YOGA FOR YOUTH: THE EFFECTS OF YOGA ON MINDFULNESS IN HIGH-RISK ADOLESCENTS

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Abstract

Yoga has been demonstrated to have physiological and psychological benefits to young people and adults with a variety of psychological issues. Trauma-Informed Yoga (TIY) is tailored for people with sensitivity to triggers, by observing their boundaries and incorporating mindfulness to help them illuminate the mind-body connection. The purpose of this study was to analyze outcomes of TIY programs on measures of self-awareness and self-acceptance in youth between the ages of 13 and 24. The design of this study was a pre-test post-test comparison with nonequivalent groups on two assessments: the Child and Adolescent Mindfulness Measure - Short Form (CAMM) and the Avoidance and Fusion Questionnaire for Youth – Short Form (AFQ-Y8). Of the 102 participants who entered the study, 17 completed the study after two yoga classes and 34 completed the study after four yoga classes. Results showed no statistically significant improvements in scores on the CAMM or the AFQ-Y8 for any subgroup, although some patterns towards significance emerged. Several participants reported enjoyment and benefits of yoga. In conclusion, more research is needed to determine what factors make yoga interventions successful for high-risk youth.

Keywords: yoga, adolescents, mindfulness, self-awareness, self-acceptance, Child and Adolescent Mindfulness Measure, Avoidance and Fusion Questionnaire for Youth, Latino

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Chapter 1

Yoga for Youth: The Effects of Yoga on Mindfulness in High-Risk Adolescents

Yoga and its components of mindfulness and meditation have gained reputable standings in the complementary and alternative medicine (CAM) world as prevalent therapies used by American adults and increasingly by youth as well (Barnes, Bloom, & Nahin, 2008; Clarke, Black, Stussman, Barnes, & Nahin, 2015). The practice of yoga has infiltrated the Western world over the last 250 years (DeMichelis, 2004). Interest began as curiosity in Eastern traditions and then became a framework for physiology and self-help as introduced by B.K.S. Iyengar. It is currently an acknowledged method for fitness, health, stress management, and treatment for both physical and psychological conditions (DeMichelis, 2004; Strauss, 2004; White, 2009). Although many people participate in yoga secularly, the spiritual and disciplinary foundation upon which yoga is based is still at the core of modern practice. The goal of yoga as it is practiced today remains rooted in self-transformation; transformation of physical fitness and strength, health and wellness, mindfulness and self-awareness, and stress management. Yoga has been evidenced to alleviate physical symptoms, improve physiological system functioning (Atkinson & Permuth-Levine, 2009; Mahajan & Babbar, 2003; Markil, Whitehurst, Jacobs, & Zoeller, 2012; Sinha, Singh, Monga, & Ray, 2007; Telles et al., 2004) and improve psychological health (Atkinson & Permuth-Levine, 2009; Chapman, 2010; Hamilton, 2006; Markil et al., 2012; Streeter et al., 2007). Yoga also increases self-awareness and focusing of the senses (Carmody & Baer, 2008; Morley, 2001), leading to healthier coping skills (Frank, Bose, & Schrobenhauser-Clonan, 2014; Kabat-Zinn, 2011) and self-care practices (Christopher, 2006; Herrick & Ainsworth, 2000).

Yoga has gained popularity, empirical support, and recognition as a practical science for use with adults (Bhavanani, 2012; van der Kolk et al., 2014), thereby, interest has grown for its application to children and adolescents. Currently, Cognitive Behavior Therapy (CBT) is the primary evidence-based therapeutic technique employed in the treatment of anxiety, depression, behavior problems, and trauma in children and adolescents (Harborview Medical Center, 2013). CBT supports the mind-body connection with the linkage between thoughts, feelings, and behaviors. Emotion regulation and distress tolerance are skills taught by CBT therapists to children that directly utilize yogic breathing skills, progressive muscle relaxation, body scans, and guided imagery. Swick, Knopf, Williams, and Fields (2013) highlighted the importance of experiential treatment for children learning stress management, such as practicing relaxation and coping skills, thereby actively engaging in self-regulation. These experiential methods can be best achieved in non-traditional modalities of therapy, which has prompted CAM research for children. In 2002, the American Academy of Pediatrics established the Task Force on Complementary and Alternative Medicine to educate providers and patients, develop resources, establish legal and ethical boundaries, and expand utilization (Kemper, Vohra, & Walls, 2008). Yoga, including the elements of relaxation, meditation, and visual imagery, is in the category of mind-body medicine (Kemper, Vohra, & Walls, 2008). In a review of CAM therapeutic techniques used by children in the US, Ndetan, Evans, Williams, Woolsey, and Swartz (2014) found that of the children using movement therapies, 82.2 percent were using yoga; of the children using relaxation therapies, 73.8 percent were using deep-breathing exercises and 34.3 percent were using meditation. Anxiety and stress combined was the highest reported

reason for children to seek movement and relaxation therapy; 31.4 percent of children utilized movement therapy and 41.4 percent utilized relaxation techniques for stress and anxiety (Ndetan et al., 2014). While the use of yoga and mindfulness techniques with young people is on the rise, more research is needed on specific programs that utilize yoga and mindfulness as an alternative method of treatment to ensure positive outcomes and effectiveness of these programs.

The Practice of Yoga

Yoga. "Yoga" is derived from Sanskrit root meaning to yoke or bind, to direct attention to, and to create union between the mind, body, and soul (Iyengar, 1976). Traditionally, the goal of yoga practice is the disciplinary attainment of spiritual and physical painlessness, or conversely, happiness that is not conditioned by either painful or pleasant experiences (Kaur, 2010). This type of happiness can counteract negative internal or external experiences through the action of observation without judgment, acceptance, and peace. Despite a common misunderstanding that yoga operates in aloneness and introspection, it conceptualizes the fundamental value of interdependence amongst all living things, "thus upholding organic continuity, balance and integration within the natural and social world" (Whicher, 1995, p. 51). Of the eight stages of yoga experience identified by Iyengar (1976), there are five that resonate with modern practice and are not bound by religious values.

Asanas or postures. Yogis believe that steadiness of the body creates mental equilibrium. There are over 200 postures and multiple variations of each, thereby exercising every muscle, nerve, and gland in the body (Iyengar, 1976).

Pranayama or rhythmic control of the breath. Breathing and emotionality are seen as interrelated. When a person is emotionally stimulated, breathing patterns are affected; therefore breath control can regulate emotional reactions (Iyengar, 1976). Controlling the breath involves inhalation, exhalation, and retention of air with full or empty lungs, at a steady pace. Strengthening of the respiratory tract in this way has many physiological and psychological benefits such as reducing the flight-or-fight response in children with disruptive behavior (Jensen, Stevens, & Kenny, 2012), improving cardiovascular efficiency and parasympathetic activity in adults (Harinath et al., 2004; Markil et al., 2012), reducing PTSD and depressive symptoms in tsunami survivors (Descilo et al., 2010), and increasing cerebral blood flow that stimulates brain functioning and learning (Mahajan & Babbar, 2003). Breath control is foundational to yoga practice because of the balance achieved between the sympathetic and parasympathetic nervous systems, regulating autonomic activity.

Pratyahara or freeing the mind from domination of the senses and exterior objects. Hindu philosophy has stated that humans have three qualities to their senses; the illuminating good quality, the dark and restraining quality, and the activity or energy that stands between (Iyengar, 1976). As yoga practitioners learn to equalize the mind through steadiness of postures and regulated autonomic control of the breath, they are able to understand which qualities of their senses underlie their thoughts and actions. Through this understanding, yoga practitioners gain energy to eradicate negative thoughts and actions, permitting a more positive state of mind (Iyengar, 1976).

Dharana or concentration. This element, when paired with pratyahara, most equates to the practice of mindfulness. Dharana recognizes that the brain utilizes

classification and judgment as tools to make sense of the environment and internal world, yet this process is exhausting and often dysfunctional (Iyengar, 1976). The mind cannot focus on a single task without being stilled, and without concentration one cannot achieve mastery. Once the previous stages are accomplished, this type of concentration can transpire.

Dhyana or meditation. This is the uninterrupted flow of concentration achieved in dharana. The body, breath, senses, mind, reason, and ego become integrated into a state of consciousness with no characteristics, simply a state of being (Iyengar, 1976). Dhyana is an active meditation that does not turn off consciousness. It is like sleep, but calms and integrates consciousness with all other elements of the mind and body. Accomplishing this calmness and continued concentration exercises the mind by controlling thoughts, feelings, and actions more effectively. The mind without training, however, is unruly and oppositional (Rama, 2014). Mantras, or repeated words or phrases, are used to help people concentrate on one thought while quieting all other brain activities. In a therapeutic setting, mantras represent alternative positive thoughts that help people eradicate persistent negative thoughts. Especially with children, mantras can be statements of self-empowerment, such as "I am strong!" or "I'm not afraid!" This type of introspection retrains the mind to abstain from adopting a self-perception according to what *others* say or imply about one's self and state of being, and instead establish a self-schema that is authentically based on what one's mind and body truly are (Morley, 2001).

Chakra. Chakra is an additional experience that can be achieved during yoga, yet it is more rooted in the physiological and biological level than the psychological and spiritual level. Chakra is a term used to describe the physiological effects that are felt

throughout the body during postures and meditation. It is considered a type of energy that has been found to exist at the neuronal level, released through synaptic activity, most commonly through the autonomic nervous system (Maxwell, 2009). Chakra energy also exists in the central nervous system as hormones released in the endocrine system and in the frontal cortex and limbic system of the brain, which is known to manage pain and create a sense of pleasure in the body and mind (Maxwell, 2009). In yoga practice, this state is called vrittis, or metal soundness, and is directly related to the perceived ability to manage emotional and cognitive states. Through continued practice, people can activate the release of hormones in the endocrine system more efficiently and achieve mental soundness in the central nervous system, calming the body through the autonomic nervous system (Maxwell, 2009). In adolescents especially, the prefrontal cortex of the brain is immature, so much of decision-making and risk assessment takes place in the limbic system – the emotion and aggression center of the brain (Pharo, Sim, Graham, Gross, & Hayne, 2011). This immaturity leads to more risk-taking and emotionally charged behaviors. For adolescents with behavior disorders or traumatic experiences, this finding is even more pronounced (Pharo et al., 2011). Learning how to regulate frontal cortex and limbic activity by controlling chakra energy is a key benefit to young people achieved through yoga meditation and postures.

According to Hindu philosophy, the body is the vehicle through which the spirit achieves peace and happiness by controlling and nurturing the mind. Through yoga practice, chakra energy connects the mind and body while improving one's sense of spirit. The mind, body, and spirit are interconnected; therefore one cannot be improved without engagement of the others (Iyengar, 1976).

The Practice of Mindfulness

Mindfulness is the mental action of yoga whereas postures are physical. Although some believe that mindfulness, meditation, and yoga are competing principles on a religious spectrum, others see them as highly collaborative mechanisms used for achieving focus, relaxation, and heightened presence that, under this united front, could provide holistic treatment in healthcare, education, and public safety (Bose, 2011). Jon Kabat-Zinn (2011), a yoga instructor and scholar, fathered the movement of mindfulness as a therapeutic intervention for people with physical and psychological illness. He is an advocate for taking the advantages of yoga practice, namely mindfulness, wakefulness, and compassion, and disseminating them to suffering people who may not have been introduced to yoga otherwise due to religious or cultural boundaries. In 1979, Kabat-Zinn established the Stress Reduction clinic, whose practice later became known as mindfulness-based stress reduction (MBSR). MBSR is based on the definition of mindfulness that is moment-to-moment, non-judgmental awareness of the ongoing stream of internal and external stimuli as they arise (Baer, 2003; Germer, 2005; Kabat-Zinn, 2011). Kabat-Zinn (2011) clarified that the term "non-judgment" does not imply a mindset in which judgments are no longer made because this is the basis of how the brain operates. Brains are hardwired to make constant judgments and appraisals of the internal and external world. Instead, Kabat-Zinn (2011) stated that people have the choice to withhold judgment from a feeling or experience, such as perceiving something to be pleasant, unpleasant, or neutral, and can instead choose to simply observe it as it is. This type of mindful observation breaks the cycle of negativity by offering awareness with acceptance, no matter what that experience is (Kabat-Zinn, 2011). In Kabat-Zinn's (2011)

own words, this meant practicing "awareness of the present moment and acceptance of things as they are, however they are in actuality, rather than a preoccupation with attaining a particularly desired outcome at some future time, no matter how desirable it might be" (p. 290). An integral piece to this process is letting go of what one does not know and what one cannot control. Being present in the moment is surrender from the desire to know and control (Fulton, 2005), which is often the opposite of what people are taught, especially in Western cultures. America's individualistic culture generates a worldview of self-reliance and independence beginning in early childhood, and promotes the sharing of positive emotions, but discourages expressing negative emotions with one another (Hofstede & Hofstede, 2005). These cultural standards are counterintuitive to healing from illness and suffering, which propelled Kabat-Zinn's desire to propagate the benefits of yoga and mindfulness (Kabat-Zinn, 2011).

History and Research on Mindfulness and Yoga

Mindfulness. MBSR and mindfulness-based psychotherapies have had a reputable footprint in therapeutic interventions since their origins in the late 1970s, but not without skeptics along the way. Psychoanalysts in the 1930s, including Sigmund Freud, thought that Buddhist psychology, namely meditation, was regressive and artificial (Germer, 2005). Carl Jung and Karen Horney on the other hand, took a deep interest in Eastern philosophy, and by the 1960s many practicing psychotherapists were utilizing meditation in their clinical work (Germer, 2005). By the mid 1970s, the American Psychiatric Association began investigating the effectiveness of meditation, which led to the sponsorship of mindfulness meditation, upon which Kabat-Zinn's MBSR program is based. MBSR has been empirically studied and has shown significant

improvements in psychological symptoms and stress management for adults (Baer, Carmody, & Hunsinger, 2012; Evans, Ferrando, Carr, & Haglin, 2011; Nyklíček, Mommersteeg, Van Beugen, Ramakers, & Van Boxtel, 2013), college students (Zeidan, Johnson, Gordon, & Goolkasian, 2010), and adolescents (Biegel, Brown, Shapiro, & Schubert, 2009; Sibinga et al., 2011). Mindfulness-based therapeutic interventions are now commonplace in CBT (Claessens, 2010), dialectical behavior therapy (DBT; Perroud, Nicastro, Jermann, & Huguelet, 2012), and in self-care practices that mental health professionals use themselves (Richards, Campenni, & Muse-Burke, 2010). However, the main difference between CBT and MBSR is that CBT supports making judgments on what thoughts are rational and logical versus those that are not, and then replacing the irrational thoughts with thoughts that are more realistic. Conversely, MBSR encourages the acceptance of all thoughts and feelings without judgment, increasing cognitive flexibility (Smith et al., 2008). This type of acceptance is particularly helpful for people who are suffering from things that are difficult to control, such as chronic illness or stressful life events. Kabat-Zinn (2011) first practiced MBSR with chronically ill and very sick populations in hospitals, where many people were depressed, in pain, and had a negative self-view. Over the last 30 years, research on mindfulness and meditation has demonstrated positive effects for patients with chronic pain (Kabat-Zinn, Lipworth, & Burney, 1985), anxiety (Kabat-Zinn et al., 1992; Hamilton, 2006), and depression and subsequent psychological symptoms (Smith et al., 2008; Teasdale et al., 2002). By 2000, MBSR had been implemented in 240 health care clinics in the US and internationally (Kabat-Zinn, 2000).

Yoga. Research on yoga has progressed over the last four decades as well. According to a meta-analysis by Arpita (1990), Hatha yoga, which focuses on postures and breathing, has shown an empirical progression over the twentieth century, from beginning as a medical and fitness curiosity, to being embraced for its physiological and psychological benefits in the late 1980s. The popularity of yoga practice has nearly doubled in use by adults since 2002, now reaching 21 million people 18 years of age and older (Clarke et al., 2015). Approximately 400,000 more 4 to 17 year olds are engaged in yoga today than in 2002, up to 1.7 million children in America (Black, Clarke, Barnes, Stussman, & Nahin, 2015). Research on the physical, physiological, and psychological benefits of yoga continues to grow as well. For example, Cramer, Lauche, Langhorst, and Dobos (2013) reviewed 12 randomized control trials (RCTs) which demonstrated moderate, short-term improvement of depressive symptoms with meditation-based yoga specifically when compared to usual therapeutic and medicinal treatment, and significant yet limited improvement when compared to relaxation and aerobic exercise. Skowronek, Mounsey, and Handler (2014) reviewed 23 RCTs on yoga for depression and anxiety, and determined that in studies of moderate to high quality designs, depression and anxiety were found to be significantly reduced. Verrastro (2014) summarized findings of RCTs demonstrating benefits of yoga for physical problems (back pain, menopause, asthma, hypertension, balance) and psychological problems (depression, anxiety). Although these studies have involved adult participants, other mindfulness-based interventions with yogic qualities have been deemed appropriate for use with young people as well, but are often adapted to be based in art, metaphor, and imagery (Coholic, Eys, & Lougheed, 2012; Feldman, 2005). Drawings and imagery can help young people

shape their bodies into poses (Feldman, 2005). Metaphors are useful to help children visualize positive thoughts and safely explore their feelings, especially when they do not yet have the vocabulary to articulate their personal experiences (Holyoake, 2013).

PTSD and Trauma-Informed Yoga

Trauma-sensitive yoga (TSY), or trauma-informed yoga (TIY) as it is commonly called, was established in response to the growing empirical evidence of yoga's effects on physiological and psychological symptoms, many of which are experienced by people with Posttraumatic Stress Disorder (PTSD; Emerson, Sharma, Chaudhry, & Turner, 2009). Lifetime prevalence of PTSD in America is 7.8 percent for all adults, and women (10.4 percent) are twice as likely as men (5 percent) to meet criteria for PTSD at some point in their lives (Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; PTSD, 2013). However, the likelihood that American adults will experience a traumatic event over the course of their lifetime is much higher; 60.7 percent of men and 51.2 percent of women have reported experiencing at least one traumatic event in their lives (PTSD, 2013). The need for PTSD treatment is evident, yet the cost of treatment of PTSD, and frequently co-occurring depression, is very high. Kilmer, Eibner, Ringel, and Pacula (2011) analyzed the cost of treating PTSD and co-occurring depression in over 260,000 American soldiers deployed in June 2008. The total social cost for this group, which included cost of treatment, cost of lost productivity, medical costs of suicide, and value of lives lost due to suicide, was estimated at $923 million; only half received treatment upon their return, one-third of which received evidence-based treatment (Kilmer et al., 2011). According to Kilmer et al. (2011), if 100 percent of those receiving treatment had evidence-based treatment, there would be a 15 percent cost savings, which still values the cost of

treatment as high. There is a pronounced demand for cost-effective supplemental treatment for people who have suffered trauma, which has further propelled the research around yoga for PTSD symptoms. Likewise, researchers at the Trauma Center Yoga Program at the Justice Resource Institute in Brookline, Massachusetts have conducted multiple studies and trained their own yoga-informed therapists to develop trauma-informed yoga (TIY) classes in accordance with qualitative and quantitative feedback from participants (Emerson et al., 2009). The main principle of TIY is that symptoms of PTSD, and many other mental illnesses, affect the body, mind, and spirit; therefore all three must be holistically targeted during treatment (Emerson et al., 2009). PTSD symptoms generally fall into four categories: re-experiencing the traumatic event through flashbacks or nightmares; avoiding internal (thoughts and feelings) or external (people, places, and things) reminders of the traumatic event; negative alterations in cognitions or mood; and hyperarousal (American Psychiatric Association, 2013). TIY was designed to teach its students self-regulation skills to manage these symptoms in a safe, non-judgmental environment. TIY instructors are trained to use invitatory language, as opposed to instructional language, to guide the class through stretches and poses, and to offer optional postures for students that let them have control over their body and experience in the class (Emerson et al., 2009). Because yoga heightens bodily awareness, a necessary process for relearning healthy emotion regulation and tolerance (van der Kolk et al., 2014) many trauma survivors may initially be more susceptible to triggers while engaging in certain postures. However, practicing yoga postures is seen as way to observe one's bodily experience and detach the stress response from physical sensations that many trauma survivors experience (van der Kolk et al., 2014). For these reasons, the

respect of the participant's pace and freedom of choice in yoga practice are important features of TIY.

As of 2012, TIY was offered in 28.8 percent of Department of Veteran Affairs (VA) specialized PTSD treatment programs as an alternative way to reduce symptoms because of the high attrition rate in traditional treatment programs (Libby, Reddy, Pilver, & Desai, 2012), and is currently on the rise. TIY is also used to address the hypervigilant and aggressive symptoms that many veterans experience (Pollack, 2010; Staples, Hamilton, & Uddo, 2013). Additionally, TIY has been shown to improve sleep and reduce daytime dysfunction (Staples et al., 2013), and to help veterans regain self-control and self-regulation (Stankovic, 2011). In a qualitative investigation on TSY and treatment-resistant chronic PTSD in adult women, West, Liang, and Spinazzola (2016) identified five themes that emerged from the participants' experience with yoga. They were grace and compassion, relation, acceptance, centeredness, and empowerment, now called GRACE (West et al., 2016). Therefore, yoga has been shown to benefit trauma survivors in physiological, behavioral, and psychological ways.

Young people are also susceptible to experiencing traumatic events. As many as two-thirds of American youth have had a traumatic experience by age 16 ("Psychosocial plus Pharmacologic Treatments," 2013), and approximately 5 percent of adolescents meet criteria for PTSD (U.S. Department of Health and Human Services, 2013). Common features of complex trauma symptoms in children and adolescents are difficulty forming attachments and building trust, disrupted self-regulation, and stunted development in sense of self (Cook et al., 2007; Longaker & Tornusciolo, 2003). Not only can PTSD have a negative impact on children and adolescents while they are young, it can affect

them well into adulthood. Van der Kolk et al. (2007) discovered that treating "adult-onset" PTSD with Eye Movement Desensitization and Reprocessing (EMDR) was more successful than treating childhood-onset trauma in adults. They concluded that their EMDR intervention "was not enough to resolve longstanding trauma imprints and adaptations" (van der Kolk et al., 2007, p. 8). The longer trauma survivors go without treatment, especially if the trauma was experienced in childhood, the more entrenched the unhealthy coping mechanisms seem to become. In fact, growing up in adverse living environments, if severe enough, can alter brain development, leading to greater risk for mental illness in adolescence and later in life (McLaughlin, Zeanah, Fox, & Nelson, 2011). Childhood maltreatment has also been linked to chronic pain in adulthood, implying that those who have been traumatized may have poorer adjustment to pain than those who have not been victimized (Sansone, 2010). Parental substance abuse, one of the most frequent reasons for children entering foster care, negatively affects children well into later childhood and adolescence (Minnes, Lang, & Singer, 2011), and may actually be a stronger risk factor for children attempting suicide later in life than parental divorce and parental suicide attempts (Alonzo, Thompson, Stohl, & Hasin, 2014). Due to the prevalence of childhood trauma and the importance of timely intervention, yoga has been adapted for use with traumatized and behaviorally challenging young people as well (Emerson et al., 2009; Lilly & Hedlund, 2010; Longaker & Tornusciolo, 2003; Spinazzola, Rhodes, Emerson, Earle, & Monroe, 2011). Another important aspect of TIY is the emphasis on a "no-talk" therapeutic experience. When children are expected to verbally describe their thoughts and feelings, especially relating to trauma, it may cause anxiety because they are unable to find the appropriate words (Longaker & Tornusciolo,

2003). TIY provides traumatized children with a way to develop relationships with the yoga instructor and fellow classmates, relieve stress, and build self-awareness. Compared to psychotherapy, yoga offers psychosomatic pleasure that is soothing to many young people and adults alike, and combines self-reliance with attachment to the instructor in a safe, less vulnerable way (Chapman, 2010). Yoga is a natural complement to first line treatment methods for dealing with childhood trauma such as Trauma-Focused CBT (TF-CBT). Both yoga and CBT utilize mindful self-awareness of physical and emotional feelings. The cognitive restructuring, which is a main focus of TF-CBT, occurs during yoga through the slowing of thoughts and self-regulation (Gould, Dariotis, Mendelson, & Greenberg, 2012). Yoga is a safe way for young people to experience the multi-sensory and bodily integration that is necessary for healing from trauma.

Physiological Effects of Yoga

If mindfulness is considered conscious awareness, then yoga is considered mindfulness of the body (Germer, 2005). Physiologically, breathing is one of the human body's primary life sources, and is the one basic, essential function over which humans share autonomic and voluntary control (Kaminoff & Matthews, 2012). Therefore, achieving control of the breath is the gateway to voluntarily controlling one's autonomic responses, thus stimulating the parasympathetic nervous system (Mahajan & Babbar, 2003). Breathing represents the fluidity between internal and external domains, embodying the interconnectedness humans have with nature (Morley, 2001). Symbolically, the breath serves as a reminder of how easy it is to absorb and expel many things in the environment (Morley, 2001). Heart rate, which is more difficult to voluntarily control, is often felt but not noticed by people until they are asked to do so in

yoga or progressive muscle relaxation. Comparatively, Delizonna, Williams, and Langer (2009) found that people were able to relax their heart rate during meditation by mindfully attending to its fluctuations, because the heart, much like the breath, has a fluctuating rhythm. Delizonna et al. (2009) concluded that when participants were able to accept the fluctuating changes in their body, they achieved a greater sense of calmness, thereby improving their self-regulation skills. When these physiological effects are paired with the symbolic perspectives of breathing and acceptance of bodily changes, yoga practitioners have a multi-sensory experience of calmness, which becomes a key coping skill outside of therapy.

While yoga calms the body, then subsequently calms the mind; meditation calms the mind, then subsequently calms the body. Telles et al. (2013) investigated the physiology behind meditative focusing (dharana) and meditative defocusing or effortless meditation (dhyana), compared to random thinking and nonmeditative focusing. Meditative focusing is similar to the mindfulness activity of body scan, in which the practitioner is consciously observing parts of the body from head to toe while omitting all other thoughts during that time. Effortless meditation is a subsequent state achieved after dharana during which the mind is quieted and subtle thoughts may flow through consciousness without attention given to them. In a study on healthy adults, Telles et al. (2013) found that during dharana, skin resistance increased, and dhyana produced autonomic changes in breath rate, heart rate variability, and skin resistance. In the two other cognitive states, random thinking and nonmeditative focus, changes in autonomic variables were inconclusive. This implies that during the deeper meditative state of dhyana, breathing was more regulated, heart rate variability was improved, skin

resistance increased indicating a decrease in sympathetic nerve activity to the sweat glands, and pulse volume increased indicating reduced noradrenergic sympathetic control over the cutaneous blood vessels (Telles et al., 2013). All of these physiological responses are indicative of relaxation and voluntarily achieved parasympathetic activation.

Yoga postures require muscle activation, balance, and concentration, intertwining the work of the mind and body, which has pronounced physiological and psychological effects. Although aerobic exercise has widely known benefits from the release of endorphins to achieving physical fitness, it has barriers such as physical ability and motivation. Netz and Lidor (2003) found that for mood alterations, mindful low-exertion rhythmical movements had greater immediate impact on improving mood than non-mindful high-intensity rhythmical movements. In yoga, rhythmic movements are attained by holding and flowing through postures. The purpose of flowing through postures is to explore the body's range of motion, thereby releasing pent up tension retained by the body throughout the day, and providing a sensation of relief and liberated energy (Kaminoff & Matthews, 2012). Yoga postures are meant to reach muscle groups that are often missed in everyday activity, which increases blood flow to more regions of the body, releasing deeper tension and increasing vitality of the brain and body (Kaminoff & Matthews, 2012). Similarly, studies have shown that yoga increases antioxidant levels, regulates oxidative stress (Sinha et al., 2007), improves cardiac vagal tone (Khattab, 2007; Streeter, Gerbarg, Saper, Ciraulo, & Brown, 2012), and improves heart rate variability (Khattab, 2007).

The neurotransmitter GABA is commonly known as an inhibitor in negative feedback loops to stress, turning off the stress response to a perceived stressor (Freberg, 2010). In people with depression, anxiety, PTSD, and chronic pain, GABA levels are often low, causing the sympathetic nervous system to be overactive and the parasympathetic nervous system to be underactive (Streeter et al., 2012). GABA activity has been shown to increase after yoga sessions in healthy adults compared to non-active control participants (Streeter et al., 2007). GABA levels, mood, and a sense of tranquility have also been shown to increase, while reports of exhaustion and situational anxiety decrease, in a yoga group compared to a walking group of adults (Streeter et al., 2010). These findings implicate the improvement of physiological and emotional symptoms of depression, anxiety, and PTSD through GABA activity and the calming of the sympathetic nervous system (Streeter et al., 2012).

The physiological benefits of yoga have been studied in young people as well. Because of the close connections between the core muscles and internal organs, yoga has provided relief to children with Irritable Bowel Syndrome (Evans, Cousins, Tsao, Sternlieb, & Zeltzer, 2011). Yoga has also helped disabled children with low muscle tone (Cooper, 2010), children with asthma (Bray et al., 2012), and children with chronic pain (Tsao, Meldrum, Kim, Jacob, & Zeltzer, 2007). Body image has also been an increasing concern in children for decades, for which yoga has been demonstrated as a beneficial intervention (Clance, Mitchell, & Engelman, 1980). Societal and parental pressure to meet body image norms are considered potentially harmful to young people's self-concept, because children who have been criticized for their bodies by others often come to criticize themselves, developing "an anxious reaction toward many physical activities

and have habitually withdrawn from [parental and peer] interaction" (Clance et al., 1980, p. 84). To demonstrate, Clance et al. (1980) evaluated African-American third-graders with low body satisfaction who were given yoga and awareness training three times a week for four weeks, and found that they had significant improvements in satisfaction of body parts and bodily processes as compared to a control group. This yoga program intended to change behavioral-motor habits through kinesthetic experimentation in a safe, accepting environment, rewiring feelings towards the body from shameful to satisfied (Clance et al., 1980).

Yoga can also be approached as a lifestyle change, which includes a dietary component of healthy and timely eating, frequent practice, and dedicated application of mind-body wholeness (Bhavanani, 2012). Through this lens, yoga has been found to promote weight loss and improvement of body composition, having implications for supplementary treatment for people with obesity as well (Rioux & Ritenbaugh, 2013). In like manner, Carei, Fyfe-Johnson, Breuner, and Brown (2010) found yoga to be a positive supplementary intervention for adolescents with eating disorders by decreasing food preoccupation and symptoms of anxiety and depression. Through the mind-body connection, people with eating disorders can learn to reshape their mindset and bodily experience to one of nourishment, acceptance, and wholeness (Douglass, 2011). The experiential engagement of yoga helps practitioners learn new physical coping skills while simultaneously experiencing direct psychological outcomes by retraining their brains to react more calmly to various daily experiences.

Psychological Effects of Yoga

The psychological effects of yoga are derived from the physiological experience that takes place in the body, and are arguably the most influential outcome of yoga practice. While many people engage in yoga for the physical benefits, yoga has a significant impact on psychological symptoms as well.

For example, in middle-aged adults with partial remission of depression, mood assessments showed immediate decreased negative moods, increased positive moods, and increased energy and arousal after yoga sessions (Shapiro et al., 2007). However, Shapiro et al. (2007) noted that those who benefitted from yoga had pre-intervention autonomic differences compared to those who did not benefit, suggesting that depressed patients should be assessed accordingly to determine who would make an appropriate candidate for yoga classes. In this case, adults (Shapiro et al., 2007) as well as children (Gould et al., 2012) with mild to moderate levels of depression may be better candidates for a yoga intervention than those with more severe depression. Similarly, Woolery, Myers, Sternlieb, and Zeltzer (2004) found that young adults with mild depression had significant improvements in mood after a five-week yoga intervention, formulated specifically with strengthening and empowering poses such as backbends and poses that open the chest, known to counter the slumped body shape associated with depression. Although heightened levels of cortisol throughout the day are associated with greater stress levels, a specific spike of cortisol in the morning is associated with self-esteem and tenacity (Woolery et al., 2004). In these participants, there was a trend toward a significant increase in morning cortisol levels following the yoga intervention as well (Woolery et al., 2004).

Effects of yoga on anxiety and stress children and adolescents. Additionally, yoga and mindfulness have been adapted for use with many child and adolescent populations as preventative measures, health promotion, and for use in school-based programs as more research evaluates their empirical value (Greenberg & Harris, 2012). For example, a study on anxious pre-teens followed a 15-week yoga and relaxation school-based intervention that found significant decreases in aggression, anxiety, helplessness in school, physical complaints, and an increase in emotional balance and stress coping (Stueck & Gloeckner, 2005). At the three-month follow-up, decreases in anxiety and increases in emotional balance were maintained, and decreases in impulsiveness and shyness were significant (Stueck & Gloeckner, 2005). In adolescent musicians (Khalsa, Butzer, Shorter, Reinhardt, & Cope, 2013) and young professional musicians (Khalsa, Shorter, Cope, Wyshak, & Sklar, 2009), yoga was also found to reduce performance anxiety, improve overall mood, and increase feelings of improvement in musical ability. An important element to these studies is that the young people were able to take the skills they learned in yoga and apply them to multiple domains, such as school, home, the music classroom, and the concert hall.

Other studies have been conducted on the applicability of yoga in school settings (Jensen & Kenny, 2004; Khalsa, Hickey-Schultz, Cohen, Steiner, & Cope, 2012; Mehta et al., 2011; Mendelson et al., 2010; Peck, Kehle, Bray & Theodore, 2005; Powell, Gilchrist, & Stapley, 2008; Steiner, Sidhu, Pop, Frenette, & Perrin, 2013). Mendelson et al. (2010) assessed the feasibility of applying a yoga and mindfulness intervention to urban youth living in poverty and high-stress environments, and found that of the 97 participants, only 3 dropped out of the 12-week program due to unrelated injury or school

transfer, and 73.5 percent of them completed at least 75 percent of the intervention classes, implying that yoga was well received amongst the young participants. Mendelson et al. (2010) also measured cognitive and behavioral outcomes and found that rumination, intrusive thoughts, and emotional arousal were significantly improved. Scores on impulsive action, physiologic arousal, depressive symptoms, and negative affect showed trends towards significant improvement (Mendelson et al., 2010). In another study on seventh-grade students, a yoga education class was compared to a physical education (PE) class over the course of one semester on measures of anger management, resilience, and fatigue/inertia (Khalsa et al., 2012). Interestingly, the resilience measure showed an insignificant increase in the yoga group, yet a significant decrease in the PE group. There was a significant difference between groups on an anger management scale; the yoga group showed improved scores whereas the PE group worsened. Lastly, there was a significant improvement on fatigue/inertia in the yoga group and a significant deterioration on this measure in the PE group. Khalsa et al. (2012) determined that their yoga intervention (www.yogaed.com) not only fit the school curriculum requirements for physical education, but it had multifaceted benefits to the students.

Effects of yoga on ADHD in children and adolescents. School-aged children with Attention Deficit Hyperactivity Disorder (ADHD) have also been studied as potential beneficiaries of yoga intervention. In one study on adolescent boys, yoga supplementary to pharmacological intervention was compared to a pharmacological intervention alone (Jensen & Kenny, 2004). Although teacher ratings were insignificant after the yoga series, parent ratings on oppositional behaviors and emotional dysregulation such as mood swings, crying fits, temper outbursts, restlessness, and

impulsivity, all significantly decreased (Jensen & Kenny, 2004). In another study, a low-cost method of implementing yoga for children with ADHD was evaluated for potential use in developing countries. It involved training high-school student volunteers to lead younger students with ADHD in yoga practice and play therapy (Mehta et al., 2011). Over half of the students showed measureable improvements in academic and behavioral performance, 90.5 percent had significantly improved performance impairment scores, and 39.1 percent of children had parent and teacher ratings on the Vanderbilt Child Behavior Questionnaire that entered normal ranges (Mehta et al., 2011). Similarly, for ten undiagnosed first- through third-grade children with attention problems, just one yoga session was observed to produce positive effects on on-task behavior in the classroom (Peck et al., 2005). Not only are yoga and mindfulness easy for children to learn, they are enjoyable activities which help children with attention problems to have better focus and more control over their behaviors (Hariprasad, Arasappa, Varambally, Srinath, & Gangadhar, 2013).

Effects of yoga on more severe issues in children and adolescents. Yoga interventions have also shown promising outcomes for use with children who have more serious behavioral and emotional dysregulation problems (Steiner et al., 2013). For instance, a yoga-cognitive training class, which focused on yogic self-discipline and adjusting irrational beliefs and misinterpretations of stimuli, showed similar results for Indian adolescent boys with deviant behavior when compared to group therapy that included human relationship training (Kannappan & Bai, 2008). Both classes showed a significant decline in maladjustment and antisocial behavior at post-assessment and follow-up, indicating that the yoga-cognitive class was equally as successful as the

human relationships group therapy (Kannappan & Bai, 2008). In another study on children with emotional, behavioral, or learning difficulties, a Self Discovery Program was implemented which involved teaching practical skills of yoga, positive touch with peers, breathing, and relaxation (Powell et al., 2008). When compared to a control group, these children had significant improvements in self-confidence, social confidence with teachers, communication with peers and teachers, and contribution in the classroom (Powell et al., 2008). Yoga has also been studied with autistic children, based on the hypothesis that a highly sensory-based approach would be helpful to their unique sensory processing (Ehleringer, 2010; Rosenblatt et al., 2011). In one pilot study, children aged five to twelve had significant beneficial changes in externalizing and internalizing behaviors. Rosenblatt et al. (2011) concluded that the highly sensory-based intervention was useful in regulating some core behavioral features of autism, particularly in school-aged children and those with greater sensory awareness. Staples, Abdel Atti, and Gordon (2011) also applied a yoga and mindfulness training program to children and adolescents from the Gaza Strip with severe PTSD symptoms. Reports of PTSD symptoms, depression, negative self-esteem, and hopelessness had significantly improved, even at the seven-month follow-up assessment (Staples et al., 2011). These improvements were demonstrated at post-intervention and follow-up despite continued conflict in the Gaza area. Therefore, these children were able to self-regulate and cope with persistent stress after learning how to utilize the mind-body skills (Staples et al., 2011).

Effects of yoga on children and adolescent offenders. Yoga has also been evaluated for use with incarcerated youth and youth offenders. Derezotes (2000) was one of the first researchers to qualitatively evaluate a yoga and meditation intervention for

adolescent sex offenders. Participants reported benefitting from the class in managing anger, feeling relaxed, sleeping better, and feeling welcomed in a group instead of ostracized. All but one participant reported having increased self-awareness regarding their thoughts and feelings, and had greater self-control and focus on important things in their lives (Derezotes, 2000). Most participants identified stress and anger as triggers to commit their initial offenses and to reoffend, yet none of the participants reoffended during the nine months of intervention (Derezotes, 2000). Similarly, Ramadoss and Bose (2010) brought a Transformative Like Skills (TLS) program that included yoga, breathing exercises, and meditation, to over 200 residents in a juvenile hall. After 18 months, participants showed significant reductions in perceived stress and increases in self-control. Then, to evaluate preventative strength of TLS, Ramadoss and Bose (2010) offered the program to urban high school students, a third of whom qualified for free-or-reduced lunch. After 18 weeks, perceived stress was slightly yet significantly reduced, and self-control scores continued at an already high level. Ramadoss and Bose (2010) concluded that TLS may be promising for high-risk youth in promoting stress management and resilience. Berger, Silver, and Stein (2009) found similar benefits of yoga on negative behaviors, wellbeing, and self-regulation in inner-city fourth and fifth-graders.

Overall, yoga and mindfulness have been demonstrated as feasible interventions for children with mental health and behavioral concerns and as a way to cope with stress and debilitating symptoms. Yoga empowers young people to have better self-control and self-awareness while mastering new skills with their bodies. It has also been beneficial to high-risk youth as a preventative measure, keeping resiliency high in young people facing

many risk factors. Yoga and mindfulness appear to be promising for therapeutic effects in many young people (Galantino, Galbavy, & Quinn, 2008; Kaley-Isley, Peterson, Fischer, & Peterson, 2010).

Adapting Yoga Programs for Children

Yoga has been adapted for children in multiple ways. While not all styles of yoga practice are suitable for children, the general focus is on the connection of breath and posture, and self-observation without judgment, instead of perfecting postures through intense discipline (White, 2009). Lilly Robold (2002) established Breathercise in 1991 as a yoga intervention for aggressive youth, which has since evolved into an Integrative Arts therapy program incorporating yoga and art therapy for emotionally impaired children. Robold (2002) found improved stress management in program participants. Heidi Feldman (2005), an MD and PhD in Developmental Psychology, also developed a yoga program for school-aged children as a means of coping with the demands of school and family, building on the children's acquisition of skills during typical development. Feldman (2005) referenced Erik Erikson's (1950) psychosocial stage of development for this age group, Industry vs. Inferiority, as the foundation for the success of this program. Between the ages of six and twelve, children learn to be competent students by mastering new skills and learning new information while competing in a classroom environment. A dangerous cycle of failure and low self-efficacy can ensue if children struggle to achieve to the degree expected by teachers and parents (Feldman, 2005; Hagen & Nayar, 2014). To counter this negative cycle, yoga can be used to "increased body awareness and physical control, improved mental concentration, enhanced sense of competence and confidence, and a deep sense of inner harmony and peacefulness while having fun"

(Feldman, 2005, p. 88). Yoga with children shares several philosophies as yoga for adults, such as inclusion, natural energy and flow, body-mind connection, and self-acceptance (Feldman, 2005). These philosophies combined with gentle physical activity make yoga suitable for any student because instructors are able to adapt the class to the needs of the children.

Yoga has become a popular way to promote a healthy lifestyle and positive stress coping in the school setting (White, 2009), and has become more therapeutically prominent in facilities that provide services for youth (Tate, 2003). Introducing children early to yoga philosophy exposes them to skills that may help them face challenges throughout their lifetime (Hagen & Nayar, 2014). Practicing yoga keeps children engaged and focused on themselves instead of on classroom demands, a philosophy described by Toscano and Clemente (2008) as "Teaching children, not activities." Institutions that serve youth tend to operate on a short-term basis, and exposure to just one yoga class can give participants a sense of community and show them that simple skills like deep breathing can be beneficial (Tate, 2003). Similarly, many young people facing challenges present with somatic symptoms that can be alleviated with yoga and relaxation (Blume, Brockman, & Breuner, 2012; Evans et al., 2011; Khalsa et al., 2012; Tsao et al., 2007). For example, urban school children with high violence exposure (Hart, Hodgkinson, Belcher, Hyman, & Cooley-Strickland, 2013), children and adolescents who have experienced traumatic events (Banks & Bevan, 2014; Kugler, Bloom, Kaercher, Truax, & Storch, 2012), children with sleep disturbances (Simola, Liukkonen, Pitkaranta, Pirinen, & Aronen, 2014) and children diagnosed with depression (Campo, 2012; Romero-Acosta et al., 2013) and anxiety (Campo, 2012; Crawley, 2014; Kristensen, Oerbeck, Torgersen,

Hansen, & Wyller, 2014; Romero-Acosta et al., 2013; Serra Giacobo, Jané, Bonillo, Ballespí, & Díaz-Regañon, 2012) strongly present somatically. When children learn postures and breathing skills in the yoga class, they recognize how it makes their body feel and can utilize them in other settings (Hagen & Nayar, 2014). Yoga instructors may use imagination and metaphor to teach postures instead of referencing them by name, such as suggesting animals they can imitate or images they can visualize (Holyoake, 2013; Tate, 2003; White, 2009). In this way, children connect their cognitions with feelings and actions, establishing a sense of mastery and autonomy, which are foundational to a resilient childhood (Infurna, Rivers, Reich, & Zautra, 2015).

Application of Yoga for Children and Adolescents

Yoga, mindfulness, and meditation, have grown in reputation as common complementary and alternative medicine (CAM) therapies used by adults and is increasing in application for youth (Barnes et al., 2008). Yet lifetime prevalence rates of mental disorders, developmental delays, and substance abuse in children and adolescents are still high (Merikengas et al., 2010; Boyle et al., 2011; Center for Disease Control and Prevention, 2012). The need for early prevention and intervention is greater than the current focus on just treatment (Merikangas et al., 2010). Also, children with mental illness have a unique presentation of symptoms when compared to adults, leading to frequent misdiagnoses and short-term interventions with psychotropic medication (Alavi & Calleja, 2012). Psychotropic medications have been evidenced to have negative short-term and long-term effects in young people (Bobo et al., 2013; Correll, 2014; Cosgrove, Roybal, & Chang, 2013). As more awareness is raised around the importance of using preventative measures and successful early interventions for childhood and adolescent

dysfunction, more pressure is placed on treatment providers to serve a growing number of children at an affordable cost and in a timely manner (Phelps, 2014). People in America have begun to turn to CAMs as a naturalistic alternative to costly medical, therapeutic, and pharmaceutical interventions. Yoga programs that incorporate therapeutic mindfulness skills have been adapted for use with children and adolescents, establishing a valuable place in the CAM world. However, little research has been collected from small, individual yoga organizations that serve diverse populations of high-risk youth. Likewise, little research is available on how yoga impacts specific mindfulness skills such as self-awareness and self-acceptance. The purpose of the present study is to connect these two unexplored areas of research to provide innovative data for emerging programs like Street Yoga and Kamala.

Street Yoga. Street Yoga is a non-profit yoga program, founded in 2002, which provides free yoga classes to youth and caregivers in the Portland and Seattle areas. The instructors are volunteers trained in trauma-informed yoga (TIY) and have experience in the mental health domain as well. Street Yoga employs TIY as a prevention and intervention treatment for high-risk youth. In this case, the term "high-risk" encompasses homeless youth; youth who have experienced traumatic and adverse life events including sexual abuse; students growing up in high-poverty neighborhoods; adolescent immigrants in temporary housing sent to America by their families; Lesbian Gay Bisexual Transgendered and Queer (LGBTQ) youth; young criminal and sex offenders; and youth in residential treatment for substance abuse, psychological problems, and severe behavioral disorders (J. Osberg, personal communication, June 3, 2015; Street Yoga, 2014). Street Yoga is based upon elements of evidence-based therapeutic practices and

the benefits of yoga for the mind and body. However, few studies have been conducted on its empirical value for improving mindfulness skills in young people. Researchers within Street Yoga have attempted empirical research of their own with promising outcomes, but due to the drop-in nature of the clinics providing Street Yoga and the severity of dysfunction of many of its participants, consistent data collection has been a challenge (S. Toby, personal communication, October 31, 2013; Street Yoga, 2014). Three sites used in this study provided yoga classes to participants through Street Yoga.

Kamala. Kamala provides mindfulness-based psychotherapy services and outreach for adolescents and adults. Its yoga instructors are Registered Yoga Teacher (RYT) certified, and have backgrounds in behavioral health as well. It is owned and managed by a licensed clinical psychologist, certified yoga instructor, and former Buddhist nun, Jamie Walker ("Kamala," n.d.). Their outreach program includes providing yoga to inpatient adolescents hospitalized for various psychological and psychiatric issues. These adolescents are also considered "high-risk" as many of them are in foster care, long-term residential treatment, or homeless; are suicidal; have substance abuse and addiction issues; identify as LGBTQ; have abuse histories and trauma symptoms; are offenders or are hospitalized in lieu of incarceration; and have severe psychiatric and behavioral disorders. One site provided yoga classes to participants through Kamala in this study.

The present study is one of the first of its kind to evaluate yoga programs like Street Yoga and Kamala with participants from multiple locations serving youth of varying types of risk factors and ages. Although Street Yoga and Kamala offer classes to young people with mental health issues, it is not intended to replace psychotherapeutic

treatment altogether. The focus of the present study is specifically on changes in self-awareness and self-acceptance since these constructs tend to be addressed with yoga. Participants had up to eight weeks to complete four yoga sessions. However, some participants only completed two yoga classes due to concluding treatment from the site offering yoga. For that reason, the outcomes of two and four yoga classes were compared in this study. Comparisons were also made between genders, age groups, and site. Specifically, the sites were compared by culture because two sites served only undocumented Latino youth while the other two sites served diverse American youth. Responses to traumatic events can differ on an ethnocultural level (Cook et al., 2005), so it was worth exploring how different cultural groups responded to a growing CAM treatment method like yoga. The Street Yoga and Kamala sites were also compared, since Street Yoga mainly served outpatient, drop-in style facilities, whereas Kamala served an inpatient site. Yoga may be a feasible program for inpatient youth (McIlvain, Miller, Lawhead, Barbosa-Leiker, & Anderson. 2015; Re, McConnell, Reidinger, Schweit, & Hendron, 2014), although inpatient youth tend to function at a lower level than outpatients (Holler, Kavanaugh, & Cook, 2013). Additionally, adolescent boys and girls tend to present their psychopathological symptoms differently, at inpatient and outpatient levels (Holtberg, Olson, & Brown-Rice, 2016). Therefore, it was important to compare how yoga affects boys and girls from these sites. Furthermore, the development of depressive symptoms tends to grow rapidly in early adolescence and often decreases with age, except when adolescents experience persistent risk factors (Cole et al., 2002). So, exploring the effects of yoga as a coping tool across adolescence was a point of interest in this study. Especially when treating complex trauma, Cook et al. (2005) emphasized the

importance of adapting a treatment style according to various psychosocial and demographic factors including gender, age, and culture and ethnicity. In consideration of the diverse and high-risk nature of the participants in this study, these variables were highlighted to see how each subgroup responded to a yoga intervention.

Therefore, my research hypotheses are as follows: Across gender, age, culture, and yoga program, yoga will have a positive impact on participants' self-awareness, by increasing acute awareness of thoughts, feelings, and behaviors, and the interconnectedness between them, as measured by the CAMM. Secondly, across gender, age, culture, and yoga program, yoga will have a positive impact on participants' self-acceptance, by improving the ability to withstand negative thoughts and feelings, as measured by the AFQ-Y8. Lastly, improvements on these scales will be observed after two yoga classes, yet more pronounced improvements will be observed after four yoga classes.

Chapter 2

Participants

In this study, 102 participants completed the pre-assessments. Two participants were eliminated based on disclosure that they did not accurately complete the assessments. Of the remaining 100 participants, 51 completed the study: 34 completed 4 yoga classes and 17 completed 2 yoga classes. The participants who completed this study were from a drop-in center for LGBTQ youth and young adults, two temporary housing sites for immigrant Latino boys and girls, and an adolescent unit in an inpatient psychiatric hospital. All participants who completed two yoga classes were from the psychiatric hospital. There were 35 females, 12 males, and 4 transgender participants. There were three age groups in which participants were categorized: 20 participants were 13-15 years old, 25 were 16-18 years old, and 6 were 19-24 years old. The Latino youth at the temporary housing sites were immigrants from Latin-American countries and did not speak English. Many spoke Spanish, although some only knew Spanish as a second or third language. The other two sites had culturally diverse Americans. To differentiate, the sites were categorized into two culture groups: 13 participants were Latinos, and 38 were American. Additionally, sites were categorized by the yoga program they offered: 20 participants received yoga through Street Yoga, 31 received yoga through Kamala. All participants were selected based on their voluntary inclusion in the yoga program offered by the facilities serving them. Consent to participate in this study was obtained from the sites and participants prior to data collection in accordance with RCW 71.34.530 (Washington State Legislature, 2006), which states that people 13 years of age and older may consent to therapeutic services for themselves.

To be included in this study, participants must have abstained from consistent practice of yoga for at least two months prior to beginning the study. Participants were required to have a basic knowledge of the English or Spanish language and ability to write legibly for completion of the assessments. Lastly, participants were required to be functioning well enough to attend the yoga classes to promote valid measures of self-awareness and self-acceptance. Compensation was offered to all participants, which included snacks or a $5 gift card to a popular store.

Materials

The sites provided a room or space to host the class, yoga mats, writing utensils, and at least one staff member was present. Participants were administered two questionnaires before their first yoga class and were re-administered the same questionnaires after they completed either two or four yoga classes. A demographic survey was also administered with the questionnaires at the pre-assessment. At the post-assessment, a participation survey was included with the two questionnaires. Spanish consent forms, Spanish versions of the questionnaires, and interpreters were provided for the participants at the two sites serving Latino youth. Interpreters were employees of these sites and volunteered to assist with the study. The researcher and most yoga instructors did not speak Spanish, so the staff members assisted during the yoga classes and interpreted the researcher's interactions with these participants. They also helped to ensure that those knew Spanish as a second or third language understood the items on the questionnaires by individually checking in with them as they completed the paperwork.

Child and Adolescent Mindfulness Measure. The Child and Adolescent Mindfulness Measure, Short Form (CAMM; Greco, Baer, & Smith, 2011) is a 10-item

assessment of mindfulness and self-awareness, which measures both internal states and external experiences (see Appendix A). Participants are asked to rate each statement according to how true or not true it is for them, on a 5-point Likert scale of 0 (Never True) to 4 (Always True). Adequate levels of absolute and relative fit indices, validity coefficients for correlations with relevant variables (Children's Somatization Inventory-Short Form, .82; Symptoms and Functioning Scale Internalizing, .90 and Externalizing, .91; Youth Quality Life-Revised, .91; White Bear Suppression Inventory, .88; Social Skills Rating System-Teacher Form, .92-.94) and internal consistency via test-retest reliability (.81) have been established for children between ages 10 and 17 years (Greco et al., 2011). When scoring, the values are inversed so that higher scores equate to higher levels of mindfulness. The Spanish version of the CAMM was obtained from Fernando Jimenez (E. Fernández-Jiménez, personal communication, September 17, 2015). The validation for the Spanish version of the CAMM is currently in publication (E. Fernández-Jiménez, personal communication, August 28, 2016).

Avoidance and Fusion Questionnaire for Youth. The Avoidance and Fusion Questionnaire for Youth, Short Form (AFQ-Y8; Greco, Lambert, & Baer, 2008) is an 8-item assessment of cognitive fusion of negative personal experiences and related experiential avoidance (see Appendix B). Cognitive fusion is a term used to describe the attachment one forms to a specific dysfunctional thought or experience, as opposed to accepting thoughts as fluid and fleeting. When this occurs, people believe a harmful negative thought to be a true representation of reality, thereby inducing negative self-view and emotionality (Greco et al., 2008). In the AFQ-Y8, participants are asked to rate each statement according to how true it is for them, on a 5-point Likert scale of 0 (Not at

all True) to 4 (Very True). Adequate levels of internal consistency (Cronbach's alpha = .83) and item-separation reliability (.93) were established for children aged 6 to 14 years old (Greco et al., 2008). Likewise, convergent and construct validity coefficients for correlations with relevant variables (Multidimensional Anxiety Scale for Children, .91; Children Somatization Inventory-Short Form, .86, Youth Quality of Life-Revised, .91-.92; Symptoms and Functioning Scale Internalizing, .89, and Externalizing, .91; Social Skills Rating System-Teacher Form, .90-.97; CAMM, .87; White Bear Suppression Inventory, .88) were determined (Greco et al., 2008). Adequate reliability (.92), and appropriate convergent and discriminant validity have also been established for college-aged young adults (Schmalz & Murrell, 2010), as well as reliability (.90), factorial validity, and both convergent and discriminant validity for the AFQ-Y for use with adults as well (Fergus et al., 2012). Higher scores indicate higher levels of cognitive avoidance and inflexibility, whereas lower scores indicate greater self-awareness. The Spanish version of the AFQ-Y was recently validated on 483 Spanish adolescents as an appropriate tool to measure psychological inflexibility as well (Valdivia-Salas, Martin-Albo, Zaldivar, Lombas, & Jimenez, 2016).

Demographic and Participation Surveys. The demographic and participation surveys were created by the author to collect additional qualitative information. The demographic survey, administered before the yoga classes began, documented demographic information of each participant, such as age, gender, living situation, and ethnicity (see Appendix C). The participation survey, administered after the final yoga class, assessed interest in pursuing yoga after the study, enjoyment of the yoga classes, favorite part of class, and attribution of any self-observed changes (see Appendix C).

These assessments were considered with the CAMM and AFQ-Y8 results, and were qualitatively used to determine how the youth accounted for any changes they may have experienced and how they enjoyed yoga.

Procedure

Participants at each site provided consent to be a part of this study, and were informed they had up to eight weeks to complete four yoga classes. At the psychiatric hospital, some participants were given the option to engage in just two classes because their discharge date did not allow them to stay long enough to complete four classes. Participants completed the CAMM, AFQ-Y8, and demographic survey prior to the first yoga session in the yoga room or a room nearby. Participants began the yoga class upon completion of these forms. One trained yoga instructor from Street Yoga or Kamala guided the class, and at least one staff member from the site was present. At the Latino sites, the staff member interpreted for the yoga instructor. The yoga instructors helped the researcher document weekly attendance, although the researcher attended or participated in most classes. Classes ranged from 45 to 60 minutes, and class size varied from 4 to 12 participants. Participants were never required to follow the exact poses of the instructor during yoga class; they were always given the choice to engage in gentler poses, or simply sit or lay quietly. After two or four classes had been attended, participants were re-administered the CAMM and AFQ-Y8, along with the participation survey, and offered compensation.

Chapter 3

Results

Baseline differences. Two one-way analyses of variance (ANOVAs) were conducted to determine baseline differences between the participants on each measure. On the CAMM, there were no significant differences between participants who dropped out of the study (x = 17.80, SD = 7.98), those who completed two yoga classes (x = 14.24, SD = 7.89), and those who completed four yoga classes (x = 18.15, SD = 8.95), $F(2, 97) = 1.421$, $p = .246$, partial $\eta^2 = .028$. Likewise, on the AFQ-Y8, there were no significant differences between participants who dropped out of the study (x = 17.18, SD = 7.30), those who completed two yoga classes (x = 19.18, SD = 8.46), and those who completed four yoga classes (x = 15.21, SD = 7.07), $F(2, 97) = 1.715$, $p = .185$, partial $\eta^2 = .034$. This signifies that groups were statistically equivalent on measures of self-awareness and self-acceptance prior to the study.

Reliability. Cronbach's Alpha was calculated for the CAMM and the AFQ-Y8 to determine reliability of the measures. The CAMM was found to have a reliability score of $\alpha = .837$ and the AFQ-Y8 was found to have a reliability score of $\alpha = .822$.

Correlation between self-awareness and self-acceptance. To determine if there was a relationship between the two dependent variables, Pearson's r was calculated comparing the change in scores on the CAMM and the AFQ-Y8 across time. A significant negative correlation was found between them, $r(49) = -.546$, $p < .001$, implying that high scores on the CAMM were correlated with low scores on the AFQ-Y8. Since the two dependent variables were significantly correlated, a five-way repeated measures multivariate analysis of variance (MANOVA) was used to calculate how they

were influenced by the five independent variables: gender, age group, classes completed, culture, and yoga program. The data met the assumptions required for conducting a MANOVA, including the non-significant Box *M*'s test (p = .060) which indicates homogeneity of covariance matrices of the dependent variables. The multivariate test that was used to determine main effects and interactions in the MANOVA was the Pillai's trace (*V*) because its criterion is more robust, thus more appropriate for small and unequal sample sizes (Tweedy & Lunardelli, 2001).

Self-awareness. On the CAMM, higher scores represented higher self-awareness, whereas lower scores represented lower self-awareness. The highest possible score was 40. Findings from the MANOVA showed that the difference between pre-test (x = 16.84, SD = 8.73) and post-test scores (x = 20.25, SD = 8.34) for all participants was not statistically significant, V = .064, $F(1, 43) = 2.930$, p = .094, partial $\eta^2 = 0.064$. This demonstrated that no significant change was discovered from the baseline to the outcome measure, although there was a pattern toward significance. The main effects for each independent variable (gender, classes completed, age group, culture, and yoga program) were explored. There was no significant difference in scores across time for gender, V = .059, $F(2, 43) = 1.347$, p = .271, partial $\eta^2 = 0.059$. There was also no significant difference between classes completed over time, V = .022, $F(1, 43) = .948$, p = .336, partial $\eta^2 = 0.022$, demonstrating that there was no significant difference in how many yoga classes were taken on the outcome. Additionally, there was no significant difference among age groups across time, V = .024, $F(2, 43) = .531$, p = .592, partial $\eta^2 = 0.024$. Then, Americans had a greater absolute change from pre-test (x = 15.16, SD = 78.84) to post-test (x = 19.82, SD = 8.29) than Latinos from pre-test (x = 21.77, SD = 6.42) to post-

test (x = 21.54, SD = 8.69), yet the difference was not significant, V = .029, $F(1, 43)$ = 1.270, p =.266, partial η^2 = 0.029. In fact, the Latinos showed virtually no change at all. However, Americans had slightly lower overall ratings of self-awareness than Latinos. Lastly, there was no significant main effect for yoga program, V = .021, $F(1, 43)$ = .911, p = .345, partial η^2 = 0.021, implying that there was no difference between Street Yoga and Kamala. Overall, most participants scored in the low-moderate range of self-awareness at baseline and post-assessment. Expectedly, the interaction effects between these variables were not significant as the sample sizes were too small to accurately make these comparisons. This data are represented in Appendix D, Table A.

Self-acceptance. On the AFQ-Y8, higher scores represented higher cognitive avoidance and inflexibility, whereas lower scores represented greater self-acceptance. The highest possible score was 32. Findings from the MANOVA showed that on the AFQ-Y8, the difference between pre-test (x = 16.53, SD = 7.71) and post-test scores (x = 14.51, SD = 7.23) for all participants was not shown to be statistically significant, V = .006, $F(1, 43)$ = .279, p = .600, partial η^2 = 0.006, demonstrating that no significant change was discovered from the baseline to the outcome measure. Main effects for each independent variable were also explored. There was no significant difference in scores across time for gender, V = .038, $F(2, 43)$ = .860, p = .430, partial η^2 = 0.038. There was no significant difference between classes completed over time, V = .001, $F(1, 43)$ = .028, p = .868, partial η^2 = 0.001. Likewise, there was no significant difference among age groups over time, V = .011, $F(2, 43)$ = .231, p = .795, η^2 = 0.011. Then, even though Americans again had a greater absolute change from pre-test (x = 17.32, SD = 8.26) to post test (x = 13.95, SD = 7.02) than Latinos from pre-test (x = 14.23, SD = 5.46) to post-

test (x = 16.15, SD = 7.87), the difference was not significant, V = .004, $F(1, 43)$ = .188, p = .667, partial η^2 = 0.004. The Latinos actually showed a pattern of change in the opposite direction. Lastly, there was no significant difference between Street Yoga and Kamala across time, V = .007, $F(1, 43)$ = .324, p = .572, partial η^2 = 0.007. Overall, most participants scored within the moderate range of self-acceptance at baseline and post-assessment. Again, the interactions between these variables were not significant as the sample sizes were too small to accurately make these comparisons. This data are represented in Appendix D, Table B.

Participation survey. On this survey, participants were asked to rate how much they enjoyed doing yoga on a Likert scale from 1, meaning "Not at all" to 5, meaning "I loved it!" The 51 participants who completed this survey yielded a mean score of x = 4.45. Participants were also asked to state their favorite part of the yoga class. To "relax" or "calm" was mentioned 23 times as the favorite part of yoga. "Stretching" or "to get flexible" was mentioned 10 times. "All" or "everything" was mentioned eight times. "Laying down" was mentioned five times, and "deep breathing" was mentioned four times. Several other unique responses were given, such as "it's free," "the body scans," and "what the instructor said during the class." Additionally, if they noticed any changes during their time in the study, they were asked to identify what they thought was the main reason for those changes. Of the 43 participants who responded to this question, "yoga" was mentioned 15 times as a contributing factor to the changes they noticed, which included changes such as "feel more relaxed and calm," "more aware of my mind and surroundings," "accept myself and feelings," and "connecting to my body." Eight participants stated they did not notice any changes, and three participants stated they

"don't know." Three participants referenced "breathing exercises." Several other unique responses were given, such as "spring break," "starting a new job," "being clean," and "separation from family."

Summary

In sum, there were no significant overall changes from pre-test to post-test scores on both measurements, yet there was a pattern toward significance over time on the CAMM. When looking at each of the independent variables, there were patterns observed although no significant changes were noted. On both questionnaires, males showed the least amount of change across time as compared to females and transgendered participants. For both completion times, participants had patterns of improvements on both measures, although two classes showed slightly bigger changes over time than four classes, yet neither group reached significance. There was a unique pattern observed between cultures. The Latinos showed virtually no change across time on the CAMM, and a slight pattern in the opposite direction from the other demographic categories on the AFQ-Y8. When sites were categorized by yoga program, similar patterns as were found with the culture categorization. Nonetheless, differences were not strong enough to be statistically significant. Despite the lack of statistical significance in these analyses, there was a large amount of positive feedback from the participants regarding their enjoyment of yoga and how yoga contributed to personal changes they observed.

Chapter 4

Discussion

The purpose of this investigation was to assess how participation in a trauma-informed yoga (TIY) program affected self-awareness and self-acceptance in high-risk youth. Participants were assessed at baseline and after completing either two or four yoga classes on two mindfulness-based constructs: self-awareness, measured by the Child and Adolescent Mindfulness Measure, short form (CAMM), and self-acceptance, measured by the Avoidance and Fusion Questionnaire for Youth, short form (AFQ-Y8). The participants' experience doing yoga was qualitatively investigated as well.

The research hypotheses were as follows: 1) Across gender, age groups, culture, and yoga program, yoga will have a positive impact on participants' self-awareness as measured by increased scores on the CAMM. 2) Across gender, age groups, culture, and yoga program, yoga will have a positive impact on participants' self-acceptance as measured by decreased scores on the AFQ-Y8. Lastly, 3) Improvements on these scales will be observed after two yoga classes, and more pronounced improvements will be observed after four yoga classes.

Hypotheses 1. There were no significant differences across gender, age group, culture, and yoga program from pre-test to post-test on the CAMM. However, there was an overall pattern toward significance over time. Only males and Latinos showed virtually no changes. All other subgroups analyzed showed slight patterns of improvement, although none reached statistical significance. Therefore, the hypothesis that across gender, age group, culture, and yoga program, all groups would show a significant increase in scores on the CAMM, signifying an improvement on self-

awareness was not supported.

Hypothesis 2. Similarly, there were no significant differences across gender, age group, culture, and yoga program from pre-test to post-test on the AFQ-Y8. Certain subgroups showed more promising patterns of improvement than others. Males, 13-15 year-olds, and 19-24 year-olds, showed virtually no change across time. Latinos showed a pattern in scores in the opposite direction, suggesting a decrease in self-acceptance, or increased cognitive avoidance and inflexibility. All other subgroups analyzed showed a pattern of improvement over time, although none reached statistical significance. Therefore, the hypothesis that across gender, age group, culture, and yoga program, all groups would show a significant decrease in scores on the AFQ-Y8, signifying an improvement on self-acceptance was not supported.

Hypothesis 3. At baseline, there were no statistically significant differences between those who dropped out of the study, those who completed two yoga classes, and those who completed four yoga classes. This showed that these groups were statistically equivalent prior to starting the yoga program. Overall, there was no significant improvement in self-awareness or self-acceptance from pre-test to post-test for either two or four yoga classes, although both groups showed patterns of improvement. Interestingly, the group who completed two yoga classes had worse scores on both measures at baseline yet had a larger change from pre-test to post-test on both measures than the group who completed four yoga classes, which is the opposite of what the hypothesis predicted. Nonetheless, these changes were not statistically significant. Therefore, the hypothesis that both completion times would show significant changes, with four classes showing greater improvement than two classes, was not supported.

Interpretation

These results should be interpreted with caution due to the small sample size and large amount of variation of scores within groups. Likely due to these factors, there were no significant improvements observed on the measures of self-awareness and self-acceptance. However, it is important to note the patterns that emerged. Culture and yoga programs showed similar patterns likely due to the fact that the majority of Street Yoga participants were Latino. Overall, the scores on the CAMM showed a bigger change across time than scores on the AFQ-Y8. Not only was there a lesser overall improvement on the AFQ-Y8, the Latinos and Street Yoga group showed a slight pattern of worsening in this particular time frame and males showed virtually no change at all. Thus, the question is raised of how these particular brief yoga interventions impact self-awareness than self-acceptance specifically, which should be examined with larger sample sizes and over greater lengths of time. The concepts of self-acceptance and conversely, cognitive avoidance and inflexibility, may be too complex for young people to explore and develop in this short time frame, as shown by the non-significant improvements and worsening scores for some groups across time on this measure. Howe-Martin, Murrell, and Guarnaccia (2012) looked at experiential avoidance, another term for cognitive avoidance, and described it as a temporary "short-circuiting" that self-harming adolescents use to avoid exposure to uncomfortable and overwhelming feelings due to limited access to their deeper internal emotional states. Avoidant coping strategies and behavior patterns often become habit over time, which can contribute to development of psychological disorders (Howe-Martin et al., 2012). Self-acceptance, then, requires the ability to acknowledge and sit with painful thoughts and feelings without habitually

trying to avoid them. It may require not just changing, but unlearning old ways of coping and relearning new ways of processing emotional pain. Because young people's brains are not fully developed, particularly in the pre-frontal cortex, the limbic system often mediates decision-making and risk-assessment, resulting in emotionally charged and impulsive choices and actions (Pharo et al., 2011). Unlearning this reactive process and relearning healthier coping strategies may take much longer than two or four times in the yoga class for young people, especially in clinically distressed and high-risk populations.

Similarly, the creators of the AFQ-Y8 acknowledged, "it is possible that youth scoring at the extremely low end may not truly demonstrate excellent flexibility, they may have avoided the task altogether by answering *not at all true* to most or all items" (Greco et al., 2008, p. 98). Some people may be unaware of the true level of cognitive avoidance they are experiencing, so as they are asked to reflect on these items a second time after a brief intervention, scores may not improve or they may even increase, demonstrating differing levels of self-awareness of meta-cognition. Therefore, it may be possible that as self-awareness grows, awareness of cognitive avoidance and inflexibility initially increases before improvements in self-acceptance can be observed. Haden, Daly, and Hagins (2014) concluded similar findings after seeing a significant increase in stress in a small sample of young adolescents trying yoga compared to a PE class. Hagan and Navar (2014) pointed out that yoga may assist in increased self-awareness by turning attention inward towards internal cues as opposed to constant focus on external forces. The outcome of the current study showed that higher scores of self-awareness are correlated with lower scores on cognitive avoidance and inflexibility, yet it is not clear just how self-awareness and self-acceptance impact one another. Perhaps over a longer

period of time, a curvilinear relationship with self-acceptance would be observed.

In addition to patterns of decreased self-acceptance across time, there was virtually no observed change across time on self-awareness for Latinos, despite the fact that there were patterns of improvement on self-awareness for all other demographic groups. An important factor at the Latino sites was that these participants were in temporary housing after being caught immigrating by American government until family reunification was possible. Therefore, they may have been in a state of distress, and possibly experienced increased fear of an uncertain future, which may have compounded the results. A Spanish version (but not exact translation) of the AFQ-Y (AFQ-S) was created by Luciano et al. (2011) in a Spanish study on Acceptance and Commitment Therapy (ACT) and its ability to defuse avoidance patterns in low- and high-risk adolescents. Low-risk adolescents showed small improvements in psychological flexibility, yet the high-risk adolescents did not show improvements. A similar pattern was found using a yoga-based mindfulness intervention with urban fourth and fifth graders; those who had low to moderate depression at baseline showed significantly improved stress responses over time, whereas those who had high levels of depression at baseline did not significantly improve (Gould et al., 2012). Like in the current study, those deemed high risk and those with more severe dysfunction did not show significant psychological improvements after a yoga and mindfulness intervention. Other researchers successfully applied a Mindfulness-Based Stress Reduction for Teens program to Latino adolescents to improve mindfulness, self-compassion, perceived stress, and depression (Edwards, Adams, Waldo, Hadfield, & Biegel, 2011). However, that program was longer and more structured than the conditions of the current study, which are important factors

to consider in future research.

It was interesting to note that the participants who completed two yoga classes showed greater, yet still slight patterns toward improvement on both scales of self-awareness and self-acceptance than those who completed four yoga classes. All participants who completed two yoga classes were from the inpatient adolescent unit at a psychiatric hospital, and were unable to complete four yoga classes because they discharged from the hospital. At that point in time, they may have been functioning at a higher level than the participants from the same psychiatric hospital who were admitted long enough to complete four classes. Participants from the psychiatric hospital made up 41 percent of those who completed four classes. Holler et al. (2013) explored differences in symptom presentation between adolescent inpatient and outpatient samples and found that the inpatients had lower cognitive functioning than outpatients. Specifically, the inpatients with major depression had lower functioning on cognitive flexibility than outpatients. Similarly, the inpatient major and "minor" depression groups showed lower attention span and working memory than outpatients (Holler et al., 2013). This is in line with the patterns in the current study; those shifting to outpatient services from the inpatient psychiatric hospital may be functioning at a slightly higher level than those still in inpatient services.

Despite the non-significant findings of this study, there was an overwhelming report of enjoyment in the yoga program by the participants who completed the study; 64.7 percent rated their experience the highest ranking (5 out of 5), 86.3 percent rated it either a 4 or 5. Participants most commonly reported that their favorite part of yoga was to "relax," followed by to "stretch/get flexible." Of participants who acknowledged that

they observed changes over the course of the study, changes were attributed to participating in yoga, or that yoga helped, most frequently. However, some participants cited unrelated reasons for changes, said they noticed no changes, or did not respond to this question at all. Overall, the majority of participants provided positive feedback on their experience in yoga, similar to findings in other yoga studies with adolescents when interest in yoga had been assessed in this way (Noggle, Steiner, Minami, & Khalsa, 2012; Ramadoss & Bose, 2010).

This study is the first of its kind known to the researcher to utilize these assessment tools together as measures of self-awareness and self-acceptance in a study on yoga and high-risk youth. However, it is not the first of its kind to show mixed results for adolescents. Significant results have been found in studies with longer engagement in yoga programs, especially when the class is held multiple times a week (Edwards et al., 2011; Kauts & Sharma, 2009; Khalsa et al., 2012; Ramadoss & Bose, 2010). In other cases, adolescents actually showed significant increases in perceived stress at the time of post-assessment (Ferreira-Vorkapic et al., 2015; Haden et al., 2014; White, 2012). Ferreira-Vorkapic et al. (2015) concluded that while evidence is prominent that yoga is beneficial to healthy and unhealthy adults, the picture is less clear for young people. The initial negative effects and insignificant results in multiple studies with adolescents may be explained in part by an adaptation period that may be required for some young yoga practitioners to become more mindful and self-aware (Ferreira-Vorkapic et al., 2015). In the initial phase of becoming mindful, people may become more aware of how they are affected by stress, thereby perceiving more persistent stress (Ferreira-Vorkapic et al., 2015; Haden et al., 2014; Kaley-Isley et al., 2010). Because length of time spent

practicing yoga often surfaces as an important factor for its success on psychosocial constructs, the current study was intended to explore just how long it may take to observe significant improvements. It may be concluded that while two and four yoga classes show promising patterns of improvement on self-awareness and self-acceptance, it will likely take much longer to show more robust changes.

Larger sample sizes, of course, is another key difference in finding significant effects of yoga on the adolescent population, as Kauts and Sharma (2009), Ramadoss and Bose (2010), and Khalsa et al. (2012) had. A study with the same sample size as the current study (n = 51) utilized a longer and more frequent yoga intervention, and found significant improvements in mood and negative affect (Noggle et al., 2012). Studies that employed smaller sample sizes than the current study did not have significant results, despite utilizing a more consistent yoga program (Ferreira-Vorkapic et al., 2015; Haden et al., 2014; Hagins, Haden, & Daly, 2013) or mindfulness-based program (Coholic et al., 2012). These results emphasize the importance of larger sample sizes. It is important to note, however, that there are typically very few adverse effects reported for the use of yoga as a therapeutic intervention with children and adolescents (Kaley-Isley et al., 2010) and adults (Cramer et al., 2013; Skowronek et al., 2014), so yoga (Ferreira-Vorkapic et al., 2015; Kaley-Isley et al., 2010) and other mindfulness-based interventions (Coholic et al., 2012; Mendelson et al., 2010) are often deemed a promising endeavor in research and practice for young people.

Limitations

There were several limitations to this study. First and foremost, the sample size was small. Access to participants was limited through Street Yoga because there were

few available volunteer yoga instructors to begin teaching yoga at new sites. Other sites through Street Yoga did not meet criteria for inclusion into this study. Kamala was included to add more participants through the psychiatric hospital site. While both yoga programs employed the same style of yoga and both ensured a behavioral health background in their instructors, they are still separate institutions, which could have compounded the results. Still, the total number of participants who completed this study was small, and subgroup sizes were even smaller when the four independent variables were compared. Since the results showed patterns of improvements in most subgroups on both measures, a larger sample size would greatly strengthen the power of this study.

Additionally, participants engaged in a small number of yoga classes in this study. One of the goals of this study was to detect a just-noticeable difference of how many yoga classes it would take to observe a pronounced impact on self-awareness and self-acceptance. However, particularly with acute participants, more time may be required to see significant results. A longer amount of time doing yoga and frequent assessment administration would help detect those unique trends with more strength as well. Like other researchers have observed, there may be a curvilinear pattern of self-acceptance over time as people become more mindful and self-aware (Ferreira-Vorkapic et al., 2015; Haden et al., 2014; Kaley-Isley et al., 2010).

Another notable limitation was the high attrition rate, at 49 percent. However, this was expected due to the researcher's familiarity with the drop-in nature of most Street Yoga classes and the chaotic nature of the psychiatric hospital. Most participants who dropped out of the study only did so because they discharged from the hospital or were reunited with their families. Very few participants intentionally chose to discontinue.

There was some difficulty with participants completing the study at the LGBTQ drop-in clinic as well because they only offered Street Yoga twice per month, and the last yoga class was canceled due to a scheduling conflict. Although the drop-in style of these yoga classes poses significant limitations to the research, it is often more appropriate for young people's lifestyles as their schedules are sporadic and they are often dependent on others for transportation (Feldman, 2005). Therefore, attendance and scheduling were difficult to control.

The methodology of this study had multiple weaknesses in that there were potentially several moderating variables over which there was little control, such as availability of yoga instructors, discharge dates and family reunifications, and site schedules and frequency of offering yoga. There were potentially several confounding variables as well, such as high levels of distress and lower functioning levels especially at the psychiatric hospital, non-recent previous experience with yoga, different yoga instructors between and within sites, and varying lengths of time it took for participants to complete two or four yoga classes. Perhaps looking at just one variable at a time would provide clearer results. Also, having the same yoga instructor, or small group of instructors lead all participants through the yoga program would eliminate or reduce instructor differences and hopefully create a more consistent experience for the participants and researcher. As Emerson et al. (2009) emphasized, teacher qualities are important to the success of TIY. Additionally, there was no control group used in this study due to limited access to high-risk youth who were not participating in a yoga program. All participants in this study were recruited through the yoga programs or the site providing yoga. However, in the future, utilizing a control or comparison group

through either a wait-list control group or a high-risk group receiving therapeutic treatment as usual would strengthen the power of the study. Overall, the structure of the current study demonstrates good ecological validity. It is representative of real-world, diverse and complex situations making the findings of this study more generalized if they were replicated with a larger sample size.

Future Directions

This study revealed several potential strengths and weaknesses of young people's experience in short-term, drop-in style yoga programs that can be useful in informing future research. One notable variable worth exploring further is length of time in a yoga intervention group. In the current study, significant improvements in self-awareness and self-acceptance were not found, yet promising patterns emerged. Specifically, the AFQ-Y8 may be a more appropriate measure of long-term growth as opposed to a brief intervention, so it would be a beneficial contribution to the research to see this hypothesis explored. Because of the differences between the American and Latino participants, and generally limited and inconclusive research on self-awareness and self-acceptance across culture groups and risk levels, more research is needed to explore the mediating factors that may contribute to these differences. It is not yet understood just how self-awareness and self-acceptance are related. Initial increases in self-awareness may explain initial increased reports on stress and negativity, so following participants over longer periods of time to see if these trends change in a curvilinear fashion would be useful. Additionally, more research is needed to explore these constructs with the CAMM and AFQ-Y8, as well as other representative tools. Likewise, more research is needed to explore the differences in these constructs between genders, and how appropriate yoga

and mindfulness-based interventions are for young men and women of varying levels of functioning. Since there is such high demand for affordable preventative programs to help keep young people on the right track for health and happiness in the face of continuous risk factors as they enter adulthood (Merikangas et al., 2010; Phelps, 2014), more research on this subject is relevant and timely.

Conclusions

The results of this quasi-experimental research study were not significant. There were no significant improvements in self-awareness or self-acceptance after engagement in trauma-informed yoga classes for all genders, classes completed, age groups, culture, and yoga programs. However, there were patterns of improvement that emerged. There was an overall pattern toward significance on self-awareness. Then, females showed a slightly stronger report of cognitive avoidance and inflexibility at baseline, which improved over time, whereas males showed very little change on either measure over time. Transgendered participants had similar trends as females. On both constructs, there were slight patterns of improvement for those who completed two and four yoga classes, although those who completed two classes showed a slightly bigger change over time. No significant differences were found across age groups over time on either construct. No significant differences were found between Americans and Latinos over time, although Latinos showed a slight increase in cognitive avoidance and inflexibility and virtually no change on self-awareness across time. Americans, on the other hand, showed patterns of improvement on both constructs. Yoga program differences showed similar patterns as culture groups. While the outcomes of this study were non-significant, the enjoyment in yoga that the participants reported was overwhelming. The majority reported that they

loved their experience in the yoga classes and they were able to identify their favorite parts and benefits of class. Many said they would continue to do yoga in the future if they had the opportunity.

While there were several limitations in this particular research project, two important messages emerged that are in line with existing research. First, adolescents enjoy doing yoga for several different reasons, and many of them are able to recognize the benefits of its practice. Second, this is a complex and challenging arena for empirical research. The existing body of research contains very mixed results, yet the differences seem to be based on limitations of the studies such as small sample sizes and brevity of the intervention, both of which were major limitations to the current study. Despite these limitations, promising patterns of improvement on scales of self-awareness and self-acceptance for most participants began to surface. With larger sample sizes and more time for participants to engage in the yoga program, these patterns would likely become more pronounced with greater empirical strength. Especially with more time, the connection between self-awareness and self-acceptance would become more visible in the data. Perhaps the curvilinear trajectory of cognitive avoidance and inflexibility, first increasing as self-awareness grows, then decreasing over time as self-acceptance develops, would become clearer as well. Pursuing these hypotheses in future research would be very beneficial to this field of study, especially in a time when the need for cost-effective, early prevention and intervention methods for youth is imperative.

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Appendix A

Child and Adolescent Mindfulness Measure

English Version

The cross-cultural adaptation into Spanish of the Child and Adolescent Mindfulness Measure (CAMM) could not be included in this appendix because it is still under the process of publication (E. Fernández-Jiménez, personal communication, August 28, 2016).

Child and Adolescent Mindfulness Measure (CAMM; Greco, Baer, & Smith, 2010)

We want to know more about what you think, how you feel, and what you do. **Read** each sentence. Then, circle the number that tells **how often each sentence is true for you.**

	Never True	Rarely True	Some-times True	Often True	Always True
1. I get upset with myself for having feelings that don't make sense.	0	1	2	3	4
2. At school, I walk from class to class without noticing what I'm doing.	0	1	2	3	4
3. I keep myself busy so I don't notice my thoughts or feelings.	0	1	2	3	4
4. I tell myself that I shouldn't feel the way I'm feeling.	0	1	2	3	4
5. I push away thoughts that I don't like.	0	1	2	3	4
6. It's hard for me to pay attention to only one thing at a time.	0	1	2	3	4
7. I get upset with myself for having certain thoughts.	0	1	2	3	4
8. I think about things that have happened in the past instead of thinking about things that are happening right now.	0	1	2	3	4
9. I think that some of my feelings are bad and that I shouldn't have them.	0	1	2	3	4
10. I stop myself from having feelings that I don't like.	0	1	2	3	4

Appendix B

Acceptance and Fusion Questionnaire for Youth

English and Spanish Versions

AFQ-Y8

We want to know more about what you think, how you feel, and what you do. Read each sentence. Then, circle a number between 0-4 that tells how true each sentence is for you.

	Not at all True	A little True	Pretty True	True	Ver Tru
1. My life won't be good until I feel happy.	0	1	2	3	4
2. My thoughts and feelings mess up my life.	0	1	2	3	4
3. The bad things I think about myself must be true.	0	1	2	3	4
4. If my heart beats fast, there must be something wrong with me.	0	1	2	3	4
5. I stop doing things that are important to me whenever I feel bad.	0	1	2	3	4
6. I do worse in school when I have thoughts that make me feel sad.	0	1	2	3	4
7. I am afraid of my feelings.	0	1	2	3	4
8. I can't be a good friend when I feel upset.	0	1	2	3	4

AFQ-Y8

Queremos saber más sobre lo que usted piensa, siente y hace. Lea cada frase. Luego ponga un círculo alrededor del número, de 0 a 4, que indique hasta qué grado es cierta esa frase para usted.

	No es para nada cierta	Poco cierta	Más o menos cierta	Cierta	Muy cierta
1. Mi vida no será buena hasta que yo no me sienta feliz.	0	1	2	3	4
2. Mis pensamientos y sentimientos me arruinan la vida.	0	1	2	3	4
3. Las cosas malas que pienso de mí mismo deben ser ciertas.	0	1	2	3	4
4. Si el corazón me late rápido, será que algo me pasa.	0	1	2	3	4
5. Dejo de hacer las cosas que me son importantes cada vez que me siento mal.	0	1	2	3	4
6. Voy peor en la escuela cuando tengo pensamientos que me hacen sentir triste.	0	1	2	3	4
7. Tengo miedo de mis sentimientos.	0	1	2	3	4
8. No puedo ser buen amigo o buena amiga cuando me altero.	0	1	2	3	4

Appendix C

Demographic Information and Participation Surveys

English and Spanish Versions

YOGA FOR YOUTH: THE EFFECTS OF YOGA ON MINDFULNESS IN ADOLESCENTS

Demographic Survey

Dissertation, *Northwest University*

Elisa Lebman, Researcher

Sarah Drivdahl, PhD, Dissertation Chair

Thanks for being willing to participate in this study! Before you get started with the yoga class, please share a little more about yourself. Your responses are anonymous, meaning your name will not be attached to these responses. Please answer as honestly as you can.

Age: _____

Gender: _____

Ethnicity (check all that apply):

- ☐ White
- ☐ African-American
- ☐ Hispanic
- ☐ American Indian
- ☐ Asian
- ☐ Pacific Islander
- ☐ Other (please fill in the blank): _____

Who do you currently live with? (check all that apply):

- ☐ Birth mom
- ☐ Birth dad
- ☐ Adopted parent
- ☐ Foster parent
- ☐ Grandparent
- ☐ Aunt/Uncle
- ☐ Older Sibling(s)
- ☐ Temporary Housing/Shelter
- ☐ Other (please fill in the blank): _____

YOGA FOR YOUTH: THE EFFECTS OF YOGA ON MINDFULNESS IN ADOLESCENTS

Participation Survey

Dissertation, ***Northwest University***
Elisa Lebman, Researcher
Sarah Drivdahl, PhD, Dissertation Chair

Thanks for participating in this study! Now that you've done four yoga classes, please share how your experience was doing yoga. Your answers are anonymous, meaning your name will not be attached to these answers. Please answer as honestly as you can.

1. What was your favorite part of the yoga class?

2. Will you continue to do yoga in the future?

3. On a scale of 1 to 5, 1 meaning not at all and 5 meaning you loved it, how much did you enjoy doing these yoga classes? Circle the number that matches how you feel.

1--------2--------3--------4--------5

Not at all I loved it!

4. If you noticed any positive changes in yourself over these last few weeks, what do you think is the MAIN reason for those changes?

YOGA PARA JÓVENES: LOS EFECTOS DEL YOGA SOBRE LA ATENCIÓN PLENA EN LOS ADOLESCENTES

Encuesta de Demográphica

Tesis, *Northwest University*
Elisa Lebman, Investigadora
Sarah Drivdahl, PhD, Presidenta de comité de tesis

¡Gracias por su interés en participar en este estudio! Antes de que usted comience la clase de yoga, le quisiéramos solicitar unos datos personales adicionales. Sus respuestas son anónimas, lo cual significa que su nombre no estará conectado con estas respuestas. Por favor, conteste con la mayor sinceridad posible.

Edad: _____

Sexo: _____

Etnicidad (marque todas las casillas que correspondan):

- ☐ Blanco
- ☐ Afroamericano
- ☐ Hispano
- ☐ Indígena norteamericano
- ☐ Asiático
- ☐ Isleño del Pacífico
- ☐ Otro (especifique): _____

¿Con quién vive actualmente? (marque todas las casillas que correspondan):

- ☐ Mamá biológica
- ☐ Papá biológico
- ☐ Mamá y/o papá adoptivo(s)
- ☐ Mamá y/o papá de acogida
- ☐ Abuela y/o abuelo
- ☐ Tía y/o tío
- ☐ Hermana(s) y/o hermano(s) mayor(es)
- ☐ Vivienda temporal/Albergue
- ☐ Otro (especifique): _____

YOGA PARA JÓVENES: LOS EFECTOS DEL YOGA SOBRE LA ATENCIÓN PLENA EN LOS ADOLESCENTES

Encuesta de Participación

Tesis, *Northwest University*
Elisa Lebman, Investigadora
Sarah Drivdahl, PhD, Presidenta de comité de tesis

¡Gracias por participar en este estudio! Ahora que ha participado en cuatro clases de yoga, cuéntenos cómo fue su experiencia de hacer yoga. Sus respuestas son anónimas, lo cual significa que su nombre no estará conectado con estas respuestas. Por favor, conteste con la mayor sinceridad posible.

1. ¿Cuál fue su parte favorita de la clase de yoga?

2. ¿Seguirá haciendo yoga en el futuro?

3. En una escala de 1 a 5, en que 1 significa para nada y 5 significa que le encantó, ¿cuánto disfrutó de su participación en estas clases de yoga? Ponga un círculo alrededor del número que mejor describa cómo se siente.

1--------2--------3--------4--------5

Para nada ¡Me encantó!

4. Si notó cambios positivos en su persona durante estas últimas semanas, ¿qué cree que es el PRINCIPAL motivo de esos cambios?

Appendix D

Tables A and B

Descriptive Statistics

Table A: CAMM Summary				**Table B: AFQ-Y8 Summary**			
Highest possible score:		40		Highest possible score:		32	
	n	*x*	*SD*		*n*	*x*	*SD*
Gender				***Gender***			
Male				**Male**			
Pre-Score	12	21.17	11.05	Pre-Score	12	12.17	5.69
Post-Score	12	22.50	10.66	Post-Score	12	12.08	7.37
Female				**Female**			
Pre-Score	35	15.86	7.92	Pre-Score	35	18.31	8.04
Post-Score	35	19.31	7.07	Post-Score	35	15.74	6.73
Transgender				**Transgender**			
Pre-Score	4	12.50	1.00	Pre-Score	4	14.00	4.24
Post-Score	4	21.75	12.01	Post-Score	4	11.00	10.10
Classes Completed				***Classes Completed***			
2 classes				**2 classes**			
Pre-Score	17	14.24	7.89	Pre-Score	17	19.18	8.46
Post-Score	17	19.00	8.01	Post-Score	17	15.71	7.77
4 classes				**4 classes**			
Pre-Score	34	18.15	8.95	Pre-Score	34	15.21	7.07
Post-Score	34	20.88	8.56	Post-Score	34	13.91	7.00
Age Group				***Age Group***			
13-15				**13-15**			
Pre-Score	20	18.25	10.04	Pre-Score	20	15.80	7.05
Post-Score	20	20.25	9.99	Post-Score	20	14.85	8.61
16-18				**16-18**			
Pre-Score	25	15.36	8.00	Pre-Score	25	18.12	8.49
Post-Score	25	19.92	7.14	Post-Score	25	14.88	6.30
19-24				**19-24**			
Pre-Score	6	18.33	7.12	Pre-Score	6	12.33	4.89
Post-Score	6	21.67	8.36	Post-Score	6	11.83	6.43
Culture				***Culture***			
American				**American**			
Pre-Score	38	15.16	8.84	Pre-Score	38	17.32	8.26
Post-Score	38	19.82	8.29	Post-Score	38	13.95	7.02
Latinos				**Latinos**			
Pre-Score	13	21.77	6.42	Pre-Score	13	14.23	5.46
Post-Score	13	21.54	8.69	Post-Score	13	16.15	7.87
Yoga Program				***Yoga Program***			
Street Yoga				**Street Yoga**			
Pre-Score	20	19.80	7.59	Pre-Score	20	13.95	5.29
Post-Score	20	21.05	8.47	Post-Score	20	14.90	7.37

Kamala				**Kamala**			
Pre-Score	31	14.94	9.00	Pre-Score	31	18.19	8.61
Post-Score	31	19.74	8.36	Post-Score	31	14.26	7.26
Overall				***Overall***			
Pre-Score	51	16.84	8.73	Pre-Score	51	16.53	7.71
Post-Score	51	20.25	8.34	Post-Score	51	14.51	7.23

Tables A and B show numbers of participants in each independent variable (*n*), mean scores (*x*), standard deviations of scores (*SD*), as well as overall values.