Behavior Therapy: describing (Linehan, 2014). Writing was also one of the tasks incorporated in the Lindauer and colleagues study (2008) that is thought to have helped alleviate symptoms in conjunction with imagery. However, the participants' ability to respond to the questionnaires may have been limited by their language skills, which can be impacted by trauma. Three participants of 18 were believed to have some learning difficulties.

Finally, while the two study sites used the same basic curriculum and coordinated during the intervention to ensure that it was being delivered similarly, fidelity has not been formally assessed. There may have been subtle differences between how the facilitators approached the material that caused additional differences, and delivery of the curriculum in a consistent way should be assessed in future research. In addition, given the applied, clinical nature of the research population, changes were made in regards to the length of the group, the number of sessions of the group, and the way the themes were combined across the seven groups of participants included in the current study. While

qualitative findings speak to the salience and importance of the various group themes, future research is needed to compare dose effects of the treatment.

Recommendations

Evidence from the current study indicated that while the initial session involving safety and grounding poses was well received across participants, some participants struggled with subsequent sessions of the group. While safety can be established for participants in the initial session with breath work and grounding postures, the real work of the group involves experiencing other poses calmly, tolerating emotions and sensations in the body, and shifting towards more accepting and positive beliefs cognitively. When other poses are introduced, there is a potential for triggers, and van der Kolk noted, "The yoga study had the highest dropout rate of any study I've ever done" (Wills, 2007, p. 44). Participants with the highest degrees of trauma-related triggers, negative trauma-related cognitions, and emotional dysregulation may need several additional sessions focused on establishing safety and grounding before they are ready to proceed to the other group content. Such participants may need less cognitive content as well. A six-session group focusing only on safety and grounding could be run prior to the HCSAY curriculum to assist clients with coping with the adjustment to body-oriented work.

Use of invitational language (Emerson & Hopper, 2011) that gives permission for the participant to choose whether or not she will enter the pose, what variation of the pose she will take, and how long she will stay in the pose can also assist participants with feeling safe and in control. Participants commented that structuring the group in this way was helpful. The frequency with which these comments should be stated during the

practice cannot be overstated enough, as they were used in the current study, and one participant still felt that more frequent reminders were needed. Additional ways that participants were given choice in this group, that also coupled with the theme of the group, involved asking them to request how many breaths to hold a pose or to verbalize when they wanted a pose to end. It is highly recommended that invitational language be used frequently and options be provided to give participants control of how they experience yoga.

While Lilly and Hedlund (2010) noted that with preparation and attention to class content and structure, it is not difficult to avoid the poses that are most likely to be triggering, that has not been the case for this writer. This may be due to the high level of symptom severity present in one of the study sites. Having their faces and chests against their bodies (which occurs in child's pose), being on hands and knees (present in grounding poses), and Warrior poses (strength poses) triggered participants in the current study. In terms of poses that were found to be helpful by participants, there was a wide range of poses, and these poses sometimes overlapped with poses that were triggering. In addition, the level of awareness and bodily sensation involved in yoga can also be difficult for clients as a whole (van der Kolk, 2006). Hip openers are recommended after a few sessions of trauma-sensitive classes (Emerson & Hopper, 2011), but participants in the classes led by this writer enjoyed butterfly and frog. One participant specifically requested happy baby, a pose that involves lying on your back and opening hips and legs. Presenting clients with poses that may be triggering provides them with an opportunity to make choices for themselves not to go into a pose to maintain safety or to tolerate distress

while gaining an understanding that their current experience is temporary (van der Kolk, 2006). Based on experiences in this study, it is recommended to start with postures that are traditionally safe and grounding, allow participants to choose whether or not a pose is right for them, give options about versions of poses, and make clear that these choices are an individual process. Do not assume participants cannot do certain poses.

While yoga psychotherapy group leaders need to be prepared to attend to triggers within the group members (van der Kolk, 2009), developmental concerns specific to adolescents should also be taken into account. In addition to having a tendency to engage in avoidance behaviors due to trauma, teenagers also have concerns about fitting in and how their peers or the adults working with them will perceive them that were evident in the qualitative results of the study. It is especially important to create ways to respond to triggers for participants in an adolescent group in the event that participants are uncomfortable doing something different from other group members or unable to indicate a need for a safe or grounding pose. Participants should be given opportunities to come out of poses or not participate in a pose when needed, but all may not feel able to make this choice. Returning to safe poses chosen by participants and a focus on the breath at various intervals throughout the practice can also be incorporated to help calm and ground participants who are currently less able to request help.

The HCSAY curriculum was originally developed as an 8-week curriculum. The current study has used applied clinical research, which resulted in the delivery method of the group occurring with some variation based upon the needs of the clients. The most recently implemented form of the group involved a 6-week model involving: safety,

boundaries, strength and assertiveness, power, trust and intuition, and community. The current study supported that safety, strength, trust, and community were core themes. Assertiveness also had a significant impact when discussed in follow-up interviews. Based upon the writer's experiences leading the group, boundaries served an important feature to reinforce the concept of safety, and to allow the curriculum to build more slowly towards strength, power, and assertiveness. Having assertiveness during the third group was not ideal because the group members were still becoming comfortable with each other, and assertiveness exercises involving sound and their voices were very difficult. While this may be the case even if assertiveness occurs one session later, given its importance as a theme, and the developing group process, the following structure is recommended for a 6-week group: safety, boundaries, strength and power, assertiveness, trusting your instincts, and community/support.

Future Directions

Additional research is needed into yoga as a treatment modality for adolescent trauma survivors. Next steps for this research would be conducting the study with a comparison group to compare the yoga intervention to gains made in treatment as usual with adolescents. Following that, a preliminary randomized controlled study is recommended. While the study found that yoga was largely beneficial for the participants, they participated in the yoga group by choice. It is possible that the intervention is more effective for certain types of clients who are naturally drawn to this type of intervention. Follow-up research to determine the effectiveness of the intervention following treatment would also be beneficial.

In the future, it would also be helpful to expand the study to examine younger children and male clients to determine if yoga can effectively treat trauma in these populations. The HCSAY curriculum is already being used with these populations by the originators of the curriculum, but the effectiveness has not been studied. A longitudinal design would be helpful to determine if yoga psychotherapy for the current population can mitigate long-term health difficulties often present in adult survivors of complex childhood trauma. Given the recent surge of neuroscience research demonstrating that meditation changes brain structure, future research may pursue whether similar changes are found through yoga. Other physiological changes could be measured directly.

Conclusions

The results of the study indicate that yoga is a promising body-oriented psychotherapy method to treat trauma in female adolescents. Current findings demonstrated that yoga is helpful in decreasing behavioral, mood, and avoidance symptoms. Similar gains were seen in two samples with differing levels of symptom severity, though the group with higher initial symptom severity demonstrated a smaller decrease in trauma-specific symptoms. The physical postures were discussed most frequently as respondents' focus about what was helpful and difficult about the group. Over half the group members also noted that components of the breath work were helpful and 39% noted that the meditative and mindfulness components were helpful. Themes related to safety, strength, trust, and community had the most impact for participants. While trauma presents differently in children and adolescents than adults, the findings from the current study are similar to recent findings from the adult yoga literature.

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Appendix A

Affirmation Questionnaire

Please circle the response that fits best with how you feel about the following statements:

1. *I believe that I have the right to be safe.*

Strongly disagree Disagree Neutral Agree Strongly Agree

2. *I can tell others "no" when they intrude in my personal space.*

Strongly disagree Disagree Neutral Agree Strongly Agree

3. *I feel that I am strong.*

Strongly disagree Disagree Neutral Agree Strongly Agree

4. *I am able to stand up for myself and others.*

Strongly disagree Disagree Neutral Agree Strongly Agree

5. *I believe that I am powerful.*

Strongly disagree Disagree Neutral Agree Strongly Agree

6. *I believe that I am smart and wise.*

Strongly disagree Disagree Neutral Agree Strongly Agree

7. *I trust myself.*

Strongly disagree Disagree Neutral Agree Strongly Agree

8. *I feel that I have people that support me.*

Strongly disagree Disagree Neutral Agree Strongly Agree

9. *I can control my emotions.*

Strongly disagree Disagree Neutral Agree Strongly Agree

10. *I am able to use skills that help me cope with my trauma.*

Strongly disagree Disagree Neutral Agree Strongly Agree

Appendix B

The Child PTSD Symptom Scale (CPSS) – Part I

Below is a list of problems that kids sometimes have after experiencing an upsetting event. Read each one carefully and mark the number (0-3) that best describes how often that problem has bothered you IN THE LAST 2 WEEKS.

Please write down your most distressing event:

_____

Length of time since the event:

_____

0	**1**	**2**	**3**
Not at all or only at one time	Once a week or less/ once in a while	2 to 4 times a week/ half the time	5 or more times a week/almost always

____1. Having upsetting thoughts or images about the event that came into your head when you didn't want them to.

____2. Having bad dreams or nightmares.

____3. Acting or feeling as if the event was happening again (hearing something or seeing a picture about it and feeling as if I am there again).

____4. Feeling upset when you think about it or hear about the event (for example, feeling scared, angry, sad, guilty, etc).

____5. Having feelings in your body when you think about or hear about the event (for example, breaking out into a sweat, heart beating fast).

_____6. Trying not to think about, talk about, or have feelings about the event.

_____7. Trying to avoid activities, people, or places that remind you of the traumatic

event.

_____8. Not being able to remember an important part of the upsetting event.

_____9. Having much less interest in doing things you used to do.

_____10. Not feeling close to people around you.

_____11. Not being able to have strong feelings (for example, being unable to cry or unable to feel happy).

_____12. Feeling as if your future plans or hopes will not come true (for example, you will not have a job or getting married or having kids).

_____13. Having trouble falling or staying asleep.

_____14. Feeling irritable or having fits of anger.

_____15. Having trouble concentrating (for example, losing track of a story on the television, forgetting what you read, not paying attention in class).

_____16. Being overly careful (for example, checking to see who is around you and what is around you).

_____17. Being jumpy or easily startled (for example, when someone walks up behind you).

The Child PTSD Symptom Scale (CPSS) – Part 2

Indicate below if the problems you rated in Part 1 have gotten in the way with any of the following areas of your life DURING THE PAST 2 WEEKS.

Yes No

18. Y N Doing your prayers.

19. Y N Chores and duties at home.

20. Y N Relationships with friends.

21. Y N Fun and hobby activities.

22. Y N Schoolwork.

23. Y N Relationships with your family.

24. Y N General happiness with your life.

Appendix C

Cohesiveness Scale

This measure asks you to focus on your experiences in your therapy group. Use the following rating scale to respond to each of the following items:

1 = not at all
2 = a little bit
3 = somewhat
4 = moderately
5 = quite a bit
6 = a great deal
7 = extremely

1. Even though others may disagree with me sometimes, I feel accepted in group.

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

2. We cooperate and work together in group.

1	2	3	4	5	6	7

3. I feel accepted by the group.

1	2	3	4	5	6	7

4. The members distrust each other.

1	2	3	4	5	6	7

5. I feel a sense of belonging in this group.

1	2	3	4	5	6	7

6. I feel good about being a part of this group.

1	2	3	4	5	6	7

7. Group members don't express caring for one another.

1	2	3	4	5	6	7

8. We trust each other in my group.

1	2	3	4	5	6	7

9. Even though we have differences, our group feels secure to me.

1	2	3	4	5	6	7

Appendix D

Working Alliance Inventory- Short Revised (WAI-SR)-Bond Items

Instructions: Below is a list of statements about experiences people might have with their therapist or group leader. Some items refer directly to your therapist with an underlined space _____. As you read the sentences, mentally insert the name of your group leader in place of _____ in the text. Think about your experience in group, and decide which category best describes your own experience.
IMPORTANT!!! Please take your time to consider each statement carefully before entering your response.

1. I believe _____ likes me.

1	2	3	4	5
Seldom	Sometimes	Fairly Often	Very Often	Always

2. _____ and I respect each other.

1	2	3	4	5
Seldom	Sometimes	Fairly Often	Very Often	Always

3. I feel that _____ appreciates me.

1	2	3	4	5
Seldom	Sometimes	Fairly Often	Very Often	Always

4. I feel _____ cares about me even when I do things that she does not approve of.

1	2	3	4	5
Seldom	Sometimes	Fairly Often	Very Often	Always

Appendix E

Yoga Experiences Form

Please take a few minutes to reflect on what you've experienced to help you learn more about yourself and your new awareness and skills.

Mark how you felt in your body before practicing yoga:

Very distressed Very relaxed

1----------2----------3----------4----------5----------6----------7---------8---------9---------10

Comments about what you are experiencing that contributed to your rating:

_____

_____

_____

Complete Following group:

Here is what I want to remember about today's theme:

_____

_____

_____

What I found helpful:

_____

_____

_____

What I found difficult:

_____

_____

_____

What I became aware of while practicing yoga:

_____

_____

Something I learned that I want to practice again in group and on my own:

_____

_____

One thing that I learned from others in the group today:

_____

_____

How I felt in my body while practicing yoga:

_____

_____

Mark how you felt in your body after practicing yoga:

Very distressed Very relaxed

1----------2----------3----------4----------5----------6----------7---------8---------9---------10

Comments about what you are experiencing/experienced that contributed to your rating:

_____

_____

Appendix F

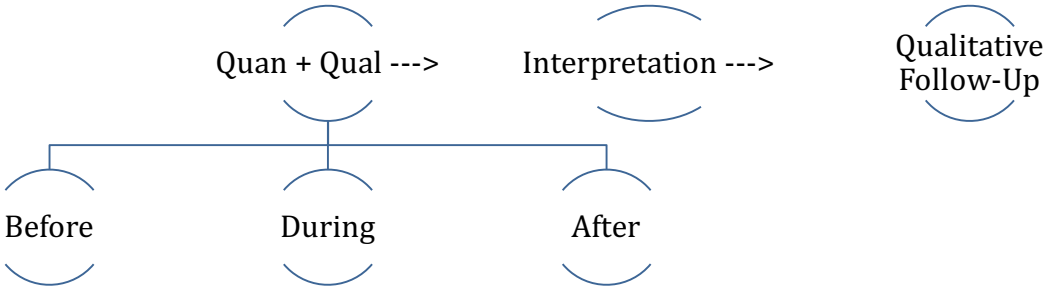
Study Design

Modified Embedded Design

BEFORE (QUAN)
YOQ-SR, CPSS, Affirmation Questionnaire

DURING (QUAN/QUAL)
Yoga Experiences Form

AFTER (QUAN/QUAL)
Quan: YOQ-SR, CPSS, Affirmation Questionnaire, Therapeutic Factors Inventory Cohesiveness Scale, Working Alliance Inventory- Short Form Bond Scale
Qual: Individual Follow-Up Interviews



Appendix G

Summary of Group Activities

Theme	Affirmation	Selected Poses & Activities
Week 1: Safety & Boundaries (90 min)	"I have the right to be safe!"	Child's pose, easy seated pose, mountain pose, spinal twist, janu sirsasana, deep breathing, Safe place drawing
Week 2: Boundaries (90 min)	"I have the right to personal space!"	Downward facing dog, rag doll, sun salutations, Warrior I, walking meditation on the yoga mat
Week 3: Strength & Assertiveness (90 min)	"I am strong & can speak up for myself!"	Warrior poses, plank, chair, superhero, hero, drawing a time when felt strong, "Yogini says" game
Week 4: Power (90 min)	"I am powerful!"	Dolphin, side plank, inversions, arm balances, headstand, drawing power in your body
Week 5: Intuition & Trust (90 min)	"I am wise & I trust myself!"	Rabbit, balancing poses, triangle & half moon, poses with eyes closed, Group Tree pose, Yoga wave game, lotus meditation
Week 6: Community (90 min)	"I am not alone!"	Whole series, Partner poses, Rainbow meditation, making eye pillows or chakra bracelets, post-test questionnaires following group

Appendix H

Interview Questions

1. In what ways do you think yoga contributed to the experience of this group?

2. In what ways do you think being in a group affected this experience? In other words, do you think this intervention would be as helpful/more helpful if done individually?

3. Would you do this group again if offered? Why or why not?

4. What were some important things/the most important thing you learned about yourself from these sessions?

5. What wasn't helpful for you about these sessions?

6. What stands out to you about the themes that were covered during the groups? Were any of the themes easier or more difficult to relate to than others?

7. What, if any, parts of the group changed the way you think about yourself or the difficult experiences you've had in the past?

8. Did you practice yoga outside of the group while you were participating in the group?

9. What, if any, of the skills that you learned in group are you continuing to practice on your own?

10. In what ways do you think the yoga group was different from attending a traditional yoga class?

11. In what ways did the yoga group help with the concepts you are learning in your individual therapy sessions?

12. What was different about the group from what you are learning in your individual therapy sessions?

Appendix I

Consent & Assent Forms

Approval Date: April 14, 2015 **Valid for Use Through:** April 14, 2016
Project Title: Evaluation of Effectiveness of DCAC Group Yoga Intervention as an Adjunctive Trauma Therapy for Adolescent Girls
Principal Investigator: Melissa Houser, MA, PhD candidate
Faculty Sponsor: Dr. Cynthia McRae
DU IRB Protocol #: 723823-1

DCAC Information Sheet & Consent Form (Parent Permission Form)

Your child is being invited to participate in a research study. This form provides you with information about the study. A member of the research team will describe this study to you and answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding whether or not your child will take part.

Invitation to participate in a research study

Your child is invited to participate in a research study about the benefits of a group yoga intervention as a treatment for trauma and associated mental health symptoms. The purpose of the study is to assess the impact our group yoga intervention has on mental health and trauma related symptoms among adolescent girls. We also want to know what parts of the intervention are perceived to be more and less helpful.

Your child is being asked to be in this research study because your child was recommended for and will be participating in the yoga group here at DCAC.

Description of participant involvement

If you agree for your child to be part of the research study, she will be asked to complete an additional questionnaire prior to the group, which will take approximately 5-10 extra minutes. This questionnaire will include questions about the type of trauma she experienced and about trauma symptoms that she experiences. If you allow your child to participate in the study, we will also collect data from your child's referral form and the other questionnaires administered to all participants in the yoga groups. This information includes her age, race, how long she has been participating in treatment at DCAC, and information about her general mental health symptoms.

During each week of the group, your child will also complete a questionnaire describing experiences during that session. Following the group sessions, in addition to the questionnaires that are typically a part of the yoga group, your daughter will be asked to complete the questionnaire she completed prior to the group, as well as brief questionnaires about her experience with the other group members and the group leader.

This will take an additional 10-15 minutes. We are looking for a total of 40 people to participate in the study.

Possible risks and discomforts

The researchers have taken steps to minimize the risks of this study. Even so, your child may still experience some emotional discomfort answering some of the survey questions. Participants will be reminded that they may stop at any time and may skip any questions that they would like to skip. There are no consequences for choosing to stop the study or skip study questions.

If your child does become upset, the group leader is trained in trauma treatment and stabilization. She can help your child calm down again.

Possible benefits of the study

This study is designed for the researcher to learn more about the effectiveness of the group yoga intervention offered by DCAC.

There are no direct benefits to your child, but the research may allow researchers to better understand the effectiveness of this intervention. This knowledge may inform treatment of other children like yours in the future.

Study compensation

Funding is not currently available for the study to provide compensation for participating in the study.

Study cost

There are no additional costs for study participation.

Confidentiality, Storage and future use of data

To keep your information safe, the researchers will:

- Not attach your child's name to any research data, but a study number will be used instead.
- Keep the data on a secure server at the Denver Children's Advocacy Center.

Once the research information is coded, the hard copies of the questionnaires will be filed for clinical purposes in your child's clinical file. These records will be kept for 7 years. The data for the study from the questionnaires will not identify your child, and will be stored in a password-protected data file on the researcher's computer.

The data will not be made available to other researchers for other studies following the

completion of this research study and will not contain information that could identify your child.

The results from the research may be shared at a conference or meeting and may be in published articles. Your child's individual responses and identity will be kept private when information is presented or published.

Who will see my child's research information?

Although we will do everything we can to keep your child's records a secret, confidentiality cannot be guaranteed.

Both the records that identify your child and the consent form signed by you and your child may be looked at by others including:

- Federal agencies that monitor research
- Human Subject Research Committee

All of these people are required to keep your and your child's identity a secret. Otherwise, records that identify you and your child will be available only to people working on the study, unless you give permission for other people to see the records. Only personnel at DCAC directly involved in the group and the research will have access to your child's information. The information will be coded before the researcher receives it, and she will access it via a secure connection. As this study is being conducted as part of a doctoral dissertation, some data may be shared with a faculty sponsor at the University of Denver, but as many children will be participating and as the data will be coded, your child's identity will not be known.

Also, if you or your child tell us something that makes us believe that she or others have been or may be physically harmed, we may report that information to the appropriate agencies.

- Some things we cannot keep private. If you give us any information about child abuse or neglect we have to report that to the Denver Department of Human Services. Also, if we get a court order to turn over your child's study records, we will have to do that.
- If your child tells us she is going to physically hurt herself or someone else, we have to report that to you and/or the local police.

Voluntary Nature of the Study

Your child does have to be in this study if you do not want her to be. Even if you agree for her to participate in the study now, you can change your mind and she can withdraw from the study at a later date. If you decide to withdraw her from the study, you can also

ask her study records are not used, and the information or data you provided will be destroyed.

If you agree to allow your child to participate, we will seek her individual assent. If she does not want to participate, we will not make her.

Contact Information

The researcher carrying out this study, in cooperation with Denver Children's Advocacy Center, is Melissa Houser, PhD candidate. You may ask any questions you have now. If you have questions later, you may call Melissa Houser at 289-400-3061 or email at melissahouser@gmail.com**.** Kristen Chamberlain is the group leader at the Denver Children's Advocacy Center, and she can answer many questions about the general process as well. The faculty advisor for the project at the University of Denver is Dr. Cynthia McRae, and she can be contacted at 303-871-2475 or Cynthia.mcrae@du.edu.

If the researcher cannot be reached, or if you would like to talk to someone other than the researcher about (1) questions, concerns or complaints regarding this study, (2) research participant rights, (3) research-related injuries, or (4) other human subjects issues, you may contact the Chair of the Institutional Review Board for the Protection of Human Subjects, at 303-871-4015 or by emailing IRBChair@du.edu, or you may contact the Office for Research Compliance by emailing IRBAdmin@du.edu, calling 303-871-4050 or in writing (University of Denver, Office of Research and Sponsored Programs, 2199 S. University Blvd., Denver, CO 80208-2121).

Agreement to be in this study

I have read this paper about the study or it was read to me. I understand the possible risks and benefits of this study. I know that being in this study is a choice. I choose to enroll my child in this study. I will get a copy of this consent form.

☐ Please initial here and provide a valid email address if you would like a summary of the results of this study to be sent to you._____

Signature:_____Print Name:_____Date:_____

Approval Date: April 14, 2015 **Valid for Use Through:** April 14, 2016
Project Title: A Mixed Methods Evaluation of Effectiveness of a Group Yoga Intervention as an Adjunctive Trauma Therapy for Adolescent Girls
Principal Investigator: Melissa Houser, MA, PhD candidate
Faculty Sponsor: Dr. Cynthia McRae
DU IRB Protocol #: 723823-1

DCAC Assent Form (For Children Ages 12-15 Years of Age)

You have been invited to be in a research study. This form provides you with information about the study. Please read this sheet below. Since most kids who are asked to be in studies have questions about them, please ask questions about anything you don't understand before deciding if you want to be in the study or not. Your parent knows about the study, but you can still decide whether or not you want to be in it.

Invitation to be in a research study

You are invited to participate in a research study about a yoga group to help with feelings and experiences that you might have due to bad things that have happened to you in the past that might be affecting how you think, feel, and cope. The reason the researcher is doing the study is to find out if our yoga group helps kids who have had difficult past experiences think, feel, and cope better, and if so, how. We want to know what parts of the group are perceived to be more and less helpful.

You are being asked to be in this research study because you were recommended for and will be participating in the yoga group here at DCAC.

What will happen during the study?

You will fill out two surveys at the beginning and end of the group process whether or not you decide to be in the study. If you agree to be part of the study, you will be asked to complete an additional survey prior to the group, which will take an extra 5-10 minutes. This survey will include questions about the type of trauma you experienced and how it affects you. If you decide to be a part of the study, we will also collect data from your referral form and the other surveys administered to all participants in the yoga groups. This information includes your age, race, how long you have been participating in treatment at DCAC, and information about your general mental health.

During each week of the group, you will also complete a survey describing your experiences during that session. Following the group sessions, in addition to the surveys that are typically a part of the yoga group, you will be asked to complete the survey you completed prior to the group, as well as two brief surveys about your experience with the other group members and the group leader. This will take an additional 10-15 minutes. We are looking for a total of 40 people to be in the study.

Are there bad things about the study?

The researchers have taken steps to minimize the risks of this study. Even so, you may have some uncomfortable feelings answering some of the survey questions. You will be reminded that you may stop at any time and may skip any questions that you would like to skip. No one will be mad at you if you choose to stop the study or skip study questions.

If you become upset, the group leader is trained to help kids cope with difficult experiences. The group leader can help you to calm down or you can also talk to your individual therapist.

Are there good things about the study?

This study will allow the researcher to learn more about whether or not of the yoga group offered by DCAC helps kids.

There are no direct benefits to you for being in the study, but the study may allow other researchers and therapists to better understand how to help kids with difficult experiences feel better.

Will I get anything for being in the study?

Funding is not currently available to provide compensation for being in the study.

Will it cost me anything to be in the study?

There are no costs for being in the study.

Who will know about what I did in the study?

To keep your information safe, the researchers will:

- Not attach your name to any research data, but a secret code will be used instead.
- Keep the data on a secure server at the Denver Children's Advocacy Center.

Once the research information is coded, the hard copies of your surveys will be filed for clinical purposes in your clinical file. These records will be kept for 7 years. The data for the study from the surveys will not identify you, and will be stored in a password-protected data file on the researcher's computer.

The data will not be shared with other researchers for other studies after this study is over and will not contain information that would allow people to know who you are.

The results from the research may be shared at a conference or meeting and may be in published articles. Your survey answers and identity will be kept private when

information is presented or published.

Who will see my research information?

Although we will do everything we can to keep your records a secret, confidentiality cannot be guaranteed.

Both the records that identify you and the consent form signed by you and your parent may be looked at by others including:

- Federal agencies that monitor research
- Human Subject Research Committee

All of these people are required to keep your identity a secret. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records. Only personnel at DCAC directly involved in the group and the research will have access to your information. The information will be coded before the researcher receives it, and she will access it via a secure connection. As this study is part of a doctoral dissertation, some data may be shared with a faculty sponsor at the University of Denver, but as many children will be participating and as the data will be coded, your identity will not be shared.

Also, if you tell us something that makes us believe that you or others have been or may be physically harmed, we may report that information to the appropriate agencies.

- Some things we cannot keep private. If you give us any information about child abuse or neglect we have to report that to the Denver Department of Human Services. Also, if we get a court order to turn over your study records, we will have to do that.
- If you tell us you are going to physically hurt yourself or someone else, we have to report that to your parents and/or the local police.

Can I decide if I want to be in the study?

Your do not have to be in this study if you do not want to be. Even if you agree to be in the study now, you can change your mind, and you can stop being in the study. If you decide to stop being in the study, you can also ask that your surveys are not used, and the information you provided will be destroyed.

Contact Information

The researcher carrying out this study, in cooperation with Denver Children's Advocacy Center, is Melissa Houser, PhD candidate. You may ask any questions you have now. If you have questions later, you may call Melissa Houser at 289-400-3061 or email at

melissahouser@gmail.com**.** Kristen Chamberlain is the group leader at the Denver Children's Advocacy Center, and she can answer many questions about the general process as well. The faculty advisor for the project at the University of Denver is Dr. Cynthia McRae, and she can be contacted at 303-871-2475 or Cynthia.mcrae@du.edu.

If the researcher cannot be reached, or if you would like to talk to someone other than the researcher about (1) questions, concerns or complaints regarding this study, (2) research participant rights, (3) research-related injuries, or (4) other human subjects issues, you may contact the Chair of the Institutional Review Board for the Protection of Human Subjects, at 303-871-4015 or by emailing IRBChair@du.edu, or you may contact the Office for Research Compliance by emailing IRBAdmin@du.edu, calling 303-871-4050 or in writing (University of Denver, Office of Research and Sponsored Programs, 2199 S. University Blvd., Denver, CO 80208-2121).

Agreement to be in this study

I have read this paper about the study or it was read to me. I understand the possible good and bad things about being in this study. I know that being in this study is a choice. I choose to be in this study. I will get a copy of this consent form.

☐ Please initial here and provide a valid email address if you would like a summary of the results of this study to be sent to you._____

Signature:_____Print Name:_____Date:_____

Approval Date: April 14, 2015 **Valid for Use Through:** April 14, 2016
Project Title: Evaluation of Effectiveness of DCAC Group Yoga Intervention as an Adjunctive Trauma Therapy for Adolescent Girls
Principal Investigator: Melissa Houser, MA, PhD candidate
Faculty Sponsor: Dr. Cynthia McRae
DU IRB Protocol #: 723823-1

DCAC Assent Form (For Teens Ages 16-17 Years of Age)

You have been invited to participate in a research study. Your parent has already been told about this study, but you can still decide if you will participate. This form provides you with information about the study. A member of the research team will describe this study to you and answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding whether or not to take part.

Invitation to be in a research study

You are invited to be in a research study about the benefits of a group yoga intervention as a treatment for trauma and related symptoms. The purpose of the study is to assess the impact our group yoga intervention has on mental health and trauma related symptoms among adolescent girls. We also want to know what parts of the intervention are perceived to be more and less helpful.

You are being asked to be in this research study because you were recommended for and will be participating in the yoga group here at DCAC.

What will happen during the study?

There will be two questionnaires that you are asked to complete as part of the group yoga process, even if you do not participate in the study. If you agree to be part of the research study, you will be asked to complete an additional questionnaire prior to the group, which will take approximately 5-10 extra minutes. This questionnaire will include questions about the type of trauma you experienced and about trauma symptoms that you experience. If you participate in the study, we will also collect data from your referral form and the other questionnaires administered to all participants in the yoga groups. This information includes your age, race, how long you have been participating in treatment at DCAC, and information about your general mental health symptoms.

During each week of the group, you will also complete a questionnaire describing your experiences during that session. Following the group sessions, in addition to the questionnaires that are typically a part of the yoga group, you will be asked to complete the questionnaire you completed prior to the group, as well as brief questionnaires about your experience with the other group members and the group leader. This will take an extra 10-15 minutes. We are looking for a total of 40 people to be in the study.

Are there risks?

The researchers have taken steps to minimize the risks of this study. Even so, you may still experience some emotional discomfort answering some of the survey questions. You will be reminded that you may stop at any time and may skip any questions that they would like to skip. There are no consequences for choosing to stop the study or skip study questions.

If you become upset, the group leader is trained in trauma treatment and stabilization. She can help you calm down again. You can also talk to your therapist.

Are there benefits?

This study is designed for the researcher to learn more about the effectiveness of the group yoga intervention offered by DCAC.

There are no direct benefits of being in the study, but the research may allow researchers to better understand the effectiveness of this intervention. This knowledge may inform treatment of other children and teenagers in the future.

Will I get anything for being in the study?

Funding is not currently available for the study to provide compensation for participating in the study.

Will it cost me anything to be in the study?

There are no additional costs for study participation.

Who will know about what I did in the study?

To keep your information safe, the researchers will:

- Not attach your name to any research data, but a study number will be used instead.
- Keep the data on a secure server at the Denver Children's Advocacy Center.

Once the research information is coded, the hard copies of the questionnaires will be filed for clinical purposes in your clinical file. These records will be kept for 7 years. The data for the study from the questionnaires will not identify you, and will be stored in a password-protected data file on the researcher's computer.

The data will not be made available to other researchers for other studies following the completion of this research study and will not contain information that could identify you.

The results from the research may be shared at a conference or meeting and may be in published articles. Your individual responses and identity will be kept private when information is presented or published.

Who will see my research information?

Although we will do everything we can to keep your records a secret, confidentiality cannot be guaranteed.

Both the records that identify you and this consent form signed by you may be looked at by others including:

- Federal agencies that monitor research
- Human Subject Research Committee

All of these people are required to keep your identity a secret. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records. Only personnel at DCAC directly involved in the group and the research will have access to your child's information. The information will be coded before the researcher receives it, and she will access it via a secure connection. As this study is being conducted as part of a doctoral dissertation, some data may be shared with a faculty sponsor at the University of Denver, but as many children will be participating and as the data will be coded, your identity will not be known.

Also, if you tell us something that makes us believe that you or others have been or may be physically harmed, we may report that information to the appropriate agencies.

- Some things we cannot keep private. If you give us any information about child abuse or neglect we have to report that to the Denver Department of Human Services. Also, if we get a court order to turn over your study records, we will have to do that.
- If you tell us you are going to physically hurt yourself or someone else, we have to report that to your parents and/or the local police.

Can I decide if I want to be in the study?

You do not have to be in this study if you do not want to be. Even if you agree to participate in the study now, you can change your mind and withdraw from the study at a later date. If you decide to withdraw from the study, you can also ask that your study records are not used, and the information or data you provided will be destroyed.

Contact Information
The researcher carrying out this study, in cooperation with Denver Children's Advocacy Center, is Melissa Houser, PhD candidate. You may ask any questions you have now. If you have questions later, you may call Melissa Houser at 289-400-3061 or email at melissahouser@gmail.com**.** Kristen Chamberlain is the group leader at the Denver Children's Advocacy Center, and she can answer many questions about the general process as well. The faculty advisor for the project at the University of Denver is Dr. Cynthia McRae, and she can be contacted at 303-871-2475 or Cynthia.mcrae@du.edu.

If the researcher cannot be reached, or if you would like to talk to someone other than the researcher about (1) questions, concerns or complaints regarding this study, (2) research participant rights, (3) research-related injuries, or (4) other human subjects issues, you may contact the Chair of the Institutional Review Board for the Protection of Human Subjects, at 303-871-4015 or by emailing IRBChair@du.edu, or you may contact the Office for Research Compliance by emailing IRBAdmin@du.edu, calling 303-871-4050 or in writing (University of Denver, Office of Research and Sponsored Programs, 2199 S. University Blvd., Denver, CO 80208-2121).

Agreement to be in this study
I have read this paper about the study or it was read to me. I understand the possible risks and benefits of this study. I know that being in this study is a choice. I choose to enroll in this study. I will get a copy of this consent form.

☐ Please initial here and provide a valid email address if you would like a summary of the results of this study to be sent to you._____

Signature:_____Print Name:_____Date:_____

Approval Date: April 14, 2015 **Valid for Use Through:** April 14, 2016
Project Title: Evaluation of Effectiveness of DCAC Group Yoga Intervention as an Adjunctive Trauma Therapy for Adolescent Girls
Principal Investigator: Melissa Houser, MA, PhD candidate
Faculty Sponsor: Dr. Cynthia McRae
DU IRB Protocol #: 723823-1

DCAC Information Sheet & Consent Form (For Participants 18 Years of Age)

You have been invited to participate in a research study. This form provides you with information about the study. A member of the research team will describe this study to you and answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding whether or not to take part.

Invitation to participate in a research study

You are invited to participate in a research study about the benefits of a group yoga intervention as a treatment for trauma and associated mental health symptoms. The purpose of the study is to assess the impact our group yoga intervention has on mental health and trauma related symptoms among adolescent girls. We also want to know what parts of the intervention are perceived to be more and less helpful.

You are being asked to be in this research study because you were recommended for and will be participating in the yoga group here at DCAC.

Description of participant involvement

There will be two questionnaires that you are asked to complete as part of the group yoga process, even if you do not participate in the study. If you agree to be part of the research study, you will be asked to complete an additional questionnaire prior to the group, which will take approximately 5-10 extra minutes. This questionnaire will include questions about the type of trauma you experienced and about trauma symptoms that you experience. If you participate in the study, we will also collect data from your referral form and the other questionnaires administered to all participants in the yoga groups. This information includes your age, race, how long you have been participating in treatment at DCAC, and information about your general mental health symptoms.

During each week of the group, you will also complete a questionnaire describing your experiences during that session. Following the group sessions, in addition to the questionnaires that are typically a part of the yoga group, you will be asked to complete the questionnaire you completed prior to the group, as well as brief questionnaires about your experience with the other group members and the group leader. This will take an additional 10-15 minutes. We are looking for a total of 40 people to be in the study.

Possible risks and discomforts

The researchers have taken steps to minimize the risks of this study. Even so, you may still experience some emotional discomfort answering some of the survey questions. You will be reminded that you may stop at any time and may skip any questions that they would like to skip. There are no consequences for choosing to stop the study or skip study questions.

If you become upset, the group leader is trained in trauma treatment and stabilization. She can help you calm down again. You can also talk to your therapist.

Possible benefits of the study

This study is designed for the researcher to learn more about the effectiveness of the group yoga intervention offered by DCAC.

There are no direct benefits of being in the study, but the research may allow researchers to better understand the effectiveness of this intervention. This knowledge may inform treatment of other children and teenagers in the future.

Study compensation

Funding is not currently available for the study to provide compensation for participating in the study.

Study cost

There are no additional costs for study participation.

Confidentiality, Storage and future use of data

To keep your information safe, the researchers will:

- Not attach your name to any research data, but a study number will be used instead.
- Keep the data on a secure server at the Denver Children's Advocacy Center.

Once the research information is coded, the hard copies of the questionnaires will be filed for clinical purposes in your clinical file. These records will be kept for 7 years. The data for the study from the questionnaires will not identify you, and will be stored in a password-protected data file on the researcher's computer.

The data will not be made available to other researchers for other studies following the completion of this research study and will not contain information that could identify you.

The results from the research may be shared at a conference or meeting and may be in published articles. Your individual responses and identity will be kept private when information is presented or published.

Who will see my research information?

Although we will do everything we can to keep your records a secret, confidentiality cannot be guaranteed.

Both the records that identify you and this consent form signed by you may be looked at by others including:

- Federal agencies that monitor research
- Human Subject Research Committee

All of these people are required to keep your identity a secret. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records. Only personnel at DCAC directly involved in the group and the research will have access to your child's information. The information will be coded before the researcher receives it, and she will access it via a secure connection. As this study is being conducted as part of a doctoral dissertation, some data may be shared with a faculty sponsor at the University of Denver, but as many children will be participating and as the data will be coded, your identity will not be known.

Also, if you tell us something that makes us believe that you or others have been or may be physically harmed, we may report that information to the appropriate agencies.

- Some things we cannot keep private. If you give us any information about child abuse or neglect we have to report that to the Denver Department of Human Services. Also, if we get a court order to turn over your study records, we will have to do that.
- If you tell us you are going to physically hurt yourself or someone else, we have to report that to your parents and/or the local police.

Voluntary Nature of the Study

You do not have to be in this study if you do not want to be. Even if you agree to participate in the study now, you can change your mind and withdraw from the study at a later date. If you decide to withdraw from the study, you can also ask that your study records are not used, and the information or data you provided will be destroyed.

Contact Information
The researcher carrying out this study, in cooperation with Denver Children's Advocacy Center, is Melissa Houser, PhD candidate. You may ask any questions you have now. If you have questions later, you may call Melissa Houser at 289-400-3061 or email at melissahouser@gmail.com**.** Kristen Chamberlain is the group leader at the Denver Children's Advocacy Center, and she can answer many questions about the general process as well. The faculty advisor for the project at the University of Denver is Dr. Cynthia McRae, and she can be contacted at 303-871-2475 or Cynthia.mcrae@du.edu.

If the researcher cannot be reached, or if you would like to talk to someone other than the researcher about (1) questions, concerns or complaints regarding this study, (2) research participant rights, (3) research-related injuries, or (4) other human subjects issues, you may contact the Chair of the Institutional Review Board for the Protection of Human Subjects, at 303-871-4015 or by emailing IRBChair@du.edu, or you may contact the Office for Research Compliance by emailing IRBAdmin@du.edu, calling 303-871-4050 or in writing (University of Denver, Office of Research and Sponsored Programs, 2199 S. University Blvd., Denver, CO 80208-2121).

Agreement to be in this study
I have read this paper about the study or it was read to me. I understand the possible risks and benefits of this study. I know that being in this study is a choice. I choose to enroll in this study. I will get a copy of this consent form.

☐ Please initial here and provide a valid email address if you would like a summary of the results of this study to be sent to you._____

Signature:_____Print Name:_____Date:_____

Approval Date: March 25, 2015 **Valid for Use Through:** March 25, 2016

Project Title: A Mixed Methods Evaluation of Effectiveness of a Group Yoga Intervention as an Adjunctive Trauma Therapy for Adolescent Girls

Principal Investigator: Melissa Houser, MA, PhD candidate

Local Principal Investigator: Dr. Paulo Pires, C. Psych.

Faculty Sponsor: Dr. Cynthia McRae

DU IRB Protocol #: 700871-1

Parent Information Sheet & Consent Form

Your child is being invited to participate in a research study. This form provides you with information about the study. A member of the research team will describe this study to you and answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding whether or not your child will take part.

Invitation to participate in a research study

Your child is invited to participate in a research study about the benefits of a group yoga intervention as a treatment for trauma and associated mental health symptoms. The purpose of the study is to obtain information about whether or not a group yoga intervention improves mental health, and if so, what parts of the intervention are perceived to be helpful. You child is being asked to be in this research study because your individual therapist identified you as someone who might possibly benefit from the yoga group and the skills involved (mindful awareness, positive coping, deep breathing, physical stretching).

Description of participant involvement

If you agree for your child to be part of the research study, she will be asked to complete 3 questionnaires prior to the group, which will take approximately 15-20 minutes. The group yoga intervention will involve attending a weekly group at McMaster Children's Hospital for six weeks. Each group session will last 90 minutes, and will involve interaction with other group members, weekly affirmations/positive sayings, physical yoga poses, deep breathing, meditation exercises, and art activities. During each week of the group, your child will also complete a questionnaire describing experiences during that session. Following the group sessions, your child will be asked to complete the questionnaires she completed before the group and two brief additional questionnaires regarding experience in the group, which will take approximately 20-25 minutes to complete. We are looking for a total of 40 youth to participate in the study.

Your child will also have the opportunity to complete an individual follow-up interview to further discuss your experiences during the group. Interviews will be audio taped so that they can be transcribed following the interviews. Participation in the follow-up interview is not mandatory for participation in the yoga group. No video or audiotaping will occur during the group.

Possible risks and discomforts

The researchers have taken steps to minimize the risks of this study. Even so, your child may still experience some risks related to her participation, even when the researchers are careful to avoid them. These risks may include the following:

- The yoga class may bring up uncomfortable feelings at times. Your child is always free to stop doing a pose or move into another pose that feels safer.
- With any physical activity, there is a small risk of injury. The trained yoga instructor leading the class will help make sure your child is practicing safely.
- If your child gets hurt during a yoga group, she will need to go to a walk-in clinic or your family doctor as soon as possible after class. The doctor will inform the group leader whether or not it is safe for her to return to the group and how to care for her injury.
- The questionnaires may bring up uncomfortable feelings for your child. Your child is free to skip a question or stop answering the questionnaires.

Possible benefits of the study

This study is designed for the researcher to learn more about the effectiveness of a group yoga intervention to treat trauma and related mental health symptoms. We do not know if the yoga group will be directly beneficial. Yoga is linked to many positive benefits in adults that we think we may also happen for young people too. Your child may benefit from being in this study because she will have the opportunity to participate in the yoga psychotherapy group. She will learn skills that can help her cope through the yoga poses, deep breathing, and other guided mindfulness activities. Yoga may help her cope better with her difficult experiences, improve her mood, improve her sleep, improve how she feels about herself, help her pay attention to your experiences in her body, and help her acknowledge her emotions.

Alternative treatments

Mental health needs of children are most often treated through methods like Trauma-Focused Cognitive Behavioral Therapy and Cognitive Behavioral Therapy. This intervention will not take the place of these other interventions, but is designed to increase the effects of the other treatment your child is receiving.

Study compensation

You and your child will receive compensation for your expenses to travel to the group ($5/week), as well as a $10 gift card at the end of the group to thank your child for participating in the study. Participants who complete the interview portion will also receive an additional $10 gift card.

Study cost

You will be responsible for transportation/parking costs that exceed $5/week. Your child does not need to have a yoga mat or other supplies. These will be provided during the group.

Confidentiality, Storage and future use of data

To keep your information safe, the researchers will:

- Not attach your child's name to any data, but a study number will be used instead.
- Keep identifiable data and consent forms on a secure server at McMaster Children's Hospital.
- Keep the anonymous data (that cannot be linked to your child) on a password-protected computer in a password-protected file so that no one besides the researcher can read it.

The surveys your child gives us will also be stored on the secure server at McMaster Children's Hospital. The data for the study from the questionnaires will be stored using you child's code research code in a password-protected file. The questionnaires will be kept in records for 10 years. The data will not be made available to other researchers for other studies after this study is over and will not contain information that could identify your child.

Recordings made during the follow-up interview phase of research will only be used to transcribe the interview. Following transcription, the audio recordings will be deleted (within approximately 2 weeks). Only the researcher will have access to the recording, and will also be stored on a secure server at McMaster Children's Hospital. The recording will not be used for educational purposes.

The results from the research will be shared at a meeting. The results from the research may be in published articles. Your child's individual identity will be kept private when information is presented or published.

Who will see my child's research information?

Although we will do everything we can to keep your child's records a secret, confidentiality cannot be guaranteed. Both the records that identify your child and the

consent form signed by you and your child may be looked at by others including:

- Human Subject Research Committee

All of these people are required to keep your and your child's identity a secret. Otherwise, records that identify you and your child will be available only to people working on the study, unless you give permission for other people to see the records.

Also, if you or your child tell us something that makes us believe that she or others have been or may be physically harmed or if she tells us she is going to physically hurt herself or someone else, we will report that information to the appropriate agencies. Also, if we get a court order to turn over your child's study records, we will have to do that.

Voluntary Nature of the Study

Your child does have to be in this study if you do not want her to be. Even if you agree for her to participate in the study now, you can change your mind and she can withdraw from the study at a later date. If you decide to withdraw her from the study, you can also ask her study records are not used, and the information or data you provided will be destroyed.

Contact Information

The researcher carrying out this study, in cooperation with McMaster Children's Hospital, is Melissa Houser, PhD candidate. You may ask any questions you have now. If you have questions later, you may call Melissa Houser at 905-521-2100 x77350 or email at houserm@hhsc.ca**.** The psychologist supervising the research at McMaster is Dr. Paulo Pires, C. Psych., and he can be contacted at 905-521-2100 x74245 or pires@hhsc.ca. The faculty advisor for the project at the University of Denver is Dr. Cynthia McRae, and she can be contacted at 303-871-2475 or Cynthia.mcrae@du.edu.

This study has been reviewed by the Hamilton Integrated Research Ethics Board (HIREB). The HIREB is responsible for ensuring that participants are informed of the risks associated with the research, and that participants are free to decide if participation is right for them. If you have any questions about your child's rights as a research participant, please call the Office of the Chair, HIREB at 905-521-2100 x 42013.

If the researcher cannot be reached, or if you would like to talk to someone other than the researcher about (1) questions, concerns or complaints regarding this study, (2) research participant rights, (3) research-related injuries, or (4) other human subjects issues, you may contact the Chair of the Institutional Review Board for the Protection of Human Subjects, at 303-871-4015 or by emailing IRBChair@du.edu, or you may contact the Office for Research Compliance by emailing IRBAdmin@du.edu, calling 303-871-4050 or in writing (University of Denver, Office of Research and Sponsored Programs, 2199 S. University Blvd., Denver, CO 80208-2121).

Agreement to be in this study

I have read this paper about the study or it was read to me. I understand the possible risks and benefits of this study. I know that being in this study is a choice. I choose to enroll my child in this study. I will get a copy of this consent form.

☐ Please initial here and provide a valid email address if you would like a summary of the results of this study to be sent to you._____

☐ Please initial here if you agree for your daughter to be audio taped for the follow-up interview.

Signature:_____Print Name:_____Date:_____

Consent form explained in person by:

_____	_____	_____
Name and Role (Printed)	Signature	Date

Approval Date: March 25, 2015 **Valid for Use Through:** March 25, 2016
Project Title: A Mixed Methods Evaluation of Effectiveness of a Group Yoga Intervention as an Adjunctive Trauma Therapy for Adolescent Girls
Principal Investigator: Melissa Houser, MA, PhD candidate
Local Principal Investigator: Dr. Paulo Pires, C. Psych.
Faculty Sponsor: Dr. Cynthia McRae
DU IRB Protocol #: 700871-3

Assent Form (for Children Ages 12-15 Years of Age)

You have been invited to be in a research study. This form provides you with information about the study. The person in charge of the study is Melissa Houser, and she is a Psychology Resident at McMaster Children's Hospital. She is doing this study as part of her dissertation, which is a big research project and paper at the end of a doctoral degree. Please read this sheet below. Since most kids who are asked to be in studies have questions about them, please ask questions about anything you don't understand before deciding if you want to be in the study or not.

Invitation to be in a research study

You are invited to be in a research study about a yoga group to help with feelings and experiences that you might have due to bad things that have happened to you in the past that might be affecting how you think, feel, and cope. Your parent has been told about the study, but you can still decide if you would like to be in it or not. The reason the researcher is doing the study is to find out whether or not a yoga group helps kids who have had difficult past experiences think, feel, and cope better, and if so, how. You are being asked to be in this research study because your therapist thought you might be someone who would like to try the yoga group and the skills involved (mindful awareness, positive coping, deep breathing, physical stretching) and you have had some had some bad things happen to you in the past.

What will happen during the study?

If you agree to be in the study, you will be asked to complete 3 surveys before the group during this screening appointment, which will take about 15-20 minutes. The yoga group will meet every week at McMaster Children's Hospital for six weeks in a row. Each group session will be 90 minutes long. During the group, we will talk with other kids in the group to get to know each other, have a positive saying and theme that we talk about that week, do yoga poses, do deep breathing, do other relaxing exercises, and we will sometimes do art activities. During each week of the group, you will also complete a survey about what the group was like for you that week. At the end of the sixth group,

you will be asked to complete the surveys you completed before the group and two more brief surveys about how you felt about the other kids in the group and the group leader. These surveys will happen at the end of the last group. They will take about 20-25 minutes to do, but it won't require you to spend more time because we will do them in group. We are looking for a total of 40 people to be in the study.

The researcher will also be asking two people from each group to talk with her more about what you liked and didn't like about group in an interview after the group is over to make sure she really gets the whole story. Interviews will be audio taped so that she doesn't miss anything you say. You don't have to do the interview to do the yoga group. No taping will happen during the group.

Are there bad things about the study?

Young people often like doing yoga, and many like sharing what they like and do not like about things. The researcher has tried to prevent there from being bad things about the study and to make the yoga group activities safe for kids who have had bad things happen to them, but you may still find some bad things about it. These things may include:

- The yoga helps people learn how to be in the present. Sometimes being in the present or being in a certain yoga pose can feel scary, especially if bad things have happened to you. You can stop doing a pose or do another pose that feels safer.
- With any type of exercise or sport, sometimes people get hurt. The yoga teacher will give you ways to do the poses so that you are safe to keep this from happening.
- If you do get hurt during a yoga group, you will need to go to a walk-in clinic or your family doctor as soon as possible after class. The doctor will inform the group leader whether or not it is safe for you to return to the group and how to care for your injury.
- Filling out the surveys might remind you of things you don't like thinking about. You can always skip a question or stop answering the surveys.

Are there good things about the study?

This study is designed for the researcher to learn more about how a yoga group can help the way kids think, feel, and cope about bad things that have happened to them. We know that yoga has helped some adults who have experienced bad things cope with them, but we don't know if yoga helps kids yet. The group may not be directly helpful to you, but we think it might help kids in some of the same ways. You will learn skills that can help you cope, including the yoga poses, deep breathing, and other relaxation activities. Yoga may help you feel better, help you sleep, help you feel better about yourself, help you pay attention to how your body feels, and help you understand your feelings.

What would I do instead of being in the study?

Mental health, feelings, and bad things that have happened to children are most often treated through Trauma-Focused Cognitive Behavioral Therapy and Cognitive Behavioral Therapy. This study will not take the place of these other things, but may help the other therapy to work better.

Will I get anything for being in the study?

You will receive compensation for your expenses to travel to the group ($5/week) and a $10 gift card at the end of the group to thank you for being in the study. If you decide to do the interview at the end of the study, you will also receive an additional $10 gift card.

Will it cost me anything to be in the study?

If it costs you and your parents more than $5 to get to group and park, you will need to pay for the additional costs. You do not need to have a yoga mat or other supplies. These will be provided during the group.

Who will know about what I did in the study?

To keep your information safe, the researchers will:

- Not attach your name to any surveys, but a secret code will be used instead.
- Keep the data with your personal information on a secure server at the hospital where it will be safe.
- Keep data that does not name you on a password-protected computer in a password-protected file so that no one besides the researcher can read it.

The surveys you give us will also be stored on the secure server where people who are not supposed to know about it will not be able to see it. The data for the study from the surveys will be stored using your secret code. The surveys will be kept in records for 10 years. The data will not be made available to other researchers for other studies after this study is over and will not contain information that could identify you.

Recordings made during interviews will only be used so the researcher can write down what you said. After that, the audio recordings will be deleted (within about 2 weeks). Only the researcher will have access to the recording, and it will be stored on the secure server at McMaster Children's Hospital. The recording will not be used to help other psychologists or researchers learn about using yoga with kids.

The results from the research will be shared at a meeting with other psychologists. The results from the research may be in published articles. None of the information will have your name on it, and since many kids are going to be in the yoga groups, no one will know what you said in your surveys or interview. We will not give anyone your

information that could help him or her know who you are, unless something happens that requires us to tell.

Who will see my research information?

Although we will do everything we can to keep your information a secret, this cannot be guaranteed. The records that identify you and this form that you will sign may be looked at by others including:

- Human Subject Research Committee

These people are also required to keep your identity a secret. Otherwise, records that tell your name and help people figure out who you are will be available only to people working on the study, unless you give permission for other people to see the records.

Some things we cannot keep private. If you tell us about child abuse or neglect or that you are going to physically hurt yourself or someone else, we have to report that to the appropriate authorities. Also, if we get a court order to turn over your study records, we will have to do that.

Can I decide if I want to be in the study?

You do not have to be in this study if you do not want to be. Even if you decide to be in it now, you may change your mind and stop being in the study at any time. If you decide to stop being in the study, you can also ask that your study records are not used, and the surveys you provided will be destroyed. No one will be angry if you decide not to be in the study or to stop being in the study.

Contact Information

The researcher carrying out this study, in cooperation with McMaster Children's Hospital, is Melissa Houser, M.A., PhD candidate. You may ask any questions you have now. If you have questions later, you may call Melissa Houser at 905-521-2100 x77350 or email at houserm@hhsc.ca**.** The psychologist supervising the research at McMaster is Dr. Paulo Pires, C. Psych., and he can be contacted at 905-521-2100 x74245 or pires@hhsc.ca. The faculty advisor for the project at the University of Denver is Dr. Cynthia McRae, and she can be contacted at 303-871-2475 or Cynthia.mcrae@du.edu.

This study has been reviewed by the Hamilton Integrated Research Ethics Board (HIREB). The HIREB is responsible for ensuring that participants are informed of the risks associated with the research, and that participants are free to decide if participation is right for them. If you have any questions about your rights as a research participant, please call the Office of the Chair, HIREB at 905-521-2100 x 42013.

If the researcher cannot be reached, or if you would like to talk to someone other than the researcher about: (1) questions, concerns or complaints regarding this study, (2) research

participant rights, (3) research-related injuries, or (4) other human subjects issues, you may contact the Chair of the Institutional Review Board for the Protection of Human Subjects, at 303-871-4015 or by emailing IRBChair@du.edu, or you may contact the Office for Research Compliance by emailing IRBAdmin@du.edu, calling 303-871-4050 or in writing (University of Denver, Office of Research and Sponsored Programs, 2199 S. University Blvd., Denver, CO 80208-2121).

Agreement to be in this study

I have read this paper about the study or it was read to me. I understand the possible good and bad things about being in the study. I know that being in this study is my choice. I choose to be in this study. I will get a copy of this form.

☐ Please initial here and provide a valid email address if you would like a summary of the results of this study to be sent to you._____

☐ Please initial here if you agree to be audio taped for the follow-up interview.

Signature:_____Print Name:_____Date:_____

Consent form explained in person by:

_____	_____	_____
Name and Role (Printed)	Signature	Date

Approval Date: March 25, 2015 **Valid for Use Through:** March 25, 2016
Project Title: A Mixed Methods Evaluation of Effectiveness of a Group Yoga Intervention as an Adjunctive Trauma Therapy for Adolescent Girls
Principal Investigator: Melissa Houser, MA, PhD candidate
Local Principal Investigator: Dr. Paulo Pires, C. Psych.
Faculty Sponsor: Dr. Cynthia McRae
DU IRB Protocol #: 700871-3

Participant Information Sheet & Consent Form (Participants 16-18 Years of Age)

You have been invited to participate in a research study. This form provides you with information about the study. A member of the research team will describe this study to you and answer all of your questions. Please read the information below and ask questions about anything you don't understand before deciding whether or not to take part.

Invitation to participate in a research study
You are invited to participate in a research study about the benefits of a group yoga intervention as a treatment for trauma and associated mental health symptoms. The purpose of the study is to obtain information about whether or not a group yoga intervention improves these symptoms, and if so, what parts of the intervention are perceived to be helpful. You are being asked to be in this research study because your individual therapist identified you as someone who might possibly benefit from the yoga group and the skills involved (mindful awareness, positive coping, deep breathing, physical stretching).

Description of participant involvement
If you agree to be part of the research study, you will be asked to complete 3 questionnaires prior to the group, which will take approximately 15-20 minutes. The group yoga intervention will involve attending a weekly group at McMaster Children's Hospital for six weeks. Each group session will last 90 minutes, and will involve interaction with other group members, weekly affirmations/positive sayings, physical yoga poses, deep breathing, meditation exercises, and art activities. During each week of the group, you will also complete a questionnaire describing your experiences during that session. Following the group sessions, you will be asked to complete the questionnaires you completed before the group and two brief additional questionnaires regarding your experience in the group, which will take approximately 20-25 minutes to complete. We are looking for a total of 40 people to participate in the study.

You will also have the opportunity to complete an individual follow-up interview to further discuss your experiences during the group. Interviews will be audio taped so that

they can be transcribed following the interviews. Participation in the follow-up interview is not mandatory for participation in the yoga group. No video or audiotaping will occur during the group.

Possible risks and discomforts

The researchers have taken steps to minimize the risks of this study. You may still experience some risks related to your participation, even when the researchers are careful to avoid them. These risks may include the following:

- The yoga class may bring up uncomfortable feelings at times. You are always free to stop doing a pose or move into another pose that feels safer.
- With any physical activity, there is a small risk of injury. The trained yoga instructor leading the class will help make sure you are practicing safely.
- If you do get hurt during a yoga group, you will need to go to a walk-in clinic or your family doctor as soon as possible after class. The doctor will inform the group leader whether or not it is safe for you to return to the group and how to care for your injury.
- The questionnaires may bring up uncomfortable feelings for you. You are free to skip a question or stop answering the questionnaires.

Possible benefits of the study

This study is designed for the researcher to learn more about the effectiveness of a group yoga intervention to treat trauma and related mental health symptoms. We don't know if yoga will be helpful to adolescents with have experienced trauma yet. However, yoga is linked to many positive benefits in adults that we think we will be able to demonstrate are true for adolescents too. You may benefit from being in this study because you will have the opportunity to participate in the yoga psychotherapy group. You will learn skills that can help you with coping through the yoga poses, deep breathing, and other guided mindfulness activities. Yoga may help you cope better with your difficult experiences, improve your mood, improve your sleep, improve how you feel about yourself, help you pay attention to your experiences in your body, and help you acknowledge your emotions.

Alternative treatments

Mental health needs of children are most often treated through methods like Trauma-Focused Cognitive Behavioral Therapy and Cognitive Behavioral Therapy. This intervention will not take the place of these other interventions, but is designed to increase the effects of the other treatment you are receiving.

Study compensation

You will receive compensation for your expenses to travel to the group ($5/week), as well as a $10 gift card at the end of the group to thank you for being in the study. Participants who complete the interview portion will also receive an additional $10 gift card.

Study cost
If transportation costs exceed $5/week, you will be responsible for the remaining costs. You do not need to have a yoga mat or other supplies. These will be provided during the group.

Confidentiality, Storage and future use of data
To keep your information safe, the researchers will:

- Not attach your name to any data, but a study number will be used instead.
- Keep data that is linked to you, your consent form, and your questionnaires on a secure server at the hospital
- Keep the anonymous, coded data on a password-protected computer in a password-protected file so that no one besides the researcher can read it.

The questionnaires you provide will be stored on a secure hospital server for 10 years after the study. The data will not be made available to other researchers for other studies following the completion of this research study and will not contain information that could identify you.

Recordings made during the follow-up interview phase of research will only be used to Transcribe the interview. Following transcription, the audio recordings will be deleted (within approximately 2 weeks). Only the researcher will have access to the recording, and it will stored on the secure server at McMaster Children's Hospital. The recording will not be used for educational purposes.

The results from the research will be shared at a meeting. The results from the research may be in published articles. Your individual identity will be kept private when information is presented or published.

Who will see my research information?

Although we will do everything we can to keep your records a secret, confidentiality cannot be guaranteed. Both the records that identify you and the consent form signed by you may be looked at by others including:

- Human Subject Research Committee

All of these people are required to keep your identity confidential. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

Also, if you tell us something that makes us believe that you or others have been or may be physically harmed or that you are going to physically hurt yourself or someone else, we will report that information to the appropriate agencies. Also, if we get a court order to turn over your study records, we will have to do that.

Voluntary Nature of the Study

Participating in this study is completely voluntary. Even if you decide to participate now, you may change your mind and stop at any time. If you decide to withdraw early, you can also request that your study records are not used, and the information or data you provided will be destroyed.

Contact Information

The researcher carrying out this study, in cooperation with McMaster Children's Hospital, is Melissa Houser, PhD candidate. You may ask any questions you have now. If you have questions later, you may call Melissa Houser at 905-521-2100 x77350 or email at houserm@hhsc.ca**.** The psychologist supervising the research at McMaster is Dr. Paulo Pires, C. Psych., and he can be contacted at 905-521-2100 x74245 or pires@hhsc.ca. The faculty advisor for the project at the University of Denver is Dr. Cynthia McRae, and she can be contacted at 303-871-2475 or Cynthia.mcrae@du.edu.

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☐ Please initial here and provide a valid email address if you would like a summary of the results of this study to be sent to you._____

☐ Please initial here if you agree to be audio taped for the follow-up interview.

Signature:_____Print Name:_____Date:_____

Consent form explained in person by:

_____	_____	_____
Name and Role (Printed)	Signature	Date

Healing Trauma Through Yoga

Yoga Group Facilitator & Principal Investigator: Melissa Houser, MA, Psychology Resident

For additional information, contact Melissa Houser, MA at 905-521-2100 x77350 or by email at houserm@hhsc.ca

Curious about yoga? Want to learn new skills to manage your emotions?

- A 6-week yoga group for adolescent girls will be starting in Summer 2015
- Sessions are 90 minutes each
- Group involves mindfulness, deep breathing, yoga postures, & art activities
- Each group addresses a theme:
  *Safety
  * Boundaries
  *Strength & Assertiveness
  *Power
  *Intuition & Trust
  *Community
- Based on an established curriculum (The Healing Sexual Abuse with Yoga curriculum by Lilly & Hedlund, 2010) & open to all clients with a history of complex trauma
- Yoga mats and props will be provided, as well as snacks & water

Appendix K

Recruitment Script

"We are currently recruiting for a 6-week yoga group for adolescent girls at (location). The researcher is studying whether or not group yoga therapy helps youth experience less trauma and mental health symptoms (ex. Difficulty tolerating emotions, feeling emotions, being in your body). Sessions will be 90 minutes each, and the group will meet for six weeks in a row. You will be asked to fill out a set of surveys before the group, one survey about your experiences during each group session, and then a set of surveys following the group. You may also be asked to participate in a follow-up interview about your experiences with the group. Yoga has the potential to address the ways that your negative past experiences have affected you in a different way than traditional therapy methods. It can help people cope by balancing your body's nervous system and giving you new ways to cope with emotions and difficult situations. You may experience discomfort with feelings that come up or in a yoga pose, and the instructor will help you find ways to feel safe and cope with those emotions. The principal investigator for the study is Melissa Houser, and she can be contacted at 905-521-2100 x77350. If you sign up to hear more about the study, she will contact you to have a meeting where you can learn more about if it is something you would like to participate in."

Appendix L

Graphical Display of Interview Findings.

Interview Question	**H4 (Other dx, moderate benefits)**	**H7 (PTSD dx, benefited highly)**	**H8 (PTSD dx, benefited highly)**
In what ways do you think yoga contributed to the experience of this group? For instance, how would it be different if we hadn't been doing yoga had had just been doing a trauma group or a DBT group?	I think it made us feel more comfortable around each other because we *felt more assertive with ourselves*, so being able to do group poses was a lot easier later on into the group. **Interviewer: What do you think would have been different if it had just been a general trauma group, as compared to a yoga group?** Well, that's kind of hard to say because I've never really been in a trauma group, like just a regular group, but I think that it *made us open up more* because when you're just talking, it can be hard to talk, but we learned about mindfulness and we had all those little card things… Affirmations, yes. I think it was just a lot more comfortable than having to awkwardly talk about your traumatic experiences.	I think it would be very different because yoga helped me relax. I think I'd probably be a lot more tense after the group, rather than calmed down, and I'd probably be a lot more upset after the group after talking about it. I think the yoga really helped in calming down and *uniting us as a group*. We were all doing the same thing together, instead of just sitting around talking.	Um, I think the yoga was just a different way, which I liked, and the fact that we had an intention every time we did it. **Interviewer: How was that helpful?** It made me concentrate on my goal, kind of, for that class, and just be in the moment. It' s very mindful. **Interviewer: How was it different trying to be in the moment in yoga versus just trying to be in the moment in DBT group or day-to-day life?** Cause DBT's boring. Um, I don't know. This is more hands-on, which is a good type of learning for a lot of people now. DBT is a lot of paperwork and writing and talking. Yoga is more intimate for yourself.

			Interviewer: So you're having that experience in the moment for yourself. You're not, like, writing and thinking or are you thinking? Like, I'm thinking, it's just there's nothing to really distract me from what I'm thinking. You take it all in your own pace. You come out of a position when you feel ready. **Interviewer: Is there that same sense of "you take it your own pace" when you're doing other groups or DBT?** Not really. When you're doing DBT, you finish something and you might not know it 100%, you might not understand it, but we're just going to move on. And we don't have, like… we just read it. We don't experience it. **Interviewer: So that experiencing, it sounds like that is an important piece.** Yeah, it is. Definitely an important piece. **Interviewer: Um, what's different when you read about**

			something versus when you experience it? You can experience it for yourself and see how you feel about it. Not just from what you've heard from other people or a textbook or whatever. **Interviewer: That makes sense. Um, with the yoga, we had a number of different elements. We had the breathing, the physical poses, and we also had a bit of focused meditation. How do you think those 3 components contributed?** Um, the breathing was just helpful to be really mindful in your space. You're just concentrating on your experience and it's relaxing. The poses, it felt as though, like, you're in charge of your own decisions and you take control. You can push yourself to a certain limit. You don't have to overdo it or anything. Just, you're doing it! And the meditation, we didn't do a lot of it, but it just felt nice to just relax, and I noticed when I was meditating, I was

			thinking about what our goal was of the day, and how I felt during all the poses, so just kind of reflecting. **Interviewer: The meditation helped you connect the other elements.** Yeah. **Interviewer: Were any of those elements more helpful than others?** I prefer the poses that we did.

In what ways do you think being in a group affected this experience? In other words, do you think this intervention would be as helpful/more helpful if done individually?	I think being in the group was more beneficial because I'm gonna assume that a lot of people in that group have some form of anxiety where being in a social situation like that were it would have been awkward to do all those funky poses in front of each other. It made you more comfortable in social situations because you were all calm when you were doing that. **Interviewer: Was that your experience?** Yeah. **Interviewer: Do you feel like you have bad anxiety in social situations too?** Oh, I have bad anxiety. I have horrible anxiety. I can't eat in front of people. If I go in the car and I know there's no bathroom, I have to go automatically. Like, I can't speak in front of people. At work, I can't be a cashier because I get panic attacks. I know I have anxiety. But being in the group, at first I was nervous, but then it got easier to open up because I knew how to calm myself down and just focus on me.	I think because it was a group, I was more encouraged to try because I would look bad if I didn't. It was kind of an encouragement almost. And if I were doing it on my own, I probably wouldn't do it at all, just because I have no reason to do it, if I were on my own. **Interviewer: Tell me more about that.** I'm lazy. And it's just that I feel like I would look silly if I were just on my own doing it. And with a group, I feel like I don't look as bad, whereas it's easier to do with other people, especially people who know what they're doing, because at least then I know that I'm doing it right and I don't look like a fool. **Interviewer: If it were just you with just a therapist or yoga teacher, how would it be different?** I think it would be very awkward, kind of like that time that we just did it. I enjoyed it, but I was kind of like, there was no one else. It was just…	Well, you'd expect to feel really uncomfortable, but it wasn't like that at all. It was a very supportive group, and you get to experience it with other people, which was nice. And we had times when we were laughing and having fun. **Interviewer: Yeah. Do you think it would be more helpful or as helpful if you had done something like this individually?** No, I don't think it would be actually. **Interviewer: Why do you think?** It's different when you do something on your own than when you do it with other people. **Interviewer: Do you think there's anything that you learned in particular from the other people in the group?** H8: Yeah, definitely. You get to connect with the people. It also helps to realize you're not alone. It's not just that you can't do something. Like, I know for a fact that

		awkward. Like, it… I think it was just because I didn't know you that well, so it was just harder. But if it were someone that I knew better, it might be easier, if you know what I mean. **Interviewer: Yeah. So, having other people doing this yoga thing/ this exercise in a group setting makes it feel a little bit safer for you to do it, to try it.** It's kind of like the attention isn't as on me as it is when it is a 1:1.	when I'm alone, I start judging myself in my mind, but when you're in a group, it's kind of different because you see them. You can see that they're judging themselves too, and it just kind of balances each other out. **Interviewer: So you can see other people struggling with the same thing.** H8: Yeah, and it helps you realize that you're not alone, and it's normal.

Would you do this group again if offered? Why or why not?	Personally, I wasn't a huge fan of the yoga because I do have really bad joints and stuff, and a lot of them (poses) are really hard for me to do. Like, again, I like the meditation side of it, but I don't really think I would. I'm more comfortable in talking. Like a regular group. **Interviewer: Do you think that there were any modifications that would have helped?** In the group? **Interviewer: Yeah, there's different ways to make poses more gentle or more difficult.** Yeah, I think that… well, I've had to modify a lot because I'm flexible, and I have bad joints, so for ones where I can show my more flexible side, you showed me how to do that because you're flexible too, but like, for example, like plank, I couldn't do that, so we modified that. I think it was better.	Absolutely! No question about it. I thought it was great and I loved it. I thought it was fun, and I found it very helpful. It was kind of like a way to get away from everything, and as I entered back, I was relaxed and refreshed and more able to deal with things. I actually mentioned it to (client's therapist and group co-leader) that I wished it was an all year-round thing.	Yeah, definitely. **Interviewer: Why do you think?** Because I like it. I enjoy doing yoga.

What were some important things/the most important thing you learned/learned about yourself from these sessions?	Mindfulness because for the past… well, over a year now, I've had countless people talk to me about mindfulness. It didn't really stick with me until after being in the group. I can't exactly put my finger on it about what about the group made the mindfulness techniques stay with me, but something did, and now I'm able to practice it whenever I need to. **Interviewer: That's interesting. Part of the point of the physical practice of yoga is to prepare the body for stillness and mindfulness and meditation, so I don't know if there was something to that or if it was just a different experience to mindfulness because you were learning by doing.** Probably because I was learning by doing. I'm a lot more hands-on when I learn, and having people lecture me about mindfulness; it won't really stay. I have the attention span of a gnat. I forget what I'm saying halfway through a sentence.	That I am *strong* and that I don't have to be afraid to try new things and that *I can trust myself* and love myself, despite everything. **Interviewer: Cool. And how do you think you learned that through the yoga?** I think it was partly through the themes and sometimes it was through just talking with everybody else, but mostly through the themes.	That others don't control me. That I have the right to do what I want and how I want to do it. **Interviewer: Why do you think that changes things for you?** I feel stronger as a person. Mentally, physically. I learned to trust myself.

What wasn't helpful for you about these sessions?	I don't know. I think everything had its purpose. I mean, personally for me, having to be on my hands and knees, I wasn't comfortable with that, but I guess everyone has their own individual thing. I don't get how that would help me. It just made me really uncomfortable. **Interviewer: (condensed) So that's the kind of thing I'm looking for…Knowing if there are particular things like that that we did like being on your hands and knees that made you uncomfortable, is really good feedback.** Yeah, I think being on my hands and knees made me the most uncomfortable. When I think of that, I think of like a dog, so that's just… yeah. **Interviewer: I wonder if we had been in that situation now where we were doing those poses if choosing to do something else instead would have been helpful. Come into another pose like child's pose or a different stretch would have felt better to you.** Probably, but I feel kind	I think if it were during the school year, it would just kind of be inconvenient to get here because the buses, but that's pretty much it, really.	Nothing really. **Interviewer: Is there anything that you think, oh that theme really didn't make sense or it would be helpful to do certain poses more or do more meditation or anything like that?** I think a bit more meditation would have been good. And having more space, which we couldn't really do. **Interviewer: Did it seem like the classes here were long enough?** I feel like they could have been longer. **Interviewer: How long? 75 minutes? 90 minutes?** 90 minutes.

	of uncomfortable if I'm not going with the group, so I just do everything to the best of my abilities. **Interviewer: So if you're not going with the group, then that might be noticeable. People might see you doing something differently. So even though we talked about at times how it was important to honor your body and do what you needed to do for yourself if a pose was uncomfortable, I wonder if there was any way I could have conveyed that message in a stronger way where it felt like you could do something different.** I think just reminding it before you start each like little individual session the whole group and just reminding that if you remember that if you're ever uncomfortable, you can come out of the pose because I think that you get nervous.		

What stands out to you about the themes that were covered during the groups? Were any of the themes easier or more difficult to relate to than others?	I don't know. I didn't remember all of the themes. I think the theme that was easiest, the only one that I can remember, was when we talked about *our safe places, and how our mat was our safe* place and things like that. That one was probably the easiest. **Interviewer: Um, so some of the other themes… you mentioned safety, boundaries, strength and assertiveness…** That one was difficult for me because I don't think of myself as a very strong person, physically, mentally, or emotionally. **Interviewer: Mmm-hmm. Tell me more about that.** What do you want to know? **Interviewer: So, all of the themes were designed sort of to target things that you might not think were true initially that we're hoping that you can maybe gain as a result of experiencing them through the yoga and that sometimes trauma can affect. (Names themes.) So, a lot of times those things might be unfamiliar or**	*I can trust my instincts* I thought was my favorite because a lot of the time I don't trust my instincts because I can't trust myself, and that one, it showed me that I can trust myself. So that one was my favorite. I love that one. **Interviewer: Were there some that were maybe just okay or harder to connect to?** Mmm, not that I can think of. I thought that they were pretty accurate and very helpful. (pause) Applicable. That's the word I was thinking of. Not accurate. **Interviewer: (Names themes.) Any further thoughts on them?** I'm not a very assertive person, so I thought that was very interesting to… because I never really thought of it as a strength to be assertive because I'm kind of that person that just lays down and lets people walk all over me, but when the time comes if I have to defend myself, I can. But I've never really thought of being assertive as a good thing.	I really liked the one, I think it was the second week, no, the fifth week… to trust yourself. I like that one a lot. It's something people don't really think about. When you think of trust you're not really thinking about "Do you trust yourself?" You're think about, "Do you trust others? Do people trust you?" And that was a really interesting way of looking at it. Yoga's more about you. **Interviewer: Even though you're in a group?** H8: Yeah. **Interviewer: Were there any of the themes that were more difficult to relate to or didn't make sense?** They all made sense. Also, I hadn't really thought about safety before the group, and safety is really important. It was also helpful the order that you put them in. We got to start thinking about ourselves with safety, our environment with boundaries, feeling strong, and trusting

	not feel true about you at first, and then hopefully it will become a little bit more true or feel a little different. Um, and in the sense of what I just told you, it's still the same for me. *I feel a little more assertive, obviously, because I was able to talk about a recent experience and not wait as long. I feel more assertive in terms of what I have to say,* but in terms of feeling strong mentally, physically, emotionally, I still really don't. **Interviewer: Mmm. And I know you feel like you're more flexible and you're a dancer, and that's the physical part of it. What do you think keeps you from feeling strong (emotionally)?** Like, when I said the being on my hands and knees made me feel like a dog, dogs have people that, like, have power over them. They have their owners, so they get commanded for things, and that's where the strength thing comes in. **Interviewer: So if you're feeling like you're a dog…**	**Interviewer: I guess I'm trying to figure out how to ask you more about that because I see this (assertiveness) as being in the middle with aggressive on one end and passive on the other end.** I don't know, I feel like assertive is closer to aggressive than it is to passive because to be assertive, you have to be aggressive. Like, you can't be passively assertive. That's just my feeling. Like, if you're passively assertive, I feel like those two things kind of contradict each other.	ourselves before community was added in. It's good that you didn't start talking about that on day one. It helped us work up to it. DBT is all about how you relate to others. Yoga was more internal, but then when we got to community, it was fun.

	It makes me feel docile, it makes me feel like I'm lesser. Like people can take advantage of me.		

What, if any, parts of the group changed the way you think about yourself or the difficult experiences you've had in the past?	I think *the safe place.* Knowing that I have a safe place made some things easier for me. (Later on) **Interviewer: You said before at the beginning that you didn't necessarily change the way you feel about yourself, and yet you are also saying that you do feel more assertive about yourself, so I'm wondering…** See, this is what I mean when I say one thing and I can't remember what I'm saying. **Interviewer: So I'm wondering which is more true about you. And it could be a little bit of both. Sometimes we feel like we haven't really changed, and then sometimes we notice that there's this one little area.** I think that's probably what it is. **Interviewer: Where it's hard to notice things that are different.** Yeah, because I'm very hard on myself, I don't pick out the positives, so I don't think of the positives when it comes to myself, so noticing things like that, it	Um, I found the grounding poses really help when I've felt insecure. They just… they *made me feel safe.* And that's changed me because I *feel it's made me stronger*, more able to deal with things because I know if I can't *there's always something that I can fall back on.* **Interviewer: Now that we talked about it in group, and I guess here a little bit, do you still feel as though it isn't good?** *I find myself when I don't like something, I'm more able to say that I don't like it,* whereas before, I would just kind of accept it and try to work with it. A lot of people have noticed, but they don't say it as a bad thing. You know, it's nice that you're standing up for yourself. Like at work, I don't get pushed around, but I also don't push people around, if you know what I mean. *So people have noticed it and they seem to think it's a good thing that I'm able to stand up for myself better because I guess a lot of people see*	It makes me think more positively about myself. It also made me realize that my past doesn't define who I am. **Interviewer: How do you think the group helped with the way that your interact with your community?** It helped a lot. It also helped me realize that I need to have people in my community that are supportive.

	doesn't happen often. **Interviewer: And so I wonder if that's one of the things that gets in the way with you feeling strong.** Probably. I try to do things on my own time that help myself feel better, but I can always pick the negatives. That's just a bad habit that I have because I was bullied so much, and it just messed with my mentality. **Interviewer: Right, yeah. So whereas a lot of people, me included, looking at you in your yoga poses in the class, would think, she's doing well, she's strong, she can do this, you noticed the things that were hard for you.** Yeah. **Interviewer: So looking back on it, if you were to notice the parts of it that came easier, that you did well, what poses would those be?** Anything where you can really enhance the flexibility because being able to do that makes me feel a bit stronger and I have more balance and it just feels more stable.	*passiveness as a weakness*, and I don't. Like, it's not easy to let people walk all over you. Some people, they're just the types of people who just do. They're not strong enough to tell people to stop. If you are strong enough, sometimes you either become aggressive or you stay letting people walk all over you when you can choose when you want it to stop. Does that make sense? **Interviewer: So like, that's kind of like when people either go to one end or the other. They either let people continue walking all over them or they become aggressive to get it to stop.** Yeah. But when you start out, when you're weak, chances are you're going to have people walk all over you because you're not strong enough to get them to stop. And then somewhere in the middle from weak to strong, if you're aggressive where you can walk all over the weak people…And then when you reach true strength, you have the strength to allow	

	Interviewer: Are there any particular poses? I like the (half) moon pose. I know it wasn't really a pose, but I liked it when we did the splits. **Interviewer: It was a pose! And yeah, you're the one in the group that could do that. Go all the way into it.** Just stuff like that where you could really show off your flexibility and push it to its furthest, any of those poses were my favorite. **Interviewer: The half moon pose, that's a pretty hard pose for a lot of people. You're like, oh yeah, no problem.** Well yeah, you described it to me, and I just did it. I just got it. It reminded me of an arabesque. It's a move in ballet.	people to walk all over you. That way they feel better because it makes them happy when they have control, a lot of people. **Interviewer: So it's kind of choosing, like acknowledging that you're strong and acknowledging that you can tolerate a certain amount of crap from people in certain situations, and then…** *Being strong enough to make it stop when it gets too much.* **Interviewer: So choosing your battles, it sounds like.** Yeah. **Interviewer: And if there were no limit, if there were no boundary about what's too much for you…** Then it becomes abuse. **Interviewer: Right. But now it sounds like you're in a place where you know what your limit is.** Yes. *And I feel like you have to be strong*	

		enough to tell people to stop when they're reached the limit, rather than…and it takes a lot less effort to push people to their limits, rather than let people come to your limits and tell them to stop. I think it's a lot easier to, instead of letting people come close to your limits, to go to their limits, you know what I mean? Kind of like a defense or attack thing. It's easier to attack than to defend. **Interviewer: Yeah, for a lot of people, and so like, that's why these things are kind of on the extremes. It might be weak to do either one (only), but then this place in the middle of knowing your limits and being able to say when those have been reached.** Yeah. **Interviewer: So that's pretty cool that people have complimented you in that way.** *It's kind of big. I feel kind of awkward when people say it's nice that you're standing up for yourself.* Well, I always have. I just	

		haven't been so open about it. Like, when I stand up for myself, I would gradually stop letting them get away with it, rather than outright saying stop. *Whereas now, I'm outright say, "Stop. I don't like this. You need to cease this."* **Interviewer: So you're being a little bit more direct about it.** Yeah. So that's what people have noticed.	

Did you practice yoga outside of the group while you were participating in the group?	Not particularly. Not yet. I've used a couple because I am a competitive dancer to stretch and stuff because I know some of them are beneficial, so I've been doing those just to help myself in another situation, but other than that, not really.	Yeah. **Interviewer: How often do you think?** Umm, three to four times a week outside the group. Whenever my mom and I went to the gym, I would do yoga to warm up, and I did a lot of the poses that you taught me because it was just a nice feeling and I enjoyed them. **Interviewer: Do you think practicing on your own made a difference to be able to feel comfortable in the poses?** Yeah, it made it easier to get into the poses and to get out of the poses. But also at the same time because I wasn't trying to learn them on my own, I was just practicing them, it was easier because if I were to try to learn them on my own, whereas just practicing them, I know I'm doing them right because I'm just repeating what I've learned.	Yes, and I'm still doing yoga. **Interviewer: How often do you practice it?** Five times a week. **Interviewer: Do you have any favourite poses?** Warrior poses.

What, if any, of the skills that you learned in the group are you continuing to practice on your own?	When I'm not in the group, I used things that I learned in the group. Like, um, the thing where you have to breathe and you feel it in your feet and then you move up to your calves where you do all that and you feel all the different parts of your body, I'll do that before bed now. Because it makes me feel more one with myself. Body scan, that's what it's called. **Interviewer: Yeah, or if you have another name for it too, that's fine. Are there other skills from the group that you're using in your life?** It's mostly the body scan, but a lot of breathing that we did. When I start to get anxious, I start to do some breathing. And mindfulness too.	Deep breathing and mindfulness. Still the Rainbow… **Interviewer: The rainbow meditation that we did at the end?** Yeah, it's helpful. That was my absolute favorite. I actually took the cards and I started coloring them the colors of the rainbow. **Interviewer: Oh, those cards? The ones with all the little affirmations?** Yeah, so I taped them on my wall, in like, the order of the rainbow. **Interviewer: Oh cool! That's really neat.** So they really help. I love those.	Realizing my strengths and trusting myself and safety. And, of course, the poses. I'm practicing a lot of yoga. Lion's breath. I go to the bathroom at school and do it. (demonstrates) Meditation before sleep.

In what ways do you think the yoga group was different from attending a traditional yoga class?	I wouldn't know. I've never been in a traditional yoga class. This group is really all I know. I had limited information about yoga. I knew some things, I knew some poses from a summer camp that I went to when I was 8. **Interviewer: Oh, I didn't realize it was that long ago.** Yeah, it was quite a while ago. We had the option of open gym and yoga class, and I opted for the thing that would bring me down a notch instead of running around. That's not my thing. **Interviewer: So, I guess how does this experience, this class, compare to that one other class that you've been to?** That one was more faced around calming kids down, whereas this one, it made you think about things. It made you feel more assertive about yourself.	Cause these are… this group was directed towards people like me and it targets certain things… like, it's not as broad. There's some things that were broad, but it was kind of like less broad, if that makes sense. Like it wasn't specifically targeting everything, but it was capturing it better than a regular yoga class would. **Interviewer: So a regular class… it could be anything. It could be awareness, it could be openness to experiences, it could be anything all over the place.** Whereas this was a little more directed towards trauma patients without making it obvious that "this is why you're here," you know what I mean? It was directed, but it could be taken in different ways, so I didn't have to take everything and connect it to, you know, the trauma. But I could take it and apply it to the things that are around it.	I don't know. I'd never done yoga before this. **Interviewer: Oh, where did that lotus pose you showed me on the first day come from?** Just what you think of when you think about yoga from the movies and stuff. **Interviewer: How was yoga different from what you expected it to be?** It was a lot different! My mom's been trying to get me to do yoga for like five years, and I didn't want to do it. I always thought yoga was for, like, old people or something. Relaxing was never in my vocabulary before, but it really helps. **Interviewer: Have you told your mom how you feel about it now?** Yes! It's funny, when she sees me practicing yoga, and she's like, "I told you!" I actually want to find a yoga class.

In what ways did the yoga group help with the concepts you are learning in your individual therapy sessions?	I don't really know because in my individual therapy sessions, it's not really something that we talked about. It was like, oh, how's yoga? Oh, it was good. We did some mindfulness. So how did that go for you? It went pretty good. It's starting to stay with me. That's about it. I go off into my own world in my individual session. **Interviewer: And you don't really talk to your individual therapist about your trauma experiences?** More towards the beginning I did, but not unless they're stuck in my head, I don't. I mostly talk about addiction because I have a very addictive personality and I've been into a lot of bad things, so we talk about stuff like that or self-harm. Those are the big things we talk about. **Interviewer: And bringing that sense of mindfulness and having that sense of awareness of what's going on, in relation to the urges that you're having with addiction and self-harm could potentially be helpful.** Yeah, yeah. I found that	Um, the mindfulness 'cause we're still working on that because I'm not very good at it. Because I'm the type of person that is thinking about everything at the same time while still being present. I found that the mindfulness activities were helpful in trying to get me to focus on the here and the now.	Just to put it in a different way and to actually experience (it). Well, DBT can relate a lot to the yoga. Setting intentions in both, but I prefer the way we did it in yoga. I'm not sure why. **Interviewer: Because you choose something positive to think about from the start, rather than having to try to capture your thoughts and figure out how to change them or something else?** Well, both can be good. I think mixing the two is really good.

	it's helped a lot with the self-harm. And I've been doing better with addictions. I've gotten off of some drugs. And I'm in the middle of quitting smoking.		

What was different about the group from what you are learning in your individual therapy sessions?	**Interviewer: And so, it sounds like there are a lot of things that are different about the group from what you're learning in your individual sessions.** Yeah. **Interviewer: Are you working on specific skills in individual?** Not really. It's more so getting it all out because I keep so much bottled in. It's more of an outlet, and if something comes out that could be benefited by a coping skill of some sort, then we get into that.	I feel like in individual therapy, everything is targeted towards the trauma and targeted towards my specific trauma, whereas in the group, it was more trauma as a whole, and all these people are like me. It's not just me. It's not all about me. Like, sometimes I feel in individual trauma, I feel very attacked sometimes. Like, I know she doesn't mean to, but sometimes it's just, Mmm, you know? Whereas in group therapy, other people are feeling the same thing. It's not just me, it's everybody. I guess just the more perspectives make it easier sometimes. **Interviewer: It sounds like it was helpful to know that you weren't alone. And, especially if you're the type of people that really likes to give to other people and focus on other people, having so much individual attention on you for a whole hour at a time, that might feel like a lot.** Yeah, yeah. Or especially when I have meetings with the	In DBT, it's more logical and about the facts. It's this number and this statistic. It's not the same. Yoga is experiencing it, doing it. Yoga is also more self-paced. You're working on yourself. It's more intimate.

		doctor and Sadaf's there and my mom's there and they're all focused on me… I don't like it. So that's the difference between individual therapy and group therapy. There's like one of you and like four of us and it's not as personal. The attention isn't entirely on me. It's a lot easier to open up on certain things.	

Appendix M

Qualitative data coding guide:

-Do not code "Comments about what you are experiencing that contributed to your rating" before practicing yoga. That is just for context. I coded the qualitative questionnaires first, and developed the categories from it, but so far, have found that it applies well to my interviews and my field notes as well.

-I attempting to code the text and develop a tally for the number of times each person receives a certain code for the content analysis.

-Double-coding may be appropriate for describing process examples that were helpful/unhelpful at the same time they are commenting on themes or describing poses that were helpful or not helpful. Double-coding may occasionally be appropriate if two themes are discussed appropriately at one time.

-There are eight categories that we are coding for:

1. Themes related to the groups. They will mostly be captured by the question "Here is what I want to remember about today's theme" but some participants may discuss the theme in relation to what they found helpful, what they want to practice again, or what they learned from others. If they make statements about the theme that occur later in the qualitative questionnaire (but not under the theme) that makes it clear they understood the theme, still code it. They can either state the themes explicitly or make a comment that is implicitly related to the theme. ("That I was allowed to tell everyone when I wanted to stop doing a pose" is an example of implicit coding for assertiveness.) There are 8 possible themes:
    1. Safety- any message that indicates that they learned something about feeling safe or creating their own sense of safety. Also code "I felt safe" here. Also include direct references to feeling comfortable under safety. This should happen during week 2.
    Also, interview comments where participants discuss feeling more comfortable in a group setting can also be coded under safety. Safety in numbers- "And with a group, I feel like I don't look bad."
    Exclusion: Mention of a pose only or feelings only (good poses, I got very relaxed, the breathing). Can code those under other categories.
    Exemplar: "I have the right to feel safe and I am in charge of my safety."
    Any statement that fits better with a different theme.
    Atypical Exemplar: "Safety can be a state of mind that can be available to you whenever your give yourself the availability."
    Close but not quite: "Every time, focus on what parts of your body are stretching and focus on your breath." (This might help you feel safe, but it's not quite clear enough that they are mentioning it for that reason)
    2. Boundaries- any message that conveyed that they understand that they

have the right to have boundaries. This should be a theme during either week 1 or 2. Any statement that fits better with a different theme.

Exclusion: Mention of a pose only or how they felt doing yoga.

Exemplars: "I have the right to have boundaries and have them be respected."

"My own space" (indirect)

Close but not quite: "Trust in my own body and capabilities." (Could code for trust)

3. Strength- any message they learned something about feeling strong in their body and/or mind. Can be indirect. Should be described on week 2 or 3.

Exclusion: Mention of only poses or feelings, any statement that fits better with a different theme.

Exemplar: "Strength poses: If I feel strong, I am relaxed and happy."

Atypical Exemplar: "That I am strong and that I am as powerful as I want to be." (would code under strength and power)

Close but not quite: "I love warrior poses." (Warrior poses are about strength, but it is not clear that that is why she likes them.)

"And then when you reach true strength, you have the strength to allow people to walk all over you. That way they feel better because it makes them happy when they have control, a lot of people." (Still seems like a distortion of strength)

4. Assertiveness- any direct mention of assertiveness or description of engaging in assertive behaviours during the class. Should occur during week 3 or 4.

Exclusion: Mention of only poses or feelings, any statement that fits better with a different theme.

Exemplar: "That I was allowed to tell everyone when I wanted to stop doing a pose."

5. Power- any direct mention of power or engaging in actions or statements that made them feel powerful.

Exclusion: Mention of only poses or feelings, any statement that fits better with a different theme.

Exemplar: "I am powerful."

Close but not quite: "Putting my one fear into the bowl and letting it go." (Letting go of fear can help one to reclaim power, but the connection isn't clear.)

6. Trust- Theme for either week 4 or 5. Any direct mention of learning to trust, feeling safe to trust, or experience trust in one's self or others indirectly during the practice.

Exclusion: Mention of only poses or feelings, any statement that fits better with a different theme.

Exemplar: "Feeling safe to trust myself."

Atypical exemplar: "Trusting how I could handle/how well I could do the poses."

7. Intuition- Theme during week 5. Any direct mention of learning the

meaning of intuition and following your intuition or related words (instincts).

Exclusion: Mention of only poses or feelings, any statement that fits better with a different theme.

Exemplar: “To trust my instincts”

8. Community/Support- (I have sub-divided this into support from others and support from props)- We are looking for the message that they are open to receiving support and help from others. Theme for week 6.

Exclusion: Mention of only poses or feelings, any statement that fits better with a different theme.

Exemplar: “Despite what it may seem, I am not alone.” (support from others)

“Having support makes things easier.”

“We can use the wall to do the Warrior pose #2.” (support from props)

2. Aspects of yoga that are thought to be the key ingredients of the intervention:

1. Physical poses (coding for whether they found them helpful/enjoyable or difficult; if they say they are difficult, but then say they want to practice them again, code once as each). Code once for each pose mentioned.

Subcodes include:

a. Physical pose enjoyed/helpful

b. Physical pose found difficult, (Ex. “My balance was not good.” Or “Tree pose on tippie toes.” “I mean, personally for me, having to be on my hands and knees, I wasn’t comfortable with that, but I guess everyone has there own individual thing. I don’t get how that would help me. It just made me really uncomfortable.”

2. Breath work- anything they mention about deep breathing or specific breathing exercises (Lion’s breath)

a. Breathing helpful

b. Breathing difficult

3. Mindfulness/Meditation- anything they mention about guided meditation, body scanning, or specific types of meditations (rainbow meditation, lotus meditation)

a. Mindfulness helpful- any aspects of mindfulness and meditation that they reported were helpful or they want to practice again

b. Mindfulness difficult- any aspects of mindfulness and meditation that they reported were difficult (Ex,“Staying still sometimes.”)

4. Nothing difficult- Occasionally, clients have reported under “What I found difficult” on the yoga experiences form “Nothing really.” This captures those responses.

5. Everything helpful- This is the converse of the item above. Sometimes they said that they wanted to practice everything again or everything was helpful.

3. Feelings/emotions associated with the practice (decreased emotional suppression)- these may show up under "How I felt in my body while practicing yoga," but may also be mentioned during the comments at the end or during interviews.

1. Relaxation/Relieved (quiet, peaceful, calm, relaxed, de-stressed, less aggressive, less self-conscious)

2. Happiness (good, great, happy, excited, refreshed)

3. Tired

4. Confident/In control

5. Balanced/Neutral

6. Tension/pain/negative- "the state of being stretched tight, mental or emotional strain" or any negatively valenced code, including "not good," "Uncomfortable," or "awkward."

4. Acceptance

Components include:

a. Acceptance of others: Ex, "Trusting the right people isn't that hard," "Having others in the group helps you to balance," "We are all in this together." Acceptance of others is not the same as community. Community is going a step further to actively helping and supporting members of the group. Acceptance=inclusion, non-judging.

b. Acceptance from others: Ex, "I was aware of the people surrounding me, and how mindful and unjudging everyone was." "I don't have to worry about being stared at or judged."

c. Self-acceptance: Ex, "I'm not the only one who doesn't have the greatest balance."

5. Coping (positive)

a. Awareness: Separated between i) general internal focus on self/emotions, ii) proprioception- sense of relative position of neighboring parts of the body and strength of effort being employed in movement, iii) exteroception- awareness of outside world, & iv) interoception- awareness of pain, hunger, and movement of internal organs.

b. Tolerating distress/Decreased avoidance: May be related to trauma; emotions, activities, or environments. Ex, "Thinking good things, how to face my problem." "I don't need to be afraid to try new things." Code coping with pain under tolerating distress.

c. Improved self-concept: Positive self-statements made by clients. May be related to themes or may be general. Ex, "I'm able to do positions," "That I am stronger than I think." "I can trust myself and love myself, despite everything."

d. Decreased intrusion symptoms: "When I was breathing, it helped me clear my mind." "Balance helps me focus and takes away focus from bad thoughts."

e. Coping skills: Use of specific skills described as being taught in the group. “When I’m not in the group, I used things that I learned in the group. Like, um, the thing where you have to breathe and you feel it in your feet and then you move up to your calves where you do all that and you feel all the different parts of your body, I’ll do that before bed now.”

6. Judgment- negative thoughts and judgmental statements that caused clients to be worried about, less engaged with the intervention, or to benefit less than they could have if more accepting. Some of these thoughts are developmentally normal for teenagers, due to their tendencies to feel like they are “on stage” to begin with. However, the intervention is designed to help the feel safe, comfortable, and part of a group. It is also designed to help them move at their own pace and accept their bodies.
    a. Negative thoughts- “I’m lazy. And it’s just that I feel like I would look silly if I were just on my own doing it.”
        i. Too hard/Unsuccessful- “For example, like plank, I couldn’t do that, so we modified that.”
        ii. Vulnerable- “It makes me feel docile, it makes me feel like I’m lesser. Like people can take advantage of me.”
        “That is it is not okay to be afraid.”
    b. Fitting in- “I think because it was a group, I was more encouraged to try because I would look bad if I didn’t.
    c. Uncomfortable with attention- “It’s kind of like the attention isn’t as on me as it is when it is a 1:1.”
    d. Physical problems- “the actual poses probably not because I do have really bad joints and stuff, and a lot of them are really hard for me to do.”

7. Structure:
    a. Process helpful: “That I got to tell everyone when I wanted to stop doing a pose.” (instruction)
    “Putting my one fear in the bowl and letting it go.”
    “Affirmation stories.”
    “Probably because I was learning by doing. I’m a lot more hands-on when I learn, and having people lecture me about mindfulness, it won’t really stay.” (nature of group)
    b. Process unhelpful: “The group was so small it was a little awkward.” (attendance issues)
    c. Process challenging: I’m differentiating this from above as something that was hard for them, but not necessarily in a bad way. In a way that could lead to growth. Often in relation to a theme that might feel challenging or something new and unexpected.
    “Trying not to feel awkward in certain situations.” (When we were doing things out loud related to assertiveness)

-(Strength) “That one was difficult for me because I don’t think of myself as a very strong person, physically, mentally, or emotionally.”
-“That one, that one was more faced around calming kids down, whereas this one, it made you think about things.”

d. Suggestions for future groups: “I think just reminding it before you start each like little individual session the whole group and just reminding that if you remember that if you’re ever uncomfortable, you can come out of the pose because I think that you get nervous.” (instructional)
-“I actually mentioned it to (client’s therapist and group co-leader) that I wished it was an all year-round thing.” (logistics)
- I think a Wednesday because Wednesday seems to be the day that’s the most stressful, and it’s right in the middle of the week. (logistics)

8. Individual factors
    a. Practicing or not practicing- whether or not clients practiced yoga or mindfulness outside the group
    b. Similarities/differences from individual therapy & group therapy
    c. Presence of new traumatic event

Appendix N. Qualitative Tables

Conventional Content Analysis Frequency Count.

Category: Group Themes.

ID	Safe	Bound	Strong	Assert	Power	Trust	Intuit	Support	Sum
D1	1		1					2	4
D2	2		1			2		3	8
D3	7		2	999		2		8	19
D4	6		2	999		4	1	4	17
H1	2	999	1	3	4	3		2	15
H2	1	2	2			3		999	8
H3	1	999	999	999	999	999	999	999	1
H4	2	1	1		999	999	999	1	5
H7	2	1	1		1	2	1	3	11
D5		2		1		3		1	7
D6	999	999	2		1	1	999	1	5
D7	3		2		999	1	999	999	6
D8	1	1	4			999	999	1	7
D9	1		2		999	5		2	10
H8	1	1	1			1		3	7
H9					999	999	999	999	0
H10	999	999	999	999		999		1	1
H11	999	999	999	999		1			1
IV									
H4	2		1	3				1	7
H7	1	3	4	3		2	1	5	19
H8	3	4	3	1		8		6	25
FN	8		3	4		1		10	26
Cat Tot	44	15	33	15	6	39	3	54	209

*H3 only attended the first session. 999 indicates a client was absent on the week of the theme in question and did not spontaneously report that theme in a subsequent week.
IV= Interview; FN= Field Notes.

Conventional Content Analysis Frequency Count.

Category: Key Components of Yoga.

ID	Pose enjoy -ed	Pose diffi -cult	Breath work enjoyed	Breath work difficult	Meditation enjoyed	Meditation difficult	Noth -ing hard	All enjoy -ed
D1	8	2					2	
D2	7	2					1	2
D3	17	5						
D4	8	2	3				2	
H1	3	3	2					
H2		1			2		1	
H3	1				1	1		
H4	8	4	3		1			
H7	3	2	3		1	2		
D5	13	4	3				2	
D6	11	3						1
D7	1	1	2	1				
D8	5						3	
D9	7	2	1	1		1		
H8	13	1	3		1	3		
H9	5		4		1	1		
H10		1				1		1
H11	1	1	1		1		1	
IV								
H4	3	2	1		4			
H7	2		1		3			
H8	2		2		7			
FN	6	1	4		3			
Sum	124	37	33	2	25	9	12	4

IV= Interview data; FN= field notes

Category: Individual Factors.

Participant	Practiced yoga	Practiced mindfulness	Indiv Tx Related	New Trauma During Group?
H4	No	Yes	No	Yes
H7	Yes, 3-4 times/week	Yes	Yes, helps with mindfulness	No
H8	Yes, 5 times/week	Yes	Yes, overlaps with DBT	No

Conventional Content Analysis Frequency Count.

Category: Emotions Experienced.

ID	Relax-ed	Tired	Positive Happy	Confid-ent	Balanced /Neutral	Total positive	Negative emotions/ sensations
D1	3		4			7	1
D2	5	2			1	8	
D3	7	2			1	10	2
D4	10		1			11	1
H1	7		4	1		12	4
H2			1		2	3	1
H3	2			1		3	
H4	3			1		4	1
H7	8	3		1		12	2
D5	11		4			15	
D6	2		2			4	1
D7	5		1			6	1
D8	6		8			14	
D9	6		1			7	1
H8	7		3	1		11	2
H9	3		1			4	1
H10			1			1	
H11	3		2			5	
IV							
H4	3					3	2
H7	4		3	2		9	1
H8	3		2	1	1	7	
FN	11	2	6			19	
Sum	145	9	44	8	5	175	21

IV= Interview data; FN= Field notes.