

EXPLORATIONS OF WELLNESS AND RESILIENCE: A YOGA INTERVENTION
FOR POST-TRAUMATIC STRESS

By

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Abstract

Post-traumatic stress is a highly prevalent mental health condition. Mind-body interventions like yoga are increasingly being utilized in the treatment of PTS, but further research is needed to assess its effectiveness. This present randomized control study was designed to supplement the current field of inquiry with a relatively large group of participants and mixed method analysis of the data. The PTS symptoms and overall well-being of 50 participants enrolled in an eight-week trauma-specific Kundalini yoga (KY) program were examined. The findings demonstrate that KY may impact PTS symptomology, sleep, positive affect, perceived stress, and feelings of resilience. Eight month follow-up data are presented. Participant narratives are discussed corroborating quantitative findings and suggest that participants learnt tools to modulate emotions leading to self-mastery. Study limitations are presented with recommendations for future trauma-related research and practice.

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INTRODUCTION

The purpose of this study is to evaluate the efficacy of a vigorous mind-body protocol in effecting the behaviours of people affected by post-traumatic stress disorder (PTSD). This research is founded on the premise that mind-body interventions may effectively empower and cultivate resilience in those affected by trauma. This study expands the framework of current treatments for PTSD by implementing both the social learning theory of Bandura (1971; Bandura and McClelland, 1977) to explain social behavioural outcomes and the unitive theory of Streeter, Gerbarg, Saper, Ciraulo and Brown (2012) to conceptualize the physiological transformations affected in the brains of participants. Bottom-up methodologies that engage the body directly to generate deep psychophysiological changes and increased self-regulation, as advocated by Van der Kolk (2000; 2003; 2006; Van der Kolk, Roth, Pelcovitz, Sunday & Spinazzola, 2005) and Ogden, Pain and Fischer (2006) are utilized. Participants will engage and practice empowering skills that may enhance quality of life.

Emotional trauma directly affects large segments of the population. A single distressing experience or multiple experiences can overwhelm an individual's ability to cope and integrate ideas and emotions related to the stressful experience (Van der Kolk, 2006). Trauma symptoms can manifest after exposure to any traumatic stressor. Causes include accidents, physical assault, emotional loss, and anything that violates a person's familiar ideas of the world or their human rights, thereby causing great confusion and insecurity. When a person whom an individual is dependent on for survival betrays or violates the individual, symptoms of extreme stress can result (Deprince & Freyd, 2002). While the causes of trauma are numerous, so are the responses. Some people adapt to the distressing experience(s) while others may develop symptoms of post-traumatic stress (PTS).

Epidemiologic studies indicate that approximately 8% of Americans have had or will have post-traumatic stress during their lifetime, and that about 5% have post-traumatic stress at any given time. Women are twice as likely than men to develop post-traumatic stress (Howard & Crandall, 2007). Estimates suggest that trauma-related disorders cost over \$45 billion U.S. dollars a year in medical and related costs (Howard & Crandall, 2007; Tanielian, 2009).

Canadians typically associate post-traumatic stress with war veterans, but Van Ameringen, Mancini, Patterson and Bennett (2007) suggest that in actuality, almost one in 10 civilians meets the criteria for post-traumatic stress in his or her lifetime. Post-traumatic stress disorder (PTSD) has become a global health issue (Tanielian, 2009). Van Ameringen et al. (2007) suggest that at any given time, 2.4% of the population is experiencing symptoms of post-traumatic stress.

A vast research literature documents the physiological and somatic effects of post-traumatic stress (Levine & Frederick, 1997; Rothschild, 2000; Ogden et al., 2006; Van der Kolk, 2006). Experiences of extreme stress may impact the entire body, involving physical changes of the brain and brain chemistry that influence future stress responses (Van der Kolk et al. 2005). Trauma causes a disruption of brain functioning as the amygdala and autonomic nervous system are continually in highly alert states of arousal. Experiences of traumatic stress inhibit the natural regulating flow between the parasympathetic and sympathetic bodily systems. This imbalance may cause physiological responses in the body after the traumatic situation has ceased including, but not limited to, rapid heart beat, difficulty breathing, muscle tightness, hyper-arousal, inability to relax, chronic pain, mood issues, racing thoughts, and substance abuse (Briere & Spinazzola, 2005).

Imbalances of the nervous system may create feelings of depression, anger, anxiety, extreme fear, racing thoughts, low mood, low energy, difficulty with sleep, dissociation, body numbness, digestive and immune system difficulties (Briere & Spinazzola, 2005). PTS symptoms are common in survivors of trauma, often embedded in a complex trauma spectrum

that includes anxiety, substance abuse, mood issues, self-efficacy, sleep issues, and somatic complaints (Breslau, 2002; Breslau, Davis, Peterson, & Schultz, 2000; Van der Kolk et al., 2005). Individuals with a trauma history have a four to twelve times greater risk for attempting suicide, a four to twelve times greater risk of mood disorders and all forms of substance abuse, a two to four times greater risk for smoking, a 1.4 to 1.6 times greater risk for physical inactivity and obesity, and a 1.6 to 2.9 times greater risk for developing heart conditions, cancer, lung disease, skeletal fractures, hepatitis, stroke, diabetes, and liver disease than a person without a history of trauma (Felitti et al., 1998; Saxe et al., 1994). As the issues of trauma are complex and can impact individuals over the lifespan, effective treatment interventions are required.

Individuals with PTS typically re-experience the stressful situations of the past in the present, avoid trauma-related stimuli, have increased symptoms of physiological arousal, and often exhibit a constellation of physical and mental health issues (Van der Kolk et al., 2005). Symptoms of trauma may not manifest immediately after the event has occurred and in fact may emerge weeks or years later. Inability to cope can result in mood difficulties, feelings of low self worth and helplessness. Treatment interventions should focus on alleviating these symptoms and providing feelings of comfort and security in the present by allowing individuals to feel comfortable in their own body.

While numerous individual and group therapeutic approaches are utilized for the treatment of PTS, exposure therapies including Cognitive Behavioural Treatment (CBT), prolonged exposure (PE), and Eye Movement Desensitization (EMDR) are considered the treatments of choice for PTSD (Ursano et al., 2007). Although exposure treatments are often helpful in reducing PTS symptoms, it has not been convincingly demonstrated that a reduction in PTS symptoms translates into improvements in the individual's cognitive, emotional, and behavioural development, including overall improvements in lifestyle. Furthermore, because conventional trauma therapy focuses on the story, the cognitive narrative of the mind, the

physical, visceral, and body-based dimension of PTSD is neglected (Emerson & Hopper, 2012). The impact of treatment on the overall lifestyle of trauma survivors has undergone little systematic investigation.

Moroz (2005) suggests that: “If clinicians fail to look through a trauma lens and to conceptualize client problems as related possibly to current or past trauma, they may fail to see that trauma victims, young and old, organize much of their lives around repetitive patterns of reliving and warding off traumatic memories, reminders, and affects.” (p. 12)

Overall, individuals with PTS fail to demonstrate appropriate emotional responses because they are re-living prior trauma patterns, unable to identify bodily sensations, cannot deeply relax because of high arousal, have low-self worth and few coping skills. Often caught in the experiences of their trauma, individuals are unable to relate to their current experiences (Van der Kolk, 2006). Considering the prevalence of trauma in our society, clinical interventions that calm the mind and body are required.

Treatment approaches that consider both the physiological and psychological outcomes of PTS are likely appropriate for individuals with trauma. Therapies that engage the mind and body may take into account the psychosomatic struggles of survivors of PTS. These therapies focus on developing inner awareness of sensations and relaxation, and enhancing locus of control or mastery skills related to feelings of competence and self-worth. Participants may learn tools to support their own healing. Further, these approaches may be an appealing adjunct or treatment of choice for individuals with PTS because they are empowering, cost-effective and of shorter treatment duration.

This study suggests that a yoga-based intervention may be supportive of the issues presented by PTS. As an ancient mind-body practice, Yoga focuses on breathing and physical exercises that combine muscle relaxation, meditation, and a physical movement (Granath, Ingvarsson, von Thiele & Lundberg, 2006). Numerous yoga schools exist, one of the most

common being Kundalini Yoga (KY). Kundalini yoga is a physical movement practice that stimulates blood flow and energy to the brain, nervous system, and endocrine glands (Shannahoff-Khalsa, 2010). Yoga is also regarded as a promising treatment for stress-related issues (Brown & Gerbarg, 2005). The proposed research utilizes an eight-week Kundalini yoga based intervention to examine issues of post-traumatic stress, sleep, mood, mindfulness, perceived stress, affect regulation, and resilience at baseline, mid-program, and program completion. Participants who complete the yoga program will also participate in a semi-structured phone interview. This allows a fuller understanding of their perspectives.

Emotional self-regulation is an essential aspect of trauma recovery. Yoga practices help to calm the mind and build awareness of mind and body. Empirical research suggests positive associations between self-awareness, emotional regulation, emotional attunement, and the human brain (Segal, Williams, & Teasdale, 2002; Segal, Williams, Teasdale & Kabat-Zinn, 2007). Mate (2009, p. 344) suggests that “mindful awareness is the key to unlocking the automatic patterns that fetter the addicted brain and mind.” The proposed research suggests that by learning and practicing appropriate techniques that focus on building mental and physical awareness, the brain of an individual with PTS has the ability to repair itself (Doidge, 2007).

Kissen and Kissen-Kohn (2009) maintain that the practice of yoga can create new pathways in the brain through breath and relaxation exercises. Neuroscience evidence suggests that with practices that stimulate the nervous system, it is possible for the brain to repair (Doidge, 2007; Siegal, 2007). As KY is based on principles aimed to enhance the neurologic and glandular system, this action-oriented treatment may have the potential to repair some of the mind-body disruptions caused by trauma.

To date, empirical research has evaluated the efficacy of meditation and yoga techniques alone or as part of broader treatment, finding that yoga aids in increasing awareness of one’s physiological and psychological state (La Forge, 1997; Waelde, Thompson, & Gallagher-

Thompson, 2004). Within the medical community, there is now a growing interest in studying the physiological and psychological effects of meditation and yoga. Some researchers have applied KY to their clinical setting (Cromie, 2002; Lazar et al., 2000). Arambula, Peper, Kawakami and Gibney (2001) and Peng et al. (1999) examined the physiological correlates of heart rate oscillations and slow breathing associated with KY practices and found that for patients with heart conditions, KY helped to slow down the body and related anxiety. Venkatesh Raju, Shivani, Tompkins, and Meti (1997) concluded that meditation practice resulted in structural changes in the brain as well as participant phenomenological experiences of consciousness. Furthermore, Shannahoff-Khalsa (2004) conducted clinical trials of KY for the treatment of psychiatric disorders such as obsessive-compulsive disorder and anxiety. To date, no empirical research has examined KY for symptoms of post-traumatic stress.

An obvious and efficacious benefit of yoga is how relaxing and calming it is. Through the breath, yoga reduces anxiety, thereby creating a more alert and focused mind (Goldin & Gross, 2010). Sexton (2004) states that, “Yoga gives participants behavioral coping tools so they can handle their emotions instead of being controlled by them” (p. 89). This is a significant factor to consider when working with individuals with PTS. It is anticipated that through yoga, participants will learn skills to emotionally self regulate, and be “in tune” with themselves to restore balances within the body so deep relaxation can occur. As participants may gain skills to support themselves, they may develop mastery skills and locus of control thereby increasing feelings of self-confidence and self-worth. Accordingly, this research suggests that yoga may be a promising treatment or adjunctive therapy for the physiological, cognitive, emotional and behavioural issues associated with trauma, and PTS specifically.

The use of yoga as a treatment option for improving physiological and psychological outcomes and self-reported feelings of well-being for individuals with PTS has the potential to further the healing journey. Many symptoms of PTS are stored in the body and manifest

physiologically. As yoga brings equanimity to the imbalance of mind, body and spirit, it can provide a safe, gentle, and effective way to help clients experience their struggle and pain without rehashing the past (Stukin, 2002). Through movement, people may release the emotional pain in their bodies that they may have otherwise been unable to process through traditional “talk therapies” (Mate, 2003). Teaching participants practical skills for emotional modulation, mind-body awareness and self-soothing may complement traditional cognitive-based approaches that are used in trauma specific treatment programs.

The intervention that this research examines is grounded in the philosophy that mind-body interventions focus on empowering and developing strength in those affected by trauma. If the struggles experienced by individuals with trauma are viewed as opportunities to support healing, it is possible that mind-body interventions have the potential to relieve PTS symptoms and improve overall health. It is anticipated that through yoga, physiological and psychological changes will occur, reducing PTS symptoms. As KY focuses on developing awareness and stimulating the nervous and glandular systems, trauma survivors might improve physical, mental, and emotional health and learn self-care techniques leading to enhanced well-being and resilience.

1. LITERATURE REVIEW

1.01 Post-Traumatic Stress: Definition, Causes and Symptomology

Post-traumatic stress directly affects large segments of the population. As described in the Diagnostic and Statistical Manual of Mental Disorders-5 (APA, 2013), post-traumatic stress disorder (PTSD) has been characterized by the persistent re-experiencing of the traumatic event (intrusions/flashbacks), persistent avoidance of stimuli associated with the trauma, numbing of general responsiveness, and persistent symptoms of increased physiological arousal (APA, 2013).

Trauma survivors have experienced an event or multiple events that threatened life or physical integrity of self or others with accompanying emotions of intensified fear, helplessness or horror (APA, 2013). This trauma is then re-experienced with accompanying psychological and physiological distress in the manifestation of intrusive and distressing recollections of the original event, sleep disturbances, flashbacks or hallucinations, distress and reactivity when exposed to triggering cues of the original trauma (APA, 2013).

PTSD is one of the most common psychiatric disorders with a lifetime prevalence of 7.8% (Van der Kolk et al., 2005). The highest rates of PTSD, ranging from one third to more than half, are amongst rape survivors, military personnel, and survivors of ethnically or politically motivated genocide (APA, 2013). While these are the most widely cited causes of post-traumatic stress, the mind and body's ability to react to stressful exposure is a very individual experience. For many, PTS symptoms can manifest in response to disruptions and stresses in interpersonal relationships, accidents, death, and any other self-perceived trauma.

Epidemiological research (Emerson, Sharma, Chaudhry, & Turner, 2009) has demonstrated that American men, who were the population originally studied to establish PTSD diagnostic criteria, are traumatized most by war, accidents, natural disasters and assaults. For women in the U.S., the most frequent cause of traumatization by far is childhood abuse (Kessler,

Sonnega, Bromet, Hughes, and Nelson, 1995). Childhood sexual abuse is more than twice as prevalent as adult rape, existing in about 10% of the overall population (Breslau, Davis, Andreski, Peterson, & Schultz, 1997; Kessler et al., 1995). Finkelhor, Hotaling, Lewis, and Smith (1990) found that between 17 and 33% of the general population report histories of sexual and physical abuse. These rates go up to 35 to 50% in mental health settings (Cloitre, Cohen, Edelman, & Han, 2001).

Acierno, Resnick, Kilpatrick, Saunders, and Best (1999) report that of the almost 4 million assaults annually reported in the U.S., 63% are by strangers. For women, almost 3 million assaults are reported annually, 62% by a person they know; 61% of all rapes occur before victims are the age of 18; with 29% before they turn 11 years old. Usually the perpetrators are family members (Acierno et al., 1999). Abuse and neglect of children of both genders is common in North American society and their effects over time are well documented. PTSD is a frequent diagnosis among individuals who experience such events (Ackerman, Newton, McPherson, Jones, & Dykman, 1998).

A number of studies have shown that post-traumatic stress rarely occurs alone and that traumatized people often exhibit a constellation of related issues that typically include anxiety, depression and somatization (Kessler et al., 1995). The National Comorbidity Survey (Van der Kolk et al., 2005) concludes that of those with PTSD, approximately 84% had another lifetime diagnosis. The probability that someone with PTS will meet criteria for three or more additional disorders ranges from 8 to 14% (Van der Kolk et al., 2005). The Australian National Comorbidity study (Creamer, Burgess, & McFarlane, 2001) assessed 10,600 individuals and found that 88% of the sample with PTSD had at least one other diagnosis: most commonly depression (48%) and alcohol abuse (52%). Of persons with PTSD, 59% had three or more disorders (Creamer et al., 2001). Research by Van der Kolk (2006) in the DSM IV Field Trial demonstrated that individuals with trauma exhibit a number of maladaptive patterns.

In Van der Kolk et al. (2005), the authors conclude that:

“It seems of paramount importance to address critically the fact that psychiatric disorders... in particular PTSD, seem to occur rarely in pure form, without comorbidities... This implies that the focus of trauma research needs to extend beyond the traditional preoccupation with PTSD as the sole outcome of traumatization and more closely to attend to the full range of disordered psychological domains, including disturbances in perception, information processing, affect regulation, impulse control, and personality development, that are now relegated to various other comorbidities (p. 396).”

Post-traumatic stress can have numerous negative outcomes on mind, body, and health across the lifetime. This study attempts to examine associations between post-traumatic stress and sleep, mood, mindfulness, perceived stress, affect regulation, and resilience. As post-traumatic stress is clearly associated with accompanying physical and psychological problems, it is necessary to understand how post-traumatic stress manifests in the mind and body.

1.02 Post-Traumatic Stress: Mind and Body Evidence

Individuals with PTS experience disintegration between mind and body (Rothschild, 2000). Van der Kolk (2006) emphasizes the effects of extreme trauma on the body. A PTS victim lives inside a “body frozen in a state of fear, terror, and hypervigilance.” He goes on to say “the effect of trauma is in relationship to one's body. One's body gives the signal that it is not safe, and your body keeps fighting an existing enemy.” (p. 258) The feeling of fear and inability to feel safe emerges from the mind and an imbalance in the autonomic nervous system. To understand the mind-body experiences of PTS survivors first requires an examination of the brain.

The neuropsychological dynamics of post-traumatic stress may be understood through a grasp of the functional hierarchies of the brain. According to this model, our human capacity for self-awareness, reflection, abstract thought, interpretation, and feeling exists within a developmental hierarchy of instinctual and unconscious bodily responses (Bundy, Lane, Murray, & Fisher, 2002; Ogden et al., 2006). P. D. MacLean (1990) has called this hierarchy the “triune brain” and described it as the product of evolutionary development.

According to his theory, the first to initially develop in the womb is the reptilian brain (comprising the brain stem and cerebellum), governing arousal, metabolic homeostasis, reproductive drives, sensation, and instinctual behaviours (P. D. MacLean, 1990). Surrounding this primitive brain is the “paleomammalian brain” or “limbic brain,” found in all mammals, which serves to regulate somatosensory experience, emotion, memory, some social behaviour, and learning (Cozolino, 2002). The neocortex, which governs cognitive information processing, conceptual thinking, self-awareness, and executive functioning, is the last to develop (P. D. MacLean, 1985).

This hierarchical arrangement allows for two distinct flows of information processing: from the neocortex back to the limbic brain, the brain stem, and cerebellum; and in reverse. In the absence of trauma, the more recently evolved prefrontal cortex acts as the “control centre” over our subcortical activity with “veto authority” over our limbic impulses. Under these circumstances, we are able to plan and set executive priorities, and discomforting emotions are overridden to accomplish these priorities. We are aware of our somatic and sensory experiences, but we govern our actions and behaviours based on conscious decision-making (Schore, 2002).

Under trauma however, intense emotions and sensorimotor reactions have the capacity to disorganize our cognitive processing, conceptual thinking, self-awareness, and executive functioning. Under these circumstances, dysregulated autonomic arousal creates strong waves of bodily sensations, which in turn are interpreted as confirmation of the cognitive conviction of danger. An internal cue, such as a rapid heart rate, may inflate and compound the flood of sensorimotor and emotional reactions, causing the experience to quickly escalate beyond our integrative capacity. This phenomenon has been called “bottom-up hijacking” (LeDoux, 2002). When this occurs, overwhelming emotions flood the mind and body.

When exposed to traumatic reminders, participants with post-traumatic stress show increases of cerebral blood flow in the right medial orbitofrontal cortex, insula, amygdala, and

anterior temporal pole, and a relative deactivation in the left anterior prefrontal cortex, specifically in Broca's area, the expressive speech centre in the brain, the area necessary to communicate what one is thinking and feeling (Porges, 1996). This explains why individuals with PTS may have difficulty describing sensations of mind and body.

Using script-driven symptom provocation methodologies (Rauch, Shin, & Phelps, 2006) neuroimaging studies provide evidence that irregularities in the nervous system are responsible for reliving memories, heightened attention, and arousal characteristics of post-traumatic stress. This is why individuals with post-traumatic stress have difficulty with emotional self-regulation and articulation of feelings. They are overwhelmed with emotion and unable to attune to their internal states.

Ogden et al. (2006) propose that the body's ability to achieve homeostasis becomes challenging when the individual is exposed to repeated or chronic stress. Van der Kolk et al. (2005) have labeled trauma as a disorder of extreme stress. Streeter et al. (2012) suggest that extreme stress induces an increased cumulative biological burden from the repeated attempts to adapt to ongoing or repetitive stressful events.

According to McEwen (2007), the allostatic load is a summary measure to describe the wear and tear arising from the body's efforts at maintaining stability when deviating from the typical homeostatic range. Allostasis involves two-way communication between the brain and the cardiovascular, immune, metabolic and other systems via the nervous system, endocrine system and hypothalamic-pituitary-adrenal (HPA) axis (Streeter et al., 2012). Such chronic physical wear on the body can be reflected in the onset of pathophysiological conditions and disease progression. The same physiologic systems activated by stress that can protect the body in the short term, can also damage the body over time (McEwen, 2007; Streeter et al., 2012).

Corticosteroid hormones, for example, protect the brain from adverse effects and are essential for cognitive performance. Corticosteroid effects on cognition can, however, turn from

adaptive to maladaptive when the stress response continues over prolonged periods (De Kloet, Oitzl, & Joëls, 1999). For instance, individuals with PTS have difficulty with memory, focus and attention. These challenges are later discussed.

Studies demonstrate that during chronic stress, the HPA axis is activated in different ways dependent on the type of stressor, the person's response to the stressor, and other factors. Uncontrollable stressors that threaten physical integrity or involve trauma tend to have a high, flat diurnal profile of cortisol release, with lower-than-normal levels of cortisol in the morning and higher-than-normal levels in the evening, resulting in a high overall level of daily cortisol release (G. Miller, Chen, & Zhou, 2007). While cortisol levels typically are found to be high in sufferers of PTS, secretions of the chief inhibitory neurotransmitter gamma-Aminobutyric acid (GABA) tend to be suppressed below normal levels (Streeter et al., 2012). Low GABA is associated with depression, anxiety, and epilepsy (Streeter et al., 2007).

Individuals exhibiting post-traumatic stress also demonstrate a decrease in heart rate variability (Van der Kolk, 2006; Streeter et al., 2012). According to polyvagal theory proposed and developed by Porges (2001), trauma is associated with a loss of tone in the vagal complex. The vagal pathways regulate the autonomic state and the expression of emotional and social behaviour. Thus, according to this theory, autonomic system imbalance is likely the common pathway between stressful emotions and poor health (Porges, 2001; Thayer & Brosschot, 2005).

At any stage of life, exposure to traumatic experiences is highly related to disruptions in the prefrontal cortex (P. D. MacLean, 1985). Traumatic experiences impact how individuals cope with emotions. Studies demonstrate that when reminded of a personal trauma, regardless of the age at which the incident occurred, brain regions that support intense emotions are activated, while activity is decreased in the brain structures related to the inhibition of emotions and the translation of experience into communicable language (Porges, 1996).

1.03 Behavioural and Emotional Post-Traumatic Stress

It is helpful to understand how trauma exposure impacts the mind and body in the course of human development. The ability to respond to environmental stimuli in a flexible and modulated communicable manner, termed the human response condition, emerges slowly. For instance, babies or small children have little control over their crying and clinging when they feel abandoned, nor do they have much control over showing excitement when they are happy (Van der Kolk, 2003; 2006). After signaling distress, children depend on their adult caregivers to take action and to resolve the situation. To calm the child, a caregiver may try to make changes to the surrounding environment. Children can only develop emotional autonomy from their caregivers when the prefrontal cortex has been adequately developed. In doing so, children can appraise their internal state and take actions necessary to restore homeostatic disturbances (Van der Kolk, 2006). According to Jean Piaget (1937), the goal of development is “‘decentration’: having your emotions, not being them” (p. 69).

For individuals with trauma exposure, irregular emotional functioning may be related to underdevelopment of the brain. Porges (1996) demonstrates that during the human life cycle, the presence of trusted individuals has a critical affect on emotional regulation. One particularly critical period during the course of human development lasts from when a child is approximately 10 or 12 months old to 16 or 18 months old, when the areas of the right frontal lobe are developing. These areas shape the brain circuits that will allow infants to maintain human attachments and regulate emotions (Doidge, 2007). Experimental research demonstrates that for humans to regulate their emotions and socially connect, they must experience this kind of interaction hundreds of times in the early critical period and then have it reinforced later in life (Damasio, 2003; Doidge, 2007).

Bandura's (1971) social learning theory suggests that learning is a shared process: people learn from one another, via observation, imitation, and modeling. Often called a bridge between behaviourist and cognitive learning theories, social learning theory encompasses attention, memory, and motivation. Individuals must observe a behaviour, retain it in memory, and be motivated to reproduce the behaviour that is being modeled. Particularly for individuals who experienced trauma in the context of interpersonal relationships, these opportunities for social connection are diminished. With reduced opportunities to form healthy relational connections, individuals are unable to abolish engrained emotions of trauma related cycles, relational difficulties, and problems with emotional regulation. Thus, often unbeknownst to individuals with post-traumatic stress, they live a life in which they are unable to regulate emotions, thoughts, and impulses related to experienced trauma (Van der Kolk, 2006; Holzel et al., 2011). For example, neuroimaging studies reveal that emotions of intense fear, sadness, and anger cause increased activation of the subcortical brain regions and significant reductions of blood flow in areas of the frontal lobe (Van der Kolk, 2006).

Many survivors of trauma may either experience flashbacks of the traumatic events or have difficulty remembering aspects of their lives. Prior trauma exposure can overwhelm "normal" memory storage and leave individuals who have been exposed to trauma vulnerable to fragmented memories. Due to dysfunctions of frontal-subcortical circuitry (Van der Kolk, 2006) and an inability to integrate in the mind past and present events, post-traumatic stress creates difficulty with working memory and sustained attention. These challenges make it hard to perform tasks with focused attention, and hence, with being fully engaged in the present (Krystal, 1988).

Trauma survivors are likely to react with irrational and sub-cortically initiated responses that may have been somehow appropriate during their original traumatic episode, but are not

relevant, and possibly harmful, at present. Van der Kolk (1994) suggests that in the present, individuals exhibiting symptoms of post-traumatic stress are “unable to integrate traumatic experiences and their tendency, instead, to continuously relive the past are mirrored physiologically and hormonally in the misinterpretation of innocuous stimuli as potential threats” (p. 96). Reminders of the past can automatically stimulate certain neuropsychological responses. In one example, Kardiner (1941) highlights how WWI veterans riding on the New York subway would duck in fear and behave as if they were back in the trenches when the train entered a tunnel.

Without an ability to interpret the somatic and behavioural residues from their past, the emotions and actions of trauma survivors may seem out of place and bizarre. PTS symptoms typically result if a traumatic event causes an over-reactive adrenaline response, which in turn causes deeply engrained physiological patterns in the brain. Trauma cycles or patterns persist after the traumatic event has passed and can make the individual hyper-responsive to future situations (Rothschild, 2000).

Typically, extreme trauma causes a sufferer to exhibit a state of hyper- or hypo-arousal. Hyper-arousal involves mobilizing defenses: fight or flight. Hypo-arousal involves immobilizing defenses: freeze, submit, or play dead (Van der Kolk, 2000; 2003; 2006). The fight or flight response is characterized by arousal of the sympathetic nervous system and the corresponding neurochemically mediated physical reactions (Streeter et al., 2012). The human system is primed for action and awareness of pain or injury is diminished. Essentially, this is a survival response as the individual tries to protect itself from danger. Re-lived trauma in the present may also unconsciously summon up a desperate fight response (Nijenhuis & Der Hart, 1999).

When escape is possible, the flight response is the most common response to threat and may be understood both as running away from danger and also as running to safety (Bowlby, 2005; Nijenhuis, 2004). Throughout the animal kingdom, immobilizing defenses are utilized when mobilizing stratagems cannot ensure survival (Misslin, 2003; Nijenhuis & der Hart, 1999). For example, a child sexually or physically abused by a caregiver is not in a psychological position that enables flight. Running or fighting would worsen the situation for the abused, or the witness of abuse, increasing their vulnerability and provoking more violence (Nijenhuis & Der Hart, 1999).

While freezing appears as a passive defense, often it reflects a state of alert mobility. The sympathetic system is highly engaged; there is no movement except for respiration and movement of the eyes as the individual awaits information before taking action (Misslin, 2003; Lewis, Kelly, & Allen 2004). Freezing also serves as a preventative measure when the predator is still at a distance and motionless behaviour may prevent detection. A third type of freezing described by clients is a feeling of being paralyzed, incapable of moving or breathing. There is a sense of being trapped and unable to take action (Levine & Frederick, 1997; Siegel, 1999).

The immobilizing defenses may be visibly present in a vestigial form among trauma survivors. Submissive physical expressions designed to prevent or interrupt aggressive actions, such as crouching, avoiding eye contact, and generally appearing physically smaller and non-threatening, are also common (Misslin, 2003). These physical and observable behaviours are also associated with feelings of low confidence, motivation difficulties, and an inability to regulate emotions. PTS survivors often report ongoing fear and an inability to control their lives.

Studies of the role of the autonomic nervous system (ANS) in relation to post-traumatic stress consistently find that stress activates both the sympathetic and parasympathetic nervous systems. Exposure to stress at any age, combined with a lack of adequate techniques to calm

self, significantly impacts the long-term capacity of the human organism to regulate subsequent sympathetic and parasympathetic nervous system stress responses (Krystal, 1988).

When the limbic system, the instinctual part of the brain, perceives danger, messages are sent to the ANS. It has two parts: the sympathetic nervous system (SNS) is activated in times of stress and gets the body primed for action and the parasympathetic nervous system (PNS) is activated in states of rest and relaxation (Streeter et al., 2012). Ideally, the SNS and PNS function in balance. With post-traumatic stress, the SNS is overactive while the PNS is underactive (Streeter et al., 2012).

Trauma experiences increase stress hormones in the body, which may also increase post-traumatic stress symptoms (Ogden, 2004). Symptoms of PTS may include but are not limited to: anger and irritability, increased heart rate, fear, guilt, shame and self-blame, feelings of mistrust and betrayal, depression, anxiety, hopelessness, suicidal ideation, isolation and physical aches and pains (Levine & Frederick, 1997). Individuals with post-traumatic stress have difficulty calming down or emotionally self-regulating. These challenges are reflected in higher levels of sympathetic nervous system activation and lower heart rate variability (HRV), a marker of the autonomic nervous system (ANS)'s flexibility (Cohen et al., 1997; Cohen, Matar, Kaplan, & Kotler, 1999). As the parasympathetic system is suppressed, the body is unable to enter deep relaxation making it unable to self-soothe and regenerate. Symptoms of PTS may be understood as failure of natural physiological activation and hormonal secretions of the organism to effectively respond to an overwhelming threat (Damasio, 2000).

A corroboration of research findings (Damasio, 2000; Krystal, 1988; Siegel & Barros, 2007) consistently demonstrates that the lateral nucleus of the amygdala is the critical anatomical brain structure involved in forming conditioned fear memories. In the absence of trauma, the amygdala communicates and distributes output to brainstem areas controlling ANS

responses. The ANS has connections with the periaqueductal gray region of the brain, which controls bodily reactions of freezing or immobility, and connections with the periventricular hypothalamus controlling endocrine responses of the hypothalamic-pituitary-adrenal axis (Van der Kolk, 2003).

Neuroimaging studies of post-traumatic stress demonstrate decreased activity of the corpus striatum. In the face of extreme stress or threat however, the individual organism responds by diverting information flow from the lateral amygdala to the motor circuits of the striatum. In this attempt at survival, the establishments of adequately conditioned endocrine and behavioural responses are prevented (Van der Kolk, 2000). Understanding the neurophysiology, behavioural and emotional underpinnings of post-traumatic stress is important because the struggles experienced by individuals are many.

Individuals with post-traumatic stress are unable to use their emotions as guides for effective actions; they are unable to recognize and label what they are feeling in the mind and body or to acknowledge their own needs. As a consequence, they cannot appreciate the emotional states of themselves or those around them (Van der Kolk, 2005). For many individuals, these experiences manifest as difficulties with relationships, mood, physical ailments, addictions and other related conditions.

Behavioural coping mechanisms among people with post-traumatic stress include efforts to avoid any thoughts or activities related to the original traumatic event. Many individuals struggle with severe mood, anxiety, sleep, and related conditions that impact their health, lifestyle, and motivation. They might also be unable to recall an important aspect of the traumatizing experience, and feel generally unmotivated and detached from significant people and events. People suffering from post-traumatic stress commonly are unable to plan for the future in respect to career, relational status, or lifespan (APA, 2000).

Well-established in the research literature is that locus of control, the extent to which people assume responsibility for their lives, predicts post-traumatic symptom severity as well as levels of depression, anxiety, and hostility (Porter & Long, 1999). Considering that individuals with post-traumatic stress experience deflated mood and often perceive that the circumstances of life are beyond their control, effective treatment interventions for PTS are likely those that focus on mastery experiences that can change attributional style and outcome expectations (Seligman, 1998). Such interventions may increase self-confidence and resilience. To date, trauma research has paid scant attention to fostering experiences of active mastery and therefore the capacity for effective coping.

Self-regulatory deficits may, in fact, be the most far-reaching effect of psychological trauma (Agaibi & Wilson, 2005). Loss of self-regulation manifests itself in a low threshold for emotional arousal and in frequent high intensity emotional reactions followed by a slow return to baseline. It is correlated with helplessness, loss of coping skills and a subjective feeling of loss of control (Seligman, 1998). The neuroanatomical issues that underlie these self-regulatory problems also are likely to contribute to the high prevalence of comorbid conditions and the prevalence of chronic health problems in patients with PTS (Schnurr & Green, 2004). PTS patients suffer from baseline autonomic hyper arousal and lower resting heart rate variability (HRV) than control participants (Cohen, Mater, Kaplan & Kotler, 1999). Presented with mental challenge tasks, PTS participants demonstrated greater arousal and less vagal control over heart rate (Sack, Nickel, Lempa, & Lamprecht, 2003). These data support the notion that PTS involves a fundamental dysregulation of arousal modulation (Streeter et al., 2012; Van der Kolk, 2006). Acknowledging the causes, symptoms and manifestations of PTS, a clinical discussion of treatment interventions ensues.

1.04 Conventional Therapeutic Interventions for Post-Traumatic Stress

Various therapeutic interventions are utilized in clinical treatment to support sufferers of post-traumatic stress (Foa, Keane, Friedman, & Cohen, 2008). These include group therapies, couple therapies, family therapies, art therapy, psychodynamic psychotherapy, and psychosocial rehabilitation (Ogden, 2004). Psychopharmacological treatment, consisting of the prescription of anti-depressants and mood stabilizers, is also commonly used. The symptom relief afforded by medication enables patients to stabilize moods and behaviours so that they can move ahead to more productive lives and to participate more effectively in other forms of psychotherapy, while reducing some of the attendant morbidity (and possible mortality) of post-traumatic stress (Davidson & Van der Kolk, 1996).

The therapeutic interventions of choice utilized for post-traumatic stress include Cognitive Behavioural Therapy (CBT), Prolonged Exposure (PE), and Eye Movement Desensitization and Reprocessing (EMDR) (Ursano et al., 2007). A brief overview of these treatments is provided.

Exposure Therapy (ET) or “prolonged exposure” is based on a behavioural model of anxiety where the client is seen as avoiding reminders of his or her original trauma. In this therapy, the client is gradually exposed to increasingly intense trauma reminders, often while practicing relaxation skills (Emerson & Hopper, 2012).

Cognitive Behavioural Therapy (CBT) is based on the concept that when thoughts are changed, behaviours will also change. Therapists or computer-based programs use CBT techniques to help individuals challenge their patterns and beliefs and replace "errors in thinking such as overgeneralizing, magnifying negatives, minimizing positives and catastrophizing" (Emerson & Hopper, 2012, p. 38) with "more realistic and effective thoughts, thus decreasing emotional distress and self-defeating behaviour" or to take a more open, mindful, and aware posture toward them so as to diminish their impact (Emerson & Hopper, 2012, p. 38).

Eye Movement Desensitization and Reprocessing (EMDR) is a type of exposure therapy where the client is instructed to visualize their traumatic event while moving their eyes from side to side. It may also involve exposure to simultaneous vibrations or tapping on different sides of the body, or various tones delivered by earphones (Ursano et al., 2007).

A recent meta-analysis found all of the trauma-focused treatments to be about equally effective. Generally, the trauma-focused therapies were more beneficial than traditional or supportive treatments not focused on trauma (Benish, Imel, & Wampold, 2008).

While exposure treatment is effective for reducing post-traumatic stress symptoms, it has not been convincingly demonstrated that a reduction in PTS is related to overall improvement in social, health, and occupational functioning. In fact, studies that address this issue generally do not find such a correlation (Walker et al., 1999). Neuroscience literature also demonstrates that clinical treatments to date are likely not effective for trauma populations because insight and cognitive approaches and the elusiveness of emotions and feelings are likely indicative of the extent to which the trauma narrative, or story, masks the reality of the body (Mate, 2003; 2009). Existing treatment outcome studies of PTS have primarily focused on the core post-traumatic symptoms; the impact of treatment on the social, interpersonal and overall health of trauma survivors has undergone little systematic investigation.

1.05 Limitations of Conventional Trauma Interventions

Since cognitive understanding and self-reflection are the basis of both psychodynamic psychotherapy and CBT that today predominate in professional schools of social service, neuroscience's recent discoveries of the organic nature of the post-traumatic stress experience have not readily been integrated into therapeutic practice. Mainstream psychotherapy views misplaced emotions as problems to be eliminated, rather than as cues for understanding underlying trauma (Van der Kolk, 2006).

Roger Sperry, Nobel Prize 1981, has described the brain as “an organ of and for movement.” However, with post-traumatic stress, survivors are known to respond to reminders of their original traumatic experience with emotions out of synch with present circumstances, and actions or freezing of action that, while appropriate during their original trauma, are no longer appropriate. These are issues that both conventional psychotherapies and drugs fail to address (Van der Kolk, 2006).

Conventional verbal therapy is generally inappropriate for people with post-traumatic stress as it is likely to awaken implicit memories or trauma-related bodily sensations, which in turn evoke feelings such as helplessness, dread, shame, and anger. As the explicitly remembered story of their original traumatization is retold, the implicit, somatosensory, remembered elements of the narrative are simultaneously activated. This often leads to a re-experiencing of somatoform symptoms. These can include: a breakdown of autonomic regulation, dissociative defenses associated with states of hyper- and hypo-arousal, intrusive sensations, and involuntary movements. This debilitating cycle of repetitive triggering of the mind-body can baffle desensitization regimes and extend the life of deeply ingrained trauma rather than resolving them (Van der Kolk, 2006).

Exposure therapy, the exposing of PTS sufferers to reminders of their original trauma, while widely considered to be a helpful treatment, is not applicable in every case. Some patients lack the internal and external resources to tolerate the physiological and emotional re-traumatization that often occurs during exposure. Clinicians will often not use this therapy out of concern that their clients' symptoms will worsen or they will drop out of treatment altogether (Becker, Zayfert, & Anderson, 2004).

Another issue with trauma therapies conducted one-on-one with a clinician is their time-intensive nature, taking many weeks and months, even years to reach a point of resolution. Such therapies can be prohibitively expensive. Lastly, there are not enough therapists trained in post-

traumatic stress treatment for the many thousands of acutely traumatized people who suffer from intense trauma. The U.S. military alone counts for anywhere from 103,000 to 336,000 post-traumatic stress sufferers (Tanielian, 2009). With just 7% of the U.S. population, the country's veterans account for 20% of its suicides (Lee, 2013). In 2012, more active duty U.S. servicemen and women died at their own hands than at the hands of enemy combatants (Londono, 2013). While most studies of refugee populations have not focused on the psychosocial effects of the stress of forced migration, several studies have documented refugee emigration to industrialized countries. One review of such studies conducted in Canada, the United States, and Sweden found indications of post-traumatic stress among 30 to 75% of refugee children and youth (Toole & Waldman, 1997).

Trauma therapy seeks to build safety in the environment prior to launching into the story of the trauma. If the story or cognitive memory emerges before the body is able to handle it, individuals with trauma are prone to re-living the trauma in the present. Thus, for individuals with trauma, learning to control one's arousal level is necessary for overcoming emotional regulation struggles as well as for developing feelings of autonomy. Considering the physiological and emotional struggles of individuals with post-traumatic stress, it is clear that trauma creates significant mind-body struggles (Van der Kolk 2000, 2005, 2006; Van der Kolk et al. 2005). The lack of synchrony between the mind and body also explains why individuals with post-traumatic stress are unable to focus in the present, respond with inappropriate emotions, and have difficulty connecting with their body (Emerson & Hopper, 2012).

It seems only natural that therapeutic interventions would involve assisting the individual with post-traumatic stress to become aware of their feelings and habitual patterns of movement. The one mainstream therapy that most emphasizes awareness of the present, or mindfulness techniques, is dialectical behaviour therapy (DBT). DBT focuses on supporting an individual to

develop skills related to self-awareness, effectiveness in relations with others, resilience, and emotional regulation (Emerson & Hopper, 2012).

Hull (2002) suggests that emotional memories are forever. Instead of focusing entirely on people's narrative of the past, the present study acknowledges that self-reflection and understanding alone cannot keep people who are traumatized from feeling and acting as though they are being victimized again in the present. This understanding enables clinicians and researchers the opportunity to explore methods that can offer the possibility of changing habitual physical, emotional, and behavioural responses. It is suggested that therapeutic interventions that teach techniques for emotional self-regulation, and awareness of thoughts and feelings may best support individuals with post-traumatic stress. Emotional modulation and self-soothing requires awareness of the present through labeling of emotions, often through breathing techniques (Emerson & Hopper, 2012). For these reasons, body-oriented therapies can confront core clinical issues of post-traumatic stress.

The clinical literature on post-traumatic stress treatment consistently suggests that being able to regulate affective arousal is critical to being able to deal with the traumatizing experience. Challenges with affect modulation in many traumatized individuals have forced clinicians to explore techniques that can help manage ongoing physiological arousal in response to traumatic reminders and ongoing life stresses. Non-Western healing traditions such as yoga that claim to regulate emotional and physiological states through physical movement, breathing and meditation, have not been extensively studied for the treatment of post-traumatic stress and associated problems.

1.06 Health and Mental Health: Recent Mind-Body Understandings and Therapies

Today, our understanding of the relationship of mind and body is evolving through our simultaneous exposure to new scientific research and the wisdom of other cultures. Books about advances in our understanding of how the mind and body really work together, such as Candace

Pert's *The Molecules of Emotion* (Pert, 1997) and Norman Doidge's *The Brain That Changes Itself* (Doidge, 2007) are best-sellers, translated many times over. At the same time, instructional media on meditation, relaxation techniques, and yoga are a veritable industry in the West (Philp, 2009).

Candace Pert, the author of 250 scientific papers, is also the discoverer of the opiate receptor, the cellular binding site for endorphins in the brain. Pert's extensive work in neuroscience has convinced her that mind and body are intimately related:

“In the end I find I can't separate brain from body. Consciousness isn't just in the head. Nor is it a question of mind over body. If one takes into account the DNA directing the dance of the peptides, the body is the outward manifestation of the mind.” (Pert, 1997, p. 187)

Doidge (2007) demonstrates growing evidence, as well as applications for neuroplasticity. These include case studies of people with all kinds of disabilities: everything from blindness to balance, sensory, learning and obsessive compulsive disorders; from strokes and anxiety to cerebral palsy, chronic pain and chronic depression. In each case, he found the individuals compensated for their disorder or disease through remarkable changes of brain function.

Discoveries and developments have inspired new interventions in the field of trauma rehabilitation. Pat Ogden developed Sensorimotor Psychotherapy (SMT) in the 1970s as a blend of psychotherapy and body-centred therapy (Doidge, 2007). About the same time, Marsha Linehan evolved the ideas and methodology of Dialectical Behaviour Therapy (DBT) that focuses on the development of important psychological capabilities and skills such as self-awareness, emotional regulation, resilience and interpersonal effectiveness that are often lacking in chronic trauma survivors (Fisher & Ogden, 2009).

Around 1999, Van der Kolk began to measure the heart rate variability (HRV) of his traumatized patients and his staff, recognizing it as a measure of the integrity of their emotional regulation. He found that the robust HRV of well-regulated people is mirrored in the capacity of

their inhalations and exhalations to produce rhythmical fluctuations in the heart rate. With further research, Van der Kolk found low HRV is associated with depression and anxiety. Coronary vascular disease and increased mortality are also indicated (Emerson & Hopper, 2012).

Conventional theory suggests that the human brain remains fixed after early childhood, subject only to deterioration. Recent scientific evidence suggests that the nervous system is able to reorganize itself by forming new neural connections throughout life (Doidge, 2007).

Individuals with post-traumatic stress are susceptible to reliving physical sensations and emotions from the past in the present moment. This research suggests that effective interventions for post-traumatic stress should focus on the patient's bodily experience, thereby possibly increasing their mindfulness, emotional modulation, and feelings of self-mastery.

Traumatic experiences are embodied in a trauma survivor's ongoing physiological states and behaviours. Interventions that focus on breath, sensory perceptions, feelings, thoughts, and bodily movements and gestures, are likely to be successful forms of therapy because they enhance mindfulness and self-regulation (Kissen & Kissen-Kohn, 2009, Siegel, 2007). Once individuals with post-traumatic stress learn to become aware of their own feelings and behaviours, they may creatively redefine their relationships to their environments, thereby creating and feeling a renewed sense of wellness.

1.07 Meditation as Therapy

The first eastern-inspired therapy practice in the West, Morita Therapy, is named after Japanese psychiatrist Shoma Morita (1874-1938), whose training in Zen Buddhism influenced his teachings (Kora & Sato, 1957). The most commonly practiced techniques in the West today are: Tibetan, Zen, and Vipassana meditation (Dakwar & Levin, 2009). The three practices vary considerably. Some techniques involve focusing on an object, a sensation, the breath, or a feeling such as human kindness. Other practices are more diffuse, directed toward cultivating

awareness, fostering attentiveness, and developing a dispassionate attitude. Some techniques combine the two approaches.

According to Buddhist belief, meditation is considered to be curative of the condition of human suffering, yet there are few randomized control trials of the efficacy of various practices as therapy for particular disorders. One isolated randomized control trial of 150 participants in a Buddhist retreat found that the enrolled group showed significantly lessened symptoms of depression when compared with the delayed-treatment group (Disayavanish, 1994).

According to Dakwar and Levin (2009), some therapeutic mechanisms of Buddhist meditation include: the restorative effects of the “relaxation response,” enhanced coherence of EEG wave patterns with alpha and theta predominance, increased neural plasticity, and a marked stimulation of a number of brain regions. Zen meditation also produces conditions of improved regulation of involuntary associative thinking and reduced age-related atrophy of the brain and loss of attention capacity (Pagnoni and Cekic, 2007). Compassion meditation has been shown to reduce the secretion of cortisol and potentially to enhance the brain-derived neurotrophic factor (BDNF) function, thereby reducing behavioural and neuroendocrinological outcomes caused by stress (Pace et al., 2009).

In 1966, Transcendental Meditation (TM) as taught by Maharishi Mahesh Yogi (born Mahesh Prasad Varam) arrived in the West and acquired many thousands of practitioners. The first study of the physiological effects of the practice was done by Robert Keith Wallace at UCLA and published in *Science* (Wallace, Benson & Wilson, 1971). In a subsequent study at Harvard University, the EEG and oxygen consumption, respiratory and heart rates, blood lactate and pH, and skin resistance of TM practitioners was measured. Benson described their wakeful hypometabolic state as “the relaxation response” (Wallace et al., 1971).

The TM technique consists of two meditation sessions a day, twenty-minutes at a time, one performed after waking and the other in the afternoon before dinner. Practitioners sit in a

comfortable posture with their eyes closed and in their minds recite a mantra that has been given to them (Dakwar & Levin, 2009). TM shares many of the metabolic mechanisms of action of Buddhist meditation: the restorative effects of the “relaxation response,” enhanced coherence of EEG wave patterns with alpha and theta predominance, increased neural plasticity, and a marked stimulation of a number of brain regions. Added to these shared effects, are dampened emotional reactivity and an increase in GABA (Dakwar & Levin, 2009).

With a large base of practitioners and their own Maharishi University in Iowa (founded in 1971), believers in TM promote their practice as a potential remedy for cardiovascular diseases, anxiety, addictive behaviours, and ADHD (Smith, 1975), and as an antidote to depression, a way to improved cognitive function and insight, and a help for making healthy choices (Dakwar & Levin, 2009). Studies of various degrees of methodological rigour abound. In a 12-week randomized control trial (RCT) of 73 elderly adults, there was no significant variance in depression between groups (Alexander, Langer, Newman, Chandler, & Davies, 1989). After 28 days of meditation, another RCT of 61 adults found significantly reduced symptoms (Wolf & Abell, 2003). A three-fold RCT with 55 participants comparing the efficacy of TM, relaxation training, and biofeedback as methodologies for the treatment of generalized anxiety disorder found there was no significant difference between the groups (Raskin, Bali, & Peeke, 1980).

Studies have recently begun to look at the relationship between meditative practices and PTS. J. Rosenthal, Grosswald, Ross, and N. Rosenthal (2011) conducted a pilot study to explore whether transcendental meditation (TM) supported veterans in Iraq suffering from PTSD. Veterans were followed for 12 weeks and participants showed improvements in PTS symptoms, quality of life enjoyment and satisfaction. Bormann, Thorp, Wetherell, Golshan, and Lang (2013) conducted a single-blind randomized clinical trial in which 146 outpatient veterans with PTSD were assigned to either a conventional therapy group or a 6-week mantra repetition

program. Results demonstrated a significantly greater reduction in both self-reported and clinician rated PTSD symptoms with the mantra group. Participants expressed that a major benefit of the received interventions were that medication was not a requirement. These findings suggest that individuals with PTS may seek out mind-body interventions because they are non-pharmacological and do not explicitly focus on trauma. Results suggest that mind-body interventions may encourage individuals with PTS to participate in exposure-based therapies and/or to enhance spiritual well-being (Bormann et al., 2013).

Jon Kabat-Zinn was originally instructed in the Buddhist practice of mindfulness at a retreat led by renowned Vietnamese monk Thich Nhat Hanh in 1978. Kabat-Zinn believed this practice would be helpful to people with chronic health conditions. He founded the Mindfulness-based Stress Reduction Program (MBSR) at the University of Massachusetts the following year. Jon Kabat-Zinn subsequently conducted studies on the usefulness of mindfulness meditation for chronic pain (Kabat-Zinn, Lipworth, & Burney, 1985), brain and immune function (Kabat-Zinn & Chapman-Waldrop, 1988; Davidson et al., 2003), anxiety disorders (J. Miller, Fletcher and Kabat-Zinn, 1995), and psoriasis (Kabat-Zinn et al., 1998). In each case, it was established that the mindfulness practice yielded positive, health-affirming results on a majority of the participants.

Therapies using mindfulness practices today are basically of three kinds: mindfulness-based stress reduction (MBSR), mindfulness-based cognitive therapy (MBCT), and dialectical-behavioural therapy (DBT). The mindfulness exercises resemble Buddhist meditation practices. Participants are instructed to sit in a relaxed and wakeful posture, watching their breath and observing their thoughts while remaining detached and non-judgemental. In addition to meditation, MBSR teaches participants a few hatha yoga poses, which they are encouraged to develop as a home practice. Acceptance and commitment therapy (ACT) and relapse-prevention

therapy (RPT) are related treatments that use skills consistent with mindfulness practice, but do not involve meditation (Dakwar & Levin, 2009).

Mindfulness practices are increasingly being tested for their efficacy in a number of treatment areas. In a RCT of 38 participants with mood disorder, those who participated in MBSR's 8-week class-based program, had significantly fewer mood symptoms and fewer ruminations (Ramel, Goldin, Carmona, & McQuaid, 2004). A RCT of 55 college students measured the comparative stress levels and capacity for forgiveness in three groups: mindfulness practice, another type of meditation, and no treatment. Both meditation groups experienced significantly reduced stress afterwards. They also developed a greater tendency to forgive (Oman, Shapiro, Thoresen, Plante, & Flinders, 2008). A number of MBCT RCTs combining mindfulness training and elements of cognitive-behavioural therapy for depression have been conducted to assess the therapy's effectiveness in preventing relapse of depressive disorders. Two small trials comparing MBCT and treatment as usual (TAU), found the mindfulness group associated with less relapses (Ma & Teasdale, 2004; Teasdale et al., 2000).

Kimbrough, Magyari, Langenberg, Chesney and Berman (2010) conducted an eight-week MBSR program with childhood sexual abuse survivors. At the twenty-fourth week of follow-up, they found statistically significant improvements on assessments of depressive symptoms, post-traumatic stress symptoms, anxiety and mindfulness. The limited but promising research to date warrants further investigation of mind-body approaches with PTS populations.

According to Farb et al. (2007), mindfulness practices disengage the mind from its narrative stream and re-engage it with present-moment centred awareness and its neural correlates, “away from midline cortices, toward a right lateralized network comprised of the ventral and dorsolateral PFC, as well as the right insula, SII and inferior parietal lobe.” Overall, there is less stress in relation to certain cues, cultivation of cognitive and behavioural changes,

growth of better coping skills, cultivation of acceptance and a reduction in maladaptive behaviours based on avoidance (Dakwar & Levin, 2009).

As observed by Dakwar and Levin (2009), some meditation practices exist in a context of “spiritual development.” While some potential practitioners might be put off by the religious associations of these therapeutic modalities – subtle in the case of mindfulness, less so in TM's case, and obvious in the case of Buddhist meditation – each of these conveys an integrative message of self-transcendence, inner work, and self-evolution. Meditative practices serve to instill a deep and intentional connection by tapping into people's inner resources and strengths to help experience their purpose, learn skills to handle stress, and to experience optimism, peaceful state of mind, increased concentration, and enhanced energy for day-to-day living (Finney, 2010). For persons with PTS, these inner resources often feel depleted. Meditation and yoga may serve as a practical tool to enhance one's overall mental well-being, including mind, body and spirit. Furthermore, meditation and yoga serves to teach self-discipline, change perceptions, and to teach how to overcome challenges while embracing difficulties.

Lazar et al. (2000) conducted a study with participants engaged in meditation practices. Results demonstrate that brain areas having to do with mental focus, introspection, and sensory processing were thicker in meditators than in matched controls. Studied areas included the prefrontal cortex and right anterior insula. These are the areas of the frontal lobe disrupted by traumatic experiences.

Lazar et al. (2000) study also lends support to the idea that treatment of traumatic stress may need to include enhanced awareness: becoming a sensitive observer of the ebb and flow of internal experience. In order to heal one's relationship with the past, it is helpful for individuals with trauma to learn to cultivate their capacity for self-awareness along with an abiding curiosity about their own internal experience (Siegel, 2007; Van der Kolk, 2006; Van der Kolk et al., 1996, 2005).

The present study proposes that by supporting survivors of trauma to become more attuned to sensory stimuli during formal mind-body practices, individuals with post-traumatic stress can enhance their ability to cope with potentially stressful encounters, learn to modulate emotions and learn to live in the present rather than being fixated by memories of the past. Mind-body awareness is likely necessary for an individual with post-traumatic stress in many ways: nervous system reorganization, emotional modulation, and self-mastery. Finally, mind-body awareness can allow the identification of physical and emotional sensations, and help the individual express self in a way that is understandable, most importantly, to themselves.

1.08 Prevalence of Yoga as Recreation and Therapy

Swami Vivekananda first introduced the practice of yoga to the West in 1893. At the invitation of classical scholar John Henry Wright, he spoke first at Harvard University. Vivekananda went on to tour North America and Europe (1893-97, 1899-1900), and to establish teaching centres in San Francisco and New York (Syman, 2010). Following Vivekananda, numerous yogis arrived in North America to tour, teach and publish on yogic practices.

The spread of yoga as a practice and a lifestyle took a significant forward leap in the late 1950s and mid-60s. Even as Maharishi Mahesh Yogi began to tour the world with his Transcendental (TM) technique (1959) and as Hare Krishna culture took root in New York City through the efforts of Bhaktivedanta Swami Prabhupad (1965), other remarkable teachers arrived from the east that would inspire and instill yoga practices into the lives of millions of westerners (Syman, 2010).

Richard Hittleman made yoga into a household word in America in the 1960s. After studying in India, Hittleman began to teach in his hometown of New York. In 1961, he started his *Yoga for Health* television program, airing first in Los Angeles, then nationally. The American-born yogi would later publish a series of popular yoga books, selling eight million

copies. Hittleman would share yoga's TV audience with Liliias Folan starting in 1972, when her popular series *Liliias! Yoga and You* began to air on PBS (Goldberg, 2010; Philp, 2009).

Swami Satchidananda arrived in New York City in 1966 at the invitation of pop artist Peter Max and gained public notice by being the opening speaker at the 1969 Woodstock festival. The swami's greatest contribution to yoga therapy in America was made through his students Sarah McLanahan and Dean Ornish. For twenty years, the two medical doctors packaged the main ingredients of their teacher's prescriptive lifestyle – including asanas (“stretching”), pranayama (“breathing exercises”), and meditation (“stress management”) – into a program for heart patients. Insurance companies were enthusiastic when they saw that lifestyle changes could preclude expensive surgery, and in 2008 U.S. Medicare agreed to cover the Ornish program (Goldberg, 2010; Philp, 2009).

Yogi Bhaian arrived in North America in 1968, ostensibly to teach yoga at the University of Toronto. Instead, like Swami Satchidananda, he immersed himself in the hippie counterculture while prescribing a lifestyle he described as “healthy, happy and holy” (Goldberg, 2010). In 1972, he responded to President Nixon's declaration of a war on drugs by initiating a two-week drug rehabilitation program based on Kundalini Yoga with two heroin addicts at his Washington, D.C. Centre. Dubbed “3HO Super Health,” a successful program was established in Tucson, Arizona, where the U.S. Joint Commission on Accreditation of Healthcare Organizations rated it in the top 10% of all treatment programs in the United States (M. Khalsa, 2008; Shannahoff-Khalsa, 2006). Yogi Bhaian early on recognized the psychiatric applications of his teachings. In the early 1980s, his student, David Shannahoff-Khalsa went on to test these Kundalini Yoga exercises, eventually to apply them in his clinical practice in San Diego, and to publish his findings in numerous academic papers and textbooks (Shannahoff-Khalsa, 2010).

Many other yoga teachers greatly contributed to the popularity of yoga in the West. Though he only visited America a few times, B.K.S. Iyengar's form of restorative hatha yoga

gained many practitioners. The author of the popular *Light on Yoga* and other books, he sought out yoga at the age of sixteen when he was suffering from a host of physical ailments. Pattabhi Jois, like Iyengar, never moved from India and only toured intermittently. His version of Ashtanga Yoga gained massive popularity in the West when it became known that pop icons Madonna and Sting were doing it. Another teacher who has attracted celebrities and their fans to his fold is Bikram Choudhury, proponent of Bikram Yoga (Goldberg, 2010; Philp, 2009).

Since the 1950s, the practice of yoga has grown from a countercultural phenomenon to something almost mainstream. According to a New York Times estimate, in the mid-60s just 20-100,000 Americans practiced yoga (Philp, 2009). A report by the International Association of Yoga Therapists quoted Dayna Macy, the circulation editor for *Yoga Journal* (founded in 1976) as saying that by 1990 that number had risen to one million (Lamb, 2004). The following years saw an exponential growth in the practice of yoga. A Roper Poll commissioned by the *Yoga Journal* in 1994 estimated there were six million Americans practitioners (Cushman, 1994). By 2008, the figure had more than doubled to 15.8 million. Four years later, it had again jumped to 20.4 million (Yoga in America Study 2012, 2012).

According to the Yoga Journal 2012 survey, the five main reasons given for practicing yoga were: to gain flexibility (78.3%), for general conditioning (62.2%), for stress relief (59.6%), to improve overall health (58.3%), and for physical fitness (55.1%) (Yoga in America Study 2012, 2012). A more detailed 2008 study based on the results of the U.S. 2002 National Health Interview Survey found that yoga was most often used to treat musculoskeletal or mental health conditions, severe sprains in the last twelve months and asthma. It was also used, though less frequently, for hypertension and chronic obstructive lung disease. Most practitioners reported yoga to be helpful for these conditions with a majority (61%) feeling their practice was important in maintaining their health (Birdee et al., 2008). Yoga continues to be bought and sold as a method to enhance well-being and reduce debilitating stress. Indeed, many health and

mental health professionals send their clients to yoga teachers for their assistance in ameliorating the symptoms of all kinds of stress-related issues (Michalsen et al., 2005).

Of particular relevance to this study is a recent paper describing the U.S. Department of Defense's successful introduction of integrative medicine practices into a variety of army-run PTSD treatment centres. According to the authors, bringing in alternative practices such as yoga and meditation to augment sessions of evidence-based exposure therapies “is due in no small part to demands from patients who seek alternatives to standard treatments that in some cases are perceived to be ineffective or incomplete.” (Sargent et al., 2013, p.1) The army program encourages participation in an hour-long class on meditation, including a guided fifteen minute meditation. Meditation was selected as an intervention because of its recognized effect of reducing hyper arousal and reducing substance abuse. An hour-long class of yoga postures and breathing every week is a required part of the program. This is held immediately after a session of exposure therapy since it has been found to help the participants stay functional after experiencing the intense emotions triggered by the psychotherapy.

1.09 Yoga: A Comprehensive Behavioural Mind-Body Practice

Yoga is a comprehensive system of practices for physical/psychological health and well-being, incorporating multiple techniques including physical postures/exercises, breathing exercises, and meditation. The physical exercises and postures of yoga emphasize flexibility over aerobic fitness/physical strength, and many are static/isometric in nature. Breathing exercises involve modifications of frequency and volume of breathing, which can stimulate changes in the mind and body (D. Morse, Cohen, Furst, & Martin, 1984; Pal, Velkumary & Madanmohan, 2004; Udupa, Singh, & Settiwar, 1975). Brown and Gerbarg (2005) suggest that mind-body interventions benefit both mental and physical stress-related disorders. They propose that through yogic breathing, the autonomic nervous system can be balanced, thereby helping ameliorate stress-related disorders of the body-mind. While the exact mechanisms have not been

clarified, Brown and Gerbarg (2005) suggest that breathing techniques can relieve anxiety and depression, as well as stress-related maladies, including everyday stress, post-traumatic stress, and stress-related medical illness. Descilo, Vedamurtachar, Gerbarg et al. (2010) introduced a yoga breath program to survivors in the 2004 Asian tsunami to evaluate its impact on their PTSD and depression symptoms. After three treatment groups were evaluated, it was found that the yoga breath interventions significantly reduced PTS symptoms.

Meditation, a key element within yoga practice, is generally associated with low arousal, decreased activation, and a wakeful tranquility (Delmonte, 1989; Jevning, Wallace, & Beidebach, 1992; Shapiro, 1982). Meditation consists of stimulation of a “relaxation response” by using an easy, relaxed mental focus (Benson, Beary, & Carol, 1974; Delmonte, 1989; West, 1979). Meditation is more effective than progressive relaxation as a stress-coping strategy (Carrington et al., 1980; Lehrer, Schoicket, Carrington, & Woolfolk, 1980), and is preferred over progressive relaxation by participants (Lehrer, Woolfolk, Rooney, McCann, & Carrington, 1983). As an integrative discipline, yoga takes advantage of the simultaneous application of its component techniques (Goyeche, 1979), all of which, individually and collectively, contribute towards stimulating the relaxation response.

Basic research on yoga and its component techniques have indicated that it is very effective in reducing arousal. Studies on the physical exercises have reported: reductions in muscle tension or electromyographic (EMG) activity and blood pressure, improvements in hormone levels and metabolism (Agte & Chiplonkar, 1992), reduction in autonomic sympathetic activation as measured by skin conductance and heart rate (Telles, Narendran, Raghuraj, Nagarathna, & Nagendra, 1997) and improvements in cognitive/psychological variables (Khasky & Smith, 1999; Szabo, Meskó, Caputo, & Gill 1998). Yogic breathing techniques have been shown to change cognitive and psychological variables (Jella & Shannahoff-Khalsa, 1993; Naveen, Nagarathna, Nagendra, & Telles, 1997), autonomic function (Bernardi, Sleight, et al.,

2001; Peng et al., 2004), blood pressure (Telles, Nagarathna, & Nagendra, 1996; Grossman, Grossman, Schein, Zimlichman, & Gavish, 2001), heart rate (Shannahoff-Khalsa and Kennedy, 1993), respiratory characteristics (Bernardi, Gabutti, Porta & Spicuzza, 2001; Spicuzza, Gabutti, Porta, Montano, & Bernardi, 2000), and brain electrophysiology (Shannahoff-Khalsa, 1991).

Research on the psychophysiological effects of meditation is extensive, reporting improvements in respiratory characteristics, oxygen consumption, and carbon dioxide elimination (Jevning et al., 1992), blood pressure (Barnes, Treiber, Turner, Davis, & Strong, 1999), and neuroendocrine and neurotransmitter activity in variables such as cortisol (Harte, Eifert & Smith, 1995). Improvements in autonomic function have also been reported from meditation studies measuring galvanic skin response (Telles, Nagarathna, & Nagendra, 1998; Woolfolk & Rooney, 1981), heart rate (Telles, Nagarathna, & Nagendra, 1995) and heart rate variability (Peng et al., 1999).

Changes in brain electrophysiology such as alterations in evoked potentials and changes in EEG characteristics (Lou, Kjaer, Friberg, Wildschiodtz, Holm, & Novak, 1999; Panjwani et al., 2000), cerebral blood flow characteristics (Lou et al., 1999), and cognitive/psychological characteristics have also been reported (Telles et al., 1997; Winzelberg & Luskin, 1999). Basic research on the effectiveness of yoga practice in the multicomponent fashion in which it is usually practiced has reported significant effects on flexibility (Ray, Mukhopadhyaya, Purkayastha et al., 2001; Tran, Holly, Lashbrook, & Amsterdam, 2001), respiration (Raju, Prasad, Venkata, Murthy, & Reddy, 1997), heart rate (Bowman et al., 1997), blood pressure (Ray et al., 2001), autonomic variables (Ray et al., 2001; Telles, Nagarathna, Nagendra, & Desaraju, 1993), brain electrophysiology (Kamei et al., 2000), stress tolerance (Schell, Allolio, & Schonecke, 1993), cognitive/psychological variables (Vani, Nagarathna, 1997), and neuroendocrine activity (Kamei et al., 2000).

It is not surprising that studies of long-term yoga practice have demonstrated reductions in levels of physiological arousal (Jevning et al., 1992). Long-term meditation practitioners have lower levels of cortisol and catecholamines than non-meditators (Walton, Pugh, Gelderloos, & Macrae, 1995). Plasma cortisol was also observed to decline following a 16-week intervention as compared with baseline values. In a prospective randomized trial, a 4-month meditation intervention resulted in a significant reduction in cortisol levels as compared with controls (C. Maclean et al., 1994; C. Maclean et al., 1997).

Meditation has also been reported to be effective in reducing perceived stress in occupational settings (Delmonte, 1984) and in a college setting (Deckro et al., 2002). A subsequent prospective study using the same autonomic measures in a randomized controlled trial with subjects in a 2-month yoga training program showed significantly lower sympathetic dominance and body temperature at end-treatment, an effect that persisted for 2 months after discontinuation of yoga (Gharote, 1971). Studies of physiological changes after a 3-month yoga practice have shown decreases in heart rate and blood pressure (Telles et al., 1993). A well-done randomized trial incorporating within- and between-subjects comparisons confirmed the decrease in heart rate, blood pressure, and temperature to a 10-month yoga intervention (Ray et al., 2001).

The psychophysiological effectiveness of long-term practice of yoga has led to its use as a therapeutic treatment (“yoga therapy”) for a variety of specific medical disorders (Shannahoff-Khalsa & Beckett, 1996). As is true for other mind-body practices, research shows that yoga is most effective in treating disorders that have a strong psychosomatic, psychological/psychiatric, or stress-related component (S.B. Khalsa, 2007). The number of yoga research studies is growing and suggesting that these practices may be helpful for mental health conditions.

Clinical improvements using yogic breathing techniques have been reported for psychiatric disorders (Janakiramaiah, Gangadhra, Naga et al., 2000) and significant effectiveness

of breathing techniques on the reduction of sleep onset latency in sleep-onset insomnia (Choliz, 1995). In a clinical population with high pre-treatment cortisol levels, a meditation intervention has been reported to yield significant reductions at post-treatment (Reibel, Greeson, Brainard and Rosenzweig, 2001). Clinical studies of the effectiveness of meditation have reported improvements in psychopathology (Reibel et al., 2001; J. Miller, Fletcher and Kabat-Zinn, 1995). Meditation has also been reported to be effective as a treatment for insomnia, either alone (Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003), or as part of a multicomponent treatment (Jacobs et al., 1993). Yoga was also found effective for depression (Janakiramaiah et al., 2000), anxiety (Kirkwood, Rampes, Tuffrey, Richardson, & Pilkington, 2005), and insomnia (Cohen, Warneke, Fouladi, Rodriguez, & Chaoul-Reich, 2004; S.B. Khalsa, 2004; Koch, Volk, Heidenreich, & Pflug, 1998).

Yoga-based relaxation techniques have been demonstrated to have a positive effect on HRV (Sarang & Telles, 2006). Benefits to cardiovascular risk factors and hormones have also been shown during a residential three-month yoga training combined with vegetarian diet (Schmidt, Wijga, Von Zur Mühlen, Brabant & Wagner, 1997). Interventions using yoga postures and meditation have been associated with decreased cortisol (Jevning, Wilson, & Davidson, 1978; Kamei et al., 2000; C. MacLean et al., 1997; Sudsuang, Chentanez, & Veluvan, 1991). Streeter et al. (2012) suggest that yoga reduces stress-induced allostatic load in three stress reactive systems: the ANS, the HPA axis, and the GABAergic system. These findings are critical as they address the physiology associated with PTS.

A number of comparison studies have demonstrated the relative efficacy of yoga practice. One such randomized trial compared the effects of a 12-week Iyengar yoga intervention with the effects of a 12-week metabolically matched walking intervention. Over the course of the study, there was an acute increase in thalamic GABA levels and improved mood and decreased anxiety in the yoga group compared to the walking group (Streeter et al., 2010). Another RCT compared

a group practicing an obsessive-compulsive disorder specific Kundalini Yoga (KY) meditation protocol against a comparison group that included two more common meditation techniques, relaxation response and mindfulness meditation. The trial showed results that the KY group surpassed conventional modalities, with a 71% improvement rate. At 3 months, the two groups were merged since the control group showed no improvement with any of the six psychological scales (Shannahoff-Khalsa, 1997; Shannahoff-Khalsa et al., 1999).

Streeter et al. (2012) propose a unifying theory to explain the effects of yoga in medical conditions with overlapping pathophysiologies based on their observation that participants in clinical trials have their underactive PNS and GABA system corrected in part through stimulation of the vagal nerves. Epilepsy, depression, PTSD and chronic pain are examples of conditions with low PNS and GABA activity that are exacerbated by stress, respond to drugs that increase GABA activity, and respond well to yoga-based interventions. According to this theory, the practice of yoga supports the return toward optimal balance in the PNS and GABA system and in the parts of the brain that respond to perceived danger. As allostatic load is reduced through the central regulatory systems becoming more flexible and balanced, general health improvements ensue. Understanding how physiology impacts an individual with PTS suggests that a holistic intervention like yoga may help to balance the mind and body.

Brown and Gerbarg (2005) suggest a neurophysiological model to explain the effects of yoga breathing. The fact that breathing is the one autonomic function that can be controlled by will and is vital to survival, supports their premise that willful modulations in the rate, depth, and pattern of breathing receive the highest priority in the PNS, SNS and interoceptive systems, and therefore have swift, systemic effects on the workings of the brain. Evidence shows that yoga breathing exercises increase HRV and PNS activity, improve sympatho-vagal balance, and promote stress resilience (Bernardi, Gabutti, et al., 2001; Brown & Gerbarg, 2005a, 2005b, 2009)

There is limited but promising research to date on yoga and post-traumatic stress.

Stankovic (2011) conducted an 8-week yoga intervention with combat veterans with PTSD. At study completion, participants reported reduced rage, anxiety, emotional reactivity, and increased feelings of relaxation, serenity, mindfulness, and self-efficacy. Following a period of heavy rainfall and landslides in north India that resulted in loss of life and property, Telles, Singh, Joshi, and Balkrishna (2010) randomly assigned individuals with PTS to either a yoga or non-yoga wait-list control group. Participants in the yoga group practiced yoga for an hour daily while those in the control group continued with daily routine activities. The study demonstrated that individuals in the yoga group experienced significant decreases in sadness while the control group demonstrated increases in anxiety.

While sparse, research on yoga and emotional regulation demonstrates that yoga programs have the potential to support individuals with PTS to modulate their emotions. Spinazzola, Rhodes, Emerson, Earle, and Monroe (2011) conducted a yoga program with traumatized youth in residential treatment. At program start, participants exhibited chronic affective and somatic dysregulation and related difficulties with behaviour, overall function, and health complaints, which improved over the course of the program. Anecdotal study findings and clinical observations suggest that yoga may be an effective approach to enhancing self-regulatory capacity in youth with PTS.

In addition to the previously cited review study of clinical trials of several types of meditation practices, including yoga, three new meta studies concerned only with trials on the therapeutic effects of yoga were published in 2012 (Balasubramaniam, Telles, & Doraiswamy, 2012; Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012; Vancampfort et al., 2012). This flush of new studies is indicative of a growing interest in this field.

Vancampfort et al. (2012) studied three RCTs of yoga in schizophrenic populations, a total of 125 participants. All patients were stabilized on antipsychotic medications. The

programs varied considerably in the duration and frequency of practice, the shortest being 8 weeks and the longest 16 weeks. They found that Lower Positive and Negative Syndrome Scale (PANSS) total scores and subscale scores for positive and negative symptoms were obtained after yoga compared with exercise or waiting control conditions. In the same way, the Health-Related Quality of Life (HRQL) as measured with the abbreviated World Health Organization Quality of Life questionnaire increased more significantly after yoga than after exercise or waiting list control conditions. In these studies, there were no adverse effects of the yoga.

Balasubramaniam and her colleagues analyzed 16 RCTs of yoga for neuropsychiatric disorders. They examined 4 yoga studies for depression, 3 studies for schizophrenia, 2 studies for ADHD, 2 studies for eating disorders, 3 studies for sleep disorders, and 2 studies for cognition. Overall, the researchers stated that they found emerging evidence to support popular beliefs about the effectiveness of yoga as a treatment for depression, sleep disorders, and as an augmentation therapy for schizophrenia and ADHD.

Büssing et al. (2012) examined a relatively large number of review articles on yoga as a primary or adjunctive therapy. The studies covered yoga and physical fitness, cardiopulmonary conditions, metabolic/endocrine conditions, musculoskeletal conditions, cancer, epilepsy, depression, fatigue, anxiety disorders, stress, and post-traumatic stress disorder. Overall, the authors stated they had found a number of areas where yoga may be beneficial. While they wrote that they found it quite likely that yoga may help to improve patient self-efficacy, self-compliance, physical fitness, and group support, and may well be a beneficial supportive or add-on treatment, they felt the degree to which yoga interventions are curative treatments is yet to be determined.

With regards to Post-traumatic Stress Disorder, Büssing et al. (2012) reviewed seven articles that included eight studies of PTSD following exposure to natural disasters and after exposure to combat and terrorism. The interventions varied from one week to six months. The

review found yoga practice was able to significantly reduce symptoms of PTSD, self-rated symptoms of stress (fear, anxiety, disturbed sleep, sadness) and respiration rate (Büssing et al., 2012; Telles, Singh, & Balkrishna, 2012).

1.10 Reconsidering the Relationship Between the Body and Mind

Neuroscientific evidence suggests that when energy and information flow in the various circuits of the brain, we generate the neural correlates of mental experience (Doidge, 2007; Segal et al., 2002; 2007; Siegel, 2007). For individuals who have experienced extreme stress, the neurophysiology of the traumatized brain can result in challenges of emotional regulation, lack of mind-body awareness, an inability to articulate feelings, difficulty with self-soothing or rest, and external locus of control perceptions. Over the lifespan, these outcomes can result in significant physical and psychological pathologies.

While conventional treatments for post-traumatic stress have limited effectiveness, this research suggests that the relationship between the mind and brain be reconsidered in trauma interventions. The autonomic systems of survivors with extreme stress have increased sympathetic activity, with decreased parasympathetic activity. These irregularities may also impact the neuroanatomy of the brain causing engrained automatic behavioural responses. As survivors of trauma are unable to prevent traumatic thoughts and feelings from intruding into current experience, they have difficulty with emotional modulation and recognizing internal sensations. This research suggests that to best support individuals with post-traumatic stress, it may be necessary to help them cope with the psychosomatic residues of the past without re-traumatization.

Streeter et al. (2012) suggest that individuals with post-traumatic stress experience mind-body imbalances typical of enhanced sympathetic nervous system and decreased parasympathetic activity, making it difficult for the body to rest and relax. PTS also induces under activity of the primary inhibitory neurotransmitter system of the body (GABA) and

increased allostatic load or stress on the body. The unifying theory of Streeter et al. (2012) suggests that yogic practices can serve to balance brain physiology associated with PTS. If homeostasis can be restored in the brain of PTS individuals through yoga, this research suggests that yoga can impact physiological and psychological responses of PTS. This research suggests that if individuals with PTS can learn to emotionally regulate, tolerate, orient, and focus attention on their internal experiences through a practice like yoga, repair of the disrupted physiological pathways would enable the integration of the cognitive, emotional, and physiological aspects of the original traumatic experience, thereby enhancing overall well-being (Krystal, 1988; Segal et al., 2002; 2007; Van der Kolk, 2006). This study asserts that trauma treatment should consider the impacts that PTS manifests on the mind and body and must consider treatment approaches that consider the entirety of the human-mind, body and spirit.

According to Bandura (1971), most humans adapt to unfamiliar behaviours through observation. By seeing what others do, one gains an understanding of how previously untried behaviours are executed. This observational memory may later serve as a template for action. Bandura (1971) stated however that learning and behaviour are not solely influenced by external, environmental reinforcement. While textbooks tend to associate social learning theory with behavioural theories, Bandura himself describes his approach as a “social cognitive theory.” Bandura’s (1977) social learning theory emphasizes that through continuous reciprocal interaction of cognitive, behavioural, and environmental influences, new learning can occur. As individuals with post-traumatic stress experience numerous physiological, behavioural, and emotional responses in the mind and body, treatment approaches like yoga, whereby participants’ model and experience new healing practices, offer the possibility to recognize and break habitual trauma patterns. Modeling and experiential practice may lead to changes in cognitions, behaviours, and emotions related to self-mastery and efficacy.

Like Van der Kolk (2006) and Ogden (2012), Bandura recognizes the value of intrinsic reinforcement through internal rewards such as pride, satisfaction, and a sense of accomplishment to self-regulation. Cognitive developmental theories are connected to learning theories through this focus on internal thoughts and cognitions. Teaching individuals practical and experiential skills to manage their emotions and behaviours complements conventional trauma based treatment approaches. In addition, because participants will learn new skills to support their healing, it is anticipated that locus of control and mastery skills of participants will be enhanced.

In his 1994 paper, *The Body Keeps Score*, Van der Kolk assessed the existing work on the neurobiological basis of trauma. The paper describes how trauma plays havoc with the stress-hormone system, deregulates the nervous system, and prevents people from effectively processing and integrating trauma memories into rational cognitive frameworks. Van der Kolk theorized that traumatic memories remained lodged in nonverbal regions of the frontal lobes where they remain inaccessible to logical assessment, analysis, or resolution. In subsequent years, Van der Kolk as quoted by Wylie came to feel that a major part of the work of healing from trauma is “really about rearranging your relationship with your physical self. If you really want to help a traumatized person, you have to work with core physiological states and, then, the mind will start changing.” (Wylie, p. 8, 2004). In 2006, Van der Kolk proposed yoga might play a part in an integrative rehabilitation program for survivors of PTSD and around the same time, yoga became a regular part of the therapy offered at Van der Kolk's Trauma Centre located in Massachusetts (Emerson & Hopper, 2012; Emerson, Sharma, Chaudhry, & Turner, 2009).

Pat Ogden's school of practitioners of Sensorimotor Therapy take a similar view. While not exercise oriented, Ogden and her colleagues see “the sense of self (is) represented not only in beliefs and emotional responses, but also in physical organization, postural habits and movements of the body (Ogden et al., 2006, p. 14).” Like Van der Kolk, they advocate “bottom-

up” interventions to access the trauma embedded within the nonverbal reaches of the physical body. In this way, they aim through self-awareness to turn posture, which is normally concave and visibly depressed, into a positive asset of physical and psychological transformation. Along the way, sensorimotor therapists aim to promote a bodily sense of safety, and to cultivate inquisitiveness, self-awareness and the ability to observe in the client in the present moment, and to re-awaken the executive functions of the pre-frontal cortex. Aiming for a balance of insightful and somatically sensitive top-down regulation of symptoms with a bottom-up integration of trauma-related sensations, emotions and movements, they hope to facilitate new adaptive responses, which embrace the “past and present, belief and body, emotion and meaning” (Fisher & Ogden, 2009; Ogden et al., 2006).

Taking a strengths-based approach, and building on recent mind-body evidence, the present research suggests that the problems of individuals with post-traumatic stress can be viewed as opportunities to learn life-long empowering, physiological and behavioural tools that can lead to enhanced feelings of wellness. This research examines post-traumatic stress in relation to mental health and well-being and also explores the perspectives and experiences of individuals who complete the yoga program.

1.11 Lack of Quality Research on the Therapeutic Effects of Yoga and Meditation

The complexity and multifaceted nature of methods of contemplative interventions make them more difficult to compare than pharmaceutical interventions. In a review study of 400 clinical trials on meditation practices in health care indexed in the scientific literature, five broad contemplative practice categories (mantra meditation, mindfulness meditation, yoga, tai chi, and qigong) were reviewed. Overall they found, regardless of the type of practice being studied, the methodological quality of the clinical trials could be improved (Ospina et al., 2008).

Ospina and her associates (2008) recommend that future research on the effectiveness of meditation techniques be conducted by highly trained individuals skilled with the selected

population(s), that great care be paid to the selection of controls, that larger sample sizes be used, that disease-specific outcomes be measured, and that clearer descriptions of intervention components be given. The authors also propose that mixed method studies serve a valuable purpose in addition to RCTs in enriching the knowledge base regarding the efficacy of meditation interventions.

Bessel Van der Kolk (2006) began to use yoga in his trauma treatment program because of his discovery that it could change HRV for the better. When confronted with opposition demanding large-scale studies to justify the introduction of new methodologies, Van der Kolk countered that organizations which fund scientific research typically do not support studies on unproven therapies, thereby creating “an Orwellian cycle of only advancing the exploration and practice of what is already known and closing the door on true exploration” (p. 10). According to Van der Kolk, such strictures tend to remove from academic discourse the first-hand insights and experience of therapists who daily witness the real-life complexity of human suffering and marginalize any original and potentially useful ideas emerging from clinical practice (Wylie, 2004).

This 8-week Kundalini yoga protocol was designed to have both clinical utility and to address the criticisms leveled at previous studies of yoga and meditation. The majority of yoga/meditation studies conducted have been implemented without ongoing clinical expertise. As this researcher currently works in the mental health field, the care of participants and clinical applications to research were continually monitored.

To date, the majority of yoga and meditation intervention studies have utilized only an intervention group. To ensure methodological rigour, this study consisted of a wait list control group in addition to a yoga intervention group. The purpose of this two-group repeated measures design was to elucidate the characteristics of the individual groups at baseline, during intervention (4 weeks) and at the end of the group to examine differences across time. Similar

data were collected from participants in the control group. In this design, each participant served as its own control so the variability between participants became isolated and analysis could focus more precisely on the effects of the intervention. The effects of the yoga intervention were determined using evidence from both quantitative and qualitative data sources. Each group was afforded participation in the yoga program. Further, this design reduced the variance of treatment-effects.

By using a mixed method of data collection techniques (questionnaires, interviews, journals), this study was able to derive qualitative and quantitative data. Advocated by Reichardt and Cook (1979) is the mixing of methods to achieve multiple research purposes. As this research is applicable across a number of research disciplines, a mixed methods approach was chosen. A design employing only one method may have limited research scope by answering only the proposed research questions. The chosen methodological approach allows unexpected interactions to appear and/or allows emergent phenomena from the data. For instance, quantitative and qualitative data were gathered and analyzed in parallel to generate an understanding of how a yoga intervention impacts the well-being of individuals with post-traumatic stress symptoms, from their perspective.

The utilization of a mixed methods design also allows for expansion of research scope. The mixing of methods allows for the scope and breadth of the research project to correspondingly expand (Caracelli & Greene, 1993; Greene, Caracelli, & Graham, 1989). While expansion may occur at a conceptual level, inductive data of this nature allows researchers the opportunity to generate hypotheses and formulate new questions during data analysis (Kidder & Fine, 1987; Maxwell, 2005). Emerging trends and change over time could also be analyzed.

Strengthening the validity claims of the research is another reason for employing the chosen methodology. By triangulating different types and sources of data, research findings can be validated (Greene et al., 1989; Mathison, 1988; J. Morse, 1991). To this end, quantitative and

qualitative data were collected from participants. Data triangulation offers the possibility of examining different data sources that may have possibly converging outcomes (Greene et al., 1989).

As yoga and meditation practices are becoming widely practiced and researched, this methodology was chosen because mixed method research findings can be applicable to numerous audiences (Brannen, 2005). Ideally, research findings are disseminated among multiple levels of audiences such as the target research audience, as well as stakeholders, policy analysts, educators and interested individuals in the lay public. Considering the nature of developmental psychology and education research and the applicability to various fields of study, the socio-political relevance of findings is paramount.

2. METHODOLOGY

2.01 Chapter Overview

The main objective of this two-group repeated measures design was to understand post-traumatic stress characteristics/symptoms (cognitive, emotional, behavioural) and self-reported perspectives of well-being and resilience that may be associated with a yoga treatment program. Related objectives were for participants to learn new skills for their overall health. The acceptability and compliance with the treatment program was also evaluated. This chapter reviews the research questions, summarizes the treatment program, details the development and layout of the yoga treatment protocol, the present sample, outcome measures and analytic strategies. This study was guided by:

Specific Aims:

Overall research goal: to examine the extent to which a yoga intervention impacts post-traumatic stress symptoms and self-reported feelings of well-being.

Primary Research Questions:

How does the received intervention affect:

- a) cognitive perspectives
- b) emotional/behavioural symptoms and changes
- c) perspectives about traumatic events

2.02 Overview of Yoga Treatment

The 8-week yoga treatment protocol consisted of 8 weekly 90-minute group training/practice sessions. The group yoga sessions were designed to provide intensive opportunity for thorough instruction and for observing and collaboratively correcting the practices being performed by the participants. Written instructions of class practices were provided to participants along with a link to a YouTube video. The instructional video was

designed for this research project. Participants had the option of using the YouTube video to guide them through the yoga/meditation practices to be done individually.

The instructors were required to keep detailed notes regarding problems and difficulties in understanding the techniques on the part of the participants, as well as a thorough rating of participant proficiency in performing the techniques. The yoga instructors in collaboration with this researcher also addressed any barriers or problems with participant compliance, performance, or understanding with either the class or the home practices and worked with participants to address these problems.

Kundalini Yoga (KY), a comprehensive yoga style incorporating the traditional elements of yoga practice including meditation, cultivation of mind/body awareness, postures and physical exercises, breathing techniques, deep relaxation, and education in the psychology and philosophy of yoga was utilized in this study. The specific treatment protocol includes yoga practices specifically selected to help participants a) develop the skills to relax and cope with trauma and related stress; b) cultivate mindful awareness of the body, mind, breath, and their environment; c) improve cognitions, behaviour and emotions related to self-esteem and self-efficacy; d) enhance flexibility, strength, and balance; and d) reintegrate socially.

Each yoga class consisted of the general class structure:

- Yoga breathing techniques
- Active warm-up and loosening exercises
- Yoga postures and exercises
- Deep supine relaxation
- Meditation
- Discussion of physical, psychological and philosophical principles of yoga

2.03 Design and Development of 8-week Kundalini Yoga Post-Traumatic Stress Protocol

The design and development of a KY treatment protocol for post-traumatic stress was a collaborative process. An interdisciplinary team consisting of the lead researcher (mental health and trauma specialist social worker), a psychologist working with trauma veterans, a war veteran, and Shanti Shanti Kaur Khalsa, PhD, founder and director of the Guru Ram Das Centre for Medicine and Humanology in New Mexico, participated in the design of the post-traumatic stress program. All team members have personal KY practices and teach yoga classes.

Team members utilized clinical expertise to identify the behavioural nature of trauma and post-traumatic stress. Causes, incidence, and risk factors of post-traumatic stress were identified. The anatomy and physiology of how post-traumatic stress manifests in the mind and body guided the development of the KY post-traumatic stress yoga treatment program. The exercises selected for this curriculum were chosen to address the underlying causes of post-traumatic stress. The selected exercises and meditations are believed to help to restore rhythmic strength and the connection to original self through their effect on the brain, nervous and endocrine systems, and the structural integrity of the physical body.

Another focus is to release tension and to tone the psoas muscle. This muscle is deep in the body and is associated with holding trauma in the body (Emerson & Hopper, 2012). It connects to the diaphragm and spine, supporting deep rhythmic breathing, flexibility of the spine, and stability of the body's core. Meditations were selected for their capacity to resolve recurring images and repetitive negative thoughts, and to restore self-efficacy.

The eight-week program was designed as an opportunity for individuals with post-traumatic stress to restore rhythmic strength and identity of original self. Accordingly, the program was designed with the 8-weekly key themes: (1) building support and starting a daily practice; (2) role of rhythmic breath and movement; (3) role of regulating thought; (4) role of

nervous system; (5) role of self-efficacy; (6) role of arc, auric and pranic bodies; (7) conscious identity; (8) maintaining your practice.

Emerson and Hopper (2012) suggest that when teaching yoga to special populations it is important to utilize repetition. As trauma survivors struggle to be present in the now, the repetition in this curriculum allowed students to deepen their experience over time. As the participants' capacity to be present expands, they are increasingly able to deepen their experience with mind-body.

The exercises and meditations for each week in the KY protocol utilize a layering approach. Beginning with small, manageable postures and meditations and repeating those postures and meditations provide the student the opportunity to build on successes. As the individual's capacity increases, so does the length of time for the postures and meditations. In this way, participants may gain skill and capacity for self-mastery.

In response to some of the unique challenges of trauma survivors, the development of this protocol also gives consideration to increasing the time length for deep relaxation over repeated practice. Survivors of trauma may initially experience difficulty with quiet and stillness. Using a stair-step approach, the KY post-traumatic stress protocol began with a guided relaxation to offer the experience of feeling safe and re-directed the mind. Over the 8-weeks, the program progresses to regular deep relaxation in an autonomous manner.

A home practice exercise was integrated into the eight-week protocol. This 15-minute practice consisted of movements and meditations designed to repair the central nervous system impacted by trauma. The teacher spent extended time in the first class teaching the home practice so participants felt comfortable with the lesson and could continue outside of class. Participants were given a homework log on the first day of class. This log consisted of dates and sections for the participants to complete daily as to whether they participated in the practice, how many minutes they practiced, and what they found beneficial or challenging about the practice.

Participants were encouraged to simply do their best with regard to frequency and consistency. The rationale for the home practice was that participants would learn tools to self-soothe in the program that they could utilize upon program completion.

A 20-minute YouTube video (Jindani, 2012) was created for participants to assist with the home practice. This practice consisted of a short inspirational message to participants at the beginning of the video and the 15-minute home practice exercise and meditation. Participants could utilize this video anytime and feel as though they had the support and instruction of a teacher while they practiced. Each yoga research class received the same instructional video.

The protocol was piloted on a small trauma sample (n=7) in New Mexico. Feedback and revisions were integrated into the program. In February 2012, a post-traumatic stress KY teacher-training program was held in Boston, United States. This 3-day training program allowed teacher trainees to understand post-traumatic stress and its effects, provide information on how the body stores memories of the traumatic experience, how to best support participants with trauma, how teachers should care for themselves when working with this population, and the health effects of post-traumatic stress. This training also offered the opportunity for teachers to experience and participate in the 8-week program to integrate the knowledge for themselves somatically. Twenty KY teachers from across the U.S. and Canada interested in supporting individuals with post-traumatic stress attended this training.

2.04 Recruitment

Teachers interested in participating in the research study for post-traumatic stress were recruited by email request through the Toronto Kundalini Yoga Teachers Association. The lead researcher interviewed teachers. Teachers with personal and professional experience with trauma, a personal KY practice, and interest in supporting individuals with post-traumatic stress were chosen to voluntarily teach the 8-week program to research participants. Teachers

participating in the study abided by all ethical and confidentiality codes of their teaching certification and had training/experience working with individuals with anxiety, depression, substance use, and trauma. Teachers and group facilitators selected for participation in this study were female and had 5-20 years of KY practice.

Each yoga class also had a group facilitator who was a skilled KY teacher. The role of the group facilitator was to attend each class, support participants as required, and discuss with the teacher (i.e., follow-up with participants in/outside of class if they missed sessions, required extra assistance, etc.). The group facilitator was responsible for distributing and collecting questionnaires during class and following up with this researcher after each class. The group facilitator was trained on trauma protocol and how best to support individuals with post-traumatic stress should emergent situations arise in class. The group facilitator conducted questionnaires with participants at weeks 4 and 8 of the program and arranged the scheduling of the final class interview with the lead researcher at the end of the program.

Research recruitment flyers were posted at yoga centres, the University of Toronto, trauma programs in Greater Toronto Area hospitals, on the Internet, at social service agencies, and health food stores across the GTA. The program was also advertised through the consumer survivor community bulletin at the Centre for Addiction and Mental Health. Interested participants were instructed to contact the researcher by phone or email to set up a time for study screening.

2.05 Study Procedures

Participants interested in study participation and who self-identified as experiencing post-traumatic stress symptoms were encouraged to contact this researcher by phone or email. Participants interested and able to commit to a voluntary 8 week yoga program were scheduled for a telephone screening interview to assess preliminary entry criteria. Before the interview, the University of Toronto's research ethics policy was explained to participants. Participants were

advised that they could choose not to participate at any point of the data collection process, and that they could withdraw at anytime. Written and verbal consent of participation was acquired.

The lead researcher explained to participants about confidentiality, the purpose of study and study logistics. The researcher collected demographic information (i.e., age, symptomology, mental health diagnosis, prior treatment, medication and prior contemplative experience). Participants could ask any questions. If interested in participating, qualifying participants met in person with this researcher to complete the Post-Traumatic Stress Checklist (PCL) to determine post-traumatic stress eligibility, to verify the basic entry criteria from the phone interview, to complete demographic history, to have the study protocol described in detail, and to sign informed consent. Participants meeting entry criteria continued in the study. Participants with a current yoga/meditation practice or with a PCL score under 57 were not eligible for study purposes. Participants at safety risk were disqualified and referred to an appropriate healthcare practitioner. This was the case for 2 participants. Participants who were unable to abstain from substance consumption at least 24 hours prior to each class were also excluded from study participation.

Interested participants were randomly assigned to either the experimental (yoga) group or the wait-list control (treatment as usual group). Individuals in the waitlist control group were offered participation in the yoga group at a later date. Both groups were 8 weeks in duration.

All interested participants underwent pre-treatment baseline assessments of all outcome variables, which included written questionnaires upon completion of the screening interview. Questionnaires were completed through Survey Wizard (University of Toronto online system) prior to beginning the program. Participants completed week 4 (mid-treatment) and week 8 (final session) questionnaire data in class. Program participants not able to attend class the week of data collection were provided the option of completing the questionnaire online.

The yoga treatment groups participated in weekly 90-minute group training/practice

sessions for 8 weeks and in addition, were encouraged to devote a total of 15 minutes per day to a prescribed home yoga practice. The waitlist control group also completed all outcome measures for this study and received the yoga intervention at a later date.

With the exception of individual interviews at the end of the program, research activities were built into the classes. The lead researcher conducted individual semi-structured phone interviews with all participants completing the program within a week of program completion. Eight months after study completion, participants who completed the yoga program were sent follow-up questions by email inquiring about their current contemplative practice.

A total of 7 yoga groups were conducted for the purposes of this study during the spring/summer of 2012. The groups ranged in size from 3-8 participants. Three female yoga teachers taught the classes. Two of the instructors each taught one class and the third teacher taught five classes. The lead researcher informed yoga teachers about the necessity of closely following the established yoga protocol. Teachers and the lead researcher maintained regular contact regarding adherence and participant ability.

2.06 Participants

A total of 80 individuals in the Greater Toronto and Kitchener-Waterloo Region contacted this researcher and completed related study information. Classes were held at the University of Toronto, Family Services Toronto and a Wellness Centre in Waterloo, Ontario.

Participants with any form of self-identified trauma scoring above 57 (trauma cut-off score) and completing study requirements could take part in the study. Ten individuals did not begin the study due to scheduling conflicts, 8 participants were not able to complete the program due to medical and health reasons, 4 participants discontinued because of personal reasons, and 8 participants had scheduling changes and classes being missed due to vacations eventually leading to class drop-out. This resulted in a 30% drop out rate with 29 participants completing the yoga program and 21 participants in the waitlist control group.

The yoga program was made available to males and females. The modal age of participants was 41 years with a range from 18-64 years.

2.07 Outcome Indicators

Quantitative measures.

KY treatment outcome indicators were acquired at baseline, mid-treatment, and end-treatment. Seven scales covering various areas of cognition and stress related to trauma were used as outcome measures:

- a.) The post-traumatic stress checklist (PCL; Weathers et al., 1993) is a widely used 17-item self-report scale developed by the National Centre for PTSD. The diagnostic properties of the PCL have been validated and replicated (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996). The PCL asks about symptoms related to "stressful experiences." The PCL has a variety of purposes, including: screening individuals for PTSD, diagnosing PTSD, and monitoring symptoms of change during and after treatment. The PCL can be used with any trauma population. This measure can assess single or multiple stressful events (Weathers et al., 1993). To qualify for post-traumatic stress, participants must have a total score of 57 or higher.
- b.) The 25-item Resilience Scale (RS) measures the degree of individual resilience. Items are scored on a 7-point scale from 1=disagree, to 7= agree. Items are positively worded and scores range from 25 to 175 with higher scores indicative of higher resilience. The RS demonstrates internal consistency ($r = 0.91$) and concurrent validity with established measures of adaptation such as morale ($r = 0.28$), life satisfaction ($r = 0.30$), and depression ($r = -.37$). Test-retest correlations have ranged from .67 to .84 ($p < .01$), suggesting resilience stability over time. A Cronbach's alpha of 0.94 has been reported (Wagnild & Young, 1993). This instrument is routinely used in research.
- c.) The Positive and Negative Affect Schedule (PANAS) measures positive and negative constructs as both emotional states and traits. PANAS is used as a psychometric scale and demonstrates relations between positive and negative personality traits (Watson, Clark and Tellegen, 1988). Ten descriptors are used for each positive affect (PA) scale and negative affect (NA) word. Participants who complete the PANAS respond to the 20-item test using a 5-point scale that ranges from very slightly (1) to extremely (5). Watson et al. (1988) report moderately

good reliability and validity. For the Positive Affect Scale, the Cronbach alpha coefficient was 0.86 to 0.90; for the Negative Affect Scale, 0.84 to 0.87. Over an 8-week period, the test-retest correlations were 0.47-0.68 for the PA and 0.39-0.71 for the NA. The PANAS scale reports strong validity with measures of general distress and dysfunction, depression, and state anxiety (Watson et al., 1988).

d.) The 5-Facet Mindfulness Questionnaire (FFMQ) is a 39-item self-report questionnaire that uses Likert-scale ratings (never or very rarely true to very often or always true). Various aspects of mindfulness (e.g., observing, describing and actively aware of present-moment experience, non-judgmental, and non-reactive focus) are assessed (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). This instrument is routinely used in research. This questionnaire was acquired at baseline, mid-treatment, and post-treatment.

e.) Cases of insomnia can be detected in population and clinical samples through the Insomnia Severity Index (ISI). Excellent internal consistency has been found for this measure (Cronbach α 0.91). The ISI demonstrates convergent validity and is significantly correlated with measures of anxiety, depression, quality of life and fatigue. Bastien, Vallières, and Morin (2001) conclude that the ISI is a sensitive and valid measure that can detect changes in sleep with treatment.

f.) The most widely used psychological instrument for the measurement of perceptions of stress is the Perceived Stress Scale (PSS) (Cohen, Kamarck, & Mermelstein, 1983). This measurement assesses the degree to which individuals appraise their life as stressful. Instrument items are designed to examine how unpredictable, uncontrollable, and overloaded individuals rate their lives. This measure assesses the ability to cope with stress (Cohen, Kamarck, & Mermelstein, 1983) and includes direct questions regarding current stress levels. Item questions are of a general nature and not content specific to any clinical population. The PSS asks about feelings and thoughts in the last month and respondents answer the degree to which they felt stress.

g.) The Depression, Anxiety and Stress Scale (DASS 21) assesses distress along 3 dimensions: depression, anxiety (i.e. psychological arousal) and stress (cognitive or subjective anxiety symptoms). When completing the DASS, individuals indicate whether they experienced the described symptom over the last week. Items are scored from 0 (did not apply to me at all over the last week) to 3 (applied to me very much or most of the time over the past week). The

analysis of DASS is twofold: allows measurement of symptoms and response to treatment measures (Crawford & Henry, 2003).

Qualitative measures.

The yoga instructor and group facilitator kept attendance records for the yoga classes and also kept notes on participant tolerance and compliance with the treatment.

At the end of each group, participants who completed the yoga program participated in a semi-structured interview with the researcher to gain an understanding of their experience and perspectives regarding the treatment they received. Questions were based on general thoughts and feelings of self, yoga program and changes experienced. Participants were asked whether the interview could be audio-recorded.

2.08 Study Follow-Up

The researcher followed up with all participants completing the program by email eight months after program completion. Questions to be completed by participants included whether they were engaging in any yoga or meditative practices, frequency and length of practice. Participants were also encouraged to provide other feedback. An email with the above questions was sent to participants. A week later, a follow-up email was sent to participants asking for response completion by end of week. A total of 29 responses were received.

3. RESULTS

3.01 Chapter Overview

The research questions in this study included: (a) how does the trauma intervention impact cognitive perspectives, (b) how does the trauma intervention affect emotional/behavioural perspectives, (c) how does the trauma intervention impact perspectives of self and prior trauma? As a mixed methods design was utilized for this study, an explanation of performed statistical tests and outcomes of study scales is initially presented. This is followed by a description of participant interviews, which includes a deconstruction and analysis of participants' experiences of the yoga program. A brief overview of participant journals and instructor feedback is outlined.

3.02 Quantitative data collection

To understand whether the participants, who volunteered to participate in the study and were randomly assigned to the two groups, could be considered equivalent in their background characteristics, chi-square tests of independence were performed on all demographic categorical variables. Table 1 demonstrates the raw scores and the calculated percentages of the waitlist-control and yoga treatment groups.

Table 1.**Characteristics of Study Participants at Baseline****Table 1. Characteristics of Study Participants at Baseline**

	Waitlist-Control	Yoga	X²
	n = 21	n= 59	
Gender			
male	5 (24%)	4 (7%)	
female	16 (76%)	55 (93%)	4.50 *
PTSD diagnosis	12 (57%)	38 (64%)	3.0
Therapy			
current	12 (57%)	23 (39%)	
past	4 (19%)	10 (17%)	
none	5 (24%)	26 (44%)	2.8
Yoga Practice			
past	1 (1%)	11 (19%)	
none	20 (95%)	48 (81%)	2.3
Meditative Practice			
past	0 (0%)	9 (15%)	
none	21 (100%)	50 (85%)	3.6
Medication			
prescribed	9 (43%)	29 (49%)	
none	12 (57%)	30 (51%)	.25

p < .05

The data demonstrate that with the exception of the gender variable, the two groups were similar in demographic characteristics. Of the men who began the program, all completed whether in the wait-list control or yoga intervention groups.

In addition, the two groups were compared on the baseline values of outcome variables to explore any pre-existing differences between them and adjust statistical analyses to these differences, if needed. Independent samples t-tests were performed on the seven outcome scales at baseline. At Time 1 (baseline), the only scale on which the differences between study groups reached statistical significance was the post-traumatic stress checklist (PCL) scores $t(78) = 2.39$, $p = .019$. Mean scores demonstrated that the intervention group had higher trauma scores (PCL;

$M = 59.48$, $SD = 9.33$) at baseline than the wait-list control group ($M = 55.14$, $SD = 11.86$) demonstrating that at the beginning of the program, the yoga group had higher trauma scores than the waitlist control group.

Therefore, the PCL baseline scores were used as a covariate in further analyses leading us to an ANCOVA test. ANCOVA relies on the assumption of homogeneity of slopes that has to be tested before running this analysis. Results of this test suggest that this assumption of equal slopes was checked and satisfied as the interaction effect was not significant. Results of the one-way ANCOVA, $F(1, 48) = 15.64$, $p < .05$, corrects for the differences in trauma scores between the groups at baseline.

Since the differences at baseline were evident only for the PCL scale, only this outcome variable required running a repeated-measures ANCOVA analysis with baseline PCL scores as a covariate and mid-and end-of-treatment PCL scores as repeated measures. For the rest of the outcomes, repeated-measures ANOVAs with three time-points (baseline, mid-and end-of-treatment) were used as indicated in Figure 1.

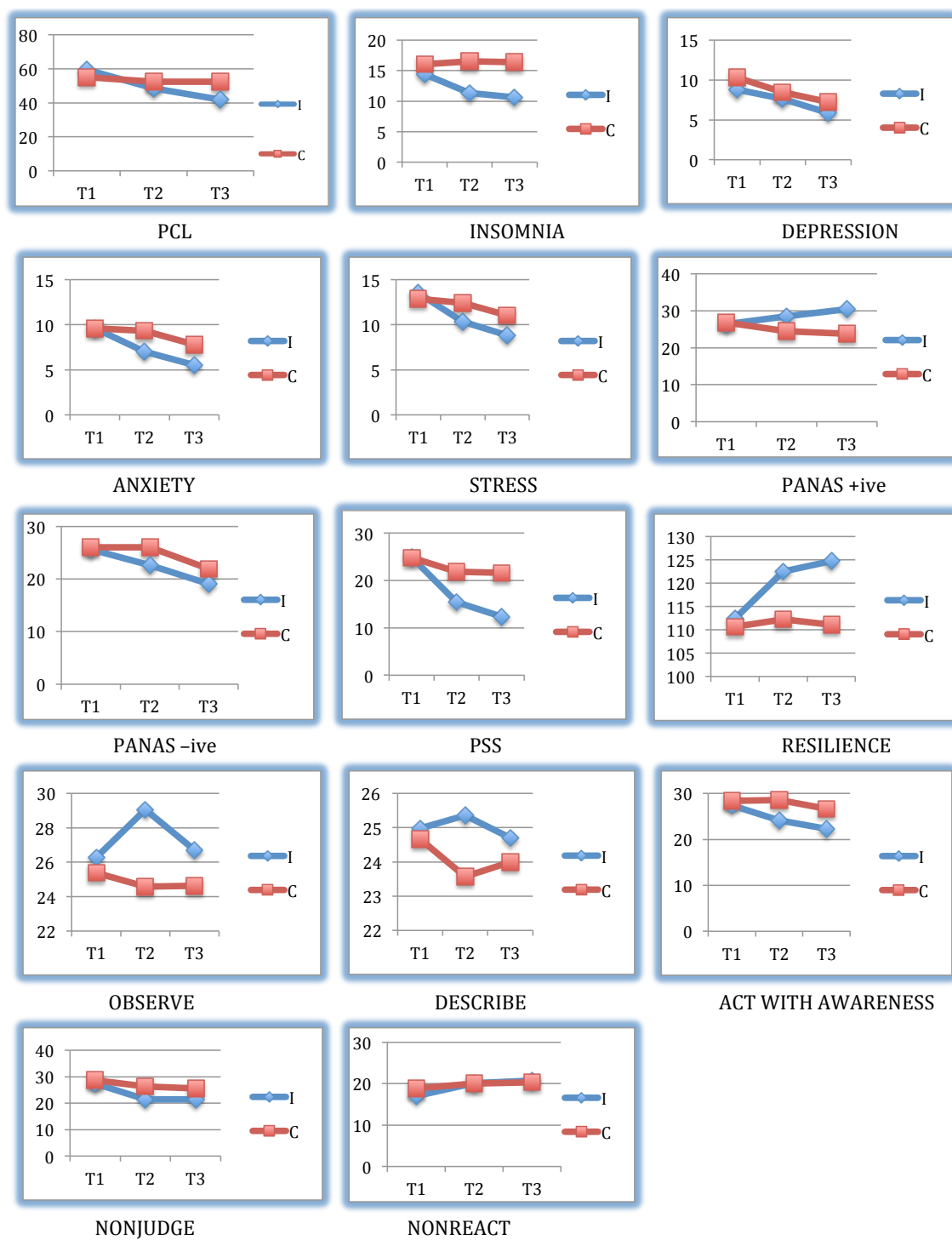


Figure 1.

Mean change across all scales for intervention and control group

While change over time occurred across groups and all outcome measures, only outcome measures that reached statistical significance can be generalized to the greater population and are further discussed.

Means and standard deviations of questionnaire outcome data for the wait-list control and yoga treatment group across the three time intervals are presented in Table 2.

Table 2

Means and Standard Deviation of questionnaire data for wait-list control and Yoga Treatment at pre-mid and post – treatment

Wait List Control Group							Yoga Group					
	<i>Pre n=21</i>		<i>Mid n=21</i>		<i>Post n=21</i>		<i>Pre n=29</i>		<i>Mid n=29</i>		<i>Post n=29</i>	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
PCL	55.14	11.86	52.48	11.64	55.43	13.46	59.48	9.33	48.48	14.31	41.83	11.95
ISI	16.05	7.91	16.52	5.63	16.38	5.78	14.38	8.09	11.38	8.04	10.62	6.72
PANAS	26.85	7.93	24.50	6.99	23.75	6.12	26.34	7.47	28.55	6.84	30.45	7.90
PSS	24.81	7.22	21.81	6.57	21.62	4.83	24.92	7.62	15.41	11.97	12.37	11.39
RESILIENCE	110.67	25.83	114.28	20.32	111.06	23.90	112.39	24.05	122.54	23.31	124.71	23.15

PCL scores of the yoga group demonstrate change over time in comparison to the wait-list control group. Sleep scores for the wait-list control group stayed about the same over time in comparison to the yoga group in which sleep improved over time. Positive and Negative affect scores decreased over time for the wait-list control group and improved over time for the yoga group. Perceived stress scores for the yoga decreased by about half in comparison to the wait-list control group, which decreased marginally. Resilience scores for the control group stayed about the same for the wait-list control group and increased significantly for the yoga group.

In consideration of the trauma (PCL) scale, Wilk's lambda = .72, $F(2, 47) = 9.33$, $p < .05$, eta squared = .284 suggests that in relation to individuals in the wait-list control group, participants in the yoga treatment group had significantly lower PCL scores at time three, after their participation in the treatment program as shown in Figure 2.

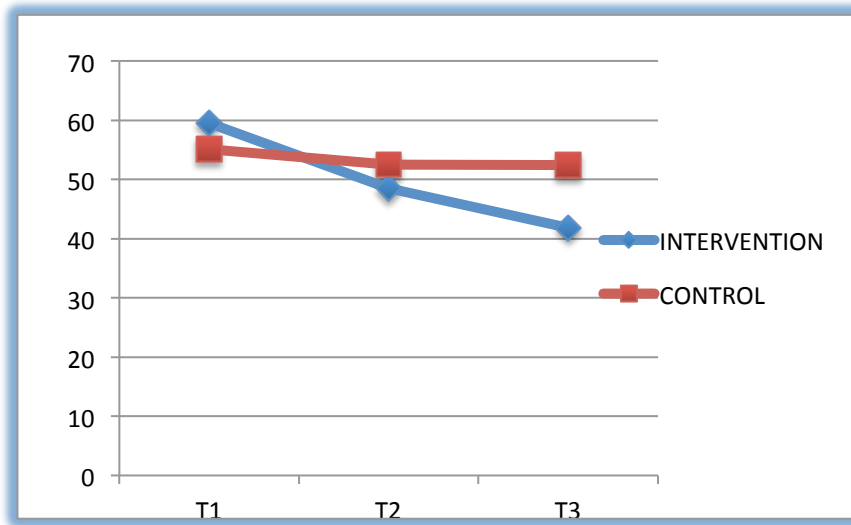


Figure 2.

Mean change for PCL (post-traumatic checklist)

Repeated measures ANOVA for the Insomnia outcome (Figure 3) demonstrate a significant interaction effect of sleep scores and group, Wilk's lambda = .88, $F(2, 47) = 3.19$, $p < .05$, eta squared = .12. These results demonstrate that individuals in the yoga treatment group were sleeping better at the end of the program in comparison to individuals in the wait-list control group.

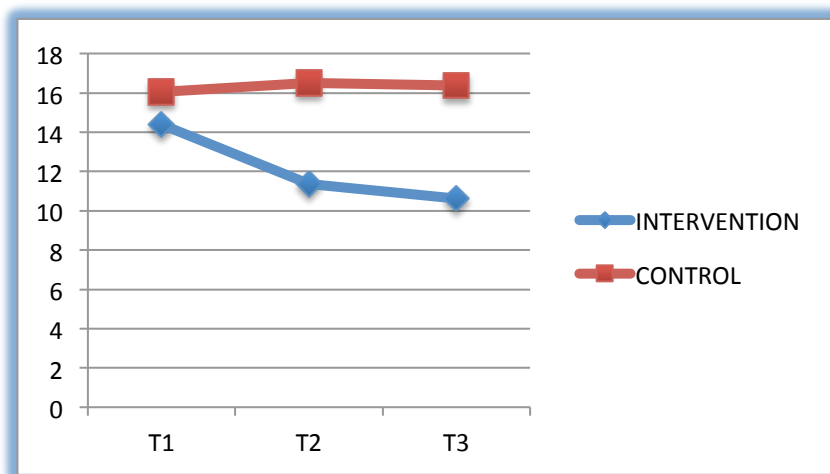


Figure 3.

Mean change for insomnia scale

Repeated measures ANOVA for the PANAS (positive affect scale) (Figure 4) suggest a significant interaction effect for positively associated words in the yoga treatment groups, Wilk's $\lambda = .87$, $F(2, 46) = 3.41$, $p < .05$, $\eta^2 = .13$. The findings demonstrate that individuals in the yoga treatment group responded with more positive affect to positively associated words than individuals in the wait-list control group at program completion.

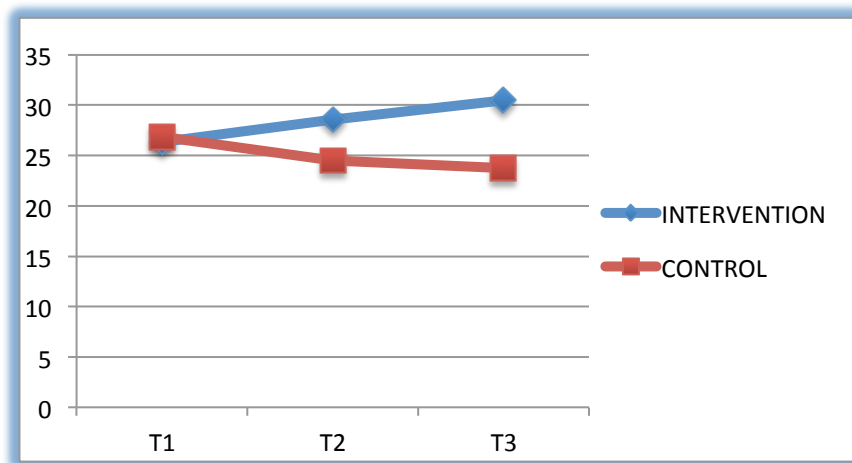


Figure 4.

Mean change for PANAS (positive affect scale)

Repeated measures ANOVA for perceptions of participant stress (Figure 5) demonstrate a significant interaction effect for perceived stress scores in the yoga treatment group, Wilk's $\lambda = .86$, $F(2, 67) = 5.35$, $p < .05$, $\eta^2 = .14$. As suggested by the findings, individuals in the yoga treatment group identified fewer perceptions of stress at the completion of the yoga program than individuals in the wait-list control group.

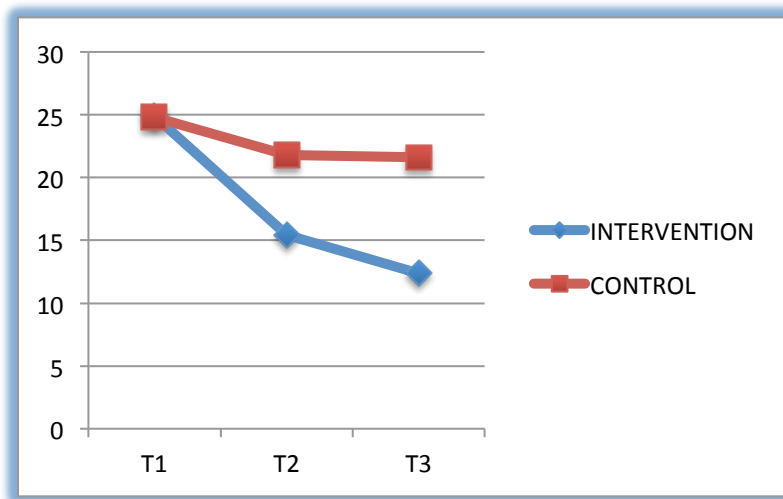


Figure 5.

Mean change for perceived stress scale

Change over time between the wait-list control group and yoga intervention group for the resilience scale suggests that for the yoga group, significant interaction effects were noted in participant perceptions of resilience between the two groups, Wilk's lambda = .922, $F(2, 43) = 4.82$, $p < .05$, eta squared = .043. Findings (Figure 6) demonstrate that yoga group participants identified stronger positive perceptions of self and well-being than individuals in the wait-list control group at program completion.

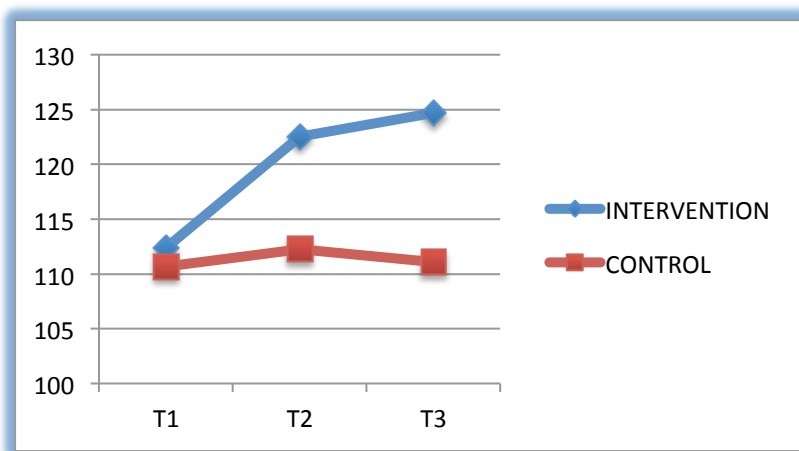


Figure 6.

Mean change for resilience scale

3.03 Follow-up Responses

Eight months after program completion, the fifty participants who completed the yoga study in either the yoga intervention group or wait-list control were sent follow-up questions by email. A total of 29 email responses were received within the 7-10 day response period.

Questions and responses are demonstrated below:

Table 3.

KY follow-up practice

1) Do you currently practice: a) Kundalini Yoga; b) other Yoga; c) other meditation.

$N=29$

Kundalini Yoga	Other Yoga	Other Meditation
10	7	12

Table 4.

KY follow-up frequency of practice

2) If yes, please indicate how often: a) daily; b) 4-6 times a week; c) 2-3 times a week; d) once a week; e) less than once a week.

$N=19$

Daily	4-6 times/week	2-3 times/week	Once a week
4	4	8	3

Table 5.

KY follow-up length of practice

3) If you answered the previous questions, about how long do you spend each time you do your practice? a) less than 5 minutes; b) 5-10 minutes; c) 10-20 minutes; d) 20-40 minutes; e) more than 40 minutes.

$N=23$

Less than 5 mins	5-10 mins	10-20 mins	20-40 mins	More than 40 mins
5	4	9	3	2

Follow-up data demonstrate that eight months after program completion, participants who prior to participating in the yoga research study had little to no yoga or meditation experience, were continuing to engage in some form of yoga/meditation practice.

In summary, the data suggest that participants were demonstrating changes over time in areas measured by the outcome data. Change over time was observed in both of the groups with greater change differences in the yoga treatment groups. The use of repeated measures ANOVA statistical tests allowed for understanding change across each participant over time. The use of this statistical test also allowed for more power because it was possible to factor out between subjects factors from the error term.

To understand the individual experiences and perspectives of yoga program participants, discussion of qualitative interview findings ensues.

Qualitative data collection: Participant interviews

Semi-structured interviews were conducted to understand the narratives of program participants. All participants who completed the yoga program were asked to participate in a semi-structured telephone interview. Participants were asked if the interview could be audio-recorded. During the interviews, participants were invited to discuss the yoga program in which they participated. On average, participant interviews were thirty minutes in length, audio-taped and then transcribed for the purpose of qualitative analysis.

Sample interview questions were created and piloted with a sample of participants. The interview protocol was refined and the final interview protocol was established (Appendix G).

3.04 Analysis of Qualitative Data Strand

The forty qualitative interviews (control = 12, intervention= 28) were coded using Nvivo10 software (QSR International, 2012). Codes, categories, themes, and outlier data were identified in this process (Creswell and Maietta, 2002; Freeman, 1998; Miles and Huberman, 1984). Nvivo10 was used to generate an inductive grounded theory approach to working with

the interview data. The initial coding phase resulted in the emergence of over 300 codes from the data. Various themes were revealed through analysis of these codes. A full coding pass was then conducted to confirm emerging themes. Following this confirmation, refined codes were grouped together. A coding scheme was then used to code five participant interviews. The remainder of the interviews were coded using the refined coding scheme. The refined coding scheme was used to explore the data, increase researcher understanding of the data, test-coding rigour, and to develop and understand thematic relationships within the interview data.

Following the extensive exploratory coding process, three final and purposeful distillation processes occurred for the purpose of analyzing the qualitative data. The original 300 codes were eventually reduced to 12 major codes that were further categorized and thematized. Using the 12 codes as column headings, data were sorted into an Excel spreadsheet so that codes could be cross-analyzed by participant, individual codes, or theme. During this phase, relevant quotes that illustrated the category were identified. Graphical representations were created to map the conceptual relationships among the codes.

Emerging themes from the data were analyzed by the researcher and grouped together according to similar themes. These themes were collapsed into groups and three major dimensions resulted. As the themes of self-observed changes, yoga program, and new awareness were confirmed as robust across the entire data set, these three dimensions formed the next phase of coding. This stage involved a purposive coding phase that was conducted in order to identify and analyze all interview data that were related to the themes of self-observed changes, yoga program, and new awareness. Codes and corresponding data were again organized into spreadsheets and graphically represented to examine the interplay of the dimensions and related codes to eventually develop code models. Each participant interview was coded to develop an aggregate file of all references made to the theme and sub-themes of self-observed changes, new awareness and yoga program.

To assess the prevalence of related codes and dimensions in the interview data, researchers typically use counts of the frequency that a code occurs in the data set as a way to identify the prevalence of a code within individual participants or groups of participants (Greene et al., 1989). The below chart (Figure 7) demonstrates the coding frequency of each theme in the overall data set.

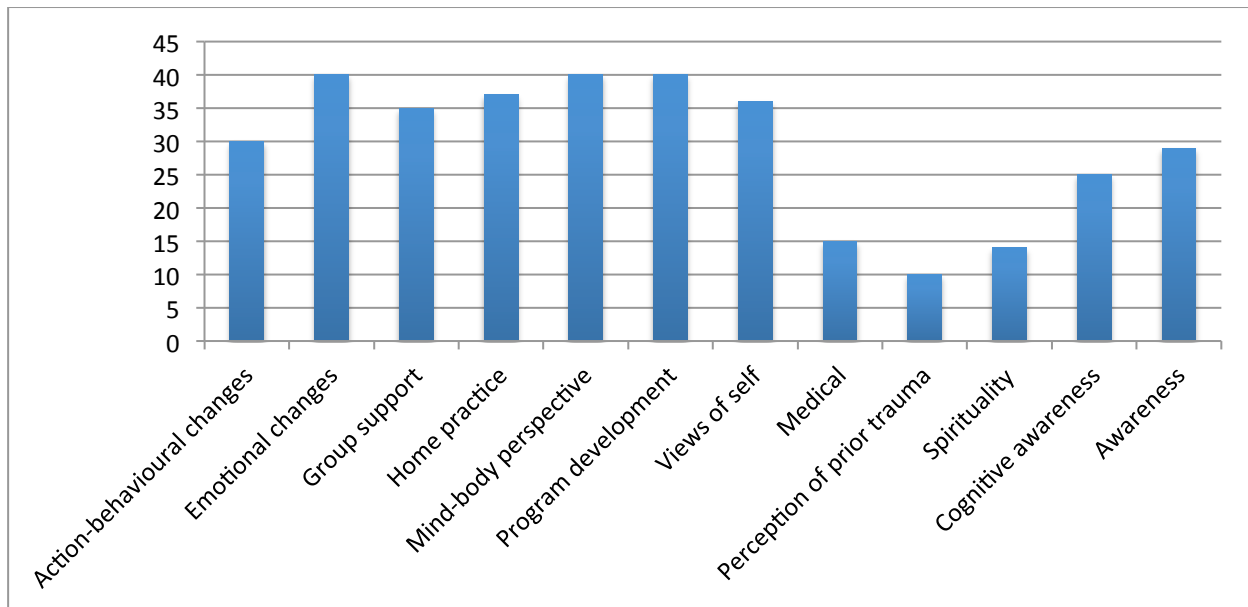


Figure 7.

Coding frequency of dataset

Analysis of participant interview data revealed that participants conceived that participation in the yoga program was related to lifestyle changes that extended across three primary dimensions: (1) self-observed changes, (2) yoga program, and (3) new awareness. The presented dimensions include various themes and multiple sub-themes. The presentation of interview findings includes a discussion of each dimension, themes within the dimension, and includes illustrative examples of participant experiences.

3.05 Participants' Experiences of Self-Observed Changes

3.05.01 Overview.

During the initial coding pass, the emergence of mind-body discussions among participants was prevalent within the interview data. Participants reported that through a physical practice like yoga, they had experienced a mind-body connection. They stated that they were learning that mind and body cannot be separated and in essence, are a reflection of one another.

In the past, I was consumed by emotions. With yoga, I could breathe and link my body and mind. I could feel my legs shaking at times, my arms aching. Sometimes I stopped, sometimes I carried on. I noticed that with this yoga, overall, I felt better afterwards. Everywhere in me...my mind and body (Participant #13).

The mind-body theme proved to be robust, as it did not collapse into related categories during the distillation of codes, and remained a theme throughout the analysis process. The mind-body theme was prevalent across all 40 participant interviews revealing that the theme emerged in all participant interview data. This theme was also the most highly referenced (354) among participant interviews. Participants' responses demonstrated that aspects of the mind-body theme were interrelated with other self-observed changes related to the yoga program.

Interview data reveal that participants conceived of mind-body experiences as related to multiple themes. Participants in this study believed that the mind-body dimension included sub-themes of: (1) physical exercise, (2) clarity/cleansing, (3) breath, (4) relaxation, (5) body awareness, (6) diet, (7) sleep, (8) energy.

3.05.02 Physical Exercise.

The participants reported that they believed that physical practices are a foundational prerequisite that enabled them to achieve improved states of well-being. When speaking about physical exercise, participants shared how they had coped with trauma in the past. The

following quotes illustrate that participants believed that through the yoga movement, they learnt new ways to manage when feeling overwhelmed.

Before, I would lie there and think and think and think, where what I should have done is gotten up, started moving my body, started breathing, started taking that energy and putting it somewhere else. That's what works. And going into the 8-week program, I learnt to redirect those and just absorb and absorb some of those energy molecules (Participant #3).

Some individuals who participated in the study already had an active lifestyle prior to participating in the yoga program. They shared how their experience of yoga was different from other forms of physical activity:

I also feel the physical benefits of the exercises to the point where, I mean I pretty much have been an athlete all of my life but I have never felt like these different vibrations and so on in my body; it felt powerful for my entire being...like my mind and body, spirit and so on because you are stimulating your nervous system, your eyes and so on...Mentally I felt better. Physically I felt stronger, and emotionally I was doing much better than I had been. Part of it is having the physical discipline that we were told to do everyday. Even before I started the class I was having very physical problems. I did various exercises to make my joints stronger and I have always been active. Some of the practice I was doing everyday and some of them I did not. I think that is part of it...the physical discipline with the Yoga. The physical is also related to psychological alignment, because when I was able to do the home practice yoga exercises, it was also improving my self-confidence. I think these exercises are helping on a physical level as well as on an emotional level (Participant #18).

3.05.03 Clarity/Cleansing.

While yoga is a physical practice, participants shared that while partaking in the physical aspects, they were simultaneously experiencing physical, emotional, and mental changes for self. Further, when discussing the physical components of the yoga program, participants noted that when engaging in postures and meditations, it felt as though a cleansing or detoxifying experience was occurring in the mind and body. Participants noted that by experiencing the sensations and pains, it felt that painful trauma was being released from the body.

So, I felt like I was pretty aware of what shifts were coming from that practice. I felt too when I would have patterns come up especially like kind of the middle point of the class, I was clearing a lot of stuff out. I would have opportunities where I'd experienced a pattern in dealing with certain situations. And the actual feelings where I was actually

able to get into it...I felt really clear, like clarifying. Like I could feel it cleansing my body (Participant #2).

When you do those breathing exercises and your stomach moves right? I got very sick and that's why some days I could do very little and some days I could do more, and I kept remembering the teacher saying 'work to your capacity, work to your capacity' and then what happened I had a very strong visceral physical response. I got sick and one of the things that happened was that I was burping a lot. And I honestly felt that it was some of the anxiety I was holding and that with the burping, I was like throwing up anxiety. I did not realize how much tension I hold inside of me and I get that comes out of hyper vigilance you know. I talked about it with my therapist, how I am holding so much anxiety in my body. I still can feel that tension and it is still impacting me but the fact is I can deal with it. I now know and it is way less than when I started the program (Participant #8).

I find it fascinating and I definitely think this can help lots of people. I have done so much therapy and I believe that it's like you have to untrap things in your body. There are different parts of the body where we are all sick. So I totally believe in this. What happened is the breathing exercises and the yoga classes made me realize how much of my anxiety, or in other words what people would call holding trauma, I am calling it anxiety, was in my stomach. What I experienced in class as relaxed was far more pleasant than other states. I could not believe the tension I was holding, I was astounded. Just astounded (Participant #5).

Participants shared how they noticed quite observable physical, emotional and mental changes over the course of the yoga program. In these discussions, they mentioned how the yoga and meditation supported them to notice changes within mind and body. For some participants, this process began at the onset of the program where immediate mind-body reactions were observed:

After the first session, there was for me a processing of a lot of my difficult emotions or illnesses through my digestive system. After that first class, for the three days after, I could just feel heavy emotional sadness or despair kind of energy moving to my digestive system. It was really difficult because I didn't have any other things going on that would warrant those kind of emotions. So I knew it was from the class. I also felt like a lot of blockages kind of opening up in my ribcage, behind my shoulder blades in my body physically. So that was even the first session so that progressed throughout. This program was very good for my mind and body. It helped me to get to a better mental and emotional place (Participant # 14).

As participants spoke about becoming aware of physical self changes, they were beginning to pay attention to parts of the body that were internal cues or triggers for trauma. Through the mindful practice of yoga, they were developing the ability to breathe through

internal trauma triggers. They were also learning to breathe through challenging situations. The ability to breathe in this manner and make notice of the body was calming for participants and allowed them to feel in control rather than overwhelmed by the trauma.

3.05.04 Breath.

As participants spoke about their experiences of becoming more attuned and aware of their bodily needs and states, they simultaneously shared how their breathing patterns had deepened and changed over the course of the program.

In the beginning what I found difficult was the change in my breath... like I usually could not breathe from my chest when I first started it. I just remember one thing... definitely the number one thing I found that I made a change, and am happy with it... was breathing. I actually love not breathing from my chest... I don't breathe from my chest anymore. I breathe from my stomach. But I mean I don't feel short of breath anymore. You just make a breath and it does feel more natural. By concentrating on my breathing, and you know I could feel the air going into my nose and down into my chest and into my stomach, and I just was so aware of the things that were going on in my body (Participant #28).

By learning to breathe deeply from the abdomen, participants were learning to breathe into a place of safety when feeling triggered or overwhelmed. Participants noted that by breathing in a deepened manner, they were feeling mentally and emotionally calmer. In a physically calmer state, the mind was also calmer. In this less aroused state, the body was able to reach relaxation.

3.05.05 Relaxation.

Through the breath, participants were experiencing internal body sensations and breathing in a manner to regulate the mind and body. In this state of being, they were able to slow the thinking processes of the mind. This supported them to be more fully present in the moment, to focus and to relax mind and body.

I had a huge, personal revolution or evolution, when I started paying attention to my breathing... I know that that's... one of the basic, you know, beginning things with yoga. It was more about regulating your breath and doing certain, you know, intense, very intense practices... but... yeah I mean at the end we did do just relaxation and for myself

I'd just, generally take a notice of my breathing; it is really, really calming. I feel more grounded and my breathing has improved. Breathing is what keeps me focused and strong (Participant #21).

Participants shared that participation in the program and the development of correct breathing techniques helped them to feel greater emotional and mental stability. Further, participants expressed that they were applying the breathing techniques learnt in class to areas of their life when they were feeling stressed or overwhelmed.

Because we did so many breathing exercises I found them very helpful to calm myself, like I felt calm in learning how to breathe properly. I find that I tend to get stressed fairly easily and my emotions do make me anxious... now I have found that a little bit of breathing space can really help. I can feel myself getting anxious and I do stop and I take a breath and I can quell that feeling. I have been able to breathe. I have been able to live inside myself now, instead of float outside of myself (Participant #25).

3.05.06 Body Awareness.

Learning appropriate breathing techniques through yoga was related to heightened emotional regulation for participants. Breathing practices also allowed participants to become aware of the relation between breathing, mind and the sensations of the body.

I could feel it in different parts of my body. I could feel my breath, my energy... I could feel different sensations... different pains... at a certain point I've been really aware of pain in my chest that I think is really due to anxiety. And I'm better at articulating my feelings and how they appear in my body because before the class I had a good understanding and I'd have to say it was head knowledge but, with the class and my exercises, I came to a better understanding of how something as simple as my breath works and my mudras and finger exercises could change my physiology, my mental stability. I am able to feel homeostasis again with my body, myself, my energy whereas the cognitive part was more of verbal cognition. Now I am happy with my energy field. Now I feel balanced, now I feel peace. I was not able to get that from the cognitive part, the cognitive therapy (Participant #4).

Through the physical yoga practices, participants were breathing through challenging situations and prior traumas. They were learning to become more attuned or aware of their own bodily needs. By developing this new relationship with the body, participants were able to calm themselves when overwhelmed. During the interviews, they shared how their perspectives on

their own health was changing as self-healing through breathing was not something other forms of trauma therapy had provided.

Participants stated that as they were developing the capacity to become attuned and aware of their mind and they were able to breath through negative thought patterns. Similarly, when feelings of stress manifested in the body, they were able to breathe through the anxiety. Participants shared that by developing this relationship with the “inner self,” they were learning to understand themselves in a deeper manner.

Participants also had the experience of feeling how certain yoga postures/poses impacted the mind and body. They spoke about the resulting effects on self:

The emotional or consciousness sensations are my body telling me stuff... sometimes we've done plow pose actually or mulbandh where you clench up everything and then relax, and then after that, it does seem to be almost like a break in consciousness, just brief and then... and then I sort of feel kind of spaced out but it's just like blown out some tension and I've never had that kind of experience. It was so powerful...like there was a shift and it was physical and mental and it was immediate like, and quite profound. You know its almost like your body almost, your mind almost feels like fainting because something is just kind of, broken. It felt so great and made my mind feel so much clearer (Participant #20).

Participants shared that they were applying breathing techniques from class to their lives. By utilizing skills learnt in class to daily life, participants were learning to experience and regulate their emotions in a healthier manner. They also stated that they were developing heightened mind and body awareness:

Awareness of my body and my emotions. I just feel like a greater awareness and the breathing I think was huge! Because at work I'm busy and running around and I've got things in my hands but I can always stop myself and just focus on my breathing and, you know, assess where my mind is at right there and where I want it to be and then just make the shift to be here, in the moment. I would definitely say that I like the way she would speak during class and just notice that's something I'm trying to do for myself now at home while I'm doing the exercises...kind of talk to myself especially during the relaxation period. Every time she would name a body part I could feel it! You know, and you just worked your way down from the top of my head to the tips of my toes and it's just, that kind of connection and awareness I would say has been the biggest difference (Participant #27).

3.05.07 Diet.

For some participants, heightened attunement to mind and body was also connected to the body's response to environmental influences. Additionally, for participants who were becoming more aware of the sensations of their bodies, some noticed how diet impacted their behavioural and emotional patterns. These participants noted that by observing their mind and bodies in a deep way, they were choosing different health choices for themselves.

This is day four without coffee and I found, it's been better ever since I stopped drinking it. That was a huge part of my routine in the morning. I was telling the teacher I have two cups of coffee every morning without fail and it almost seems like automatic in the morning you know? And, I noticed, it's weird, I can notice as soon as I drank the coffee, how jittery, how stressed I was already. Such a small change has resulted in me feeling so much better through the day! (Participant #12).

3.05.08 Sleep.

As participants were engaging in physical practices that helped to cleanse their mind and body, they stated that they were developing greater self-awareness and emotional regulation. Self-attunement was assisting participants to feel physical and emotional benefits. All these behavioural changes were manifested through appropriate breathing techniques, which enabled participants to relax and develop improved sleeping patterns.

My sleeping has gotten tremendously better. I have really bad insomnia. I signed up in May and we started in June and I had had some of the most severe insomnia I have ever had through April and May and it has been curbed almost entirely. Like I will still have it if I am having stressful situations but it has really significantly changed to the point that I can look forward to sleeping fully. I still have difficult dreams but they don't wake me up. So that was the huge change and that was incredible. I was really happy about that because that is something that affects my whole life. It affects every part of my life and makes me really miserable (Participant #19).

When the mind and body are adequately rested, all areas of life are subsequently influenced (i.e., energy levels, performance, mood, etc.). Meditations specific to sleep patterns were incorporated into the eight-week trauma sensitive yoga protocol. During the interviews, participants noted that they were utilizing the meditations taught in class that supported the development of healthier sleep patterns.

Sometimes I do meditation, which helps me mentally to be more relaxed, also helps me sleep better. I am starting to do this more regularly and hope that it will become a part of my regular end of day pattern before attempting to sleep. It is helpful and is much better than taking my sleep medication (Participant #6).

3.05.09 Energy.

As participants spoke about improved sleeping habits and patterns, they also shared that they were experiencing enhanced energy levels. Overall, it was noted that participation in the yoga program was positively associated with participants' feeling higher levels of energy.

My energy has generally gone up. I found myself with a lot of, quite a lot of energy, near the end of the program. And I noted that on my home-play page because I haven't had that endurance of energy or stamina, so much so that on the last day although I didn't have transport to get to class, I didn't wanna miss the last day so I walked 90 minutes to get to the class. Energy...that's the first thing that I find...I have to say nothing has been so effective at increasing energy. When I say higher I mean really higher energy and for somebody that is experiencing depression, like wow energy, forget the energy drinks, like wow energy! (Participant #22).

As participants noticed higher energy levels for themselves during the yoga program, many related these changes to learning to breathe and to making efforts to slow the mind and body. Participants expressed that the simple exercise of slowing oneself down and breathing allowed the movement from a stressful to renewed state of being.

There were so many times I had allergies or a cold, and the teacher said that just come and sit and breathe with us and just be here. I was totally exhausted, I did not want to be there and I did not have time for it. It never failed by the end of the session I was totally renewed in my energy and myself. I was calm, relaxed and totally energized. I had total strength to go have an eight hour day. The classes were in the evening so I could go back home. I was happy that I stayed for the class so I would tell people that even if they do not want to go, go anyway. The benefits are just unbelievable (Participant #7).

It must be noted that for some program participants, the enhanced feelings of energy and well-being developed in class reflected to other areas of life. Participants shared that because they felt more energy, they were able to participate in other activities and lifestyle changes.

It's been such an observable change in my being since the beginning of the class, the energy to go the gym comes from yoga; without this I do not think that I would have found the strength to sign up for other things. I find tremendous benefits from the yoga (Participant #26).

Overall, participants noted a relationship between the yoga program, relaxation, and trauma. Participants reflected that relaxation is nearly impossible when experiencing trauma because the mind and body are continually overprocessing, and unable to slow down. Participants suggested that by breathing in a deep manner, the human body is able to reach a state of relaxation, which is beneficial for the mind and body.

Instead of just relaxing, we had to work with our body and our minds. It's hard because people who suffer from trauma can't relax. When you have anxiety, you can't relax. This has taught us how to get into our bodies and relax in a deeper way. I really mean it. I feel like I might be able to know what some people must feel as relaxation. It's easier for me to relax with some of the breathing techniques we have learnt. It's like I have finally kinda found the bottom of my lungs. I'm relaxed enough to breathe deeply enough to take really long, slow breaths. It's great! It's really good (Participant #15).

In summary, mind-body practices were a foundational theme in participants' experiences of the yoga program. Participants explicitly expressed the belief that the mind and body cannot be separated, and that both ultimately influence our experiences of life. Participants shared that through their experience in the program, they felt that physical yoga practices and meditations were associated with increased clarity and strength. These characteristics were also related to proper breathing techniques and body awareness. For some participants, heightened mind and body awareness was associated with dietary changes and conscious efforts to improve health. Discussions on the relationship between trauma and sleep, relaxation, and energy levels was noted by participants as many felt that by engaging in physical and meditative practices, they were able to relax, and had deeper and more restful sleep. By allowing these changes to regulate and assimilate into the body, overall, they had higher energy levels and felt more engaged in their health and overall well-being.

3.06 Other Key Study Themes

3.06.01 Overview.

Participants in this study discussed mind-body perspectives in relation to other key study themes that included: (1) Emotional changes, (2) Psychosocial changes, (3) Action-Behavioural Changes, (4) Awareness, and (5) Cognitive Changes. A consideration of the relationships between associated themes in the mind-body dimension is important to consider from the perspective of program participants. Analysis of the interview data demonstrated that the theme of emotional changes was further divided to include feelings of calm, changes in mood states, hope, happiness, strength, and peace.

3.06.02 Emotional changes.

These participants believed that participation in the yoga program supported changes in emotional well-being. Participants in all 40 interviews referenced aspects of the emotional changes theme. The majority of participants noted that while life continued to be stressful and challenging, emotional regulation patterns were changing. Participants noted that after doing the yoga practices they experienced enhanced feelings of wellness.

Some things in my life have actually just gotten crazier but I'm feeling really, like really deep peace and balanced and strong in it. I would say my biggest benefit has been that I am more emotionally balanced. Often after class, I would feel really strong and balanced and really, really alert, but like deep deep calm. And then I would be able to return to that, like over the days that we weren't in class (Participant #10).

Participants expressed that the feelings of calm, stability and balance they were experiencing due to the yoga program was reflected in overall mood. They shared that they felt more alive and in control of life than they had in the past.

I feel like my overall happiness is there and I am able to deal with situations that make me unhappy. I feel like I'm more in control and actually enjoying myself. I've been going out and having more fun (Participant #23).

Feelings of hope and a belief in positively transcending and getting beyond the traumatic life situations were noted in participants' reactions to how they were coping with challenging situations. Many participants stated feeling hopeful at the conclusion of the yoga program. Participants shared how they felt currently, in the present, in relation to how they used to view life and challenging situations in the past.

I feel even more grounded and even more capable of change. Like I feel like there is hope for me. I feel normal, like that there is nothing wrong with me now. I would say that I have confidence in my ability to change and heal. I'm grounded in the fact that, today I believe because of my eight-week experience that it's possible on a progressive scale. I feel like I have something to look forward to. I don't feel as suicidal and I haven't felt suicidal since beginning the session (Participant #29).

Noticing their changes in mood over the eight-week program, participants were reflecting on their ability to react differently to situations. At the program conclusion, stable moods and emotional regulation were key characteristics noted by participants.

But sometimes when emotions are mixed up and you know just lack of communication, things are always not so good, like I have some good days and I have some bad days. When I started the PTSD program I had better days. When I went away for a week on vacation... I noticed that before the conditions that we were there for, before I would have been grumpy and miserable and I would have been pissed off. When I was there this time I took it all in stride. I wasn't grouchy, I wasn't miserable and I just let it go and was happy-go-lucky and just did what I had to do... and didn't complain about what was going on...so that was different for me (Participant #1).

The overwhelming, strong emotions, they are not there anymore. They are not taking over. They are not. My mood is definitely more stable. I am not slipping up and down as much. Usually I am on a sort of emotional roller coaster...like half a day I am okay and other half I get moody towards the afternoon. I do tend to go through little dips and emotional swings but now I feel kind of slightly more steady.... or I am aware of being more steady. And I can't remember the last time I've felt like that, that very kind of consistency. I've just kind of gotten used to the up and down moods, the mood-swings and the depression. I would say it's three weeks and I haven't experienced anything like that. That's quite a long time for me! My triggers aren't going right to the core under my skin like sharp draggers. I do not have those kinds of triggers. I am just managing on a much smoother, much smoother life (Participant #35).

Many participants expressed the experience of feeling at greater peace and having a sense of internal strength. They believed that their experiences were helping them to deal with life situations in a different manner.

I guess maybe I have found peace, forgiveness, serenity, I do not know, isn't that unreal? You know what I say I have one foot in the past and one foot in the present and one foot in the future. Actually I have fast tracked. You wouldn't know but let me tell you, eight weeks ago I could not have this conversation without totally weeping, so it lifted my spirits. It lifted my emotional strength that I also correlate to resilience to emotional resilience. Of course I will have to keep an eye on it. I carry the deep stress but I think I just made myself a little stronger in dealing with that (Participant #16).

At the end of the yoga program, participants expressed feelings of emotional fortitude.

They stated that the yoga program was having a positive impact on their feelings, mood and positive emotional states. Participants were aware that the shifts were initial and just beginning, and stated that because they felt new to yoga, they had a strong desire to continue group yoga practice. As participants noted improved emotional states, psychosocial changes experienced for participants were also considered.

3.06.03 Psychosocial changes.

Another theme related to the category of self-observed changes and overlapping with the mind-body dimension includes participants' experiences of psychosocial changes. The psychosocial theme included sub-themes of confidence/self-esteem, self-care, openness to new experience, motivation/determination, resilience, and sweeter/better/old self. This theme was referenced as the second most frequently cited theme in the interviews (239) with 36 of the 40 interviewees mentioning aspects of this theme.

The majority of participants in this study reported that at program conclusion they felt greater self-confidence and self-esteem. Participants believed that they felt emotionally resilient and were also learning to manage and cope with challenges in an empowered, autonomous manner. They shared that because the impact of trauma had been so severe, they were now starting to grow and learn new behaviours that were beneficial to life.

I feel stronger... and also more, gentle... just a lot more hope. A lot of my... thinking was very.... stunted. And I feel like I've rebirthed myself in the sense and not that, like it's just one thing but that it's a continual thing. I'm gonna need to keep doing it...I would say it was very empowering. I do not feel so small anymore. It brought along a

lot more positive behaviours and it helped me to be more independent and less needy (Participant #33).

Self-empowerment and confidence was related to behaving in new ways. Participants expressed that because they were feeling more confident in themselves, they were able to step outside of their comfort zones, take risks, and try new activities and tasks that they would not have in the past. Participants also shared that because they were more confident and at ease with themselves, they were bringing this confidence and positivity to other interactions in life.

Essentially, they were reflecting their improved selves in all areas of life.

I have an organization that I run outside of having a day job. I have been able to come at that with confidence. It changed how people perceive me. Like it had a spreading affect...I seem more confident, people seem more confident in me and my ability to do things. They come up to me more...like I had the highest attendance level than I have ever had recently. So it translates and it spreads, I am just so appreciative of this program (Participant #2).

Participants expressed that because they were feeling more confident of themselves and their environments, they were taking on new challenges. This meant living life according to their own values and goals rather than being influenced by others. For individuals with trauma, self-assertion and confidence are challenging goals, and participants were explicitly sharing that when they felt more confident, they respected themselves more.

Self-respect and confidence was connected to participants making efforts to also care for themselves. Self-care strategies were frequently discussed at program completion.

What they are stressing in yoga is be yourself, be the best that you can. All of a sudden I am going by my values, not societal values. I am happy to follow my goals not somebody else's goals for me. Who cares...I do not feel it is a problem anymore. I need to move forward and at my pace. I am allowing myself and I am happy with that. That I'm asking less for help and just trusting myself more to make my decisions... really taking responsibility for myself. I am feeling the difference when I do give to myself in the sense of dedicating myself to helping, changing how I feel physically as well, and why would not I take this and move it to other aspects of my life and make that type of dedication to myself? I feel so much better (Participant #40).

Dedication to self through the pursuit of one's goals and values suggests that participants were open to new experiences. These changes in attitude were manifested in behavioural changes.

I guess the thing that's most encouraging is taking on things that I'm not very good at. Like I'm learning how to do, some web designing and I'm basically starting from the beginning and normally something like, that's something that I would put off quite a bit. I feel like there's more self worth, like I don't need a... confirmation from others, but I'm also a more giving person cause I'm not, you know, looking for confirmation from others...I'm just kind of happy to be myself, and I just find I've been a better person in general (Participant #9).

Participants spoke about how they were participating in new activities and had pursued the yoga program in a steadfast manner determined to feel better than they had at program beginning.

If anything, I have had determination to be able to finish school and get a piece of paper. I found that I just was so determined to stop my brain from going in circles. I was so determined to not be on drugs...I was determined like I have so many obstacles and so many things to overcome with PTSD but I just wanted to feel okay. I wanted to feel good. I really tried my hardest. I tried as hard as I could (Participant #38).

Participants shared that when they began the program, many had difficulty leaving bed, were unable to leave home and were socially isolated. As confidence and mood improved toward the end of the yoga program, participants spoke about how they were having experiences of living life in a more engaged way. These participants were motivated to do healthy and beneficial activities.

You know, there have been times before the class started that, 'oh, what do I have to get out of bed for' blah, blah, blah. And I've been making sure now, that I'm sleeping before midnight and I'm up like, 8-8.30. And I find that I'm accomplishing in my own, home things that need to be cleaned up and looked through and thrown out.... And I'm also trying... it doesn't happen every day, I'm also trying to go for a walk... long before I end my day, around the block or so, or I'll do that at night also, before it gets dark, I try to do that. And I have to say that it's a push, for me. But, it's better (Participant #32).

As emotional and behavioural patterns were changing for participants at program completion, participants expressed that they were feeling not only emotionally capable of handling difficult situations, but also were utilizing coping strategies learnt in the program when

challenging situations arose. Participants noted the ability to recover in a positive manner, and when this recovery process occurred, participants felt internal strength and a feeling of resilience.

There was something about my experience that moved me from being a victim to being a strong freaking woman! With this, I was able to get out and have more confidence in getting out and that really helped me. I felt stronger until the peaks hit me and slapped me down again, but the recovery period was better. Before I was more fragile, I am stronger now. I try to jump back in. The yoga program helped to lift my spirit because it lifted my emotional strength, which I also correlate to resilience, to emotional resilience (Participant #17).

Numerous participants reflected on how views of self changed from week one to week eight of the program. Participants spoke about identity changes and shifting self-views. For example, participants stated that in a happier, renewed state at program conclusion, they felt like their “older/better or sweeter self”. Many people stated that their softer, gentler self had been lost when trauma manifested. Over time, the trauma identity had become the primary self.

It was a part of me from a while ago, quite a while ago; kind of a much kinder sweeter self was touched by the yoga. These classes really brought my own self back. Seriously, I am starting to feel like myself. I notice that. I am starting to really feel like my old self (Participant #39).

When sharing experiences of emotional changes related to yoga program participation, participants expressed that they were experiencing enhanced feelings of calm, improved mood, happiness, hope, and peace. Participants expressed that these changes were also being reflected in the manner to which they were approaching life.

3.06.04 Action/Behavioural changes.

Another theme within the self-observed changes dimension and related to the mind-body perspectives was the action/behavioural changes theme. Participants believed that by engaging in physical and meditative practices, emotional wellbeing and self-perceptions changed. Participants noted that their behaviours were generally more positive. Participants expressed that these changes were related to yoga program participation. The action/behavioural changes theme was referenced in 35 of 40 interviews. During the interviews, participants shared how

their behaviours had shifted. For some participants, these changes included career transitions, communicating in productive ways and dealing explicitly with challenging situations as they arose. As numerous changes were taking place, participants expressed surprise and awe that they were feeling and behaving as they were.

It's kind of strange because this is all really new to me and I am kind of wondering who I am at the moment because this is not like me. I like it but it's not like me. I have become very busy working and having gone back to school. I realize that now I am holding a lot in. Just the way I feel when things happen, you know I get really annoyed and aggravated, generally I would just walk away and get away from the situation. But now I would say 'oh that is really annoying.' I would verbalize it, to try to change and improve the situation. It's definitely a lot better, but like I said, sometimes I wonder, 'Is this me?' So it's kind of strange and it's amusing. I am finding myself kind of like...laughing at my behaviour because it's just so different from where I was a few months ago (Participant #36).

Participants attributed behavioural and lifestyle changes to the implementation of specific yoga strategies learnt during the course of the program. A number of participants expressed that they were continuing these practices regularly after program completion. During the program, participants learnt to become body aware and to recognize when the mind and body were becoming overwhelmed with thought patterns. Participants noted that rather than allowing the mind and thoughts to continue to overwhelm, they had learnt techniques to stop the thought patterns. This training of the mind allowed for greater confidence in learning to focus and control one's own thoughts. Participants shared that they were learning new ways to calm themselves and focus on the present, when they implemented behavioural techniques learnt in the yoga program.

I have been noticing that if I am going on with life and things start to get too much and...if I'm sitting there going "Oh God, I'm spinning for God's sake", thoughts are out of control...I just stop, go in the room and do some meditation. Yes, I am going to continue with this practice. I am not going to quit until I die, I am just not going to quit, I am just not. I feel, like I have some really neat tools from that experience. I'm continuing that practice to 90 days... That for me says a lot and how much I like the practice and the effects it's having on me. Some of the mantras like the, "EK ONG KAR GUR PRASAD" that I use as a tool like when I'm at work... I'll drop that one sometimes if I notice myself not being as aware of, not being as present or as aware of what I'm working on; I'll kind of like stop and do that for a minute. I feel there is something for me to rely on. I learnt extraordinary tools that I am sticking to (Participant #24).

Having experienced emotional and behavioural changes for self by utilizing the learnt techniques, participants acquired the confidence to continue to practice and to invest in their own well-being. Participants stated that they were becoming more aware of their internal thoughts and feelings. This included becoming more aware of life situations and self triggers, acting with awareness, non-reactivity, sitting with emotions, self-reflection and non-judgment. Participants also stated that they were learning to identify self-reflexive patterns.

I kind of stop and identify them... like okay, so this is the pattern that is happening right now and this is how I usually respond to it, so, if I usually do this... what can I do to respond to it that's different than that... what is the best way for me to respond to this at this point in my life? (Participant #34).

Participant data demonstrated that the identification of behavioural patterns and best methods of responding to situations were related to taking time to think and consider appropriate options before responding. At program completion, participants shared that they were making conscious efforts to pause when challenging situations arose. By taking time to reflect and consider the best behavioural approaches, participants could then choose to respond in an appropriate manner.

And now like when something happens and I may be upset or whatever, I wait a second to let me think about it for another moment before I act, so I am taking time and space to think about it to unbundle it first. I think that ability comes from the home practice. The reacting. I'd noticed sometimes a pattern would be for me to react, and then I would maybe start to react and then I would stop... this is gonna go the same way, right? (Participant #37).

Rather than reacting to situations emotionally, participants shared that they were learning to use their neutral or calm mind to become observers of events. By doing so, they felt less stressed and more easily able to cope with arising situations.

My job can be very stressful; people run around all the time in my job and it's just very frantic. That's a good way to describe it. Usually I am all caught up in the stresses, the issues and just like all of it. Lately I feel like I've been kind of, you know pacing myself through it, and that now I'm organizing myself better and not getting caught up in just reacting to things (Participant #30).

3.06.05 Changes in awareness.

Participants associated heightened awareness of mind and body with greater overall awareness, non-reactivity, and self-reflection processes. Participants expressed that the yoga program was associated with greater awareness and the development of self-reflection.

The shifts were coming from that practice. I felt too, like when I would have patterns come up especially like kind of the middle point of the class, I would be more aware and could then think more clearly how best to respond. When I would do that I'd feel really peaceful after and just be able to, like work in my experience a different way and take a little bit of time with that and then just like repeat the process (Participant #11).

Interview data demonstrated that the ability to sit with emotions, self-reflect and act with awareness influenced participants' ability to think and behave with greater clarity. When participants were becoming aware of thoughts and feelings before responding, they were simultaneously noting cognitive changes.

3.06.06 Cognitive changes.

The implementation of self-awareness strategies was related to mindfulness awareness and being in the present moment. For participants, these changes were associated with cognitive transitions. Towards the end of the program, participants reported that they exhibited greater focus and clarity of the mind. Participants shared that they could control thought patterns and were not as lost in negative thought patterns.

There are certain practices and certain techniques that make total sense. That in itself has stopped a lot of my negative loops (Participant #04).

Now I am learning to actually say to myself... 'This is actually beyond my control. I don't need to spin this in my head like this is actually beyond my control.' I really just sort of changed my mindset. I feel like fifty pounds lighter because I'm just not carrying around that little voice in the back of my head that seems to always bring that up when I am under stress. It sounds like that little voice has been shut off (Participant #32).

When sharing how cognition-related approaches had changed over the course of the program, participants shared recent examples of overwhelming thought patterns. Participants expressed that by engaging in the yoga program, they had learnt to breathe through the

negativity. Many participants discussed how their breathing had deepened and expanded. They felt that by utilizing these approaches, they could be in greater control and in the present moment.

I would normally panic when these sorts of things happen and I did start to... so that was a very normal reaction. For instance when I reacted, I panicked, my abdomen got really tight and when I went to look at the situation and I started seeing how the things were happening, I started breathing deeply and I calmed down significantly; it is something that normally it would take me days to recover from and I recovered almost instantly when I looked at the situation and I thought 'Okay, you know what? Nothing bounced. It's not the end of the world. It could be worse. It is upsetting, but it's okay.' The experience this time was so different, very different. Usually that would have been weeks of stress and trying to control the situation. Rather, this was like 'You know what? It's okay. It will be all right.' (Participant #6).

As participants were practicing living in the present moment and breathing through challenging experiences, they could stop negative thought patterns and also found they could better focus. Participants noted a significant shift in this ability from week one to week eight suggesting that they felt more in control of their mind and body. Greater ability to focus enabled participants to better manage their trauma responses.

It would help my ability to focus because otherwise my mind goes in a very divergent place. I just find it's given me kind of a greater focus and a better perspective on things and more of a long-term kind of holistic perspective I guess. I have more clarity and more focus, like I am not indecisive. For the longest time I was not able to decide even about what kind of socks or underwear I should wear. How bad is that? Those were the things that I was dealing with and thinking that there is something wrong with me. You know to me that was all really stupid but now it is not a problem. I grab a pair of underwear and socks. I just feel like I have more clarity (Participant #12).

Participants expressed that the changes in thought patterns they were experiencing were related to memory changes. For instance, participants shared examples of memory blocks from the past. Participants expressed that they had had difficulty accessing aspects of their memory that had been blocked due to trauma. Through the yogic practices that help to clear the subconscious, participants were gaining access to memories with greater levels of comfort and awareness. They also felt emotionally prepared to deal with these memories.

Now I am thinking back and I am actually remembering certain things in my childhood that I had forgotten happened and they are not painful and they don't need to be blocked

away. I mean like I blocked away entire years. It is like my mind opening a little door you know? My memory has just been opened. My memories are kind of trapped so I cannot access a lot of my memories. I had something come back recently and I started thinking “why would that memory come back? What does it have to do with anything right now?” So, I spent more time on it and then I starting relating it to my family and a trauma of my early childhood and I created a picture that may not be accurate, but it was a perspective that I had never had before, of my early trauma. I expect I will spend some more time with it and talk about it with some trusted people, but it feels like it is a bit of unlocking process. I feel like it has not been happening up to now because I haven’t been ready. While it isn’t significant change, even one change is a big deal because that’s the start (Participant #3).

Many of the participants came to the program after month and years of inconclusive psychotherapy. They had some mental understanding of their trauma, but were unable to come out from under it in the course of their daily thoughts and behaviours. Several participants indicated that the yoga program gave them the skills and awareness to better articulate their body-mind experience, regulate their emotions, and integrate their cognitive understanding in their lives.

They always tell you certain things that you have to accept and certain things you have to sort of integrate in order to get past your trauma and I was never really able to accept what they told me I should do... At the end of doing one of the breathing exercises, I was just laying there and I started thinking, and it was like, “Oh, okay,” and I thought, “Maybe I am tired. Maybe I am just relaxing, so I will keep this in mind for the next couple of days, and yeah, it seems to have finally soaked in.” (Participant #14)

Participants were feeling more in control of their thoughts and finding ways to stay in the present moment. Program participants expressed that while they were doing this, they were also remembering issues from the past and learning ways to cope, manage, and heal in the present.

In summary, the self-observed changes dimension was associated with program participants narrating descriptive experiences of physical and mental changes, renewed self-worth and confidence, enhanced emotional regulation, heightened levels of awareness, and the ability to focus cognitions and attune to mental processes. As participants were observing these changes for self and stating that at the end of the program they were feeling a greater state of physical, mental, and emotional wellbeing, aspects of the yoga program from the perspective of

participants were coded to further understand the utility of the program from a practice perspective.

3.07 Yoga Program

In an effort to fully understand how the yoga program could impact trauma-related practice, themes of program development, home practice, and group support are discussed more thoroughly under the yoga program dimension. As program development was related to the home practice, and group support, each of these themes are therein discussed.

Program Development

Many participants spoke about how they found the yoga program to be helpful and effective for their recovery. This theme was discussed in all 40 interviews and referenced third most frequently (213) when considering all the interviews. Participants shared that physically, emotionally, mentally, and spiritually, they were feeling more connected to the world. They felt empowered and more hopeful towards their own healing. Participants expressed that they had learnt strategies in the yoga program that they could practically implement in their life.

My goodness, my sense of wellbeing is much, much, much improved. It is doubtless that the yoga has helped me and I know that because of the way I feel when I am doing it. Eight weeks ago, I could not have had a conversation without totally weeping. When I started the PTSD program I had better days, more controlled days, days when I was actually eating, days when I was looking forward to the practice. I would come out of the class and feel empowered. I have learnt something new for myself. It helped me care for myself, which I was having a hard time doing. I felt something very different than I had ever felt before, and I was actually very excited and looking forward to Thursday mornings to do this you know. So, for eight weeks I was very enthusiastic about it and I completed the session because I really found that it works. When you go to therapy, they tell you.. you should do this, they tell you... you have to do this but they don't tell you how. I mean it's something you have to go through yourself. It's been years and years and years and I have never figured the how... and I guess this development of the neutral mind... through the exercises, I finally got the how. Definitely my health has improved so much, you cannot believe it. I have been to support groups, and I see people suffering a lot and to have this to be so impactful so quickly, I just can't put words to that because we barely understand PTSD (Participant #7).

It is important to note that individuals who have experienced trauma often have low self-image and find trauma treatment to be challenging because they have to reflect on the

challenging circumstances of the past. Participants expressed that by participating in the yoga program, they were able to tap into their subconscious patterns and trauma issues without having to continually and explicitly narrate the trauma story. The majority of program participants shared that they had a strong desire to continue yoga classes (39/40 participants =97.5%) and expressed that the eight-week program had provided a foundation to learn numerous new strategies. Participants expressed that they were experiencing a number of positive benefits in many areas of life because of program participation. As a result of the benefits experienced, participants expressed a desire to continue learning yoga and meditation in a longer, deeper and continued manner.

I kind of even did not want to end, it was too brief. It's still new, and I wanna develop my practice or like just check out more classes cause, every class I went to, that feeling of emotional resilience lasted a little longer and that's why I want to continue this practice until I feel the effects of the class emotionally from class to class like there is not that blank period where I am spiraling down again. The experience definitely inspires me to continue (Participant #28).

When discussing observed self-changes, participants described that they believed they benefitted from the program because of the way the program was designed; exercises had been carefully chosen in consideration of beginner yoga practice and trauma related sensitivities. Logistics and organization helped to make the program accessible and supportive for participation, and participants expressed gratitude for programming that considered their diverse needs.

I was really pleased with the way everything was structured; I thought it was very simple and well laid out. I felt really well supported through the program. It was a really beautiful experience to do intentional work as part of a study, because we did have the questions at the beginning and then in the middle and then in the end, so it was really neat to have this reference throughout. I felt very well checked in with (Participant #4).

In the final interview, participants shared that they were grateful to have been able to partake in the yoga program and were appreciative of the fact that they were able to do intentional self-therapy as part of a research study. Participants also expressed that they felt very emotionally supported through the process by the researcher, yoga teachers, and support

personnel. Participants in 35 of 40 interviews discussed aspects of group support. These discussions of emotional support and relationships were extended to include themes connected to group support within the yoga classes and the overall program. Participants shared feelings of a strong connection with the teacher and felt that there was openness and transparency within the group. Participants expressed that the teacher impacted individual learning, growth, and participation in the program. Participants shared that in their experiences, the yoga teachers and support personnel were very present, attuned to their individual needs, and empathic to the various issues that surround trauma.

She was really, really attentive to class, like she's so intuitive that sometimes she... she could just like pick up on things, or speak things, or shift things that had been unspoken and were maybe be spoken like later that day or maybe in the next week, that they felt attended to. She says some really powerful things when we are breathing and moving our body, and moving our arms. I mean she has a lot of energy and she has a lot of compassion so it is really nice to sort of feel embraced by that during the class. The thing that moved me was the fact that she had her own trauma issues and that she divulged aspects of herself that were quite appropriate. It just made a huge difference it touched me so deeply that I cried that first day because I could really hear what she was saying. I heard her on the inside (Participant #19).

In addition to feeling supported by the teacher, it was evident that participants were also strongly connected to the overall group process. Participants shared a sense of group cohesion and positive group dynamic. They stated that even though formal talk therapy was not part of the yoga class, they felt the group was therapeutic in a very deep and profound way. Participants expressed that by participating in physical practices and meditations together, strong group support was experienced. Yoga group participants also expressed that through the group, they felt less isolated in their issues and concerns. The yoga program provided validation that others were experiencing similar challenging circumstances. In essence, the yoga classes provided participants a form of social support.

There was also really, really incredible value of going through that process with the group and having the opportunity to hear other peoples experiences of what it is that comes up and where they were experiencing shifts and changes. It was therapeutic to be in a class, of people who I knew and we knew about each other very little, except that we all survived trauma and we were all committed to being in this class (Participant #26).

The inclusion of the home practice component was another form of support discussed by participants. Participants in 37 of the 40 interviews discussed the home practice theme. Participants felt the home practice was vital to the yoga program. Participants expressed that while it was initially a challenge to develop a home practice and do it daily, the consistency, structure, and routine of having a self-healing home practice at one's disposal was vital to feelings of self-improvement and well-being.

At the end of the practice, the feeling that I actually get when I let myself go and let myself do them... is really powerful. Part of it was just spending ten minutes of your day by being really present by, you know, doing something you focus on. I think of the brain as any other muscle and it is practicing something again and that's part of it. I was able to do the exercises, like sometimes I was just doing them, but I think it kind of moved my self esteem overall you know quite consistently. I did them every day for a month at least, I kept doing it, I found it very helpful. I felt more energy, I felt better and it helps centre me, you know, it really did. I think these exercises are helping on a physical level as well as on emotional level (Participant #22).

Participants' explicitly linked consistency of the home practice to benefits in well-being. Their practice experience demonstrated that frequency of sustained practice resulted in greater health rewards. Participants shared that by developing an individualized practice, they had something to rely on within themselves each day. Participants also discussed how a personal practice must be accommodated into one's lifestyle like other health-related behaviours, as the clarity and health benefits that result from the practice can only occur when the home practice is practiced daily.

I used to wake up with anxiety, and... with the kundalini or, like if I wanna sit and meditate or do more movement yoga... it's really helpful for me to have that to wake up to. So I started doing the meditation in the morning and I would always take the morning to do that and it would be kind of difficult for me to do it in the morning because I will be thinking about all the things I have to do during the day, you know, I had to get done, so I would feel so kind of anxious around it. But once I started the exercises I felt a lot better, and once I got it I was more focused. You know how you are always in your head sometimes thinking about different things? I found that I was lot more focused and I could concentrate on my breathing and I could feel the air going into my nose and down into my chest and into my stomach and I just was so aware of the things that were going on in my body. Even all the pain of the sitting, it made me more present and I was surprised because I have done meditation in the past because some people cannot do it

because they just find their mind keeps on going, but I found that it was good. I felt really focused and I remained calm and I was good. Its like a day-to-day maintaining of a groundedness, like something that has to be done like brushing my teeth. It is like a hygiene that is something has to be done like taking a shower, this has to be done, period. If it is not done, then you are not taking care of what needs to be taken care of. That is what I am finding it to be and I do not want to lose my way (Participant #25).

Participants expressed that the program was helpful and effective due to the structure, program content, and supportive mechanisms. The development of a yoga program with teachers with experiences of trauma, and who were supportive and empathic, was important for participants. Participants also shared that being part of a group was a therapeutic process that provided social support. Finally, while the home practice was difficult to incorporate into daily life, those that were able to do so noted that with consistency of practice, they were noticing positive overall health changes. As program participants were observing their overall health progression, during the final interview participants were reflecting on their prior life experience and their new learning.

3.08 New Awareness

The final dimension created from theme analysis was the development of new awareness. Analysis of the interview data revealed that participants felt that involvement in the yoga program was related to having new perspectives of prior life experiences. Participants shared that these realizations were different from the perspectives they had at the beginning of the program. Participants believed that themes that emerged from the data comprised multiple themes. These themes included addressing new awareness about their prior trauma perceptions, conventional interventions, and spirituality.

Contemplative interventions have been hypothesized to support the ability to clear the subconscious and provide greater clarity and present moment awareness. At program completion, participants shared that they were identifying and forming a new way to relate to their prior traumatic experiences that included not being fixated on the past and letting go in a

healthy manner. Participants were learning to be more compassionate toward themselves, attend to their health needs, and not blame themselves for the negative situations that had arisen in life. They were learning to view their traumatic life experiences as opportunities for learning, growth, and the development of compassion. They were learning to not blame themselves for challenging circumstances and were attempting to embrace techniques to forgive self and others.

Like yeah it happened, it wasn't my fault, it happened and it shouldn't have happened and that is okay. It was just... really kind of... it was not earth shattering but it was just sort of like okay everyone has been telling me this, I finally accepted it. Rather than feeling really tense and angry it is almost like I almost let the anger go. It is like I don't need that anger anymore. I can accept the fact that it happened, I can accept the fact, I can admit the fact that it really did suck and it was painful but it doesn't have to hold on me. I have to and I can let it go. I am starting to feel like I have the power to let things go (Participant #16).

Participants expressed that their views on trauma had shifted to include feelings of growth, forgiveness, and compassion. Participants spoke very reflectively about how the traumatic life experiences were necessary to develop strength, closure, and enhanced resilience.

The recent trauma...I am actually grateful for. How bizarre is that? I am grateful for it... Some of it was going in deeply to like where, like where there'd been woundedness created or where it'd created patterns or whatever in my process... but I found, like kind of from the mid-point more towards the end, that as I was reflecting on things I'd be more pulling out all of the lessons and the deeper learning of everything, so I'm left feeling now, not as though I've had all these, like, traumatic experiences, but just like... I've had all this really, really deep opportunity for learning and that it's kind of come full circle, to me being able to identify the lessons and feel more at peace with it. Like some of it's really old stuff that I've been you know, kind of identifying for years and now, now the way I feel is part of my experiences is just like, 'Wow, okay so I had this really, really deep opportunity for growth. Like, okay, this actually needed to happen that way for me to be able to kind of come to this process and understand myself more deeply.' (Participant #38)

As participants were developing a new relationship with themselves and their traumatic experiences, they noted that they were also developing new notions and awareness of spirituality as an empowering process. Participants shared that they were learning more about their mind and body, and were feeling connected to a higher self. Many participants expressed that considering all they had experienced, they were so grateful to be alive and having the opportunity to live the remainder of their lives positively. They stated that these changes were

empowering and were opening up new ways of perceiving and living in the world. Participants shared that they felt uplifted and guided by their higher self in the yoga program.

I feel my spirit. The first week here when it was over she said how was it? And I said it was unbelievable and I said this is about love, like I just knew it. I am doing, my body is having an experience and my spirit. The yoga had a connection of mind, body and spirit. During the practice and when you become aware of those three things, or be aware of them, it seems like things are more possible. Well the more peace, the idea of finding increased peace of mind. I mean what could be richer than a sense of you know a spirit; my spiritual self, you know, it has kind of been given a hard time and I want to nurture it back. So, I am very grateful (Participant #11).

Participants also spoke about the power of prayer. Participants expressed that through intentional search for a deeper purpose, they were learning to trust in something higher than themselves; that they were feeling more comfort in trusting this higher being and asking for what they desired. For many, this search included prayer. They felt prayer allowed for hope, was empowering, and connected to greater well-being. In essence, participants felt that through the yoga practices, they were developing a new relationship with themselves, and having faith and trust in the outcomes of life.

My intention was there to the point that sometime I wept, sometime I prayed, and my own doctor said to me, 'I have to start, I have to start recording these things.' I laughed because I thought he was making fun of me. He goes, 'No, I'm serious. You and another patient come in here and you always tell me the things that happen after you pray.' And he says, 'You know what? It's remarkable.' This practice helped so much. It's having faith in whatever you trust and whatever you believe. (Participant #33)

As many of the program participants had been involved in prior trauma treatment either before or during the yoga program, participants shared how their experiences in the yoga program was similar to or different from other conventional treatment modalities. Participants expressed that many conventional treatment interventions were not helpful due to the labeling and stigma that surrounded post-traumatic stress. Participants shared how these labeling and stigma experiences impacted their views of self.

I did not have any other doctor at that time I was not getting another kind of therapy which I always refrain from doing because as you go, you are labeled. I would see myself either all depressed (or) all angry because there are so many labels that have been

put on me over the years, right? I felt for years like, traditional, western, therapeutic, therapies, like talk therapies... I felt condemned. And I was in a sense. From, my first therapist I was sent to a psychiatrist and just given this diagnosis that was like (a) life sentence. It's hard to even bring up that, because it's still... it's very painful. Being part of this was really encouraging for me, because getting one more diagnosis, is not like being given a winning ticket to the lottery. (Participant #26)

The impact of stigma and labeling related to mental health was also discussed in relation to medication. As many conventional interventions focus on relieving symptoms of trauma with medication, participants spoke about how other modalities impacted them.

Because my whole life now revolves around medication and hopefully getting rid of it. Medication you know, doesn't get rid of it, it just dulls your emotions. One of the things that really irks me about medicine, neurology you know all these specialists, they are so abrupt and there is no consoling, no counseling. The neurologists made me feel guilty, like 'What are you doing here, intelligent woman? What are you doing?' I wanted to kick him, and I left his office very upset, and then I said, 'Well, I have a post-traumatic stress disorder problem,' and he looked, he looked at my file quickly, and then tells me he did not know. In the medical field, the left hand does not speak to right hand. They should have combined, so that really irked me. I mean I had gone through not knowing what an anxiety attack was for...at least for months. For months, I didn't know what that feeling was. I thought it was neurological. I thought it was nervous system. I didn't know because nobody identified it for me. Cause with the other therapies I would still be having panic attacks and I'd still be having physical urges that I was ashamed of or judgmental of, and just so many... so much of that like, stuff that's in the body, wasn't. Like those other modalities don't have... I don't know, just wasn't touching upon those things, but now with yoga, as I am kinesthetic, I am a touchy feely type of person, now I am able to feel homeostasis again with my body, my self, my energy, whereas the cognitive part was more of verbal cognition, now I am happy with my energy field, now I feel balanced, now I feel peace, that I was not able to get from the cognitive part, the cognitive therapy. I have gone through therapy with psychiatrist and they always tell you certain things that you have to accept and certain things you have to sort of integrate in order to get past your trauma and I never really been able to make that connection. But I found with the yoga just in this eight weeks that I was able to accept what they told me I should do (Participant #6).

Participants expressed gratitude that despite their numerous labels, they were able to participate in the yoga program. They shared how conventional interventions had been helpful in some aspects but also described negative experiences that they had endured and how this had led to re-traumatization. Participants shared quite profoundly how engaging in telling their traumatic narrative was not helpful to healing as explicitly reiterating the trauma narrative led to retriggering and re-traumatization.

Psychotherapy is very emotionally taxing because you have to rehash and rehash and bring it up again, the trauma. I stopped going to a psychotherapist because I did not want to talk about things anymore, and that's what I liked about this because I did not have to talk about those things 'cause that can get exhausting! And it re-traumatizes. In this, you didn't have to rehash the story. It is a simple fact that sometimes rehashing the story becomes tiring, and it re-traumatizes. I have always feared assessments and you know different psychiatrists, and I have had to go to these places and to get a formal 'official' diagnosis even though other people have diagnosed me. These diagnoses, these assessment sessions can really be re-traumatizing you know and that applies to my mental illness symptoms as well post-traumatic symptoms (Participant #22).

In summary, program participants expressed in the final interviews, that they were developing new ways to relate to their prior traumas. Participants acknowledged and discussed the negative experiences, but stated that they were learning to not define themselves by the past. Rather, they were feeling gratitude towards their trauma as it had offered new opportunities for learning and growth. Participants also expressed how conventional trauma practices had been both helpful and harmful and expressed that alternative models were supportive and empowering. Mindful yoga practices allowed trauma to be released through the body subconsciously without having to explicitly discuss the happenings of the past. Participants expressed that this process was less traumatizing and offered self-relief in a more expedited, cogent manner. Finally, by participating in the yoga program, participants expressed that they were developing a new or renewed relationship with spirituality. For some this included formalized practices. For others, this included a new relationship with external environments like nature or the world in general. In whatever practice this manifested, participants expressed that they felt greater control over their healing and thus, empowered living in the world.

3.09 Participant Journals

Twenty-seven of 29 participants who completed the yoga program completed the daily practice journals. On average, participants did the home practice on 36 of 56 days and practiced for an average of 14 minutes. It was noted that participants were motivated to practice. Positive reflections were not limited to those who engaged in the practice the most, rather they were

indiscriminately distributed throughout the range of participants. Journal responses were overviewed to understand overall themes for participants. The reflections of 12 participants with varied amounts of home practice are summarized in Appendix I.

3.10 Program Compliance

This researcher and the yoga teachers maintained weekly discussions regarding the classes. One teacher taught the majority of the classes and stated that the protocol was implemented and adhered to in each class. It was expressed that because of the various physical abilities of participants, modifications to postures and meditations were often made to support the participants. The teacher and participants expressed that the first four weeks of the protocol were very accessible for individuals with trauma and who had never practiced yoga, but the second half of the program was more physically challenging for participants. This feedback is valuable in considering appropriate modifications for program development purposes.

3.11 Summary

Outcome measures of all program participants demonstrated that changes across time occurred for the yoga treatment group on all outcomes and reached statistical significance in relation to PCL scores, insomnia, positive affect, resilience, and perceived stress. Further, the 40 program participants discussed that the yoga program had fostered numerous changes for self that were reflected physically, mentally, and emotionally. Participants expressed that they felt empowered and uplifted and felt greater confidence and resilience. Discussions of the changes participants experienced were further reviewed to understand aspects of the yoga program that program participants found effective. Participants expressed that program content, logistics and program personnel allowed for a safe space to further their trauma-healing journey. Participants also expressed that home practices, while challenging, provided tools to continue to further their growth. Finally, participants expressed that they were developing new levels of awareness

toward their prior life circumstances, conventional trauma interventions, and spirituality.

Participants expressed that they would take this learning and understanding to their lives leaving the program; they expressed gratitude for the program and expressed a desire to continue to find ways to heal from trauma through mind-body interventions so that they could further their healing journey and live healthy, productive lives. These findings were echoed in participant journals as well as in interviews with participants.

4. DISCUSSION, FINDINGS, LIMITATIONS, AND FUTURE RESEARCH

4.01 Chapter Overview

The purpose of this study was to examine cognitive, emotional/behavioural changes and perspectives about traumatic events that may occur for PTS participants partaking in a yoga intervention. Past research has revealed that individuals with PTS exhibit several physiological difficulties including but not limited to difficulties with an imbalanced nervous and autonomic system (Rothschild, 2000; Streeter et al., 2012; Van der Kolk, 2006; Van der Kolk et al., 2005). An evidence base is beginning to emerge suggesting that the mind and body cannot be separated, especially when considering the body-based dimension of trauma (Levin, 1997; Ogden et al., 2006; Rothschild, 2000; Van der Kolk, 2006).

As a result of trauma, individuals with PTS experience vast physiological, emotional, and behavioural challenges (Levine & Frederick, 1997; Van der Kolk, 2006). Individuals with PTS often re-live trauma cycles in the present and have difficulty with interpersonal relationships, employment, and overall quality of life (Felitti et al., 1998; Breslau et al., 2000). Due to the numerous challenges faced by this population, individuals with PTS are at risk for various comorbid health conditions over the lifespan (Breslau et al., 2000; Dixon et al., 2005). The prevalence of mental health issues like post-traumatic stress and its related effects are a public health concern.

While conventional trauma therapies demonstrate moderate success, they likely do not account for the body-based symptomologies experienced by individuals with PTS (Van der Kolk, 2005; Van der Kolk et al., 2006). Further, these approaches are time and resource intensive making them unaffordable and perhaps inaccessible. Current evidence demonstrates that the prevalence of PTS in the clinical and general population is increasing (Tanielian, 2009; Van Ameringen et al., 2007) and those that support this population are not equipped to handle the

numerous issues related to PTS. This research sought to examine whether a KY trauma sensitive intervention may support individuals with PTS and to understand the relationship between PTS symptoms and well-being in a wait-list control and yoga treatment program. Research was grounded in the premise that holistic treatment approaches may support the various physiological, psychological, and behavioural issues of PTS.

This study utilized a mixed methods design to understand how the yoga intervention impacted cognitions, emotions/behaviours and perceptions of traumatic events. Another purpose of this research was to allow participants the opportunity to share their experiences of the intervention. The majority of meditation/yoga studies conducted to date have not considered the ongoing clinical needs and experiences of study participants. Participant journals and interview data were analyzed for ideas and themes connected to experiences with the yoga program. This inductive analysis of data were performed for various reasons: to allow a process of creation, discovery, and analysis and to allow participants the opportunity to narrate their experiences in an environment in which they could seek feedback and would feel encouraged, supported and validated.

4.02 Findings

While study findings demonstrate that both the yoga group and the wait-list control group changed over time in all outcome measures, the yoga group experienced greater positive changes. Individuals in both groups were permitted to participate in treatment approaches outside of the research study that did not have a contemplative component. Approximately 57% of participants in the wait-list control group were participating in other therapies while 1/3 of the yoga group was involved in therapy. As the findings suggest, the yoga treatment is likely a beneficial intervention or adjunct treatment for PTS.

Significant differences for the post-traumatic stress checklist (PCL), insomnia index (ISI), perceived stress (PSS), Positive and Negative Affect Scale (PANAS-positive scale) and

resilience (RS) measures were demonstrated for the yoga group in comparison to the wait-list control group. This suggests that at the end of the program, individuals who participated in the yoga group experienced significant reductions in trauma symptoms, improved sleep, fewer perceptions of stress, were responding well to positive emotions and felt that quality of life and sense of well-being had improved in relation to the wait-list control group.

Quantitative findings demonstrate that participants in the yoga group experienced a reduction in trauma symptomology over the course of the program. During the interviews, participants shared how they were not triggered by events and situations as strongly as they had been at program start. The self-observed changes dimension demonstrates the various connections between mind-body perspectives and overall health as noted by participants.

Program participants discussed how participation enabled them to intellectually and experientially understand the relation between mind and body. Participants spoke about actually feeling physically, mentally, and emotionally stronger when participating in the program. While most participants were new to engaging in movement practices, even those participants who were avid exercisers noted that they were experiencing positive physical, emotional and mental changes.

Participants shared experiences that had not been considered a priori for research purposes (i.e., the benefits of group support, spirituality, etc.). These findings expanded the overall research scope. While grounded theory was utilized, data triangulation was also achieved (i.e., PTS symptoms, resilience, sleep, stress, etc.), strengthening outcome data findings. The emergence of new themes and perspectives within the overall data set resulted in the development of three diagrams (i.e., self-observed changes (Figure 8), new awareness (Figure 9), yoga program (Figure 10)) that demonstrate participant experiences. Representations of participant experiences are helpful for research and practice, as this field is inter-disciplinary and applicable to numerous audiences.

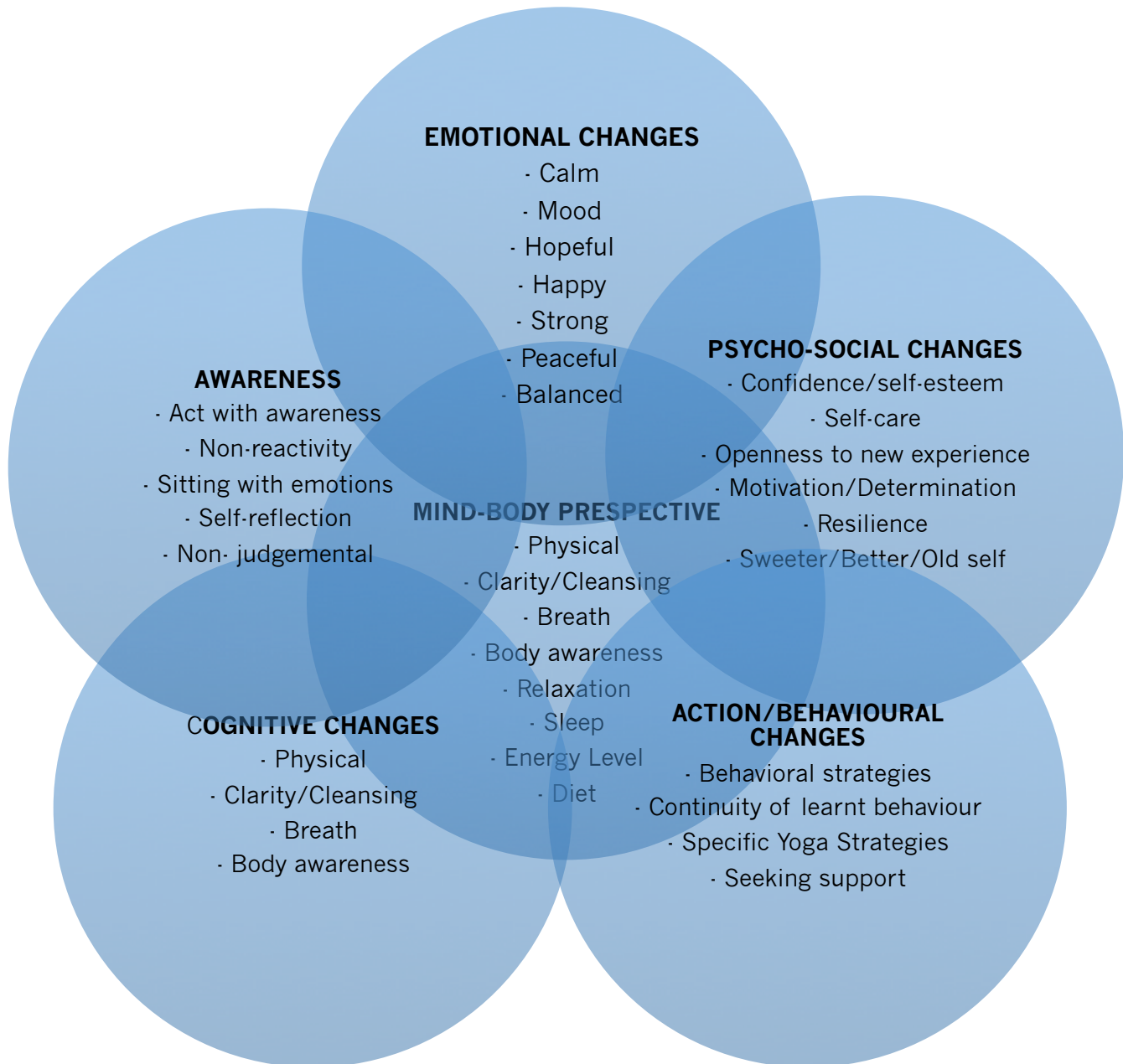


Figure 8.

Self-observed Changes Diagram

The research base is becoming clear that PTS impacts the autonomic nervous system and trauma manifests in relationship to one's body (Ogden et al., 2006; Van der Kolk, 2006). The KY trauma sensitive yoga program utilized in this study was specifically designed to provide support to the areas of the mind and body impacted by trauma. KY has been demonstrated to

impact the nervous and endocrine systems (Granath et al., 2006; Singh-Khalsa, 1998). Changes in PCL scores between the two groups demonstrate that trauma symptomology had changed significantly over the course of the program. Stressful situations and an inability to adequately respond to stressful traumatic occurrences were the primary reasons individuals chose to participate in the yoga program. Clinical experience demonstrates that traumatized individuals are unable to attend to their inner sensations and perceptions. When asked to focus on internal sensations, they typically feel overwhelmed and deny having an inner sense of themselves (Emerson & Hopper, 2012).

Changes in stress levels from program start to completion were evident. At the beginning of the yoga study, individuals expressed a high amount of stress and an inability to adequately cope with the situations presented in life. It is anticipated that because the yoga practices were slow and focused on the breath, participants were experiencing physiological changes and learning to attend to themselves. They stated that they were learning how to return to the breath when feeling anxious or overwhelmed. This is critical for individuals with PTS because one cannot learn to care for oneself without being in touch with the demands and requirements of self. Results demonstrated that at the end of the program, individuals in the yoga group were identifying feeling less overwhelmed and stressed. Further, they stated that when they did experience high stress levels, they were able to implement learnt techniques to self-soothe.

Participants shared that through the practice, they were learning to slow down and experience their mind and body. Awareness and comfort with the body was an example of participant's learning to self-regulate their own emotions. Participants expressed that when they noticed excitability in the mind and body towards the end of the program, they were learning to stop thought patterns by returning to the breath or practicing a meditation to calm self. In essence, participants were developing self-mastery skills and internal locus of control. The strategies learnt in the program were being applied to daily life in a manner that was

empowering, always accessible and healing. These findings substantiate prior theoretical literature suggesting that successful environmental adaptation and feelings of self-efficacy require understanding of self, emotions and adequate coping skills (Bandura, 1971; Volpe, 1975).

As this research demonstrates that individuals partaking in the yoga intervention experienced decreased PTS symptomology at program completion, expressed less stress perceptions, greater confidence, resilience and perceptions of positivity, and these outcome findings were corroborated with interview data, this research suggests that mind-body interventions may be a helpful treatment intervention or adjunct treatment of trauma-related care. While it is not possible for this research to demonstrate physiological changes for program participants, as participants expressed less PTS symptomology and were stating that they were learning to live in the present rather than their prior cycles of traumatic stress, it is hypothesized that the body was regulating itself. Yoga practice may have afforded changes to the nervous system, and ANS, also impacting brain chemistry.

Yoga is an ancient healing practice and is becoming a mainstream therapy because of its various health-related benefits (Brown & Gerbarg, 2005). While practiced informally, yoga is not currently regarded as a treatment or adjunctive therapy for trauma. The findings of this research substantiate the recent findings of Sargent et al. (2013) who discuss the implementation of contemplative-based practices for army personnel in the U.S. Yoga-based trauma treatment is steadily increasing in the U.S. as military personnel with PTSD advocate the use of body based approaches. This research demonstrates that for individuals with PTS, mind-body dysregulation requires integration and return to homeostasis that purely cognitive approaches neglect. Individuals may be healed physically, mentally, and socially through the modeling, learning, and practice of yoga.

Prior research has clearly demonstrated that yoga impacts physiological regulation, HRV, breathing (Streeter et al., 2012; Van der Kolk, 2006; Van der Kolk et al., 2005), a decrease in SNS activity and increase in PNS activity (Streeter et al., 2012). Evidence also suggests that yoga is related to improvements in sleep and relaxation (Choliz et al., 1995; Shapiro et al., 2003). This study demonstrates that insomnia and sleep patterns were significantly improved in the yoga treatment group. Improvements in sleep patterns suggest that through yoga practices, participants were internalizing these practices into the body. Continued practice and internalization were leading to regulation of mind and body to the extent that participants were experiencing restful sleep patterns.

Streeter et al. (2012) suggest that as the ANS becomes more integrated, energy in the mind and body increases, allowing for greater energy and the ability to relax and rest at will. The current research suggests that participant parasympathetic and sympathetic systems were becoming more balanced, reintegrated and robust, allowing for deep relaxation and restoration. Participants expressed that yoga practices were related to changes in mind and body. For many, periods of deep relaxation and sleep were experienced for the first time. This was likely related to feeling less anxious and enhanced mental clarity.

From a physiological stance, these findings suggest that participants were developing a calmer, clearer mind. Energy was circulating to the brain, whereby they were able to be more in control of their cognitions thereby impacting emotions and other behaviours. It is likely that through the practices of yoga and meditation, energy in the brain was increasing leading to greater nervous system clarity.

The PTS yoga curriculum was designed using a repeated/staggered teaching approach whereby practices from the prior week were repeated and designed to build on material taught in the prior weeks. Consistent class repetition offered participants the opportunity to feel comfortable with the practices and enabled the mind and body to integrate experienced changes.

Diligent home practice may have been associated with greater change and feelings of enhanced well-being because practice allowed the body to integrate the experiences.

During the interviews, participants clearly expressed that they felt involvement in a practice that sought to work with the body was related to other emotional and behavioural changes. Participants expressed that they were feeling calmer, more hopeful, balanced and peaceful. Stress responses were being handled in a healthier way. Some participants explained how stresses in life were not decreasing but that their attitudes and behaviours in response to the stress had shifted. They stated that they were learning how to respond in a calmer, more appropriate way rather than feeling overwhelmed and unable to manage.

Participants expressed that because they were feeling physically and emotionally stronger with improved moods, they could make beneficial changes in their lives. These changes included returning to school, gaining employment, performing household tasks, leaving home to do errands, etc. During the interviews participants shared that when they felt overwhelmed, stressed or triggered by prior traumas, they would immediately begin a strategy that they had learnt during the course of the program or seek other support rather than becoming absorbed in the triggering thoughts and feelings. Overall, participants expressed that they were trying out new activities, learning to enjoy life again, and feeling a renewed sense of confidence.

In relation to the research question examining emotional/behavioural changes, the depression, anxiety, and stress scale (DASS) demonstrated change across groups but did not reach statistical difference in the present study. Considering that prior research has demonstrated positive associations between yoga and mood (Janakiramaiah et al., 2000; Kirkwood et al., 2005), this finding may have resulted because the sample size was too small for this single scale that assesses three dimensions to elucidate the differences of depression, anxiety, and stress across the three tested time intervals.

Outcome measures demonstrate that the resilience scale reached statistical significance for the yoga group, which suggests that as the program progressed, individuals perceived themselves in new and positive ways. The resilience scale measured a number of areas including: life purpose or living a meaningful life, perseverance, self-reliance, equanimity, and self-contentment. Questionnaire data corroborated with interview data whereby participants spoke about renewed self-confidence and feelings of self-appreciation and making changes related to living a balanced, more meaningful and happy life.

These findings suggest that yoga and meditative practices are far more than mere stretching exercises, but may help to clear the subconscious in a deep way. During the interviews, participants expressed that the journey to self-fulfillment and care was difficult, requiring discipline, perseverance, and an immense desire to improve. Some participants expressed that because they had been involved in treatments that had not provided relief, they were open to new experiences. Other participants were resistant to conventional treatment approaches. The majority of participants shared that they could feel that deep traumas were held in the body and were being cleared through movement and meditation allowing for greater energy and the ability to rest at ease. Participants expressed that mental and physical clarity was related to enhanced self-respect and desire to live a positive and purposeful life. This finding suggests yoga has the potential to not only improve PTS related symptomology but can impact the individual's life in a beneficial way. Prior research has primarily focused on PTS symptomology and has not considered overall health and lifestyle.

The yoga program provided participants with opportunities to self-reflect on prior experiences and respond to life's situations in a self-regulated and appropriate manner. Participants learned to think and consider outcomes instead of reacting as they had done in the past. They also learned yogic techniques such as focusing on the breath that enabled them to calm themselves and then consciously choose how best to behave in difficult situations.

As the trial progressed, participants were more in control of their thoughts and increasingly successful in their efforts to stay in the present. They also learned to focus their minds and break habitual negative thought patterns. Some participants felt their memory was improving. These findings align with prior research suggesting connections between meditative practices and memory enhancement (Holzel et al., 2011). Those participants experiencing new memories around their trauma felt confident that they could handle their new perceptions and expressed interest in seeking out appropriate supports and treatments. It is possible that KY could be used as an adjunct to other exposure therapies. The findings of the present research corroborate the fact that the PTS protocol was designed taking into consideration the nervous system difficulties of PTS. Further research should seek to elucidate the neuroscience of KY and PTS.

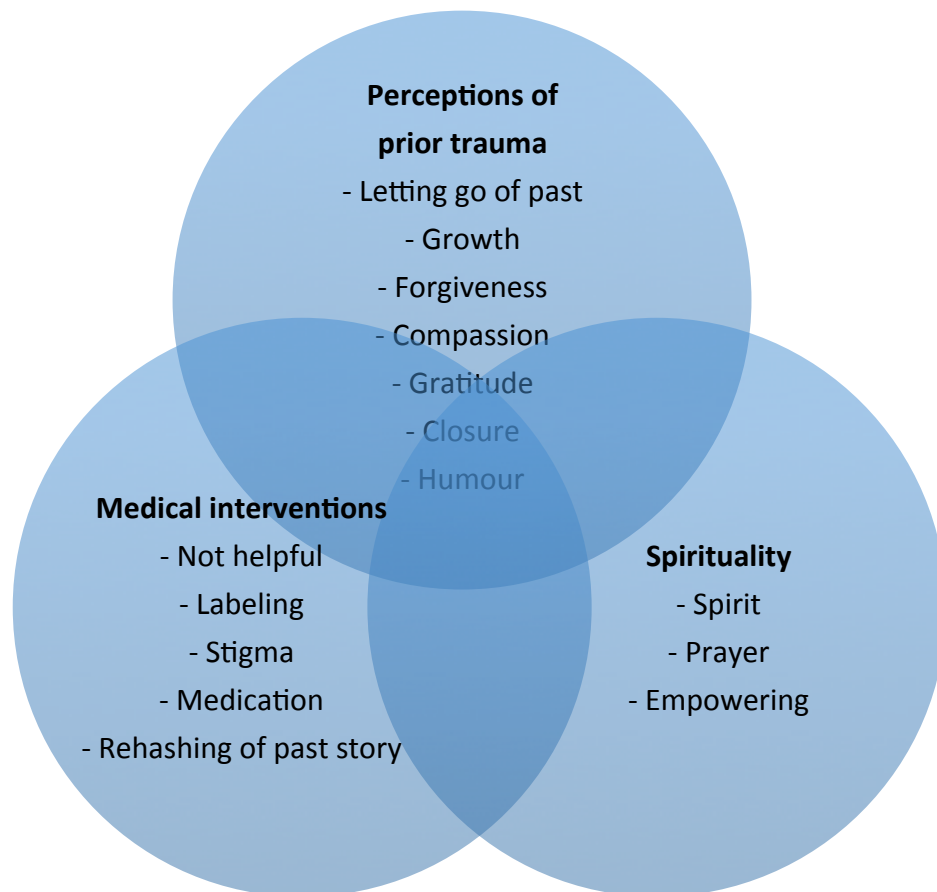


Figure 9.

New Awareness Diagram

The KY healing program facilitated a new outlook on the participants' life circumstances. These new perspectives were themed to create Figure 9. As participants became physically, emotionally and mentally stronger, they began to self-reflect on their experiences. As they developed new relationships with their prior traumatic experiences, some participants expressed gratitude for the traumas of the past. According to their new insights, the challenges of the past and present had allowed them to develop new courage, confidence, belief, and persistence. Participants spoke about the challenges and traumas as requiring them to go deep inside of themselves to heal and rejuvenate. They believed that this process had allowed them to develop a sense of character and a better understanding of themselves in the present. In this new light, participants understood their traumatic experiences to have given them opportunities for learning, growth, transformation, and a sense of comfort with self in the present.

The stigmatization of medical interventions had made many of the participants feel marginalized and hopeless. After the yoga program, they felt inspired, had confidence in themselves and felt a greater relationship with their inner self and spirituality. These findings are related to the outcome measure of resilience. Self-acceptance and care are key factors of resilience accompanied by the feeling that one can bounce back from adverse circumstances and live happy, meaningful, and purposeful lives. Individuals in the present study were taking steps to achieve such goals.

It is possible that if the yoga program had been of longer duration, participants might have been better able to recognize and focus on their current patterns of behaviour based on past trauma. Also, as participants in the study had varying types and levels of trauma at the beginning of the program, additional analyses to understand the trauma profiles of participants throughout the yoga program and onwards could be conducted. Along these lines, it would be

valuable to conduct an intent to treat analysis whereby it could be understood whether the intervention would still have been effective had all individuals remained in the program.

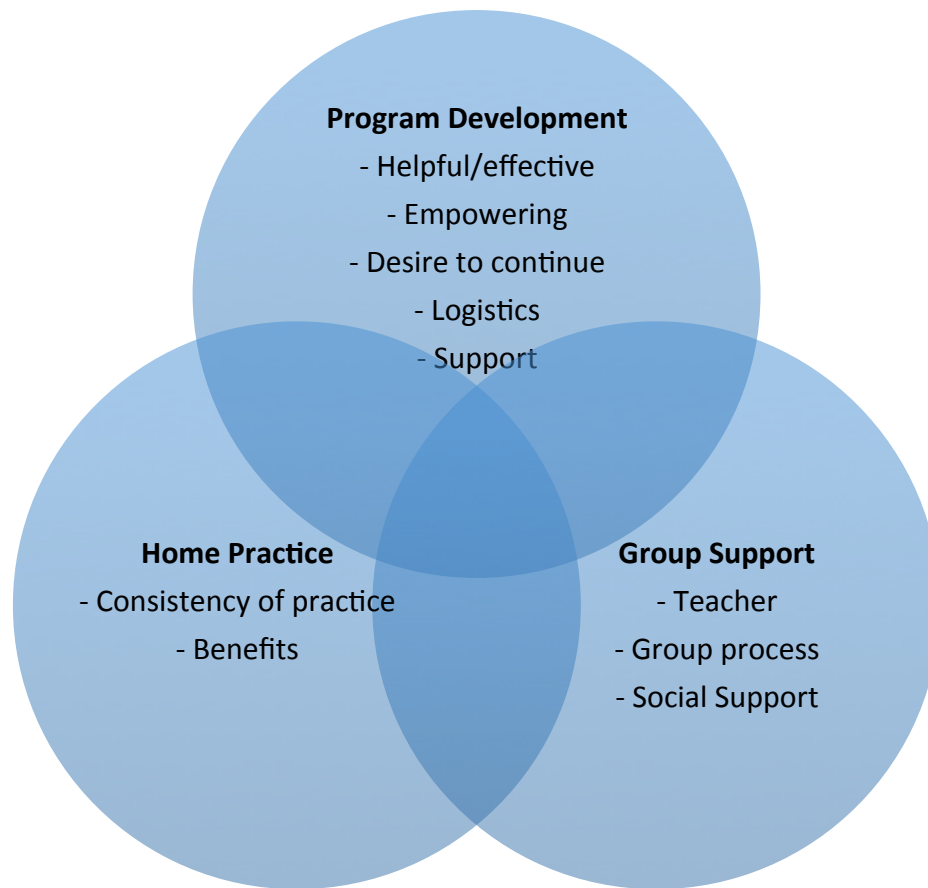


Figure 10.

Yoga Program Diagram

Certain aspects of the logistics of the yoga program were especially significant to eventual outcome. Teachers made an effort to help participants feel empowered and in control of their own healing. A sense of control is important for individuals with PTS as at the time of the trauma, they were unable to control the negative situations arising. Participants, in turn, said they found the program to be helpful because while the yoga teachers instructed them to work to their capacity and try their best, they always felt in control of their bodies and felt safe to participate or decline from participating as individually suited. This finding is important in relation to self-mastery and locus of control for PTS participants because they were learning to tolerate their own bodies and feel in control of their responses and behaviours.

Another important aspect was group support. Participants credited the teacher and their fellow participants as crucial to their growth in the yoga program. This finding adds to the scope of this research and aligns with prior research suggesting that for individuals with trauma, it is critical to have opportunities for the modeling of positive behaviours (Bandura, 1971; Van der Kolk, 2006). As many individuals with PTS have suffered trauma from those that they trusted, a safe and compassionate relationship in which healing can occur is vital. Participants felt embraced in the teacher's positivity, care, and compassion, feeling empowered throughout the process. The importance of having a teacher to model appropriate skills and behaviour gave participants an opportunity to consider and practice learning new ways of relating to themselves and the world. This is important for any trauma intervention as individuals with PTS are often re-learning appropriate ways to behave.

As individuals with PTS are generally isolated due to their various physiological and emotional struggles, participants expressed that program participation offered the opportunity to belong to a group and feel socially supported by others. Participants expressed that while the group did not process traumatic experiences verbally, involvement in a group allowed for feelings of normalcy, peer support, and commitment to both one's own growth and the healing of the group. Vast literature on group therapy and group dynamics exist (Ogrodniczuk, Joyce, & Piper, 2005) and future research may examine particular factors or variables that are associated with group treatment in yoga programs.

The daily home practice element of the program was also vital to the yoga program. Participants stated that while it was initially challenging to find the discipline to practice, when they did so, they felt the numerous physical and emotional benefits. This is an important finding and emphasizes the importance of repetition and consistency. As behaviour is repeated and practiced, it becomes automatic and a regular part of being. Participants who dedicated and committed themselves to the daily home practice stated that they were experiencing the benefits

of the practice and bringing heightened well-being to all other areas of life. In essence, the behavioural tools learnt in the yoga program helped those who participated to heal themselves. They were feeling more aware of their mind and body, behaviours and life circumstances. This is an important finding in relation to PTS as feelings of emotional modulation and self-mastery were enhanced. Participants felt greater autonomy and control of their life circumstances.

4.03 Practice Implications

The implications of this study are many. In terms of human development, Kundalini yoga presents itself as a potent agent of self-actualization, emotional and behavioural self-regulation. This was clearly demonstrated by the experiences of the participants of this study. Piaget (1970) suggests that self-knowledge involves the learning of adaptive skills. This development of knowledge requires understanding, training, practice and application. Participants in the study learnt new skills leading to enhanced self-efficacy and a sense of accomplishment.

While the yoga intervention was demonstrated to support individuals with PTS, this research suggests that mind-body practices may be beneficial for any population interested in acquiring skills of emotional regulation and self-mastery. For instance, yoga and meditative approaches are increasingly being used in school programs as a way for students to de-stress and focus their energies. Teaching children to actively regulate their emotions allows the development of sense of self, efficacy, and locus of control. The learning and applications of such techniques are likely beneficial over the lifespan.

This present research also served to confirm previous work on the capacity of yoga to effect emotional integration and healing (Brown & Gerbarg, 2005; Sexton, 2004). A surprising outcome of this work was the tendency of many of the participants to seek each other out, outside of their assigned yoga days, thereby developing informal communities, which in turn further accelerated the virtuous cycle of healing and self-growth. Not to be overlooked in these

times of burgeoning health care budgets, these yoga interventions are virtually cost-free. All that is required is a trained instructor, a space to conduct classes, and a bit of publicity or networking to get a program like this off the ground. Last, but not least, this study has illustrated the tremendous potential for self-help and self-healing that resides in everyone, a capacity that one-day may be recognized as a true responsibility.

4.04 Limitations

Participants in this program were not of a homogeneous trauma group and instead had experienced numerous adverse traumas. While this research demonstrated interesting findings, we did not account for the types of trauma experienced by those that finished the program versus those that dropped out of the program. It is possible that individuals with cumulative, ongoing life traumas may find the intervention more or less supportive to their challenges.

A criticism commonly leveled at previous yoga/meditation studies has been the desirability to conduct research in laboratory settings. The present sample did not consist of a homogenous clinical sample and as the group was not controlled, each participant was being impacted by different life stresses, interpersonal relations etc. As such, the yoga program may have attributed to some of the changes experienced by participants in addition to other group related effects. For instance, being part of a class and having weekly interaction with others may have attributed to feelings of greater well-being.

Future research may attempt to replicate the present study with a greater number of participants and control for the number of participants in each group. If a greater number of participants were utilized, greater effect may have been observed over repeated measures testing for various scales. As a relatively small sample was utilized in the present study, this may account for different amounts of change over time and should be controlled for in future studies. Relatedly, research in the future may decide to employ diverse survey questionnaires. Simple questionnaires assessing the main areas of PTS were included in this study to reduce participant

burden but in the coming years, could benefit from covering a broad range of PTS symptomology and factors related to mental health and well-being.

4.05 Future Research

This program utilized an 8-week, 90 minute, once a week community-based program. While results are promising, future research may adapt a longer treatment protocol in a clinical setting to understand treatment effects over time. Participants also expressed interest in a longer intervention, and it may be helpful to track such changes over time. It may be fruitful to examine sustained change over the long-term by more thoroughly documenting change in PTS symptoms and lifestyle changes over sustained practice. Future research may seek to examine individual participant profiles over time taking into account type of trauma experienced and other demographic variables.

Future study would benefit from tracking individual participants over time to understand whether individuals with more complex trauma (i.e., early childhood abuse, repeated abuse etc.), were more likely to stay or drop out from the program. It would also be important to match participant profiles with other demographics (i.e., whether other trauma treatment had been received, etc.) to understand the outcomes of those who had done various forms of trauma work on themselves.

Emotional factors could be studied through robust mood scales because during the interviews, participants stated that they were noting quite significant shifts and changes in mood, reporting feelings of strength, calm, and hope. In consideration of the demonstrated findings related to resilience and psychosocial changes, a valuable future scientific study would be to track individuals over time and collect long-term measures on yoga practices, quality of life, and lifestyle changes that individuals pursue over the course of trauma recovery. Future research may examine spirituality and life purpose in a deeper way. At present, these findings suggest that the yoga program improved PTS symptoms and overall well-being.

Further, it would be interesting for research to examine other health changes and track the comorbid health conditions of individuals with PTS undergoing mind-body treatments. It is possible that as the body clears deeply rooted trauma, long-term wellness is possible. As previous meditation and yoga literature has found a relation between mind-body practice and numerous mental health concerns, it would be valuable to examine whether an ongoing yoga practice can prevent the onset of mental health concerns and other comorbid health conditions.

Research that utilizes a KY group, wait-list control group, another treatment group (i.e., interventions with cognitive or exposure based elements) and another form of contemplative intervention (i.e., yoga, mindfulness, etc.) to understand how various approaches impact individuals with PTS may be beneficial. As participants were learning to emotionally self-regulate, research studies that examine PTS interventions that include breathing, meditation and movement with interventions specifically focused on paying attention to the breath (i.e., mindfulness), may illustrate the mechanisms by which the lives of individuals are changed.

The advances of neuroscience may provide further evidence of the benefits of yoga for mental health issues. While it was not possible for this research to conduct neuroimaging of participants at program start and end, future research using such techniques may provide further evidence of the mechanisms by which KY impacts individuals with PTS. Our findings substantiate current trauma research (Holzel et al., 2011; Siegal, 2007; Van der Kolk, 2006) that use brain imaging in their studies. This research demonstrates how an 8-week intervention can impact people's thought patterns, emotions, behaviours, feelings toward self, level of awareness, empathy and demonstrates the importance of further research and funding that use brain imaging for helping traumatized and mental health populations. Perhaps studies of longer duration could take into account physiological changes of the mind and body over the long-term.

4.06 Summary

A preponderance of research evidence documents the physiological and somatic effects of post-traumatic stress. PTS often manifests as a lack of integration between self and body. As physiological, emotional and behavioural struggles of PTS are interrelated, individuals with PTS find separating the mind and body to be extremely difficult. Cognitive aspects of trauma in treatment cannot be considered alone. Conventional therapies typically do not account for the physiological and somatic effects of PTS. These therapies have also been criticized for focusing on the PTS psychopathology. With the aim of integrating mind and body in a holistic manner, this study utilized a holistic KY treatment for post-traumatic stress recognizing the need for both PTS symptom reduction and to support individuals in an empowering, holistic manner.

As physiological changes were occurring in the body, participants were experiencing shifts in emotional and mental well-being leading to feelings of calm, improved thought patterns, emotional regulation, awareness of mind-body, improved emotional and behavioural patterns, and relaxation likely connected to yoga participation. As the body learnt to reach a state of homeostasis, trauma could be cleared from the body and emotions would no longer control the individual. Overall, results converge to demonstrate that because of the yoga program, the bodies of individuals with PTS were working in a more integrated and holistic manner.

Considering current research findings and methodological limitations, this is the first study that examines KY and PTS and suggests that the entire human has to be considered in trauma treatment. Participants noted that a highlight of program involvement was learning tools for self-healing, essentially techniques of self-mastery and internal locus of control. Individuals with PTS may seek holistic treatment interventions as they are nonpharmacological and do not focus on the trauma narrative.

As study participants demonstrated reduction of PTS symptomology and increased emotional modulation and overall changes related to well-being, future research that aims to

understand the physiological and psychosocial mechanisms by which yoga programs might inform trauma treatment would benefit the PTS population. As this research substantiates prior mind-body trauma research, the time may have come for a paradigm shift in relation to trauma research and treatment. There is a need to define and distinguish yoga therapy as a respected therapeutic discipline and to create care models that empower rather than stigmatize. When the prevailing mental health paradigm begins to consider how yoga can help elicit healing of the mind-body on physiology, emotional, mental, and behavioural levels, the public health issue of PTS may be alleviated simply by teaching individuals to consider their entire being in the healing process and to become comfortable, attuned, and reliant on the integral self as a powerful ally in the quest for health and healing.

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APPENDICES

Appendix A: Kundalini Yoga

As an ancient Indian practice, yoga focuses on breathing and physical exercises, combining muscle relaxation, meditation and physical workout. While a number of yoga schools exist, Kundalini yoga (KY) is characterized by exercises (kriyas) that stimulate the blood flow and energy supply to the brain, the nervous system and the glands in the endocrine nervous system (Singh-Khalsa, 1998). It stimulates optimal health and a radiant sense of well being with simple yogic techniques that can be practiced by anyone. Positive effects can be noticed almost right away. Initially a secretive discipline, KY was first taught openly by Yogi Bhajan in America in 1969. KY is dedicated to transforming the essential quality of being through exercise and meditation that is both mentally and physically integrative, and spiritually empowering (Bhajan, 2007).

KY was chosen for this study because individuals with trauma have experienced psychological and physical challenges related to the nervous system. KY is believed to help bring the energies of the brain, nervous and glandular systems into balance, in order to function at a consistently higher level, without exhausting the mind and body. When the body and mind are at ease, inspiration flows freely and peace of mind is realized. KY uses deep breathing (pranayam), yoga postures (asanas), body locks (bhandas), chanting (mantras), and hand and figure gestures (mudras) meant to enhance the nervous system, glands, and mental faculties. It is scientifically proven that optimal levels of performance can be achieved in life when one is oxygenated and physically active. The breathing pattern in KY may be done in numerous ways with the goal of synchronizing the body and breath with practice.

Overview of KY trauma protocol:

In between the opening exercise of attunement and the final well-wishing, from week to week there was a graduated progression: from simple exercises to slightly more complicated exercises; from exercises requiring less intense focus to others requiring more focus; from exercises with an external focus to ones with a more internal focus; from less strenuous exercises to more strenuous ones. Relaxation was also an important part of the protocol. Relaxations started with sitting up relaxations of 1-3 minutes duration and progressed to lying down relaxations of 3-7 minutes with the active guidance of the instructor. By the end, participants were left to relax on their backs with no verbal cues for 7-11 minutes.

Overview of breathing techniques utilized in KY protocol:

Out of 10 routines practiced over the 8-week duration of the protocol, 7 involved breath work. There were a variety of breath practices. The routines, which consisted of from 1 to 7 exercises, might themselves involve a number of differing breathing techniques. Among these, were: 1) slow and deep nostril breathing; 2) a segmented mouth breath; 3) inhaling through an O-shaped mouth and exhaling through the nose; 4) a rapid and powerful, rhythmical diaphragmatic nostril breath called "breath of fire; 5) breath of fire through an O-shaped mouth; 6) retention of the inhale for up to 1 minute; 7) inhaling through the nostrils with segmented breaths and chanting a mantra on the exhale; and 8) filling and emptying the lungs through the nostrils with segmented breaths, 2 to 8 per inhale or exhale, while mentally repeating a mantra with each segment.



Appendix B: Information and Recruitment Forms

[Date]

Dear [Title and name of healthcare practitioner/agency],

I am a PhD student at the Ontario Institute for Studies in Education at the University of Toronto in Canada. I am working under the supervision of Dr. Rick Volpe.

For my PhD research project, I am conducting a research study on the effectiveness of yoga in treating post-traumatic stress symptoms. The potential efficacy of yoga for post-traumatic stress symptoms is inferred from its demonstrated ability to generate a state of relaxation, well-being, and reduced autonomic arousal, and on preliminary research studies showing efficacy of yoga for post-traumatic stress.

I am inviting you to refer male and female clients/patients or individuals with post-traumatic stress symptoms aged 18 and older who are interested and capable of participating in this research study.

Participants will be randomized to a treatment as usual condition or to the yoga intervention for the duration of the group (11 weeks total). Participants in the treatment control condition can be receiving any form of treatment they are currently receiving or be on a waitlist for treatment. These participants will complete all research measures. All participants will be offered participation in the yoga intervention.

The yoga intervention will require weekly participation in yoga classes over an 8-week period and 15-minute daily practice sessions of yoga at home. We will follow-up with participants at program completion.

Outcome measures will include completion of questionnaires and daily yoga diaries, and a one hour interview with myself at the conclusion of the received intervention. Written, informed consent will be obtained from all participants. You should make contact with your clients/patients through the enclosed letter.

I would very much appreciate your assistance in the recruitment of patients for this study, which I believe will lead to validation of a treatment that may be a valuable adjunct to existing trauma treatments.

Please contact Farah Jindani (principal investigator) or Dr. Rick Volpe (supervisor) if you have any questions or require additional information. You can also contact the University of Toronto Office of Research Ethics (ethics.review@utoronto.ca or +1 416 946 3273).

Sincerely,

Farah Jindani
PhD Student, OISE / University of Toronto

Phone: 416.934.4524, email: farah.jindani@utoronto.ca

Supervisor: Dr. Rick Volpe
Professor, OISE / University of Toronto
Phone: 416.934.4511, email: richard.volpe@utoronto.ca



Dear [Patient Name],

A colleague of mine is conducting a research study on the effectiveness of yoga in treating post-traumatic stress symptoms. She has reason to believe that yoga may be effective as a treatment for this disorder. This belief is based in part upon the known effect of yoga to generate a state of physical and psychological relaxation and on preliminary research on yoga for trauma patients that showed improvements. This treatment is not widely available from health care practitioners treating post-traumatic stress symptoms, and may be helpful in treating your problem. Your participation in this study is entirely voluntary, and alternative treatments for your health concern are available.

Your participation would begin with a telephone conversation, an interview session, and questionnaire completion with the researcher. You would then be randomized to one of two groups and would complete research information for a period of 11 weeks. All participants will be offered participation in a yoga group. The yoga practice will include complementary weekly yoga classes for 11 weeks (8 weeks of yoga, 3 weeks to complete research information). In addition, you will receive 15-minute daily practices that you can practice at home.

A qualified instructor will teach the yoga practices. The yoga does not require flexibility or physical fitness and is easy to learn. You would be required to complete questionnaires a total of three times, have an interview about the yoga with the researcher at week 1 and week 11 and to complete a daily yoga diary over the 8 weeks of yoga class.

This communication with you is strictly confidential. If you are interested in participating in this study, please contact:

Farah Jindani
PhD Student, OISE / University of Toronto
Phone: 416.934.4524, email: farah.jindani@utoronto.ca

Supervisor: Dr. Rick Volpe
Professor, OISE / University of Toronto
Phone: 416.934.4511, email: richard.volpe@utoronto.ca

Sincerely,

[Patient's physician/therapist]

Email recruitment

[Salutation to potential participants]

Individuals over the age of 18 years and diagnosed with post-traumatic stress or experiencing symptoms of post traumatic stress are invited to participate in a research study of a yoga treatment for post-traumatic stress symptoms.

There is some evidence that yoga may be effective for treating post-traumatic stress. This belief is based in part upon the known effect of yoga to generate a state of physical and psychological relaxation and on preliminary research on yoga for post-traumatic stress patients that showed improvements. This treatment is not widely available from health care practitioners treating post-traumatic stress.

You will participate in this study for 11 weeks. You will be assigned to one of two groups and all participants will be offered yoga classes.

You will also receive 15 minute daily home practices. A qualified instructor will teach the yoga classes. The yoga does not require flexibility or physical fitness and is easy to learn.

Participation also includes interview sessions and questionnaire completion.

Participation in this study is entirely voluntary.

This communication with you is strictly confidential. If you are interested in participating in this study or would like more information, please contact:

Farah Jindani
PhD Student, OISE / University of Toronto
Phone: 416.934.4524, email: farah.jindani@utoronto.ca

Supervisor: Dr. Rick Volpe
Professor, OISE / University of Toronto
Phone: 416.934.4511, email: richard.volpe@utoronto.ca



**Do you experience (Post-traumatic
Stress) or trauma
symptoms?**

Individuals over the age of 18 are invited to
participate in a research study of Yoga for
post-traumatic stress

**The yoga in this study is easy to learn
and does not require flexibility or physical
fitness.**

Participation will require an in-person screening and assessment,
an 8 week yoga intervention, and completion of questionnaires and
interviews.

For information please call:

(416) 934-4524

Email: farah.jindani@utoronto.ca

Ontario Institute of Studies in Education, University of Toronto



Appendix C: Participant Screening Tools

Participants will be recruited from hospitals, local physicians, trauma specialists, trauma serving social service agencies, online advertisements (e.g. kijiji, etc.). At the beginning of a phone pre-screening conversation, potential participants will be informed of the nature and sensitivity of the questions, asked whether this is an appropriate time for them to answer these questions, and told that the phone call is expected to take up to 10 minutes. For live calls, in the interests of confidentiality, the researcher will record only the subject's first name or initials at the beginning of the screening conversation; only if s/he appears to be eligible and is interested in pursuing the study, will s/he be asked to provide contact/identifying information (e.g. last name, address, phone number or e-mail address). This contact/identifying information will be recorded on a separate document that will be kept separate from the Telephone Call Script. The contact/identifying information will be accessible by only this researcher and will be kept confidential, secure and locked in a key-access only location. No identifiable data will be shared. Participants will be informed that participation is entirely voluntary and the decision to participate or not participate will not affect their further evaluation or therapy. Participants who are interested in participating will be given a complete and thorough explanation of the discomforts and benefits of this study and their involvement in it. Written informed consent will be obtained in person prior to enrollment.

SCRIPT

ID number:

1. Hello, Dr./Mr./Ms. [name], my name is [name]. I am a doctorate candidate at the Ontario Institute for Studies in Education, University of Toronto. Thanks for your inquiry about our study evaluating a yoga treatment for post-traumatic stress symptoms. Are you still interested in participating?

Yes -->Go to #2.

No -->Thank you for your time. **DONE.**

2. Is now a good time to describe the study and to see if you qualify to participate?

Yes -->Go to #3

No -->Is there a better time for me to call back? Note time and schedule to call individual back at that time. **DONE.**

3. Let me briefly describe the study. We first test your eligibility with a personal and medical history interview. If you are eligible, you will be randomized to a treatment as usual group (you can continue any treatment you are currently doing) or to our 11-week yoga group treatment. The yoga classes are for a total of 11 weeks (8 weeks and 3 weeks) for collecting research information. You will be asked to attend simple group yoga classes once per week and a simple daily 15-minute practice at home. You will have to undergo interviews with me prior to beginning the study, at week 11 of the yoga program and throughout the program to complete some questionnaires. The yoga program is free for you. If you are in the other group, you will still complete the research measures. Are you still interested in participating?

Yes -->Go to #4.

No -->Thank you for your time. **DONE.**

4. During this interview, I will ask you a few questions that are related to your medical and personal history to assess your eligibility for this study. Is this ok with you?

Yes -->Go to #5.

No -->Thank you for your time. **DONE.**

5. What is your age?

If Age ≥ 18 -->continue to question #6.

If Age < 18 -->Thank you for your interest but I'm sorry you are not eligible for our study.

DONE.

7. Have you had a diagnosis of post-traumatic stress from a qualified health care professional or do you believe that you suffer from post-traumatic stress?

Yes -->continue to question #9

No -->continue to question #8

8. Have you experienced a traumatic event?

Yes -->continue to question #9

No -->Thank you for your interest but I'm sorry you are not eligible for our study. **DONE.**

9. Have you experienced any persisting behavioural consequences from this event (e.g. flashbacks, nightmares, avoidance, numbing, insomnia, irritability, hypervigilance, etc.)?

Yes -->continue to question #10.

No -->Thank you for your interest but I'm sorry you are not eligible for our study. **DONE.**

10. Do you have a serious medical or psychological condition that would prevent you from participating in yoga postures, breathing exercises or meditation?

No -->continue to question #11.

Yes -->Thank you for your interest but I'm sorry you are not eligible for our study. **DONE.**

11. Do you have any medical, psychological, or neurological conditions?

Yes -->please describe: _____

If above mentioned is a condition that would hamper full participation in protocol (for example, lacking the cognitive ability to understand and comply with treatment, wheelchair bound, or late pregnancy): Thank you for your interest but I'm sorry you are not eligible for our study.

DONE.

No, or do not have condition that would hamper full participation in study -->continue to question.

12.

Are you in treatment for this condition? Please explain.

Yes/No -->Notes:

Continue to question #13

13. Are you following a doctor's recommendations for this condition?

Yes -->continue to question #14

No -->ask if the person is willing to acquire his/her doctor's assent to participate in yoga practice. If person has untreated condition, and is willing to get doctor's consent to participate in the study, continue to question #14. If not -->Thank you for your interest but I'm sorry you are

not eligible for our study. **DONE**

14. Please list all medications you are currently taking.

Continue to question #15.

15. Are you pregnant?

Yes -->How many months along are you? Due date: _____

If person is within their third trimester: Thank you for your interest but I'm sorry you are not eligible for our study. **DONE**

No or not within third trimester -->continue to question #16.

16. Do you have any physical limitations?

Yes -->please explain: _____

No or physical issues will not hamper participation in study -->continue to question #17.

17. Do you have a current practice of yoga (more than once/week), meditation or mind-body intervention? Are you participating in any other treatment that includes elements of relaxation or mind-body based stress reduction strategies that are of more than one hour per week on average?

No -->Continue with question #18.

Yes -->Thank you for your interest but I'm sorry you are not eligible for our study. **DONE**.

18. Do you have any questions so far?

Yes -->Respond to question. Do not continue until question is clarified, then go to #19.

No -->Go to #19.

19. I would like now to give you a more detailed description of the study. The first step is to come in and have the study described in detail, complete some questionnaires and have you sign a consent form.

Your eligibility for the study will be evaluated at this time and this will take up to 1 hour.

Are you still interested in participating?

Yes -->Go to question #20.

No -->Thank you for your time. **DONE**.

20. You will then be scheduled to participate in a weekly yoga classes for 8 weeks and will be instructed in a daily 15-minute at-home yoga practice. You will be asked to complete a number of questionnaires on your feelings, mood, physical state, etc. that take up to 1 hour to complete. These will be completed just before the yoga classes' start, in the middle of the 8 weeks of classes, at the end of the 8 weeks of classes. At the middle of the 8 weeks and at the end of the 8 weeks, I will also conduct an interview with you.

21. Do you have any questions so far?

Yes → Respond to question. Do not continue until question is clarified, then go to question #22.

No → Go to question #22.

22. Participation is complementary for you. Trained teachers will teach you the yoga. They will answer any questions you may have and support you throughout the 11 weeks. If you are still interested in the study we can proceed to the scheduling. Are you still interested in participating?

Yes → Proceed with scheduling appointment

No → Thank you for your interest and time. **DONE**.



Demographic Questionnaire

1. Date of Birth:

2. Gender:

3. Have you done yoga before?

If yes, what type?

4. Are you currently seeking medical advice, therapy etc?

If yes, what?

If yes, how long?

4.b.) if yes, how long have you been attending this treatment?

5. Have you done yoga before?

Types _____

6. Are you currently taking any medications? No Yes

If yes, what/why _____

7. Are you currently taking any other substances? No Yes

If yes, what _____

Are you willing to abstain for either 8 weeks/ 48 hours before class/ able to tell us if you are using? _____

- Explain that it is not safe to be using during the actual class therefore if 'high' client will not be able to participate

8. Are you pregnant? No Yes Number of weeks _____

- Inform client there may be some postures she cannot do.

9. Are you presently undergoing psychotherapy/counseling? No Yes

If yes, where _____

10. Have you had and past psychotherapy/counseling? No Yes

If yes, where _____

11. Are you currently doing yoga or meditation? No Yes

If yes, are you willing to stop your practice to participate in this research?

No Yes



Appendix D: Consent form

Why is this research study being done?

We would like your permission to enroll you as a participant in a research study. We are asking you to take part in the study because you have symptoms of post-traumatic stress. The purpose of the study is to test the effectiveness of a yoga treatment and how this treatment might work. During the study you will be asked to make at least 11 study-related visits, most of which are to participate in group yoga sessions. We plan to enroll up to 50 participants in this study being conducted at the University of Toronto.

How long will I take part in this research study?

The total time that you will participate in this study will be at least eleven-twelve weeks. During this time you will be asked to make at least 11 study-visits. This includes at least 1 week for the screening procedures and pre-study evaluations, 8 weeks for the treatment, and 3 weeks to collect research information. During the 11-week treatment period you will be attending one yoga class per week each up to 90 minutes in length and you will be practicing yoga techniques at home for 15 minutes per day. The yoga instructor will be able to answer any questions you might have about the yoga practices. If you are in the other group, you will continue with anything you would normally be doing and just meet with this researcher twice during eleven weeks to complete research information.

What will happen in this research study?

Screening Procedures

If you are interested in partaking in the study, you will phone or email the study investigator. The study investigator will follow-up with you by phone to complete some demographic information. If you are interested and eligible for further screening, you will be asked to meet the study investigator at the University of Toronto. At this session, you will undergo a demographic and personal history interview related to trauma/post-traumatic stress, and complete questionnaires that will take up to 1 hour. The screening procedures will test whether you qualify for this study. If you do not qualify for this study, you will be informed of this. If it is appropriate, you will be referred to a health care specialist from whom you can receive appropriate treatment for any health issues found in the screening procedures.

Study Procedures

If you qualify for this study, you will be scheduled to attend group yoga class sessions once per week for 11 weeks. If you are in the other group, we will schedule times to meet.

At the beginning of each yoga class, you will be asked to complete the **Outcome Rating Scale (ORS)**. This scale takes less than one minute to complete and assesses your overall well-being. At the end of each class, you will be asked to complete the **Session Rating Scale (SRS)**. This scale takes less than one minute to complete and assesses your overall thoughts about the class. Immediately before the start of the first session you will be asked to complete 6 questionnaires that ask questions about your feelings, emotions, mood, health, mental state, and post-traumatic stress symptoms that will take up to one hour to complete altogether. It will be most helpful if you can answer each and every question in these questionnaires.

Although it is important for the study that you complete all of the questionnaires, you may skip any questions you feel strongly you do not wish to complete. The following is a list of all questionnaires you will complete throughout the study:

- The **PTSD Checklist (PCL)** asks questions about the clinically recognized symptoms of post-traumatic stress. You will rate how much you were “bothered by that problem in the past month”.
- The **Positive and Negative Affect** scale asks about your emotions
- The **25-item Resilience Scale** asks questions about your ability to adjust or recover from trauma, misfortune, or change.
- The **5-Facet Mindfulness Questionnaire** asks questions about your different levels of awareness (observing, describing, actively aware of present-moment experience, and non-judgmental).
- The **Depression and Anxiety Scale** asks questions about feelings of mood and stressful situations.
- The **Insomnia Severity Index** asks questions about general sleeping patterns
- The **Perceived Stress Scale** asks questions about your general levels of stress.

At the conclusion of the eleven weeks, you will be scheduled for an interview with the principal investigator. In the yoga group, during the weekly yoga classes, you will also be instructed in the performance of simple home yoga practices and will be given instructions in writing. You will be asked to continue recording about the regularity of your yoga practice during the group.

If we find information during the study that indicates you are medically at risk, we will let you know and refer you for appropriate treatment. The yoga instructor will interact with you regularly in the group yoga sessions. About half way through the 8-week treatment you will be asked to complete the same questionnaires you completed before the treatment that will take up to one hour. After the 11-week treatment, you will have an individual in person interview with the researcher and complete questionnaires. This may require an additional session (week) and may take up to two hours.

What are the risks and possible discomforts from being in this research study?

Practice of the physical exercises, breathing exercises, postures, relaxation techniques, and meditation in the treatments involve little risk, although at times you may find them challenging and difficult to complete. Overexertion on the physical exercises may lead to temporary muscle soreness for up to a week. However, you will be instructed to gradually increase your effort on the physical exercises so as not to overexert yourself, and to stop if you experience unexpected unpleasant symptoms. There may be risks and side effects that are currently unknown and/or unanticipated.

Please note that all information will be de-identified and locked in the Principal Investigator’s office within a suite of locked offices. Only study staff will have access to the information. Some of the questions posed on the questionnaires may require you to reflect on aspects of your life with which you are unsatisfied or even unhappy. This may result in additional stress.

What are the possible benefits from being in this research study?

There may be no direct benefit to you for your participation in this study. It is possible that the yoga treatment may eliminate or reduce the severity of your post-traumatic stress disorder but this cannot be guaranteed.

Your participation in this study may contribute to the development of an effective behavioural treatment for post-traumatic stress symptoms. Results from this study may also help our understanding of post-traumatic stress.

What other treatments or procedures are available for my condition?

The alternative is to not participate in the study and continue to receive standard care. There are other known treatments for post-traumatic stress. These include both medications and other non-drug psychological and behavioural treatments other than yoga and meditation-related treatments, which have been shown to be effective.

If you choose to discontinue participation in this study, please let your yoga teachers and/or the principal investigator know of your choice and they will ensure that you discontinue the study safely. If required, you can be referred to a healthcare specialist who can provide you with an alternative trauma treatment. Behavioural treatments for post-traumatic stress are covered by some health insurance plans. Although you may be able to get treatment from a healthcare provider it is not certain that you could get the yoga treatment used in this study since it is not currently being used as a standard treatment.

I understand that if I choose to participate:

- I will be asked to participate in one of two groups
- I will be offered to participate in a yoga group and it is my choice whether to accept or decline
- I will be asked to complete questionnaires
- I will be asked to be interviewed by the student researcher
- The interview will be audiotaped if I give permission. I don't have to give permission if I don't want to.
- Completion of questionnaires will take no more than an hour
- The interviews will take no more than one hour.
- I can change my mind and stop participating at any time.
- I don't have to answer each question.
- My information will be kept confidential in locked files. Only the student researcher (Farah Jindani) and her supervisor (Dr. Rick Volpe) will see my responses. My responses will not be identified with my name.

☐ Yes, I agree to participate in this study.

Date: _____

Signature:



Yoga class information

Your yoga instructor will be _____

Your classes will be held at _____ **from** _____
commencing _____ **and ending** _____

What to bring:

- Open mind
- Wear loose, comfortable clothing.
- Bring non-slip mat and cushion for postures and meditation and a shawl or blanket if required for relaxation. (some extra mats and cushions will be provided).
- Water for hydration



Appendix E: Quantitative Questionnaires

PTSD Checklist (PCL)

If an event listed on the Life Events Checklist **happened to you** or you **witnessed it**, please complete the items below. If more than one event happened, please choose the one that is **most troublesome to you now**.

The event you experienced was _____

on _____ .

Instructions: Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, then **circle** one of the numbers to the right to indicate how much you have been **bothered** by the problem **in the past month**.

1 = Not at all

2 = A Little Bit

3 = Moderately

4 = Quite a bit

5 = Extremely

1. Repeated disturbing memories, thoughts, or images of the stressful experience? 1 2 3 4 5
2. Repeated, disturbing dreams of the stressful experience? 1 2 3 4 5
3. Suddenly acting or feeling as if the stressful experience were happening again (as if you were reliving it)? 1 2 3 4 5
4. Feeling very upset when something reminded you of the stressful experience? 1 2 3 4 5
5. Having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when something reminded you of the stressful experience? 1 2 3 4 5
6. Avoiding thinking about or talking about the stressful experience or avoiding having feelings related to it? 1 2 3 4 5
7. Avoiding activities or situations because they remind you of the stressful experience? 1 2 3 4
8. Trouble remembering important parts of the stressful experience? 1 2 3 4 5
9. Loss of interest in activities that you used to enjoy? 1 2 3 4 5
10. Feeling distant or cut off from other people? 1 2 3 4 5
11. Feeling emotionally numb or being unable to have loving feelings for those close to you? 1 2 3 4 5
12. Feeling as if your future will somehow be cut short? 1 2 3 4 5
13. Trouble falling or staying asleep? 1 2 3 4 5
14. Feeling irritable or having angry outbursts? 1 2 3 4 5
15. Having difficulty concentrating? 1 2 3 4 5
16. Being “super alert” or watchful or on guard? 1 2 3 4 5
17. Feeling jumpy or easily startled? 1 2 3 4 5



5- Factor Mindfulness Questionnaire

Subject number _____ Date _____

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

1	2	3	4	5
never or very rarely true	rarely true	sometimes true	often true	very often or always true

- _____ 1. When I'm walking, I deliberately notice the sensations of my body moving.
- _____ 2. I'm good at finding words to describe my feelings.
- _____ 3. I criticize myself for having irrational or inappropriate emotions.
- _____ 4. I perceive my feelings and emotions without having to react to them.
- _____ 5. When I do things, my mind wanders off and I'm easily distracted.
- _____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.
- _____ 7. I can easily put my beliefs, opinions, and expectations into words.
- _____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
- _____ 9. I watch my feelings without getting lost in them.
- _____ 10. I tell myself I shouldn't be feeling the way I'm feeling.
- _____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
- _____ 12. It's hard for me to find the words to describe what I'm thinking.
- _____ 13. I am easily distracted.
- _____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
- _____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.
- _____ 16. I have trouble thinking of the right words to express how I feel about things
- _____ 17. I make judgments about whether my thoughts are good or bad.
- _____ 18. I find it difficult to stay focused on what's happening in the present.
- _____ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.
- _____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
- _____ 21. In difficult situations, I can pause without immediately reacting.
- _____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.

- _____ 23. It seems I am “running on automatic” without much awareness of what I’m doing.
- _____ 24. When I have distressing thoughts or images, I feel calm soon after.
- _____ 25. I tell myself that I shouldn’t be thinking the way I’m thinking.
- _____ 26. I notice the smells and aromas of things.
- _____ 27. Even when I’m feeling terribly upset, I can find a way to put it into words.
- _____ 28. I rush through activities without being really attentive to them.
- _____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.
- _____ 30. I think some of my emotions are bad or inappropriate and I shouldn’t feel them.
- _____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
- _____ 32. My natural tendency is to put my experiences into words.
- _____ 33. When I have distressing thoughts or images, I just notice them and let them go.
- _____ 34. I do jobs or tasks automatically without being aware of what I’m doing.
- _____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
- _____ 36. I pay attention to how my emotions affect my thoughts and behaviour.
- _____ 37. I can usually describe how I feel at the moment in considerable detail.
- _____ 38. I find myself doing things without paying attention.
- _____ 39. I disapprove of myself when I have irrational ideas.



Depression and Anxiety Questionnaire

DASS 21 (Depression and Anxiety) *Name: Date:*

Please read each statement and circle a number 0, 1, 2 or 3 that indicates how much the statement applied to you *over the past week*. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree, or a good part of time

3 Applied to me very much, or most of the time

1 I found it hard to wind down	0	1	2	3
2 I was aware of dryness of my mouth	0	1	2	3
3 I couldn't seem to experience any positive feeling at all	0	1	2	3
4 I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3
5 I found it difficult to work up the initiative to do things	0	1	2	3
6 I tended to over-react to situations	0	1	2	3
7 I experienced trembling (eg, in the hands)	0	1	2	3
8 I felt that I was using a lot of nervous energy	0	1	2	3
9 I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10 I felt that I had nothing to look forward to	0	1	2	3
11 I found myself getting agitated	0	1	2	3
12 I found it difficult to relax	0	1	2	3
13 I felt down-hearted and blue	0	1	2	3
14 I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15 I felt I was close to panic	0	1	2	3
16 I was unable to become enthusiastic about anything	0	1	2	3
17 I felt I wasn't worth much as a person	0	1	2	3
18 I felt that I was rather touchy	0	1	2	3
19 I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3
20 I felt scared without any good reason	0	1	2	3
21 I felt that life was meaningless	0	1	2	3



Positive and Negative Affect Scale

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment. Use the following scale to record your answers:

1 2 3 4 5

very slightly or not at all = 1

a little = 2

moderately = 3

quite a bit = 4

extremely = 5

___ interested

___ distressed

___ excited

___ upset

___ strong

___ guilty

___ scared

___ hostile

___ enthusiastic

___ proud

___ irritable

___ alert

___ ashamed

___ inspired

___ nervous

___ determined

___ attentive

___ jittery

___ active

___ afraid



Insomnia Severity Index

Name: _____

Date: _____

1. Please rate the current (i.e., last 2 weeks) **SEVERITY** of your insomnia problem(s).

None = 0 Mild = 1 Moderate = 2 Severe = 3 Very = 4

Difficulty falling asleep: 0 1 2 3 4

Difficulty staying asleep: 0 1 2 3 4

Problem waking up too early: 0 1 2 3 4

2. How **SATISFIED**/dissatisfied are you with your current sleep pattern?

Very satisfied Very dissatisfied

0 1 2 3 4

3. To what extent do you consider your sleep problem to **INTERFERE** with your daily functioning (e.g. daytime fatigue, ability to function at work/daily chores, concentration, memory, mood, etc.)?

Not at all	A little	Somewhat	Much	Very much
Interfering				Interfering

Interfering

Interfering

0 1 2 3 4

4. How **NOTICEABLE** to others do you think your sleeping problem is in terms of impairing the quality of your life?

Not at all	A little	Somewhat	Much	Very much
Noticeable				Noticeable

Noticeable

Noticeable

0 1 2 3 4

5. How **WORRIED**/distressed are you about your current sleep problem?

Not at all A little Somewhat Much Very much

0 1 2 3 4



Resilience Scale

Date: _____

Please read the following statements. To the right of each you will find seven numbers, ranging from "1" (Strongly Disagree) on the left to "7" (Strongly Agree) on the right. Circle the number which best indicates your feelings about that statement. For example, if you strongly disagree with a statement, circle "1". If you are neutral, circle "4", and if you strongly agree, circle "7", etc.

1 = Strongly Disagree

7 = Strongly Agree

1. When I make plans, I follow through with them. 1 2 3 4 5 6 7
2. I usually manage one way or another. 1 2 3 4 5 6 7
3. I am able to depend on myself more than anyone else. 1 2 3 4 5 6 7
4. Keeping interested in things is important to me. 1 2 3 4 5 6 7
5. I can be on my own if I have to. 1 2 3 4 5 6 7
6. I feel proud that I have accomplished things in life. 1 2 3 4 5 6 7
7. I usually take things in stride. 1 2 3 4 5 6 7
8. I am friends with myself. 1 2 3 4 5 6 7
9. I feel that I can handle many things at a time. 1 2 3 4 5 6 7
10. I am determined. 1 2 3 4 5 6 7
11. I seldom wonder what the point of it all is. 1 2 3 4 5 6 7
12. I take things one day at a time. 1 2 3 4 5 6 7
13. I can get through difficult times because I've experienced difficulty before. 1 2 3 4 5 6 7
14. I have self-discipline. 1 2 3 4 5 6 7
15. I keep interested in things. 1 2 3 4 5 6 7
16. I can usually find something to laugh about. 1 2 3 4 5 6 7
17. My belief in myself gets me through hard times. 1 2 3 4 5 6 7
18. In an emergency, I'm someone people can generally rely on. 1 2 3 4 5 6 7
19. I can usually look at a situation in a number of ways. 1 2 3 4 5 6 7
20. Sometimes I make myself do things whether I want to or not. 1 2 3 4 5 6 7
21. My life has meaning. 1 2 3 4 5 6 7
22. I do not dwell on things that I can't do anything about. 1 2 3 4 5 6 7
23. When I'm in a difficult situation, I can usually find my way out of it. 1 2 3 4 5 6 7
24. I have enough energy to do what I have to do. 1 2 3 4 5 6 7
25. It's okay if there are people who don't like me. 1 2 3 4 5 6 7
26. I am resilient. 1 2 3 4 5 6 7



Perceived Stress Scale

Name: _____ Date: _____

Circle the description that best represents how often you have felt or thought that way during the past month.

- | | | | | | |
|--|-------|--------------|-----------|--------------|------------|
| 1) Been upset because of something that happened unexpectedly? | Never | Almost Never | Sometimes | Fairly Often | Very Often |
| 2) Felt that you were unable to control the important things in your life? | Never | Almost Never | Sometimes | Fairly Often | Very Often |
| 3) Felt nervous and — “stressed”? | Never | Almost Never | Sometimes | Fairly Often | Very Often |
| 4) Felt confident about your ability to handle your personal problems? | Never | Almost Never | Sometimes | Fairly Often | Very Often |
| 5) Felt that things were going your way? | Never | Almost Never | Sometimes | Fairly Often | Very Often |
| 6) Found that you could not cope with all the things that you had to do? | Never | Almost Never | Sometimes | Fairly Often | Very Often |
| 7) Been able to control irritations in your life? | Never | Almost Never | Sometimes | Fairly Often | Very Often |
| 8) Felt that you were on top of things? | Never | Almost Never | Sometimes | Fairly Often | Very Often |
| 9) Been angered because of things that were outside of your control? | Never | Almost Never | Sometimes | Fairly Often | Very Often |
| 10) Felt difficulties were piling up so high that you could not overcome them? | Never | Almost Never | Sometimes | Fairly Often | Very Often |



Appendix F: Homework Log

Example Homework log for yoga practice:

Name: _____

Example

Date		6/1/05	6/2/05	6/3/05	6/4/05
Day of the week		Wed	Thu	Fri	Sat
Start and end times of KY yoga practice	1:00 to 1:45 pm				
Completed KY practice	Yes/no				
Liked about practice					
Did not like about practice					



Appendix G: Semi-structured Interview Guides

- 1.) What are your overall thoughts/feelings on the yoga classes?
- 2.) Can you describe your general feelings of well-being at this point in your life
- 3.) How do you perceive your stress in relation to your stress 8 weeks ago?
- 4.) Have you noticed any shifts in relation to your thoughts, feelings, emotions, behaviours etc. over the course of the program?
- 5.) What have been your recent experiences of feeling down, anxious, angry, anxiety, problems sleeping etc.?
- 6.) Did you learn any techniques/ways to calm self when feeling overwhelmed etc.?
- 7.) Was the teacher a fit for you?
- 8.) How did you find the home practice?
- 9.) Were you able to maintain the practice?
- 10.) Were you participating in any other form of treatment/therapy over the last 8-weeks?
- 11.) Is there any additional support that I can provide you at this point/resources etc.?
- 12.) Do you have any recommendations/final thoughts?



Follow-up Questions

Please circle the answer that applies to you (1-3) and any additional feedback (4). Thank you for your valuable input.

- 1) Do you currently practice: a) Kundalini Yoga; b) other Yoga; c) other meditation.
- 2) If yes, please indicate how often: a) daily; b) 4-6 times a week; c) 2-3 times a week; d) once a week; e) less than once a week.
- 3) If you answered the previous questions, about how long do you spend each time you do your practice? a) less than 5 minutes; b) 5-10 minutes; c) 10-20 minutes; d) 20-40 minutes; e) more than 40 minutes.
- 4) Please add any other comments here:



Teacher Semi-Structured Interview Guide

- 1.) Can you please describe your experience in teaching this program?
- 2.) Were you able to adhere to the program as outlined in the protocol?
- 3.) What are your perspectives on how the protocol was designed for a trauma specific population?
- 4.) What is your opinion on this program for individuals with post-traumatic stress?
- 5.) How did you find the home practices?
- 6.) How did participants manage the home practices?
- 7.) What skills do you learn or gain in delivering this program?
- 8.) What changes would you make in the program?
- 9.) Comments/Recommendations/Reflections

Appendix H: Code Scheme/Themes

- 1. Emotional Awareness**
 - self-reflection
 - act with awareness
 - non-reactivity
 - non-judgmental
 - sitting with emotions
- 2. Mind-Body Perspectives**
 - physical
 - body-awareness
 - breath
 - clarity/cleansing
 - sleep
 - relaxation
 - diet
 -
- 3. Perceptions of self**
 - resilience
 - self-care
 -
- 4. Yoga as a therapeutic intervention**
 - openness to new experience
 - empowering
 - helpful/effective
 - desire to continue
 - attitudes and values
 -
- 5. Program Development**
 - exercise
 - support
 - logistics
- 6. Tools**
 - continuity of learnt behaviours
 - specific yoga strategies
 - seeking support
- 7. Psychosocial Changes**
 - self-esteem/self-confidence
 - motivation/determination
 - energy levels
- 8. Home Practice**
 - consistency of practice
 - individual practice
 - audio-visuals
 - hard/easy
 - benefits
- 9. Participant perceptions of prior behaviours**

- irrational thoughts
- isolation
- emotional regulation
- automatic pilot
- anxiety
- anger
- depression

10. Participant perceptions of prior trauma

- closure
- gratitude
- growth
- humour
- compassion
- forgiveness
- letting go of the past

11. Participant perceptions of medical interventions

- rehashing of past/cognitive story
- labeling
- lack of help
- stigma
- medication
- interventions not helpful

12. Spirituality

- spirit
- prayer

13. Emotional Changes

- sweeter self
- better/old self
- happy
- calm
- peaceful
- balanced/strong
- hopeful

14. Cognitive Changes

- focused/concentration
- stopping of thought patterns
- present focused
- memory

15. Group/Social Support

- teacher
- social support
- group process

Description of the Themes

Theme	Description
Action-Behavioural Changes	is defined as the behavioural changes experienced by participants. Action-behavioural changes include experiences in continuing practices learnt in the classes after program completion, seeking of positive supports and maintaining meditation/yoga practices.
Emotional Changes	suggests that participants experienced substantial changes related to feelings of calm, balance, happiness, hope, mood, peace and strength. These descriptions were detailed participant experiences and suggested to be related to yoga program participation.
Group Support	refers to participant descriptions of the group process, teacher, and the importance of support networks.
Home Practice	refers to the implementation of the home practice program component in life outside of class. This theme includes discussions regarding audio-visuals, home practice benefits, consistency of practice, difficulty of practice and individual practice.
Mind-Body Perspectives	consists of sub-categories related to the relation between mind and body: body-awareness, breath, clearing-cleansing, diet, energy levels, physical, relaxation, and sleep.
Program Development	is a description of participants' experiences of the overall program. This theme includes: desire for participants to continue practice, discussion of exercises, mention of the program as helpful-effective for trauma (PTS), program logistics and provided support.
Views of self	is defined as participants changing perceptions of self. Discussion of self focused on themes of motivation-determination, openness to new experience, resilience, self-esteem/self-confidence, self-care and redefining views of self including feeling acknowledgement of sweeter, better/older self.
Medical	suggests that participants described experiences in the program dissimilar to prior medical/therapeutic approaches by which participants mentioned themes of: labeling, medical, interventions as not helpful, rehashing of past cognitive story and stigma.
Perceptions of Prior Trauma	refers to how participants describe their life experiences and situations before beginning the yoga program. These reflections indicate changes in how prior trauma is perceived and include themes of: closure, compassion, forgiveness, gratitude, growth, humour and letting go of the past.
Spirituality	is defined as new connections with something higher than self and includes: prayer and spirit.
Cognitive Changes	refers to changes noted in thought patterns and cognition described by participants to be related to program participation including themes of: controlled thoughts, focus-concentration, memory and thoughts in the present.
Awareness	is defined by key themes of mindfulness: act with awareness, non-judgemental, non-reactivity, self-reflection, sitting with emotions.

Appendix I: Journal responses

Participant number	Week 1 to 4 Responses	Week 4 to 8 Responses
#3	Two weeks in, participant #3 gave a detailed assessment of her progress in: a) <i>physically</i> "I am stronger, more confident" b) <i>sleep</i> "nightmares are reduced... inspired." c) <i>anger</i> "have not had a 'raised level of anger' in two weeks"	<i>Anxiety</i> "decreased substantially"
#12	This participant went through a lot of changes and kept meticulous notes. Sometimes she "liked nothing" and "disliked everything."	By week seven, she was at peace with herself and the practice: "liked everything" and generally "disliked nothing."
#8	From week one, participant noticed she had "emotional control, that wasn't there before." By week three, her sleep had started to improve.	By weeks six and seven, she was "feeling less lonely and more fulfilled" and "less traumatized and more 'myself.'"
#22	Had no dislikes except "getting there."	There is a steady progression to the final week where she indicates in the "what I like" column: "awesome!" "feeling less sick/stronger" "calmer" "stronger about self needs."
#18	Struggled with her practice at times.	By week six, however, she wrote in clear letters: "I am finding this to be - Beneficial - for my well-being" Week seven: "satisfying" "amazing" Calming - the soul (my soul)" "put me to sleep, relaxed" "comfortable" "very helpful"
#1	Practice was a bit up and down,	by the last week she said: "fewer thoughts" "more and more of a happy routine" "liked everything" "very strenuous but wonderful!" Teacher was very re-assuring" week six she wrote "Focus better, less thinking in my head, less anxious"
#6	"I feel <u>SO</u> much better and <u>stronger</u> "	Week seven: "I am <u>SO</u> grateful for this experience" "It has been too short" "I feel so much improvement but I feel that I am only just recently starting to really 'move forward'" "Thank you!" Teachers have been

		truly <u>awesome</u> "
#22	After a good beginning, participant had a "terrible week at work." "Absence of yoga had a profound effect on my mood and sense of self worth."	The next week, he picked up his practice and gain and bounced back. His last two weeks were the best. "My family very supportive."
#14	Struggled with bouts of depression,	By the last week: "Truly enjoyed my practice. It was challenging, but good." "mood bad anxiety chaos" "better mood, more calm, felt lots of clarity" "felt filled with energy, calmness, more balanced" "more in tune with my breathing, more calm, sense of clarity"
#28	Managed just fifteen days of her practice.	Week five: "earlier this evening, I learned that my eldest son walked into a was transferred to another hospital and admitted into a locked ward. I was able to speak with staff. <u>What I've learned in class has helped me to cope with this development without being overwhelmed. I will be forever grateful for the info that the teacher gives to us in class relative to how we can calm ourselves and reassure ourselves that we're safe and okay.</u> " Week seven: "On the date of the last class, I was able to walk to my last class within two hours... I am amazed - fifteen years ago I was bedridden. I've never been able to do this before."
#4	Day one: "My body felt electrified from the practice. I could feel my energy flowing and my emotions surfaced. It felt good."	"Last class was really good. I feel reconnected to the practice, although I was unable to really integrate it into my life right now. I will definitely pick it up again at some point. I strongly believe in its efficacy for relief of PTSD and other mental and physical problems."