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THE EFFECTIVENESS OF 10-WEEK ONLINE TRAUMA CENTER TRAUMA-SENSITIVE YOGA (TCTSY) SESSIONS ON INTEROCEPTIVE AWARENESS AND DEPRESSION, ANXIETY, STRESS SCORES

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The Effectiveness of 10-Week Online Trauma Center Trauma-Sensitive Yoga (TCTSY) Sessions on Interoceptive Awareness and Depression, Anxiety, Stress Scores

10 Hafta Çevrimiçi Travma Merkezi Travmaya - Duyarlı Yoga Seanslarının İnteroseptif Farkındalık ve Depresyon, Anksiyete, Stres Skorlarına Etkisinin İncelenmesi

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ABSTRACT

Trauma can cause distinct changes in brain structure and function of mind. It creates behavioral, emotional, social and mental disorders in an individual's life. Along with single traumas, the accumulation of long-lasting repetitive traumas over time lead to the formation of different psychiatric diagnoses and trauma-related comorbidities in their life. Therefore, a holistic treatment approach is required. Although verbal expression is an important dimension in psychotherapy, it is not sufficient for an effective trauma treatment. Only progressing through the cognitive dimension or controlling the symptoms with pharmacological intervention creates significant deficiencies in the treatment. Also it becomes dysfunctional after a while due to the recurrence of the symptoms.

The study aims to examine the effectiveness of the application of the "10-Week Trauma Center Trauma-Sensitive Yoga" protocol of Center for Trauma and Embodiment at JRI, which is an evidence-based clinical treatment based on neuroscience, attachment theory and trauma theory to female participants with a nonequivalent control group pretest-posttest design. It was aimed to increase the interoceptive awareness of the individuals and accordingly to decrease the depression, anxiety and stress scores significantly. The study was adapted to the culture and applied online. For 10 weeks, the sessions were conducted by a certified Trauma-Sensitive Yoga facilitator in the format of one hour group therapy once a week via the online platform. There were 16 female participants in

the intervention group and 19 female participants in the control group. In the data collection process of the study, Demographic Information Form, Complex Trauma Inventory (CTI), Depression Anxiety Stress Scale (DASS-21), Multidimensional Assessment of Interoceptive Awareness (MAIA-II) were applied. The measurements were repeated as the pre-test one week before the start of the yoga sessions, the post-test one week after the completion of the 10-week sessions, and the follow-up test after three months. Hypotheses were tested by ANOVA. It was revealed that there was a statistically significant reduction in the depression, anxiety and stress scores of the participants and an increase in their interoceptive awareness.

The study is important in terms of adapting the Trauma-Sensitive Yoga protocol to Turkish culture and applying it for the first time in Turkey. In addition, it is the second study in which the protocol has been applied online all over the world under pandemic conditions.

Keywords: interoceptive awareness, trauma-sensitive yoga, neuroscience, depression, anxiety

ÖZET

Travma zihin ve beyin üzerinde köklü değişikliklere sebep olmaktadır. Bireyin yaşamında davranışsal, duygusal, sosyal ve zihinsel boyutlarda bozukluklar yaratmaktadır. Tekil travmalarla beraber, uzun süre devam eden tekrarlı travmaların zaman içerisinde birikimi kişinin hayatında farklı psikiyatrik tabloların oluşmasına ve travmaya bağlı komorbitlerin oluşumuna zemin hazırlamaktadır. Bu sebeple tedavisinde sadece bilişsel boyut üzerinden ilerlemek ya da farmakolojik müdahale ile semptomları kontrol altına almak tedavide önemli eksiklikler yaratmakta ve işlevsiz kalmaktadır. Bu çalışmada, temelleri nörobilim, bağlanma teorisi ve travma teorisine dayanan klinik ve kanıta dayalı beden odaklı bir tedavi yöntemi olan "10-hafta Travma Merkezi Travmaya-Duyarlı Yoga" protokolünün uygulaması ve eşitlenmemiş kontrol gruplu ön test son test dizayn ile kadın katılımcılar üzerindeki etkinliğinin incelenmesi amaçlamıştır. Uygulanan tedavi ile bireylerin interoseptif farkındalıklarının yükselmesi ve buna bağlı olarak depresyon, anksiyete, stres skorlarının istatiksel olarak anlamlı ölçüde düşmesi hedeflenmiştir. Çalışma kültüre adapte edilmiş ve online olarak uygulanmıştır. 10 hafta boyunca seanslar çevrimiçi platform üzerinden haftada bir gün bir saat grup terapisi şeklinde sertifikalı Travmaya-Duyarlı Yoga kolaylaştırıcısı tarafından gerçekleştirilmiştir. Çalışmanın müdahale grubunda 16, kontrol grubunda 19 kadın katılımcı yer almıştır. Veri toplama sürecinde Demografik Bilgi Formu, Karmaşık Travma Envanteri, Çok Boyutlu Bedensel Farkındalık Değerlendirmesi - II, Depresyon

Anksiyete Stres – 21 ölçekleri kullanılmıştır. Ölçümler yoga seanslarının başlangıç tarihinden bir hafta öncesi öntest, 10 haftalık seansların tamamlanmasından bir hafta sonrası sontest ve üç ay sonrası izlem olarak tekrar edilmiştir. Hipotezler, ANOVA ile test edilmiştir. Katılımcıların depresyon anksiyete stres skorlarında istatiksel olarak anlamlı bir düşüş ve interoseptif farkındalıkta yükseliş gerçekleştiği ortaya konulmuştur.

Çalışma, 10 Hafta Travma Merkezi Travmaya Duyarlı Yoga (TCTSY) protokolünün Türk kültürüne adapte edilmesi ve ve Türkiye'de ilk defa uygulanması açısından önem taşımaktadır. Ayrıca protokolün pandemi şartlarında tüm dünyada online olarak uygulandığı ikinci çalışmadır.

Anahtar Kelimeler: interoseptif farkındalık, travmaya-duyarlı yoga, sinirbilim, depresyon, anksiyete

INTRODUCTION

Interoceptive awareness, which is defined as the representation of the internal state of the body (Craig, 2003) includes both the processing of afferent stimulus perceptions from within the body, the attentional and emotional evaluation of these sensations, and interpretation of them correctly (Cameron, 2001; Farb et al., 2015). Interoception, a key concept for understanding how mind and body mutually influence each other, is a new focus of mental health research (Khalsa & Lapidus, 2016). It has been shown that impairment in interoceptive awareness is associated with many psychopathologies, psychiatric and neuropsychiatric disorders (Bonaz et al., 2021; Khoury et al., 2018). Moreover, it has been suggested that it may be even the root cause of them (Khalsa et al., 2018).

Playing an important role of interoception in the emotional (Craig 2008; Dunn et al., 2010), cognitive (Herbert & Pollatos, 2012) and behavioral processes of the brain (Garfinkel & Critchley, 2013) has brought a new perspective to clinical interventions (Farb et al., 2015; Mehling et al., 2009). The effect of increasing interoceptive awareness, especially through yoga, on post-traumatic stress disorder (PTSD) and related depression and anxiety symptoms has been demonstrated by researches (Neukirch et al., 2019; van der Kolk et al., 2014; Zaccari et al., 2022). Neuroscience studies of the effects of trauma on the body have created significant changes in clinical perspective. The necessity of adding the body to the treatment has emerged. Although verbal expression is an important

dimension in therapy, Cognitive behavioral therapies and exposure treatments are insufficient for the treatment of PTSD symptoms (Berg, 2008; Bradley et al., 2005).

As a program of Center for Trauma and Embodiment at Justice Resource Institute, Trauma Center Trauma-Sensitive Yoga (TCTSY) is an evidence-based intervention developed specifically for chronic PTSD patients on the hypothesis that symptoms can be reduced by increasing interoceptive awareness at the Trauma Research Center in Boston. It is empirically validated.

With the TCTSY practice, which is based on self-control, it has been shown that ability of self-regulation can be increased and thus hyperarousal and mental rumination can be reduced by focusing on bodily sensations (van der Kolk et al., 2014;) as in theory (Farb ve ark., 2015). In the 5-year randomized controlled trial study (Zaccari et al., 2022), TCTSY was found to be equally effective in trauma treatment when compared to CPT (Cognitive Processing Therapy) which is a gold standard therapy. In the study, it was also found that TCTSY treatment improved symptoms faster and higher participant retention compared to CPT.

The aim of this study is to understand the effect of TCTSY on interoceptive awareness on healthy individuals and its relationship with depression, anxiety and stress. In addition, this study aims to adapt the TCTSY protocol to Turkish and the online platform. Within the scope of this subject, a detailed literature review and hypotheses based on the existing literature are presented in the first chapter. The methodology of this study is explained in detail

in the second chapter. The results are presented in the third chapter. Finally, the findings of this study are discussed in the fourth chapter in the context of the available literature. Finally, the findings of this study are discussed in the fourth chapter in the context of the current literature and suggestions for future research are presented. The results of this study may provide preliminary findings for future research.

CHAPTER 1

LITERATURE REVIEW

1.1. TRAUMA

The medical term of trauma is defined as a tissue injury that initiates the hypothalamic-pituitary-adrenal axis, immunological and metabolic responses of the body to restore homeostasis (Dumovich & Singh, 2021). Etymologically, the word comes from the Greek trauma (τραύμα) meaning “a wound, a hurt, a defeat” (Letissier, 2011).

1.1.1. Psychological Trauma

Unusual events that threaten the integrity of the individual's life physically and psychologically, frighten them excessively, create helplessness by terrifying, and the effects of these events are called *psychological trauma.* According to DSM-V (2014), re-experiencing, avoidance behaviors, hyperarousal or depersonalization is a cluster of symptoms that may occur after exposure to the traumatic event.

The symptom cluster that manifests itself with intrusion, avoidance, blunting, dissociation, negative changes in thoughts and mood and changes in arousal and reactivity after exposure to the traumatic event is defined as traumatic stress symptoms. A person's incurring to traumatic events occurs in four different ways. The first is directly exposing to the traumatic event, the second is directly

witnessing of the traumatic event that happened to someone else, the third is a traumatic event experienced by a family member or the person's immediate circle, and the fourth is the person's repeated and excessive exposure to the stressful impacts of traumatic events (Edition, 2013).

Although trauma is defined as danger of death, injury or sexual assault in the DSM-V (2013) definition of the American Psychiatric Association, it is stated that experiences such as humiliation, abandonment, and abasement can also cause psychological trauma, with more expanded clinical data. Excluding sexual experiences due to excessive emotional abuse, significant losses and separations, and coercion, as they are very traumatic but not life-threatening, also creates the belief that the prevalence of traumatic experiences in the general population is low. This situation prevents patients who experience significant post-traumatic stress symptoms due to events excluded from the definition of trauma from being diagnosed with Post-Traumatic Stress Disorder (PTSD) and from reaching treatment (Briere & Scott, 2016). Correlatively, childhood neglect which is also outside the definition of trauma, might be at least as injurious as abuse and caused traumatic stress responses (Webb, 2017).

Child abuse, mass interpersonal violence, natural disasters, major transportation accidents (car, train, plane, motor vehicles), fires and burns, motor vehicle accidents, rape and sexual assault, physical attack by strangers, intimate partner violence, sex trafficking/transportation , torture, war, coming face-to-face with another person's suicide or murder, life-threatening medical conditions (heart attacks, cancer, HIV/AIDS, stroke, cerebral hemorrhage, miscarriage, waking up

under general anesthesia during surgery, etc.) traumas that emergency service workers are exposed to are considered as examples of certain types of trauma (Leslie et al., 2010; O'Donnell et al., 2010; Briere & Scott, 2016; Aker, 2021).

These can be thought that experiencing one of the separately defined trauma types that seem to be independent from each other does not affect the probability of experiencing the other. However, studies show the opposite. Many of them have shown that individuals who experience interpersonal trauma are statistically more likely to experience other interpersonal traumas. Survivors who have experienced childhood abuse are more likely to re-traumatize in adolescence and adulthood (Classen et al., 2002; Amstadter et al., 2011; Duckworth & Folette, 2011; Rees et al., 2011). Inevitably, the relationships between different traumas and their reflections in the individual's life story can draw a complex picture. Childhood neglect and abuse can lead to social, environmental and relational adjustment disorders in adulthood, such as substance use, running away from home, random sexual behaviors, attachment problems, and dissociation. These symptoms also increase the possibility of experiencing interpersonal trauma in the future. (Hetzel & McCanne, 2005; Dietrich, 2007; Reese- Weber & Smith, 2011)

The impact level of trauma symptoms experienced by the individual is determined by the variables in three areas: 1) Variables belonging to the survivor 2) Characteristics of the source of stress 3) How the survivor's environment reacts (Briere ve Scott, 2016).

Variables belonging to the survivor increase the effect of some individual's showing higher traumatic stress symptoms than others after trauma, and the

probability of this effect being long-lasting. Some of these variables may be due to social discrimination and marginalization against certain groups (gender, age, race, socioeconomic status, etc.); It can also be caused by previous traumas, psychological problems and adjustment problems. Being woman (Breslau et al., 1999; Kimmerling et al., 2002; Leskin & Sheikh, 2002), younger and older individuals (Atkeson et al., 1982; Koenen et al., 2002), poverty and low socio-economic status (Rosenman, 2002; Carter, 2007; McLaughlin et al., 2009) , previous psychological disorders and mental illnesses (Petrakis et al.,2011) , using less functional coping mechanisms (Fauerbach et al., 2002), familial dysfunctions and parental history of family psychopathology (Breslau et al., 1991; Baasuk et al., 2001), previous exposure to traumatic experiences (Breslau et al., 1999; Ozer et al., 2003; Greek et al., 2011) , genetic predisposition (Yehuda & Brierer, 2009), dissociation including derealization or depersonalization during trauma or cognitive dissociation (Ozer et al., 2003; Briere, Scott, & Weathers, 2005; Lensvelt- Mulders et al., 2008; Sugar and Ford, 2012), exposure to more stress before and after trauma are survivor related traits that increase the risk factor.

The reason for the higher risk factor in the specified demographic groups is that these groups are more likely to experience trauma as a result of social factors such as race and gender inequality, rather than their low stress coping mechanisms (Breslau et al., 1998; Briere, 2004; Kukla et al., 1988). In addition, in the previous DSM-IV the A2 criterion, if the person did not report extremities of

terror, fear and helplessness after a stressful life event, it was not considered as trauma.

In DSM-V, traumatic stress is considered as an important risk factor, although it is not present in the A2 criterion. (Briere ve Scott, 2016). Besides, emotional responses experienced during trauma such as anger, shame, guilt are also likely to increase the risk of PTSD. (Andrews et al.,, 2000; Leskela, Dieperink ve Thuras, 2002; Friedman et al., 2011)

As the second factor, the characteristics of the source of stress include; Intentional acts of violence in interpersonal relationships (Briere & Elliot, 2000; Green et al., 1990; Poole et al., 1997), threat to life (DiFrande et al., 2010; Ullman & Filipas, 2001;), physical injuries (Briere & Elliot, 2000; Haden et al., 2007), exposure to combat in war (Goldberg et al., 1990; Hoge et al., 2004), death of one witnessing the loss of a loved one or friend, especially if the scene is disturbing and disgusting (Epstein et al., 1998; Selley et al., 1997;), life-threatening diseases and painful medical procedures (Bienvenu & Neufeld, 2011; Stramrood et al., 2011), unpredictability and uncontrollability (Carlson & Dalenberg, 2000 ; Foa et al., 1992), being sexually victimized (Breslau et al., 1991; Kang et al., 2005), longer duration of trauma or more frequent and repetitive trauma (Briere & Elliot, 2003; Naeem et al., 2011; Phillips et al., 2010) increase the severity of trauma and significantly affect the emergence of Post Traumatic Stress (Briere & Scott, 2016).

Childhood abuse and neglect have a great impact on these results. Although many adult traumas are severe and subsequently associated with psychological disorders, studies show that childhood traumas are more related to

future psychopathology. (Briere & Rickards, 2007; Gal et al., 2011). The possible reasons for this circumstance are that childhood traumas are experienced in the most vulnerable and caregiver-dependent period of development, usually involve relational abuse and neglect, and experiences of being victimized separately for a long time (Briere & Rickards, 2007; Bureau et al., 2010). This condition causes the effects of trauma to accumulate exponentially, but also leads to an increase in the severity of the reaction to adulthood and subsequent traumas. (Brau et al., 2008; Sallaoum et al., 2011). Therefore, although the permanent effects of physical, emotional and sexual violence in adulthood are not to be underestimated, evaluating the patient's recent traumas in the context of childhood traumas is an understanding of the complex clinical picture that emerges; Each of them is important in terms of creating an effective treatment plan against symptoms that potentially require different approaches and strategies (Briere & Scott, 2016).

The third factor is social response, support and resources, play an important role in the severity of the survivor's post-traumatic stress responses and in the post-traumatic recovery process. It is known that the family, friends and environment's approach to the survivor is accepting and does not contain blame, attention and care from loved ones, the presence of help from the environment after the event, support and aid organizations reduce the intensity of post-traumatic stress reactions (Berthold, 2000; Coker et al., 2002; Lee et al., 2002). However, the social reactions to the survivor are not independent of the characteristics of the trauma and the variables of the survivor (Briere ve Scott, 2016). Traumatic events such as non-interpersonal natural disasters are seen as

more socially acceptable (L.S. Brown, 2008). Trauma studies show that social support is one of the strongest predictors of alleviating the ultimate effects of trauma. This emphasizes the social and relational impact of recovery from trauma, including the importance of the therapeutic relationship in trauma therapy (Briere & Scott, 2016).

1.1.2 Historical Development of Trauma

Van der Kolk (2018) in his book *"The Body Keeps The Score",* which has compiled 25 years of trauma and neuroscience research, says that the approach of medicine to human suffering has been determined by technology in every period. Psychiatric disorders defined as perversion, sin, or following the devil before the Age of Enlightenment; with the scientific research of the 19th century, problems such as anger, lust, pride, and greed that humanity has always struggled to manage have been reframed as disorders that need to be corrected by applying appropriate chemicals (Insel, 2007).

From 1955 to 1996, the fivefold decrease in the number of inpatients in the US with the tremendous success of antipsychotic drugs marked the beginning of a new era in psychiatry. The pharmacological revolution has driven psychiatrists away from the complex theories of theorists such as Freud and Jung, and turned them back to laboratories, animal experiments, and complex diagnostic tests with expensive equipment (Torrey, 1997; van der Kolk, 2017). In this period, scientists moved away from being interested in how people feel with their experiences, and

a new perspective was adopted that mental illnesses were defined as a kind of disorder and chemical imbalance in the brain (Deacon & Lickel, 2009).

In the 60s, this development in the field of psychopharmacology prompt researchers to work on developing techniques to isolate and measure hormones and neurotransmitters (neurotransmitters - chemicals that regulate our system by carrying information between neurons) in the blood and brain, with the support of the National Institutes of Health (NIH). Scientists were now able to reveal evidence of the relationship between the levels of norepinephrine and dopamine in the brain for psychiatric illnesses such as depression and schizophrenia. The increase in research has led to the need to present the findings in a precise and systematic way.

This process provided the first systematic basis for the diagnosis of psychiatric disorders with the "Diagnostic and Statistical Manual of Mental Disorders (DSM)" published by American Psychiatric Association. DSM was initially not intended to be used for forensic or insurance purposes, then it has started to be used by insurance companies over time (Cooper, 2014; van der Kolk, 2018).

Technological advances in the 1990s improved brain imaging techniques and opened up new possibilities for understanding the ways the brain processes information. Million-dollar machines like positron emission tomography (PET) and functional magnetic resonance (fMRI) have turned the pharmacological revolution towards the neuroscience revolution. Technology that previously used to measure brain chemicals such as serotonin or norepinephrine has now evolved

into new technology that can monitor the neural activity of memories, senses and emotions in the brain and body. The understanding of trauma and psychiatric disorders has fundamentally changed with the use of neuroimaging technology (Briere ve Scott, 2016; Herman, 1997; van der Kolk, 2018).

According to trauma researcher Judith Herman (1997), it would never have been possible to develop psychological trauma studies without the context of a political movement. The fate of this domain of knowledge depends on the fate of the same political movement that has inspired and supported it over the past century. Compared to other fields of psychology and behavioral sciences, systemic investigation and examination of trauma responses is relatively new. The modern field of research in the form of traumatic stress studies developed after the Vietnam War, and the diagnosis of "post-traumatic stress disorder" entered the diagnostic manual DSM in the late 1980s. (Briere & Scott, 2016). When the diagnosis of post-traumatic stress disorder was first included in the 1980s, the American Psychiatric Association defined traumatic events as ‘outside the range of usual human experience’. However, this definition was later proven to be incorrect. Rape, beatings, sexual and other forms of domestic violence are a common part of women's life; Similarly, military trauma should be considered as a pervasive part of the human experience, given the number of people who have died in war in recent centuries (Herman, 1997). According to Herman (1997), only the fortunate ones describe trauma as ‘unusual’.

The ineffectiveness of the treatment administered to Vietnam war veterans had pioneered the view that the war left permanent marks on the human mind and

that the vital experience radically changed their minds (Grinker & Spiegel, 2015). Along with the political context, a small group of soldiers, most of whom stood out for their courage, led the research by rejecting their medals and publicizing their own war crimes. These anti-war veterans organized what they called the "rap group". They gathered together in these chat groups and tried to overcome the effects of traumatic experiences of the war and flashbacks by sharing. They also made an open call to psychiatrists who would like to offer them professional help (van der Kolk, 2018). Basically, Rap Group had two goals: to support veterans who had been experiencing psychological trauma and to raise awareness about the devastating effects of war. Their efforts had yielded results and had been included in the psychological trauma diagnosis book. Towards the end of the 70s, hundreds of sharing groups such as the rap group were organized, and the political pressure of the veteran groups resulted in the issuance of a court order for the psychological treatment program called "social aid operation" within the Veterans Foundation. This pressure from veterans has also prompted psychiatrists to systematically study trauma (Herman, 1997). However, it has been understood over time that Post Traumatic Stress Disorder (PTSD) is only the visible side of trauma; the picture is much more complex and spread to all segments of society; It has revealed the need for new definitions such as Childhood Trauma, Developmental Trauma, Complex Trauma and a comprehensive diagnosis and treatment system.

Another political context for the prominence of trauma research dates back to the women's liberation movement of the 1970s. Until this period, it has not

accepted that post-traumatic disorders were seen not only in men in war, but also in women in civilian life. In their studies of hysteria in the 19th century, Freud described emerging stories of childhood abuse and sexual violence as a childhood fantasy what their patients told (Herman, 1997). At the time these studies were conducted, there was no awareness of domestic violence experienced by women and children. Violence and abuse in domestic life have been rendered invisible with the exaltation of women's privacy. Talking about sexual or domestic experience triggers humiliation, ridicule and suspicion in society. Within the women's liberation movement, it has become possible again for women, who have been silenced by shame and fear, to raise their voices again. The first public statement on rape was organized by the Radical Feminists of New York in 1971, the first International Tribunal on Crimes Against Women convened in Brussels in 1976. Rape Reform Laws were initiated by the National Organization for Women in the mid-1970s (Herman, 1997).

Feminist oppression of women on sexual violence and abuse, which was ignored, has yielded results, and scientific research in the 70s turned in this direction. In 1975, the first rape research center was established within the National Institute of Mental Health. The results of the researches of this period confirmed the experiences of women who were not taken seriously at the beginning of the 19th century on the grounds that they were fantasy. The results were horrifying that Sexual violence against women and children is a common part of culture (Herman, 1997). The results showed that one out of every four women was raped and one out of every three women was sexually abused when

they were a child (Russel, 1984). Therewith, feminists redefined rape as a violent crime rather than a sexual crime (Browmiller, 1975).

These striking results had accelerated research on childhood abuse and the relationship between trauma and other psychiatric disorders. In a study on psychiatric emergency room patients, a history of abuse was found at a rate of 70% (Briere & Zaidi, 1989). In another study, a history of physical or sexual or both physical and sexual childhood abuse was revealed in 50-60% of psychiatric inpatients and 40-60% of outpatients (Bryer et al., 1987; Jacobson, 1989; Jacobson & Richardson, 1987;). In these studies, it is seen that childhood abuse is one of the main factors that lead people to psychiatric treatment in adulthood.

1.1.3. Psychological Trauma and the Body

"Prior to the advent of the brain, there was no color and no sound in the universe, nor was there any flavor or aroma and probably rather little sense and no feeling or emotion. Before brains the universe was also free of pain and anxiety."

Roger Sperry (1981)

Trauma, as defined in the physiological approach; It causes three types of reactions that occur in order to bring the body's autonomic nervous system back into balance in the face of a great life threat of the organism. Reptiles and mammals in nature must choose one of three main responses to survive: fight, flight, or freeze. In terms of conservation of energy, a hierarchy prevails among

these reactions within the body. The first reaction of an antelope, which is life-threatening in the face of a lion, if it has space, is flight response. In situations where there is no space to run, the second response is a fighting response. This response is a secondary option, as it consumes more energy than flight. The third and final strategy, the "freeze" response, plays an important role in the evolutionary survival of primates today, especially if there is nowhere to escape and death is inevitable in the case of fight (Levine, 1997).

Levine (1997) says that healing is again hidden in the physiology itself. The animal, which goes into the freezing reaction, in other words, "playing possum" in nature, has a chance to save itself in a momentary void of the hunter. After the danger has passed, the Antelope wakes up with a series of bodily reactions such as shaking and shaking and continues its daily life. Another benefit of this strategy is the transition to a special bodily state where pain is not felt at the time of freezing. This means not suffering during the predator's attack. Physiological evidence indicates that the ability to “go through” this natural response is a key to avoiding traumatic symptoms (Levine, 1997).

Levin's (1997, 1999, 2010) studies on how animals living in nature are not traumatized are very valuable in our understanding of the relationship between trauma and the body today. So what if the danger does not pass as in nature, or even if the same threat is repeatedly exposed over and over? The answer to this question is found in Maier and Seligma's (1968) study of learned helplessness in animals, which, although ethically controversial, allows us to understand the effects of long-term exposure to traumatic events. In the study, it was observed

that dogs kept locked in cages and subjected to continuous electrical shocks only responded by crying or defecating in their cages, instead of running away even if the cage was open after a while. The first reaction of the dogs in the control group, on the other hand, was to run away as soon as the doors of the cage were opened. This hyperarousal state or collapse of the dogs in the experimental group, which is seen in situations where the escape or fight responses are inhibited, is called "inevitable shock" in the literature (Jackson et al., 1980; Maier et al., 1968; Maier et al.,1976;).

Similar results have been seen in other studies with mice, cats, monkeys, and elephants. Although they were not safe, they still chose to return to their homes. Despite the chance to escape, similar reactions are seen in people who have experienced trauma. Most of them are trapped and immobile. They fail to avoid the inevitable abuse or harm. This situation provided an explanation for the behaviors of traumatized people who returned to their homes and the environment where they were harmed, despite growing up in abusive families. (van der Kolk, 2018)

Another important finding of Maier and Seligman's (1968, 1976) study in understanding the biology of trauma is that traumatized animals secrete much higher than normal levels of stress hormones. Ideally, the stress hormone system should respond to danger with lightning speed and then return to its normal level. In people with PTSD, on the other hand, it is seen that this system fails to maintain balance. Even after the danger has passed, the fight/flight/freeze signals persist and do not return to normal as in the dogs. Instead, the stress hormone,

which is constantly being secreted, manifests itself in the body as shock and panic. In the long run, it can be caused serious and harmful effects on health (van der Kolk, 2018).

In addition, the traumatic experience causes the establishment of a new chemical balance and adaptation in the body. As much as positive and enjoyable experiences; Challenging, initially uncomfortable and distressing experiences such as parachuting and marathon runners can turn into pleasure. Studies have shown that the body can adapt to all kinds of stimuli. In this respect, it is assumed that chemicals such as endorphins that the brain secretes in response to stress may lead to addiction in long-term adaptation (Solomon, 1980). Another study of Vietnam veterans found that while watching a violent movie, they were able to hold their hands up to 30% more in an ice bucket, and their pain threshold increased, compared to watching a peaceful movie. It has also been calculated that the rate of analgesia produced in their bodies during this time is equivalent to eight milligrams of morphine (van der kolk, 2018).

These results explain why traumatized people repeatedly put themselves in dangerous situations, become attached to people who hurt them, or deliberately choose physical self-harm as a coping method. Strong emotions can prevent pain, as stated by surgeon Henry K. Beecher (1946), who observed that 75% of the soldiers who were seriously injured at the front did not need morphine. Findings regarding the chemicals the brain secretes in response to stress suggest that many traumatized people re-expose themselves to stress to relieve anxiety (Pitman et al, 1990; Solomon, 1980; van der Kolk et al, 1989).

However, the fact that the physiological mechanisms that govern these reactions are connected with the most primitive and instinctive aspects of the brain and nervous system shows that the process is not under the control of the consciousness level (Levine, 2019). The brain is a cultural organ and experiences shape the brain. For this reason, after trauma, the world is experienced with a different nervous system. The nervous system trapped in the trauma interrupts development and prevents the individual from participating in life experiences again. The energy of survival tends towards suppressing the spiritual chaos within at the expense of participating in the flow of life. The effort to control the intolerable psychological reactions manifests itself as various somatic symptoms such as fibromyalgia, chronic fatigue, and other autoimmune diseases. For this reason, in the treatment of trauma, it is necessary to consider the body, mind and brain as a whole. (Levine, 2019; Porges, 2011; van der kolk, 2018)

Neuroimaging studies on traumatic memories show that participants experience the trauma again in their brains. The sensory parts of the memory involuntarily enter the present and continue the stress hormone cycle that the body secretes to protect itself at the time of trauma. The memory is a fragmented dissociative experience rather than a meaningful record with a beginning and an end. Thus, the emotions, sounds, images and physical sensations of the memory maintain their own lives. (van der Kolk, 2018)

In the re-experiencing images of f-MRI, it is seen that the limbic system and especially the amygdala are activated on the right side of the brain, while the left hemisphere becomes ineffective in cases of over-arousal. When the past is

recalled, the right side of the brain, which is intuitive, emotional, visual, spatial, and tactile, responds as if the event were happening at that moment. The left side, which is verbal, sequential, and analytical, darkens. The interruption of blood flow in the speech center of the brain, defined as Broca's area, in the left frontal lobe of the cortex, showed that this area does not function. This explains the unspoken preverbal nature of trauma. It also proves that mental trauma produces effects that are not very different from the effects of physical damage, similar to that seen in stroke due to cerebral vascular occlusion.(Lanius et al., 2001).

The left hemisphere is our capacity to organize experiences, put them in a logical sequence, and put them into words. When there is no activation in this region, it is not possible to determine cause-effect and make long-term plans. The reason why the traumatic memories are perceived as being experienced at that moment and people are not aware of this reenactment is due to the left side not working well. At the same time, the effect of the right and left dorsolateral cortices of the prefrontal cortex causes the person to lose their sense of time and to experience "eternally" by being stuck in the moment without a past or future (Carter, 1998). Disruption of the thalamus, on the other hand, is why the trauma is not remembered as a sequential story with a beginning, middle and end; this also explains that why it is remembered as sensory perceptions such as sounds, images and accompanying intense emotions like fear, helplessness, etc. (Duggal, 2002; Lanius et al., 2001; Liberzon et al., 1996).

Depersonalization and dissociation are the other side of the coin in trauma. Untreated patients who experience prolonged hyperarousal experience explosive

flashbacks for a period of time and eventually become numb. In the emotional numbing response, the mind is emptied and activation is reduced in all areas of the brain. The person can not think, can not feel deep emotions and has difficulty in making sense of what is going on around them. Medically, this response is called depersonalization. Depersonalization loss of awareness of the self; It is the feeling of one's body, thoughts and movements as if they are not their own and experiencing it as an observer separate from the body (DeYoung & Gray, 2009; Gray & McNaughton, 1996). Blank stares, distracted minds, and the biological freeze response are manifestations of depersonalization. Conventional speech therapy then becomes useless, and body-focused approaches based on bottom-up processing of the brain become necessary.

1.1.4. Complex Trauma and Attachment Theory in Relational Psychoanalysis

Anthropologists in the late 19th and early 20th centuries thought that humanity as a whole evolved from a single point. It was thought that physical traits, especially the human brain, evolved because they were adaptive for survival, which increased cognitive capacity and then allowed the development of other features of culture and social exchange. With the latest fossils discovered in the field of anthropology, it is clear that human characteristics have evolved sequentially over time and that cultural relations are not just a result of brain growth; on the contrary, it has been argued that people's brains that grow with sharing, mutual sensitivity, empathy and similar social interactions provide a

selective advantage in order to survive (Mitchell, 1988). Psychologist and pioneer of relational psychoanalysis Stephen A. Mitchell (1988) proposed that human beings have not evolved first and then entered into social and cultural interactions; The human brain, in its origin and nature, is a social product.

Relational-model theorists, like contemporary anthropologists and contemporary linguists, consider the individual's mind to be a product of that pattern as well as an interactive participant in an existing cultural and linguistic pattern. Meaning is not pre-created, it derives from the relational matrix. The relational field is the constitutive of the individual's experiences. In this respect, the relational model in psychoanalysis is, in a sense, a social theory of mind. Sullivan (1953) and Fairbain (1954), the prominent representatives of the relational model in psychoanalysis, preferred to focus on the relational field instead of focusing on the individual's mind and the psychic apparatus. Like 19th-century anthropologists and 20th-century linguists, Freud (1915) defined human beings with a mental content that precedes and exists outside of social experience. On the other hand, according to relational theory, meaning is inherent in human physiology and its biological endowment (Mitchell et al., 1988).

The relational matrix is a model that brings together the "care" dimension and the "nature" dimension rather than opposing each other. Social relationships themselves are treated as basic motivational processes encoded in secondary genes with their roots in biology. Therefore, sexuality and aggression are not preformed impulses that affect the mind with their inherent meanings, as Freud (1939, 1961) defined; They are taken as strong reactions that are produced within

the relational field that biology compels and that naturally reveal their meaning through physiology from this relational matrix (Mitchell, 1988).

According to Sullivan's (1940) theory of interpersonal relationships, persons organize what they know about the world themselves. They do this so that they can continue the necessary or satisfying functional action in the world, regardless of whether the objects are manageable or insurmountable, distant or near, they have to maintain the common existence even though unconsciously.

Bowlby's attachment theory (1961) is the main comprehensive study to understand human relationality. Just like Freud, they were interested in the biological origins of motivation and took Darwin's theory (1872) as a reference. Unlike Freud, Bowlby thought that the survival mechanisms of the infant depended on much more than the satisfaction of physical needs such as food and heat. According to Bowlby, for the infant's survival, one way or another, constant closeness and attention from the mother is required. This is the prerequisite and most urgent for the mother to be able to meet all the other physical needs of the baby. Human infants are attached to their caregivers, as in other mammalian species, they strongly, automatically and irreversibly embrace their caregivers during their early and most critical period (Bowlby, 1961). The caregiver does not need to do anything special for this. The importance of the mother depends not only on meeting the needs of the baby, but also on their "being there" (Mitchell, 1988).

Bowbly states that there are five impulsive responses that mediate the bond between mother and baby and increase the baby's chances of survival by

getting the mother closer to the baby: sucking, smiling, holding, crying, and following. These responses directly affect the development of the emotional bond and the attachment of the baby. Bowbly sees the attachment of the child to the mother as an "archaic legacy" that has been genetically encoded since the dawn of the human species (Bowbly, 1969, 1973, 1975). Attachment is not a need-derived behavior as in the drive model; it is taken as a biological basic need specific to the human species, just like nutrition and sheltering.

Stern (1985), who examines "interpersonal world" through infant research, says that the state of consciousness and actions of infants have to be socially regulated. From the first day of infancy, the individual is constantly in interaction with others; in fact, their real experience consists of these interactions. The self-representation that each of person forms is a secondary structure built upon this more fundamental and fluid relational reality (Mitchell, 1988). The baby's life is so social that a large part of what the baby does, feels and perceives consists of different forms of relationship. Research has shown that rather than an image of a baby who first starts the world in his own autistic shell and then opens and adapts to the outside world with development; defines a baby whose all perceptual systems are active and functional from birth. The human voice is the auditory stimulus that attracts the most attention and responds, even for infant just after birth. In a study conducted with infants in the delivery room, it was seen that newborns prefer a human face even before seeing a real human face. At the end of the first week, the mother's face becomes a perceptual whole for the infant, and covering the mother's face with a mask or matching it with a different voice

makes them uneasy (Dixon et al., 1981; Cohn et al., 1987;). Stern (1983) states that infants have a wide repertoire of behaviors ranging from being in a relationship with their caregivers at least when they are three months old, or not being in contact with them. The primary adaptive task of babies and children is to accommodate the network of interpersonal relations and the environment they are in, and to make relationships sustainable under all circumstances. (Stern et al., 1983).

According to Winnicott (1960), one of the representatives of Object Relations Theory in psychoanalysis, the key point of the mother's existence is reflecting the child's own appearance and existence back to them. Children's capacity to experience their own sense of existence as a reality first depends on the mother's capacity to do so and mirror it. The first developmental task of a child is the sense of self. For this to happen, the caregiver must play certain types of roles and provide these experiences for the child (Winnicott, 1991).

In a normal process of development, a child attains a secure sense of autonomy that can be remembered in difficult times, through the formation of internal representations of reliable and supportable caregivers when needed. These representations are very important for the development of feelings of independence in adulthood (Herman, 2015). In children who are physically, emotionally, or sexually abused or neglected during the developmental stage, these secure internal representations become impossible. In chronic childhood abuse, however, these representations pose a dilemma (“I have to trust the person who hurt me”), are malleable, and are repeatedly violently shattered by the

traumatic experience. Real experience with abusive and neglectful parents is ignored and idealized components are created. However, these idealized components cannot be integrated. For this reason, the traumatized child's internal representations of primary caregivers remain conflicted and divided, as their own image. This hinders the development of the child's capacity to regulate themselves emotionally (Herman, 2015). This disorder which occurs in early childhood is defined as Complex Trauma. The term of complex trauma – also known as Complex PTSD – was proposed as a potential new diagnostic category, Developmental Trauma Disorder, in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM) (van der Kolk, 2005; van der Kolk et al., 2009).

In this respect, wounds that may occur in developmental processes can leave very deep traces in the life of the individual. Children and adolescents are particularly vulnerable to abuse, as they are physically and mentally weaker compared to adults. (Gibbs, Factors in the Victim). Studies on this subject show that the degree of psychopathology increases as the age of onset of abuse decreases in child abuse (Green, 1983). Traumatic events experienced in adolescence disrupt three important adaptive functions of this stage towards life: identity development, breaking away from family roots and opening up to a wider social world. (Herman, 2015)

According to Klein (1946) in their book *Envy and Gratitude*, the representative of object relations in psychoanalytic theory, destruction by envy is not an extension of aggression as a natural motive. It is an attempt to avoid the

painful experience of loving and desiring a parent who is generally not there, or who is damaging or often inconsistent (Klein, 1946). Life long dynamic conflict is a struggle between an extremely strong need to establish, maintain and protect close ties with the other, and want to avoid the pain and dangers created by these ties, the sense of vulnerability, the threat of disappointment, the fear of being psychologically swallowed up, abused and losing the other (Mitchell, 1988). The pathological conditions of childhood abuse force the child to develop extraordinary capacities, both creative and destructive. Body and mind encourage itself to develop abnormal states of consciousness that do not exist in the ordinary relations of reality and imagination, knowledge and memory. These states of consciousness pave the way for many symptoms, both somatic and psychological. (Herman, 2015)

While repetitive traumas in adulthood disrupt the previously formed structure of the personality, developmental trauma shapes and distorts the personality.

One has to find a way to maintain a sense of trust in untrustworthy people, safety in dangerous situations, control in a frightening unpredictability situation, and power in times of helplessness (Herman, 2015). Adapting to this environment of constant danger and insecurity requires constant vigilance. To protect themselves in a threatening family and environment, children develop the ability to scan and read warning signs of an extraordinary attack. They quickly notice changes in facial expression, voice, and body language, such as anger, sexual excitement, drunkenness, and dissociation, and learn to tune in with extreme

sensitivity to the abuser's inner states and moods. This nonverbal communication becomes automatic for the child after a while and takes place outside of conscious awareness (Herman, 2015; van der kolk, 2006).

The existential task of the abused child is extremely unbearable. All of their psychological adaptations serve to still connect with parents in the face of their malice, helplessness, or indifference. For this reason, the child has to resort to a series of psychological defense mechanisms. The child, who is incapable of escaping or changing reality due to their physical and emotional vulnerability, may try to change it in their mind and deny it. With this defense mechanism, abuse is either isolated from consciousness awareness and memory ("it didn't really happen"), or it is underestimated and rationalized. By activating the state of trance or dissociation that is most common in school-age children, it creates a different reality gets created and the child disconnects themselves from the existing reality of abuse and violence. Studies have found a significant link between the severity of childhood abuse and habituation to dissociative situations (Chu & Dill, 1990; Herman et al., 1989; Sanders et al., 1989; Sanders & Giolas, 1991).

1.1.5. The Impacts of Complex Trauma on the Body

Danger is a natural part of life. The brain's mission is to recognize dangers and organize the most appropriate responses to it. According to the triune brain theory (MacLean, 1990), the brain develops from the bottom up. The reptilian

brain develops in the womb in the early stages of life and regulates basic life-sustaining functions. It is responsible for everything a newborn baby can do: eat, sleep, breathe, cry, defecate, feel heat… It is primitive and highly reactive to life threats. The brainstem and hypothalamus lie directly above it and are responsible for controlling the energy levels of the body. It is also responsible for the proper functioning of the endocrine and immune system. The limbic system, also known as the mammalian brain, is located just above the reptilian brain. The development of this part of the brain begins after the birth of the baby. It is the center of emotions, the decision maker of whether a situation is dangerous, the perceiver of pleasurable or fearful situations, as well as the command center of the struggle for survival within complex social networks. Everything that happens to a baby from birth contributes to the emotional and perceptual map of the developing brain. This situation is defined in neuroscience as "neurons that fire together connect together" and is expressed as neuroplasticity (Löwel & Singer, 1992). Brains that feel safe and loved create maps in cooperation in play, exploration, and social relationships, while brains that are constantly under threat or experiencing undesirable experiences specialize in creating maps of feelings of fear and abandonment (van der kolk, 2018). Finally, just above the limbic system is the neocortex, the uppermost and last developing layer of the brain. Although shared with other mammals, this part is thicker in the human species and is responsible for features that distinguish humans from other living things, such as using words, understanding abstract and symbolic ideas, and planning time (Goldberg, 2001).

The reptilian brain and mammalian brain are called the “emotional brain” together (Servan-Schreiber, 2004). The emotional brain is the heart of the central nervous system and is responsible for perceiving danger or promising situations and releasing hormones appropriate to the situation with sensory stimulation. These stimulations, which take place in a wide spectrum from nausea to panic in the chest, block what the mind is currently focusing on and determine both a physical and psychological direction. It is influential in all big and small decisions made throughout life. The biochemistry and cellular regulation of the emotional brain is much simpler than that of the rational brain, the neocortex. At the moment of threat, it initiates pre-planned reactions such as fight or flight and escape plans by using past maps based on similarities. These physiological responses in the muscles are unconscious and automatic. Movement is created without thought. The capacity to think logically can only be activated after the danger has passed (van der Kolk, 2018).

The emotional brain is where incoming information is first interpreted. All sensations perceived from the environment and coming from within the body (interoception) are combined and processed in the thalamus; It is then sent to the amygdala, which is part of the limbic system, for interpretation. In cases that the amygdala interprets a threat, a message is sent to the hypothalamus at the speed of light from the lower pathway to defend against the threat and stress hormones are secreted. The second neural pathway, defined as the main pathway, starts from the thalamus, extends to the hippocampus and from there to the neocortex, the rational part of the brain, via the anterior cingulate. Thus, conscious and more

nuanced interpretations can be made. However, if the amygdala's interpretation of the threat is too intense, as in traumatic experiences, the upper layers are filtered out and automatic emergency response systems such as startles or outbursts of anger are activated (LeDoux & Phelps, 2008).

The danger signals of the amygdala increase the heart rate and blood pressure, triggering the secretion of cortisol and adrenaline. Once the danger has passed, the body returns to its normal state. However, in cases where this return is blocked, the body continues to be constantly alert to defend itself. This causes people to feel aroused and uneasy (Roozendaal et al., 2009).

The symptoms that occur in complex trauma cause dysfunction at a level that affects the adult life of the person (van der kolk, 2014) Self-protection capacity, which is hindered by repeated exposure to trauma, creates a toxic effect on the body, which is trapped in a vicious circle between hyperarousal and dissociation (Emerson, 2017).

Imbalances in the autonomic nervous system that occur after complex trauma affect a person's capacity to regulate their emotions. Difficulty regulating emotions can lead to a feeling of losing control of one's own body and life. Those who have experienced traumatic experiences describe physical sensations that are hard to bear, somatic problems, emotion and impulse regulation problems, attention disorders, low interoceptive awareness, and negative self-perception (Emerson, 2017)

1.1.6. Relationship Between Trauma and Depression, Anxiety, Stress

Exposure to traumatic events can create many comorbidities, such as depression and anxiety disorders, together with PTSD (Chapman et al., 2004; Edwards et al., 2003; Kessler et al., 1995; Nanni et al., 2012).

Depressive symptoms usually present with themes of grief, loss, abandonment, and isolation in survivors. Studies reveal that post-traumatic stress, grief and depression significantly overlap (Kersting et al., 2009; O'Conner et al., 2010). Some studies exhibit the relationship between childhood traumas and depression (Felitti et al., 1998; Walker et al., 1999). There is also a relationship between traumatic depression and an increased risk of suicide (Krysinska & Lester, 2010; Nrugham et al., 2010). For this reason, depression symptoms should always be taken into account in trauma treatment (Briere & Scott, 2016).

General anxiety disorder is not only a risk factor for experiencing post-traumatic stress in response to trauma (Koenen et al., 2002) but also a syndrome that can follow exposure to trauma (Briere & Scott, 2016). In addition, panic attacks can occur especially in response to stressful events and significant losses (Briere & Scott, 2016). Many people who experienced a traumatic event reported panic episodes following the event (Mayou et al., 2001).

All psychological traumas result from a physiological response to an unpleasant stimulus which is called stress (Carlson, 2013). This type of prolonged exposure causes many physiological dysfunctions (Selye, 1976). Studies have shown that excessive stress early in life can disrupt the normal development of the hippocampus and affect its functions in adulthood. Accordingly, there is a

correlation between the size of the hippocampus and the person's susceptibility to stress disorders (Brunson et al., 2005). As with stress-related diagnoses, trauma can cause an acute stress reaction that can lead to posttraumatic stress disorder (PTSD) and, if prolonged, repetitive, can lead to complex PTSD.

1.2. INTEROCEPTION

Interception is an umbrella term for the phenomenological experience of the body state that is ultimately a product of the central nervous system (CNS). As a concept of interoception first known use in the literature was published by Sherrington (1906) in his book "The Integrative Action of the Nervous System". Over the course of a century, the concept of interoception has evolved into a more inclusive meaning that includes emotion, decision making, perception of time, health, pain, and various other areas of life. In this respect, it plays an important role in the life of every individual related to a wide range of health and psychological aspects of human life (Ceunen et al., 2016).

Dworkin (2007) defines interoception as "sensations perceived in the body" to give information about the physical and mental states of the individual. The restrictive meaning of this definition includes that only sensations stemming from viscera are interoceptive. These bodily sensations, which are responsible for providing a flow of information and homeostasis between a perceived inside and outside, have been separated. While experiences such as temperature, itch and pain are associated with an "external" somatosensory system; Experiences such as

hunger, thirst, internal sensations are differentiated as less pronounced visceral (internal organs to the body) sensations of vaso-motor activity (Dworking, 2007).

With the studies of Craig (2002, 2008, 2014), it would have been possible to reach the broader meaning of the concept. Based on the latest findings on functional anatomy, Craig (2002) claims that interoception needs to be redefined as the sense of the physiological condition of the entire body, not just the viscera. Recent findings which have led to a conceptual shift indicate that all emotions in the bodies of primates can be phylogenetically manifested in a single system. This system, which is based on the integrity of the body, re-encompasses all human emotions as a feeling of the physiological state of the body, with the concept of "interoception" as a part of the afferent arm of the hierarchical homeostatic system that explains the evolution of primates (Craig, 2003; Strigo & Craig, 2016). This single system emerged from the realization that neural processes (autonomic, neuroendocrine, and behavioral) must receive afferent inputs that inform the state of body tissues in order to maintain optimal physiological balance or homeostasis in the body (Cannon, 1939). The parasympathetic pathways of afferent fibers carrying sensory information to the central nervous system have been known for a long time. What has been newly discovered is that there is also a "sympathetic" afferent that runs parallel to the parasympathetic afferent fibers. Such fibers that innervate and surround all tissues of the body; it transmits information about all kinds of physiological states, including the mechanical, thermal, chemical, metabolic and hormonal state of the skin, muscles, joints, teeth and visceral organs (Altman & Bayer, 1984).

Interoception makes the experience subjective by constantly mapping the internal homeostatic states of the body and transferring information from the body to the brain (Damasio, 2010). However, while most internal perception signals support balancing and mapping without the need for awareness, we also have enough to bring awareness to certain internal sensations (Hodossy et al., 2021). Neuroscience studies which were focused on the potential effects of subjective differences in internal perception on the individual, have examined interoception in three different dimensions as “accuracy”, “sensitivity” and “awareness (metacognition)” (Garfinkel et al., 2015 ; Khalsa et al., 2017).

The first of these terms, “Interoceptive accuracy”, is the ability to perceive internal signals that are closely related to physiological measurement. The later “interoceptive sensitivity”, is self-evaluation of one's perception skill, just like questionnaires and self-report forms. As the third dimension, “interoceptive awareness” reflects how well one's beliefs about interoceptive abilities match their actual performance on interoceptive accuracy tests (Khalsa et al., 2017).

1.2.1 Interoceptive Awareness

Interoceptive awareness is defined by Craig (2015) as the ability to identify, access, understand, and respond appropriately to patterns of internal signals of the body. This ability provides a distinct advantage to attend in life challenges and ongoing adjustments (Craig, 2015). According to Mehling (2012), the multidimensional view of body awareness in recent years has revealed a more complex picture of distinguishing attentional modes such as thinking about the

body and being in the body. The human capacity to shift from cognitive processes about physical symptoms such as interpreting, appraising, and ruminating to a state of perceptual presence within the body is defined as mindfulness (Bishop et al., 2004; Watkins & Teasdale, 2004). Thus, it becomes the subject of clinical research and neuroscience as well as philosophy (Mehling et al., 2012).

Charles Darwin first mentioned the relationship between emotions and interoception in his book "*The Expression of Emotions in Man and Animals*" in the late 19th century. Darwin (1872) discussed the relationship between internal sensation and fear responses, which are similar between humans and animals. Following the peripheral theories of emotions (Damasio et al., 2000; James, 1884; Schachter & Singer, 1962) by the expansion of Darwin's views postulate that the perception of signals arising from the body and visceral- afferent feedback is closely linked to emotional experience. Perception of changes in bodily states has been shown to be associated with higher levels of emotional arousal, which is reflected both in emotion-related brain activity and in the intensity of reported emotions. It's also a window to access to mechanisms of emotion regulation (Khalsa and Lapidus, 2016). The study on the relationship between interoceptive awareness, emotional experience, and brain processes (Pallatos et al., 2005) proved that individuals who perceive their heartbeats with high accuracy show higher arousal ratings to affective pictures. In addition, studies have shown that individuals with high interoceptive awareness and accuracy process higher levels of emotional stimuli (pleasant or unpleasant) more deeply and therefore elicit

higher levels of cortical activity (Cuthbert et al., 2000; Keil et al., 2002; Palomba et al., 1997; Pollatos et al., 2005).

The cortical processing of interoception is associated with the thalamus, insula, brain somatosensory cortex. It encompasses the process of the brain integrating signals transmitted from the body into specific subregions (Cameron, 2001; Craig, 2002). The thalamus is the first place where interoceptive signals are received via sympathetic and parasympathetic afferents. At the same time it is an integration of primary interoceptive information, exteroceptive information (e.g., vision, sound, touch) and proceptive information (e.g., sense of movement, action, location) (Chen et al., 2021). After the neurons are processed in the thalamus, they are projected to other brain regions such as the hypothalamus and eventually to the insular cortex, a critical cortical node in the interceptive system (Craig, 2008).

The insula is seen as a "hub" region because of the role of brain connections between different areas (van den Heuvel & Sporns, 2013). One of the critical roles of insula is processing, integrating and occurring a cortical representation of interoceptive information. PET and fMRI studies show that all subjective internal feelings are associated with activation in the anterior insula (Kong et al., 2006; Olausson et al., 2002;). These interoceptive feelings come to awareness by the anterior insula (Small, 2010). Insula activities seem to provide an integrated representation of the state of the entire body and include the inner body experience such as emotions and pain (Craig, 2010). Craig (2008) asserts that the increasingly complex homeostatic state in the human insula provides a

basis for its sequential integration with the sensory environment, motivational state, and social situation.

The relationship between interoceptive awareness and physical sensations, including emotions, has been shown empirically to be an important component for affect regulation (Dunn et al., 2010), decision-making (Kirk et al., 2011) and also awareness of the "material me" which is sense of self (Cameron, 2001; Craig, 2008; Damasio, 2003)

1.2.2. The Relationship Between Interoceptive Awareness and Mental Health

Seth (2013) proposed that mental representations of the self are primarily based on embodied sensory experience and support a sense of self in the world, which is crucial for interaction with the environment. Accordingly, greater accuracy of interoceptive self-representation may encourage greater adaptation at any given moment, in contrast with dissociation from this representation may lead to dysregulation (Seth, 2013). From the perspective of several conceptual and heuristic models (Ainley et al., 2016; Barrett et al., 2016; Friston, 2010; Garfinkenl et al., 2015), dysfunctions interoception have been associated with mental health conditions (Khalsa et al., 2018). Failures to appropriately anticipate changes in interoceptive states have been linked different psychiatric disorders such as mood and anxiety disorder (Paulus & Stein, 2010), panic disorder (Khalsa & Lapidus, 2016), depression (Barrett et al., 2016), eating disorders (Berner et al., 2018; Khalsa et al.,, 2015), chronic pain (Schmidt et al., 1989), somatoform

disorders (Mirams et al., 2012; Schaefer et al., 2012) and drug addiction (Goldstein et al., 2009; Naqvi & Bechara, 2010; Paulus & Stewart, 2013).

According to the model proposed by Paulus & Stein (2010), there are two components of interoceptive dysregulation in anxiety and depression. First one is caused by the first prediction role of the insula in the bottom-up process (Paulus & Stein 2006) that is sending wrong bodily signals from internal to medial prefrontal cortex. The mPFC interprets these signals based on self-relevant and belief-based processes. For this reason, altered brain processing in both depression and anxiety is thought to involve the adaptive and increased synchrony of these brain structures, whose ultimate purpose is to adapt the individual internal environment to the demands of the outside world (Paulus & Stein, 2010).

The second is caused by an individual's "interoceptive prediction schemas" as the contextualized interoceptive afferents that include belief-based and self-referential aspects. The same afferent interception may cause fundamentally different interpretations and accordingly different self-relevance. As an example, a rapid heart rate can be interpreted as a positive arousal schema or an anxious, harmful schema (Paulus & Stein, 2010).

Schulz & Vogele (2015) who examined the relationship between interoception and stress proposed that it is the neurological communication between the central nervous system (CNS) and peripheral nervous system (PNS) to mobilize organisms for homeostasis and survival. They both are shaped by interactions with the environment. Their integrating model suggests that undue stress affects interoceptive awareness by not only altering the intensity of internal

signals but also changing their perception and interpretation (Price & Hooven, 2018).

Stress and trauma also affect the strength of signals at interoception levels and the ability to access or tolerate disturbance. This also leads to compromise in accurate interpretation of sensations and related decisions regarding behavior (Price & Hooven, 2018). The decreased activation in the right anterior insula, a region of the brain which is responsible for identifying the mismatch between cognitive and interoceptive states has been shown in a functional neuroimaging study with posttraumatic stress disorder (PTSD) patients. In addition, the decreased activation seen in the study within many nodes of the lamina I homeostatic pathway led to the inference of PTSD patients experiencing reduced interoceptive awareness (Malejko et al., 2017).

Additionally, a dimensional psychopathology approach as those provided by the Research Domain Criteria (Insel et al., 2010) can be used to link processes underlying interoceptive dysfunction to psychiatric disorders (Khalsa et al., 2018). Because several of these potential interoceptive processes might not be readily identified at the symptom reports of clinicians and might not have entered into the diagnostic specifications for DSM.

1.2.3. The Relationship Between Interoceptive Awareness and Trauma Center Trauma Sensitive Yoga

Studies on yoga and mental health have found that yoga has a reducing effect on the symptoms of various diagnostic groups, such as perceived stress level (Lin et al., 2011; Raghavendra et al., 2009), anxiety and depression symptoms (Kozasa et al., 2008; Lavey et al., 2005; Shapiro et al., 2007) and PTSD symptoms (van der Kolk et al., 2014; van der Kolk, 2006). It has also been associated with emotional regulation, self-efficacy and interoceptive awareness (Franzblau et al., 2006; Gootjes et al., 2011; Neukirch et al., 2019).

The mindfulness aspect of yoga is supposed to encourage emotion regulation by simply recognizing fear rather than avoidance and increases tolerance of one's uncomfortable thoughts and feelings, In addition, awareness of the transient nature of one's momentary experience is thought to lead to a change in the perceptual view of the self (Hölzel et al., 2011). Studies have shown that mindfulness meditation improves emotion regulation, attention regulation and body awareness skills (Davidson et al., 2003; Hölzel et al, 2011; Linehan et al., 1991; Wilamowska et al., 2010). Improving bodily awareness, which involves accepting and not judging the experience of the present moment, often results in transformative health behavior change (Schuman- Olivier et al., 2020). However, trauma survivors tend to have problem to tolerate unstructured meditation and

may be affected by the practice negatively (Miller et al., 1995). They need an instructor for guiding to maintain focus on the bodily senses and breathe exercises (van der Kolk 2014). It is very difficult for trauma survivors to stay in their own bodily sensations, as a result, survivors often experience a sense of disassociation between their minds and bodies (Herman, 2015; van der Kolk et al., 2014). While most trauma involves a physical violation of the body, individuals exposed to trauma may fear their own emotions and bodily sensations (Herman, 2015; van der Kolk, 2018; Emerson, 2017). They need a facilitator for guiding to maintain focus on the bodily senses and breathe exercises (van der Kolk et al., 2014). Interoceptive awareness is compromised after a traumatic event. Neuroimaging studies of trauma have shown decreased activation in the prefrontal cortex and brain regions associated with interoceptive awareness (Herringa et al., 2012; van der Kolk, 1994).

In the light of research, The Trauma Center in Brookline, Massachusetts which had seen the potential of yoga in trauma treatment, pioneered the transformation of yoga into a clinical intervention for chronic PTSD patients suffering from childhood traumas in line with pilot studies of van der Kolk in 2006. An evidence-based intervention was created with contributions from clinicians, yogis and Many qualitative and quantitative researches carried out over the years. Based on the relationship between interoception and PTSD symptoms (Caplan et al., 2013; Van der Kolk et al., 2014; Emerson, 2015), the 10-week trauma-sensitive yoga intervention was expected to improve symptoms in the treatment of PTSD and related comorbidities by increasing interoceptive

awareness. This hypothesis was first confirmed by the original article published in 2014 (van der Kolk et al., 2014). Additionally, the first protocol of the evidence-based system was published and an important resource was created for subsequent studies. It was an important start with its findings on the effectiveness of yoga, and also on the conditional fear responses, which are thought to be critical for the resolution of PTSD. It has also been confirmed that in order to manage intense emotions, it is necessary to focus one's attention on sensory inputs originating from the environment or from within the organism (Ford & Kidd, 1998; Jaycox & Foa, 1996; van der Kolk, 2006, 2014)

1.3. YOGA

The word yoga derives from the Sanskrit root *yuj*, meaning to bind and unite, and is often translated as "join" "bind together". To bind together, at least two things must come together. In this respect, yoga can also be defined as “relationship” (Lee, 2004).

1.3.1. A Brief History and Philosophy of Yoga

Yoga is one of the six important systems of thought known as *darshana*. The word *darshana* is derived from the Sanskrit root *drs*, which means “to see”. Therefore, *darshana* means "sight, point of view, a way of seeing". One of the six *darshanas*, yoga takes its roots from the *Vedas* , the oldest texts of Indian culture (Desikachar, 1999). In these darshanas, yoga coincides with *Samkhya* which tries to explain the nature of all existence by dividing it into two as *Purusha* (spirit,

consciousness) and *Prakriti* (material, including human mind and emotion). Samkhya defines this union as a state of yoga (Lee, 2004).

Taittiriya Upanishad: yogatma (II.4.1) is one of the earliest textual references to yoga as a spiritual discipline around 600/500 BC (Clark, 2010). It refers to the inner self which is made of knowledge and "getting and enjoying" in the breath. The best- known text on yoga, the *Yogasutra* of Patanjali, is believed to have been written around 250 CE (Clark, 2010). From Patanjali's point of view, the source of suffering comes from the wrong perception of physical and mental activities. In order to go into reunification, Patanjali describes an eightfold path of yoga in the *Yogasutra*: *Yama* (behavior), *Niyama* (attitude), *Asana* (body posture), *Pranayama* (breathe), *Pratyahara* (sense withdrawal), *Dharana* (concentration), *Dhyana* (meditation), *Samadhi* (integration). The limbs begin by correcting the attitude towards the outside world and offer an inward journey until reaching Samadhi. With Patanjali, yoga becomes a system rather than a mystical tradition (Lee, 2004).

1.3.2. Theoretical Origins and Practicing Trauma- Sensitive Yoga

TCTSY is based on three existing Western medical models. The three foundations which are Trauma Theory, Attachment Theory, and Neuroscience come directly from the clinical literature. As the clinical application of these theories, TCTSY practice includes 5 basic elements: Invitation, Choice, Interoception, Shared Authentic Experience, and Non Coerciveness.

First and extremely critical element *invitational language* requires great care and sensitivity. As opposed to traditional yoga which follows a command-execution cycle, TCTSY uses invitational language which activates a series of cognitive processes and interoception in the patient which then allows the patient to control and choose their actions at every step of the practice. For instance instead of traditional yoga language "As you inhale, raise your arms up.", TCTSY uses "*If you like, as you inhale, you may raise your arms up.*" and emphasizes the patient's will and control even to the extent of deciding on whether they want to do yoga at all. And in case the patient is undecided which is common in complex PTSD, because the patient does not know what to do with their body, the facilitator's mission is to maintain the invitational language and emphasize the patient's interoceptive perceptions and control during the choosing process (Emerson, 2015).

The second element, *making choices, is the* key to focusing on inner experience and transforming the relationship with a traumatized body that has become unreliable and unpredictable. The meaning of making a choice varies over a wide spectrum depending on the context. In TCTSY, choices focus on the "how" rather than "what". In this respect, choices are less cognitive, independent of cause and effect relationship and are more visceral. While the reasons and possible consequences of choices can be processed in therapy from a past-future focus, in TCTSY choices are about the actions of the here and now. The attention is kept on what to do with the body in the present by focusing on momentary bodily experiences using yoga forms. Invitation and options against the extreme

choicelessness caused by developmental trauma, also initiates the healing experience of a relationship, boundaries of which are well-protected by attachment-theory-based foundations of TCTSY. Extreme choicelessness is opposed with carefully and sensitively creating the possibility of choice. In some cases, it may even suffice to give A or B options and let the patient try them. Rather than choosing randomly, it is essential that the patient choses with a conscious awareness and have the 'experience of choosing' regarding the body. Thus, the patient is presented with a wide range of choices using only their body.

The third element, *interoception*, involves creating new experiences by interacting with what is felt in the body. The process that begins with interoception initiates a flow of data about what is felt in the body. Based on this data, an intentional or unintentional action is selected with the information received from the body. The feedback on the effectiveness of the action is again received from the body through interoception. This is a cyclical process and one can start at any point in the cycle. The result is a transition from a body stuck in a past trauma to an experience of a body that exists here and now. For example, a person may notice pain in the back with interoception. This awareness leads to the idea of standing up for a choice and can lead one to the deliberate action of standing up. The cycle can be completed with an interoceptive experience such as feeling better in the back (Emerson, 2015).

According to van der Kolk (2006), when clients realize their bodily sensations and their potential to act, they can discover new ways to meet their potential power sources. Interoception also has an emotional content, but TCTSY

is only concerned with sensory content. Interpretation is not part of the process, the focus of practice is more on actions based on bodily sensations "*You may notice a sensation in the right side of your neck*" (Emerson, 2015).

Shared authentic experience involves facilitators and patients doing the practice together. While the facilitator practices feeling and trusting their own experience, they simultaneously support the patient to recognize and trust their own experience. As patients begin to develop some comfort and familiarity within the safe space offered by the facilitator, they may want to make their experience more complex and profound. In this respect, yoga forms are not a goal, unlike traditional Yoga. When patients focus on their authentic experiences; forms become a tool that allows them to notice what they feel, to make a choice about it, and to take action.

Non Coerciveness is the main criteria for TCTSY to work. The facilitator should not force the participant to do a form of yoga or anything else, or to have a subjective experience with a form of yoga that they deem beneficial in some way (Emerson, 2015). TCTSY the internalization process of power in recovery from trauma. Because both parties are in a relationship that they approve of without imposing their own experiences on each other. The idea of practicing and quitting TCTSY on a preferred time instead of being exposed to a series of commands, is also essential for the patients to internalize and own their experiences. The facilitator's mission is maintaining invitational language and opening a safe space for patient's finding their own prescriptions.

1.3.3. Development of Trauma Center Trauma– Sensitive Yoga

The terms of Trauma - *Informed* Yoga and Trauma Center Trauma - *Sensitive* Yoga are different approaches based on the instructors' training. Even if the trauma-informed approach is incorporated into yoga practice, not all trauma-sensitive yoga classes apply the TCTSY methodology. The difference is TCTSY is an evidence based intervention developed for psychological trauma at the Trauma Center in Brookline. To avoid confusion with their interchangeability, *Trauma Center* Trauma-Sensitive Yoga is used wherever the term refers specifically to scholars who apply it to their studies (Nicotera & Connolly, 2020).

According to the official website (2022) of the program, TCTSY was developed at the Trauma Center in Brookline, Massachusetts for complex trauma or chronic, treatment-resistant post-traumatic stress disorder (PTSD). The first pilot studies began in 2002 by combining clinical insights and practice of yoga for people who were suffering from chronic childhood traumas. In 2003, the program started to offer sessions for groups and individuals, as well as pilot studies, and progressed in line with students' feedback. Over the years, many yoga teachers, mental health professionals, and students have contributed to the development of the program. In the same period, the study of van der Kolk on PTSD and neuroscience (2006) revealed the idea that yoga could be an effective intervention in relieving PTSD symptoms. This paper also includes some information about the pilot studies of Yoga at Trauma Center. In 2009, it received the first grant to study yoga for trauma from the National Institutes of Health

(NIH).

The core study by van der Kolk et al. was published in the *Journal of Clinical Psychiatry* in 2014. The study investigated a 10-week Trauma-Sensitive Yoga (TCTSY) intervention for 64 women with chronic PTSD compared to supportive women's health education. In this study, from pretreatment to posttreatment, the yoga group proved to have significantly greater reductions in PTSD symptoms compared to the control group. Following these findings, two more qualitative studies were conducted to understand the effectiveness of the yoga intervention (Rhodes, 2015; West et al, 2017). Through interviews, Rhodes (2015) found that patients reported greater ownership, control, and connection to their body, emotions, and thoughts after yoga. Compared to before the yoga intervention, it was revealed to include greater interactional awareness, emotion regulation abilities, self-care capacities, connection with others, and a sense of control and hope over their lives. Similarly, West et al (2017) found increased gratitude and compassion, commitment, acceptance, centrism, and empowerment themes in patients' lives after the yoga intervention. In addition to this, increased interoceptive awareness was proposed as a core mechanism of yoga to treat PTSD (Caplan et al., 2013; Emerson et al., 2009; van der Kolk et al.,, 2014). It has been suggested that improvements in interoceptive abilities are crucial to reduce trauma symptoms (Mehling et al., 2017). In the study examining Yoga for PTSD and the role of interoceptive awareness, TCTSY intervention was shown to increase interoceptive awareness (Neukirch et al., 2019).

The study of Spinazzola et al (2011) literature review documented the many positive benefits of Yoga for PTSD and emotion regulation. According to Gurda (2015), current research and meta-analyses show that yoga interventions have a significant positive effect on PTSD symptomatology.

In 2017, TCTSY was identified as the first dedicated yoga program to be listed as an evidence-based program/practice for the treatment of complex trauma. The program has been eligible for inclusion in the National Evidence-Based Programs and Practices (NREPP) database published by the Substance Abuse and Mental Health Services Administration (SAMHSA).

In a 5-year randomized controlled trial for the treatment of military sexual trauma-related PTSD (Zaccari et al., 2022), TCTSY resulted in faster symptom recovery, higher participant persistence, and an equally sustained effect which was compared to CPT (Cognitive Processing Therapy).

1.3.5. Trauma Center Trauma - Sensitive Yoga in Turkey

Within the scope of The American Hospital's Code Lotus project, yoga was offered for the first time in 2018 as a stress reducer for patients and the staff in a hospital.

In 2020, David Emerson's book "*Trauma-Sensitive Yoga in Therapy: Bringing the Body to Healing"* was translated into Turkish by Ece Turkmut Dere and published by Aura Publications, Istanbul. In this book, TCTSY methodology is explained by the founder of the Program. As of 2021, there are two TCTSY Facilitators (TCTSY-F) officially certified through the Trauma Center - Trauma

Sensitive Yoga 300 hour program in Turkey. A list of facilitators around the world, organized to include regional diversity by geographic continent, is published on the official website www.*traumasensitiveyoga.com*.

1.4. PRESENT STUDY

The TCTSY program qualified for inclusion in the National Registry of Evidence-based Programs and Practices (NREPP) database published by the Substance Abuse and Mental Health Services Administration (SAMHSA). TCTSY is also the first dedicated yoga program listed as an evidence-based program/practice for the treatment of psychological trauma.

The major aim of the present study is to examine the effect of 10-week Trauma-Sensitive Yoga Sessions on Interoceptive Awareness and Depression, Anxiety Stress Scores. In the neuroscience and trauma studies literature, the relationship of interoceptive awareness with developmental trauma and as a result of high level depression, anxiety and stress were found. TCTSY is a complementary intervention which is based on attachment theory, trauma theory and neuroscience.

This research has the speciality of being the first study of Trauma-Sensitive Yoga adapted to culture, in Turkey and the middle- region. At the same time, it is the second study in which the effectiveness of online sessions was examined along with the pandemic conditions. The protocol of the original

study (2014) published in the *Journal of Clinical Psychiatry* was followed and adapted to the online platform.

Within the scope of this study, following hypotheses were proposed:

1. 10-week Trauma Center Trauma Sensitive Yoga Sessions increase intervention groups' interoceptive awareness scores significantly.
2. 10-week Trauma Center Trauma Sensitive Yoga Sessions decrease intervention groups' depression anxiety and stress scores significantly.

CHAPTER 2

METHOD

2.1. PARTICIPANTS

The recruitment of the participants was provided by a brief screening call from social media (instagram) and email groups. As a result of the screening study, which included 102 applications, 90 female volunteers who met the basic inclusion criteria of the research were reached via email and phone call. The estimated sample size was about 30, of which 15 were in the intervention group and 15 in the control group. However, responses were received from a limited number of participants. Due to the small number of applications and the limited time frame, randomly assigned could not be possible. Therefore, the quasi-experimental model was used.

There were 16 participants in the intervention group and 19 participants in the control group according to information gathered in the pre-interview. The main inclusion criterias of the study were to be female between the ages of 18 and 65 and to be able to use Zoom application, to have sufficient technical equipment such as internet connection, microphone and camera. In addition, the participants were expected to be literate, to live in Turkey, to be able to attend the sessions weekly, not to use any psychiatric drugs, and not to have any extra medical condition that may hinder the commitment to the intervention. The exclusion criteria included those being in a treatment of active mental illness, psychiatric

medication, breastfeeding or being pregnant, unstable medical conditions, significant suicidal or self-harm risk and disabilities.

2.1.1. Demographic Variables of Participants

Demographic characteristics of the participants are presented in Table 2.1. The total sample size of study was 35, there were 16 participants in the intervention group and 19 participants in the control group.

Table 2.1. Demographic Characteristics of the Participants at Baseline

Baseline characteristics	Intervention		Control		Full Sample	
	n	%	*n*	%	*n*	%
Age						
18-30	5	31.2	5	26.3	10	28.5
31-40	8	50.0	9	47.3	17	48.5
41-50	3	18.7	4	21.0	7	20.0
51-60	0	0	0	0	0	0
Sex						
Female	16	100	19	100	35	100
Male	0	0	0	0	0	0
Other	0	0	0	0	0	0
Relational Status						
Single	10	62.5	13	68.4	23	65.7
Married	5	31.3	5	26.3	10	28.5
Divorced	1	6.3	1	5.2	2	5.7
Widowed	0	0	0	0	0	0

Occupation						
Housewife	0	0	1	5.2	1	2.8
White Collar	1	6.2	2	10.5	3	8.5
Private Sector	11	68.7	9	47.3	20	57.1
Civil Servant	1	6.2	4	21.0	5	14.2
Student	2	12.5	2	10.5	4	11.4
Unemployed	1	6.2	1	5.2	2	5.7
Perceived Socio-economic Status						
Low	0	0	0	0	0	0
Middle-low	7	43.7	3	15.7	10	28.5
Middle	7	43.7	13	68.4	20	35.0
Middle- High	2	12.5	3	15.7	5	14.2
High	0	0	0	0	0	0
Educational Level						
Primary School	0	0	0	0	0	0
Middle School	0	0	0	0	0	0
High School	1	6.3	2	10.5	3	8.5
Undergraduate	6	37.5	9	47.4	15	42.8
Graduate	8	50.0	6	31.6	14	40.0
Doctoral	1	6.3	2	10.5	3	8.5
Location						
İstanbul	9	59.9	13	68.4	22	62.8
İzmir	3	19.9	4	21.0	7	19.9
Bursa	2	13.3	0	0	2	5.7
Giresun	0	0	1	5.2	1	2.8
Çanakkale	0	0	1	5.2	1	2.8
Aydın	1	6.6	0	0	1	2.8

The Shape of work last 3 months						
Face-to face	3	20.0	8	47.0	11	34.3
Online	4	26.6	5	29.4	9	28.1
Hybrid	8	53.3	4	23.5	12	37.5
Yoga experience before						
Yes	15	93.8	16	84.2	31	88.5
No	1	6.3	3	15.8	4	11.5
Online Yoga Experience before						
Yes	9	56.3	15	78,9	24	68.5
No	7	43.8	4	21,1	11	31.4
Psychotherapy Experience Before						
Yes	13	81.2	14	73.6	27	77.1
No	3	18.7	5	26.3	8	22.8

The distributions of age, relational status, occupation, educational level, and perceived socio economic status among the participants are close to each other in both groups. The majority of the sample is in the middle age, single, high educated, middle class economic status, working in private sector and living in İstanbul. According to age, about 48% of participants are between 31-40. About 65% of participants are single. About 62% of participants have been living in İstanbul. The majority of perceived socio-economic status is middle, middle-low and middle-high. At the same time about %42 of the sample were undergraduated.

In addition, about 77% of participants had experience before psychotherapy. About 88% of them had experience before face to face yoga.

However the participants in the intervention group had lower online yoga experience than the control group. In contrast, 53% of the participants in the intervention group work in the hyrid system, while most of the participants in the control group work face-to-face. All of the participants answered biological sex as women.

In the study, there are no participants in the 51-60 age range, with less than high school education or low and high socio-economic status. Due to the small sample size, the demographic characteristics were not included in the analysis.

2.1.2. Drop-out Rates

Drop-out rates are seen low when compared to other gold standard trauma therapies (Lewis, et al., 2020). One participant in the intervention group could not continue due to relocation. The other participant reported that she could not continue due to the conflict of her schedule with another training.

Of the 4 participants in the control group, 2 answered the post test but did not answer the follow up test. The other 2 participants did not answer the posttest, but answered the follow up.

Table 2.2. Drop-out Rates in the Intervention and Control Groups

Groups	Drop-out Rates	
	n	*%*
Intervention	2	12.50
Control	4	21.05

2.1.3. Participation Rates

About 85% of the participants attended at least 8 or more sessions. From the 3rd week of the study, the number of participants with the cameras on and off were also recorded. It was seen that the rate of participants who kept the camera on was low and they were generally the same people.

Table 2.3. Number of Participants Attending Weekly Sessions

Variable	Week									
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Number of participants	15	13	14	12	14	13	10	13	12	9
Number of Open Cameras	-	-	3	3	3	2	3	3	1	1

Table 2.4. 10-Week Sessions Participation Rates

Week	Participation Rates	
	%	*n*
6 weeks and more	14	100
8 weeks and more	12	85.7
Full Participation	4	28.5

2.2. DESING

This clinical trial is carried out as a nonequivalent control group pretest-posttest design.

Table 2.5. The List of Independent and Dependent Variables

Independent Variables		Dependent Variables
Intervention Group	Control Group	
10-Week TCTSY Sessions	–	• Interoceptive Awareness Scores • Depression, Anxiety, Stress Scores

2.3. INSTRUMENTS

The instruments used in the study were the Demographic Information Form, Complex Trauma Inventory (CIT), Anxiety Stress Scale (Dass-21) and Multidimensional Assessment of Interoceptive Awareness - II (MAIA-II). The initial contact with these 35 participant was an individual interview for informing the study process by phone call. They were supposed to fill out the Demographic Form and the Informed Consent Form on the online survey to be included in the study.

2.3.1. Demographic Information Form

The demographic information form (see Appendix) includes questions about age, gender, education level, occupation, marital status, perceived socioeconomic status, the shape of work or study, yoga experience, online yoga experience and psychotherapy experience.

2.3.2. Complex Trauma Inventory (CTI)

The Complex Trauma Inventory (CTI) is a self-report inventory consisting of 20 items developed by Litvin, Kaminski, and Riggs (2017). Scores are calculated by symptom clusters of re-experiencing, avoidance, sense of threat, inability to regulate affect, negative self-perception, and deterioration in relationships. For each symptom, the participants are asked to rate the intensity of how much it bothered them in the past month, from 0 (Not at all) to 4 (Very much), and from 0 (never) to 4 (almost every day) for how often it bothered them. The average of these scores is taken and the severity score is formed. The inclusion of both intensity and frequency of symptoms may allow more subtle changes to be observed, providing more data to inform treatment planning for clinical use, track progress, and evaluate outcomes (Litvin and et al., 2017). The Turkish validity and reliability study of the scale was conducted by Calayır (2021).

2.3.3. Depression Anxiety Stress Scale – 21 (DASS-21)

Dass-21 is a set of three self-report used in the study to measure depression, stress and anxiety levels was developed by Lovibond in 1995 to shorten the application period of the DASS-42 scale (Lovibond & Lovibond, 1995).

The scale consists of 21 items including the effects of depression, stress and anxiety on physical, psychological and social life. Each item assesses between 0-3 and gives separate scores for depression, stress and anxiety. A maximum of 21 and a minimum of 0 points can be obtained from the scales. High scores indicate high levels of depression, stress, and anxiety. Lovibond (1995) found a significant relationship between Beck's depression inventory and depression, anxiety, and stress scale in a study conducted with 717 university students (r=0.4).

The Turkish validity and reliability study of the scale was conducted by Sarıçam (2018). Cronbach's alpha internal consistency reliability coefficient was α=0.87 for depression subscale, α=0.85 for anxiety subscale and α=0.81 for stress subscale. The scale is valid and reliable and it is suitable for clinical and non-clinical settings.

2.3.4. Multidimensional Assessment of Interoceptive Awareness (MAIA-II)

Multidimensional Assessment of Interoceptive Awareness Assessment-II (MAIA-II) is a self-report scale developed for the evaluation of internal bodily signals and how emotions, beliefs and attitudes are related to the internal states in

mind-body therapies (Mehling et al., 2012). The scale contains items related to interoceptive awareness and various mind-body dimensions (See Appendix-?). The original version (Mehling et al., 2012) includes of 32 items and eight subscales: Noticing, Not-Distracting, Not-Worrying, Attention Regulation, Emotional Awareness, Self-Regulation, Body-Listening and Trusting. Five items were added to an updated 37-item questionnaire (Mehling et al., 2018) to improve the reliability of the two scales, Not-Distracting and No Not-Worrying.

Participants answer each item on a Likert-type scale ranging from "(0) never" to "(5) always". Higher scores represent higher levels of interoceptive sensitivity (Solano & Moore, 2019).

The validity and reliability study of the Turkish adaptation was conducted by Özpınar et al. (2021). The Cronbach's Alpha values of all subscales were found to be within the acceptable range ($\alpha>0.60$). The reliability coefficient in this study was measured by the total score of the scale and was found to be .89.

2.4. ANALYSIS

Data analysis was carried out by Statistical Package for the Social Statistical Package for Social Sciences (SPSS), version 26. All analyses are conducted at an alpha level of .05.

First, descriptive statistics of the variables were examined and checked the normality of the scale scores. Since the questionnaires were filled out before, after and follow-up the intervention, Independent T- test and paired Sample test were

used to check the hypothesis 1. Wilcoxon Signed Rank test and Mann Whitney U test were used to check the hypothesis 2.

2.5. IMPLEMENT

The 10-week Trauma Center Trauma Sensitive Yoga (TCTSY) protocol was followed in the study. After the groups assigned in the study, DASS-21, MAIA-II and CIT were administered to all participants as pre-measures as online survey. Afterwards, ten consecutive weeks of one-hour once weekly TCTSY sessions were regularly carried out on Zoom. The study was conducted by a TCTSY facilitator who was fully accredited in the Trauma Sensitive Yoga program as developed by the Trauma Center at the Justice Resource Institute in Brookline, Massachusetts and supervised by David Emerson. In each session, the theme of that session was shared with the participants. The last 10 minutes of the session were reserved for the participants' communion and questions. The participants met with the yoga teacher only in the sessions. All other processes such as sharing Zoom links, giving technical support, sending only surveys were carried out by the assistant.

The option to keep their cameras on or off was left to the choice of the participants, and it was shared that they could leave without giving a reason at any part of the study. DASS-21 and MAIA-II as post measures were obtained within one week post intervention and follow-up measures three months post-intervention.

2.6. PROCEDURE

After the ethical approval of the Istanbul Bilgi University institutional review committee, the study was announced on social media platforms and shared in e-mail groups. An Informed Consent Form (see Appendix) was given to all participants, and only those who approved to participate continued to the study. Following the control and intervention groups were assigned, WhatsApp groups were created including the technic assistant with the permission of the participants. These groups were opened in order to share pre-test, post-test and follow-up online surveys, zoom links and to be able to convey any technical needs of the participants to the assistant.

First, The Demographic form, Depression Anxiety Stress Scale (Dass-21) and Multidimensional Assessment of Interoceptive Awareness (MAIA-II) as a pre-test, and Complex Trauma Inventory (CTI) as a confounding factor were sent to the groups as an online survey one week before the Yoga classes started. For 10 weeks, Participants met online on Zoom at the same time every Tuesday.

At the end of the 10-week classes, the participants were asked to complete the Depression Anxiety Stress Scale (Dass-21) and Multidimensional Assessment of Interoceptive Awareness (MAIA-II) Scales a second time in the online survey as a post-test.

After 3 months, Depression Anxiety Stress Scale (Dass-21) and Multidimensional Assessment of Interoceptive Awareness (MAIA-II) Scales were

sent to the participants for the third time in order to observe the effectiveness of the intervention in the process as a follow-up test.

Ethically, 10-week TCTSY sessions were offered to the control group after the publication of the study.

CHAPTER 3

RESULTS

The main aim of this study is to investigate the effectiveness of 10- week online Trauma Center Trauma- Sensitive Yoga on interoceptive awareness and depression, anxiety, stress scores. Within the scope of this aim, there is one independent variable: 10-Week Online Trauma- Sensitive Yoga Intervention. The dependent variables of the study are two: the first is Interoceptive Awareness as measured by Multidimensional Assessment of Interoceptive Awareness (MAIA-II) and the later is depression, anxiety, stress levels as measured by Depression Anxiety Stress Scale (Dass-21).

Initially, the Shapiro Wilk Normality test was used to reveal whether the score distributions were normally distributed.

Then to test the mean difference between two groups: In testing the difference between the intervention and control groups, Independent Sample T-test was used for parametric tests and Mann Whitney U test was used for non-parametric tests.

In order to test the significance of the mean difference between the pre-test and post-test scores, the independent sample t-test was used for normally distributed scores, and the Wilcoxson signed-rank test was used for non-normally distributed scores.

CTI score was higher at baseline in the intervention group. Since ANCOVA did not meet the assumptions, the relationship between interoception and dass scores could not be examined.

3.1. DESCRIPTIVE STATISTICS

First, descriptive statistics of the variables were examined to see the central tendency and dispersion of each variable. The scale scores were computed as instructed by the authors for Multidimensional Assessment of Interoceptive Awareness (MAIA-II), Dass-21 and CIT. The minimum, maximum, mean, and standard deviation for scale scores and their differences of the variables are shown in the Table 3.1

Table 3.1 Descriptive Statistics of the Scale Scores of Study Variables

Scale	*N*	*M*	*SD*	Min	Max
Intervention					
Pretest Dass-21	16	12.7500	12.44454	.00	45,00
Posttest Dass-21	14	7.7143	11.84794	.00	40,00
Follow-up Dass-21	14	11.0000	13.93943	.00	48.00
Difference pre-post tests Dass-21	14	6.7143	10.55701	-13.00	22.00
Difference Posttest follow-up Dass-21	14	-3.2857	8.33370	-24.00	12.00

Pretest MAIA-II	16	101.8125	24.64202	57.00	138.00
Posttest MAIA-II	14	122.7857	15.91892	85.00	145.00
Follow-up MAIA-II	14	121.8571	19.77122	88.00	154.00
Difference Pretest and Posttest MAIA-II	14	-22.7143	25.82911	-88.00	14.00
Difference Posttest Follow-up MAIA-II	14	.9286	13.80894	-14.00	32.00
Pretest CTI	16	59.0625	26.14184	23.00	103.00
Control					
Pretest Dass-21	19	5.5263	8,56588	,00	34,00
Posttest Dass-21	14	6.5000	9,36236	,00	37,00
Follow-up Dass-21	17	7,8235	10,56075	,00	38,00
Difference Pretest Dass-21	14	-,9286	5,19562	-8,00	10,00
Difference Posttest Follow-up Dass-21	13	-.9231	4.59096	-10.00	6.00
Pretest MAIA-II	19	107.4211	21.26112	64.00	137.00

Post-test MAIA-II	15	112.0667	16.88392	84.00	135.00
Follow-up MAIA-II	17	107.2353	20.85524	63.00	142.00
Difference Pretest Posttest MAIA-II	15	-4.8667	13.73144	-29.00	20.00
Difference Posttest Fo MAIA-II	15	6.9333	16.58513	-19.00	36.00
Pre-test CTI	19	41.2105	20.04046	12.00	86.00

3.1.1. Tests Of Normality

Normality Test was used in order to test whether the distribution of the variables subject to the research is normal. Shapiro-Wilk significance test is recommended especially in small samples (n<50) (Razali et al., 2011). Dass-21 scores did not show normal distribution in both the intervention and control groups. Apart from this, it is seen that the distribution of the variables MAIA-II and CIT scores in the study were normal in both the intervention and control groups.

Table 3.2. Tests of Normality of Scales

Scale	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	*df*	*Sig.*	*Statistic*	*df*	*Sig.*
Intervention						
Pretest Dass-21	.220	14	.064	.875	14	.050

Posttest Dass-21	.266	14	.008	.717	14	.001
Follow-up Dass-21	.215	14	.079	.801	14	.005
Difference Pretest Posttest Dass-21	.122	14	.200*	.966	14	.817
Difference Posttest Follow-up Dass-21	.204	14	.119	.890	14	.082
Pretest MAIA-II	.102	14	.200*	.965	14	.808
Posttest MAIA-II	.209	14	.099	.897	14	.101
Follow-up MAIA-II	.212	14	.087	.919	14	.213
Difference Pretest Posttest MAIA-II	.202	14	.125	.906	14	.137
Difference Posttest Follow-up Tests MAIA-II	.192	14	.169	.885	14	.070
Pre-test CTI	.163	14	.200*	.951	14	.579
Control						
Pretest Dass-21	.375	12	.000	.565	12	.000
Posttest Dass-21	.285	12	.008	.623	12	.000
Follow-up Dass-21	.247	12	.042	.733	12	.002
Difference Pretest Posttest Dass-21	.277	12	.011	.849	12	.036
Difference Posttest Follow-up Dass-21	.199	12	.200*	.906	12	.191
Pretest	.177	12	.200*	.945	12	.563

MAIA-II						
Posttest MAIA-II	.252	12	.034	.880	12	.088
Follow-up MAIA-II	.124	12	.200*	.981	12	.987
Difference Pretest Posttest MAIA-II	.232	12	.073	.876	12	.078
Difference Posttest Follow-up MAIA-II	.182	12	.200*	.908	12	.200
Pretest CTI	.259	12	.025	.874	12	.074

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

3.1.2. CTI Scores

When the initial CIT scores of the intervention group and the control group were compared, the intervention group had a higher score. However, since the groups were not evenly distributed and the gain score was not met, a result that could be associated with interoception or Dass could not be obtained.

Table 3.3.Results of pretest CTI scores for both group

Group	N	Mean	Std. Deviation	Std. Error Mean
Pretest				
Intervention	16	45.5938	19.66657	4.91664
Control	19	33.1579	15.48391	3.55225

3.2. THE EFFECTIVENESS OF TRAUMA CENTER TRAUMA-SENSITIVE YOGA (TCTSY) ON INTEROCEPTIVE AWARENESS

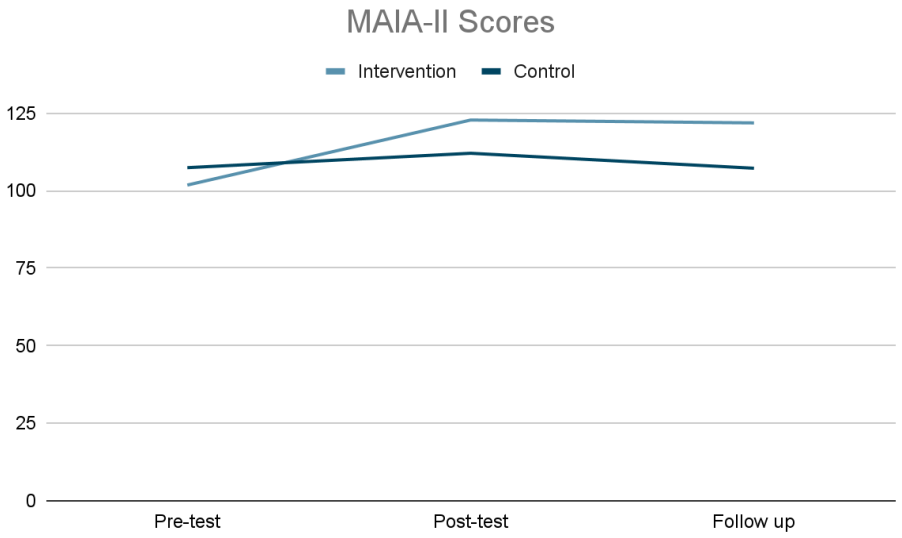
The Independent Sample T-Test was used in the intervention and control groups to test the significance of the difference between the pretest and posttest scores of the MAIA-II scores. As a result of this test ($p<0.05$), the MAIA scores of the intervention group showed a significant difference between the pretest and posttest. This finding can be interpreted as TCTSY was effective in the intervention group.

Regarding pretest and posttest of MAIA-II, Paired Sample T-test significant associations were found between pretest and posttest in the Intervention Group. The results showed that the posttest of intervention group (M = 122,78; SD = 15,91) scored significantly higher than the pretest of Intervention Group ((M = 101,81; SD = 24.64, p = .027). There is no significantly difference between the follow-up test (M = 121,85; SD = 19,77) and posttest (M = 122,78; SD = 15.91) means.

Regarding pretest and posttest of MAIA-II in the control Group, Paired Sample T-test was used. There is no significantly difference were found between pretest (M = 137.00; SD = 107.42) and posttest (M = 135.00; SD = 112.06). Also, there is no significantly difference between the follow-up test (M = 142,00; SD = 107,23) and posttest (M = 135.00; SD = 112.06) means.

Independent Sample T-Test was used to test the mean difference between two independent groups in order to reveal whether the averages of the obtained gain scores differed significantly between the intervention and control groups. Regarding the difference between the pretest and posttest MAIA-II scores in the intervention group (M = -88.00; SD = 14.00) and the control group (M =-29.00; SD = 20.00) were found significant (p=0.027). According to the test result, a significant difference was found between the scores of the intervention and control groups (p< ,05). As a result, it can be said that the TCTSY sessions in the intervention group increased the MAIA-II scores significantly compared to the control group. This finding supports hypothesis 1.

Figure 3.1. MAIA-II Scores of Intervention and Control Groups



3.3. THE EFFECTIVENESS OF TRAUMA CENTER TRAUMA SENSITIVE YOGA (TCTSY) ON DEPRESSION, ANXIETY AND STRESS

Wilcoxon Signed Rank Test was used in the intervention and control groups in order to test the significance of the difference between the pretest and posttest scores of Dass-21. As a result of this test ($p<0.05$), the Dass-21 scores of the intervention group showed a significant difference between the pretest and posttest. This finding can be interpreted as TCTSY sessions were effective in the Intervention group on Dass-21 score.

Regarding pretest and posttest of Dass-21, Wilcoxon Signed Rank Test significant associations were found between pretest and posttest in the intervention group. The results showed that the pretest of intervention Group (M = 12.7500; SD = 12.44) scored significantly higher than the posttest of intervention group (M = 7.71; SD = 11.84), p = .046). There is no significantly difference between the follow-up test (M = 11,0000; SD = 13,93) and posttest (M = 7.71; SD = 11.84) means.

Regarding pretest and posttest of Dass-21 in the control group, there is no significant difference found between pretest (M = 5.5263; SD = 8.56) and posttest (M = 6.50; SD = 9.36). Also, there is no significant difference between the follow-up test (M = 7.82; SD = 10,56) and posttest (M = 6.50; SD = 9.36) means.

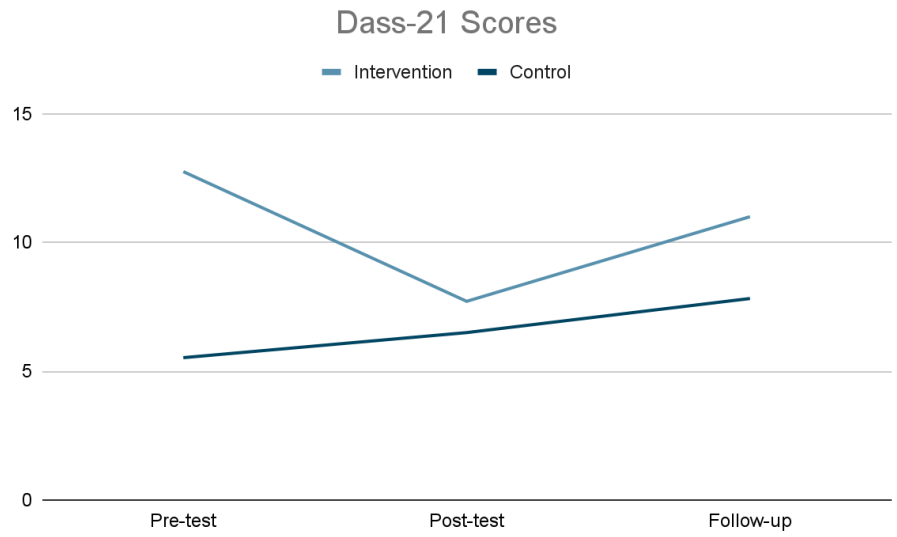
Since the mean of the pretest scores of the intervention and control groups showed a significant difference in the research design, the gain score was obtained

the difference between the pretest and posttest Dass-21 scores in both the intervention and control groups.

Mann Whitney U test was used to test the mean difference between two independent groups in order to reveal whether the averages of the obtained gain scores differed significantly between the intervention and control groups.

Regarding the difference between the pretest and posttest Dass-21 scores in the intervention group (M = 6.70; SD = 10.55) and control groups. (M = -.92; SD = 5.19) were found significant (p=0.031). According to the test result, a significant difference was found between the intervention and control group scores (p< ,05). As a result, it can be said that the TCTSY sessions in the intervention group significantly decreased the DASS scores compared to the control group. This finding supports hypothesis 2.

Figure 3.2. Dass-21 Scores of Intervention and Control Groups



CHAPTER 4

DISCUSSION

4.1. INTERPRETATION OF THE RESULTS

The major aim of the current study was to examine the effectiveness of 10-week Online TCSTY intervention to interoceptive awareness and depression anxiety stress levels. This study also includes the adaptation of interoceptive language to Turkish and culture, which is an important part of the TCTSY intervention.

The study intends to contribute to the development of an extended protocol of TCTSY to the online platform and to understand whether similar results can be obtained in different cultures. The main purpose of the study is to increase interoceptive awareness which is known to be associated with many mental illnesses, in individuals. In addition, the intervention offers the proposition of practical, short-term, easily accessible and body-oriented effective adjunct treatment for depression and anxiety.

The results of this study will be discussed with reference to the existing literature, which is based on the core study (van der Kolk et al, 2014) establishing an evidence base for TCTSY and following studies. Besides, the limitations of the current study will be reviewed.

4.1.1. Sample and Selection

Due to the process of adapting the study to culture and the finding of participants easily, it was decided to include only women first. 107 applications were received in the first step. Despite this, very few participants could be reached back during the selection process. Due to time constraints and to complete the study with statistically sufficient data, the participants were naturally assigned to the intervention and control groups according to their return time and willingness. Therefore, participants could not be randomly assigned and the study reverted to a quasi-experimental design.

4.1.2. Interoceptive Awareness

First hypothesis of the study expected interoceptive awareness skores of participants to be permanently increased as a result of TCTSY sessions. This increase was shown in the posttest, and it was found to be permanent in the follow-up three months later. As expected, there was no change observed in the control group. In this way the first hypothesis was fully supported. The finding of increasing in interoceptive awareness is also consistent with the existing literature (van der Kolk et al., 2014; Rhodes, 2015; Neukirch et al., 2019; Nguyen-Feng et al., 2020)

4.1.3. Depression Anxiety Stress

Second hypothesis of the study expected depression, anxiety and stress scores of participants to be permanently decreased as a result of TCTSY sessions. This decrease was shown in the posttest, and it was found to be permanent in the follow-up three months later. As expected, there was no change observed in the control group.

When the two groups were analyzed to compare with Mann Whitney U test in the pretest posttest, it was seen that the depression anxiety stress scores of the intervention group, which was higher than the control group at the beginning, became lower than the control group. Although the limitations of the study and was not studying with two equal groups, this is one of the important findings of this research. However, no significant difference was found between the two groups in the follow-up. As the reason for this, it can be shown that the frequency of a long-term yoga practice can lead to more permanent results, instead of a short-term practice of only 10 sessions, as found in previous studies in the literature (Rhodes et al., 2016).

In this way the second hypothesis was supported. The finding of decreasing in depression, anxiety and stress scores is also consistent with the existing literature (van der Kolk et al., 2014; Nguyen-Feng et al., 2020; Kelly et al., 2021; Neukirch et al., 2019)

4.2. LIMITATIONS AND FUTURE DIRECTIONS

Included in the strengths of this study are; supporting the two hypotheses tested with results, preventing detection bias by working with the researcher clinical psychologist, assistant and facilitator; It is relatively low cost, practical and easily accessible, lower dropout rates compared to other gold start therapy methods such as CPT (Zaccari et al., 2022) and offering an exemplary and effective group intervention method for future online studies.

Although the study achieved its main goals, there were also some limitations. The first limitation of the current study is a small sample size (*S*= 37). The low number of volunteer participants who applied caused the assignment not to be randomized and reduced the strength of the research. Due to the low number of participants, 15 participants in the intervention group and 19 participants in the control group were included in the analysis together with the drop-outs. However, the correlation between interoceptive awareness and depression could not be examined because it did not meet the gain score. For the same reason, CIT scores could not be analyzed.

The second limitation of the study is the characteristics of the sample group. The sample of the study represents a specific population, which limits the external validity. All of the participants were women; they were from relatively middle and middle high socioeconomic status, living in a metropolis and most of them had a high education level. Therefore, this sample may not be representative of a larger population. This can refer to a selection bias. Using a more diverse and

larger sample can contribute to the generalizability of the results as well as an understanding of the differences between various groups.

The third limitation of the study is that it was carried out under pandemic conditions and online. For this reason, only self-report-based Likert-type scales were used in the study. In pandemic conditions it was not possible to support the study with physical and more objective measurements. In addition this was a voluntary study. 88.5% of the participants state that they have had previous yoga experience. Therefore, it is not possible to eliminate the social desirability bias that may interfere with participants' self-report responses.

Another limitation of pandemic conditions was on the selection of the sample group to intervention. In this study, the effectiveness of interoceptive awareness and depression anxiety stress scores in individuals without any psychiatric diagnosis and active psychiatric treatment was examined. In cases where clinical pre-interview and face-to-face interviews are possible, its effectiveness on patients with different diagnosis groups such as PTSD, Depression, Anxiety or Dissociative Identity Disorder (DID) may be examined in future studies.

As an additional suggestion for future research two sample crossover studies could be designed to examine the effectiveness of face-to-face TCTSY and online TCTSY sessions. It may have also been considered in qualitative research to analyze deeper into the results of the intervention. Furthermore, longitudinal studies covering not only months but also years are needed to examine the sustainable impact of such interventions.

CONCLUSION

This study is the first study that investigates the effectiveness of Trauma-Sensitive Yoga Intervention by adapting to the culture in Turkey. It is also the first study aimed to increase interoceptive awareness. The study provides evidence that online TCTSY intervention increases interoceptive awareness and decreases depression anxiety stress level. Although a negative correlation was observed between interoceptive awareness and depression anxiety stress scores, sufficient data could not be obtained to examine the relationship between these two. Additionally, the existing literature states that there is a relationship between childhood trauma, depression, anxiety and interoceptive awareness, the relationship could not be shown due to the small sample size.

Despite all the limitations, the study achieved its main purposes. In this respect, it provides valuable data for future research. At the same time, as an effective adjunct treatment for complex trauma and PTSD and other related diagnoses it has advantages in terms of being adaptable to the online platform, relatively low cost, and having the same effect as gold standard therapies in reducing symptoms.

The high attendance rate of the participants is particularly promising for the development of body-focused alternative therapy methods in trauma therapy.

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ANNEXES

Annex A: Informed Consent Form (In Turkish)

Değerli katılımcı,

Bu çalışma, İstanbul Bilgi Üniversitesi Travma ve Afet Uygulamalı Ruh Sağlığı programına bağlı tez olarak tasarlanmış, 10 Haftalık Çevrimiçi Travmaya - Duyarlı Yoga (TCTSY) Grup protokolünün uygulandığı bir çalışmadır. Uygulanacak olan grup seansları Doç. Dr. Ersin Uygun danışmanlığında, Psikolog Sevcan Uysal tarafından yürütülmektedir.

Araştırma, Türkiye'de TDY'nin etkinliğine yönelik ilk çalışma olma özelliğini taşımakla birlikte, The The Center for Trauma and Embodiment at JRI tarafından desteklenmekte ve David Emerson tarafından süpervize edilmektedir. Grup yoga seansları, haftada bir gün 60 dakika sürecek şekilde, çevrimiçi olarak, JRI tarafından sertifikalandırılmış TDY kolaylaştırıcısı Yelina Tayfur Kabatepe tarafından verilecektir.

Bu araştırma yoganın interoseptif farkındalığı (bedenin içeriden duyumsanması) arttırarak TSSB, depresyon, anksiyete, yeme bozuklukları gibi farklı psikolojik hastalıkların tedavisinde etkili olabileceği hipotezine dayanmaktadır. Uygulama öncesinde ve sonrasında Depresyon Anksiyete Stres Ölçeği (DASS), Karmaşık Travma Envanteri (CTI) ve Çok Boyutlu Bedensel Farkındalık Değerlendirmesi-II

(MAIA) ölçekleri uygulanacaktır. Grup sürecine katıldığınız takdirde, grup oturumlarına vaktinde ve düzenli katılımınız ve ölçekleri doldurmanız beklenmektedir.

Bu araştırma için sizden herhangi bir ücret talep edilmeyecektir. Çalışmanın herhangi bir aşamasında, onayınızı çekme hakkına sahipsiniz.

10 Haftalık süre içerisindeki grup kuralları aşağıda belirtildiği gibidir:

1. Grup oturumları 60 dakika sürecektir.

2. Önemli mazeretler dışında, oturumlara devamlı katılım zorunludur. Üyeler bunun için özen göstermelidirler.

3. Grup içinde konuşulanlar grup içinde kalmalı, kesinlikle grup dışında tartışılmamalıdır.

4. Katılımcıların oturumlar sırasında kamera açma zorunluluğu yoktur.

4. Grup içinde üyeler, içlerinden geldiği gibi, duygu ve düşüncelerini rahatça söylemekte serbest olacaklardır.

5. Grup üyeleri, birbirlerini dikkatle dinlemeye ve anlamaya çabalayacaktır.

6. Grup öncesinde ve grup bitiminde uygulanan ölçme araçlarından elde edilecek sonuçlar grup üyelerine bildirilecektir.

7. İletişim ve sürece dair teknik problemler/ sorular 10 Haftalık süre boyunca WhatsApp grubundan asistan Burcu Karakurt aracılığıyla yürütülecektir.

☐ Yukarıda verilen bilgiler doğrultusunda, bu çalışmaya katılmayı kabul ediyorum.

Annex B: Demographic Information Form

1. Adınız, Soyadınız ___
2. Cinsiyetiniz: ___
3. Yaşadığınız şehir ___
4. Mezun olduğunuz son okul
    - ☐ İlkokul
    - ☐ Ortaokul
    - ☐ Lise
    - ☐ Üniversite
    - ☐ Master
    - ☐ Doktora
    - ☐ Post-doc
5. Medeni durumunuz
    - ☐ Bekar
    - ☐ Evli
    - ☐ Boşanmış
    - ☐ Dul
6. İş durumunuz
    - ☐ Öğrenci
    - ☐ Ev hanımı
    - ☐ Beyaz yaka
    - ☐ Özel sektör
    - ☐ Kamu
    - ☐ Emekli
    - ☐ Şuan çalışmıyor
7. Gelir düzeyiniz
    - ☐ Alt
    - ☐ Orta-alt
    - ☐ Orta

- ☐ Orta-üst
- ☐ Üst

8. Çalışıyorsanız veya öğrenciyseniz son 3 aydaki çalışma şekliniz:
   - ☐ Çevrimiçi
   - ☐ Yüzyüze
   - ☐ Hibrit sistem (Çevrimiçi + yüzyüze)
9. Daha önce Yoga deneyiminiz oldu mu?
   - ☐ Evet
   - ☐ Hayır
10. Daha önce Çevrimiçi Yoga deneyiminiz oldu mu?
    - ☐ Evet
    - ☐ Hayır
11. Daha önce Psikoterapi deneyiminiz oldu mu?
    - ☐ Evet
    - ☐ Hayır

Annex C: Complex Trauma Inventory (CTI)

CTI için Yönergeler

(İlk önce Travmatik Yaşantılar Ölçeği (Şar,2002) ya da buna eş değer travma geçmişi ile ilgili bir ölçek uygulayın.)

Her belirtiyi okuduktan sonra önceden tanımladığınız tüm travmatik deneyimlerin geçen ay içinde sizi nasıl etkilediğini düşünün. Aşağıdaki belirtilerin ne kadar yoğun olduğunu ve geçen ay içinde aşağıdaki belirtileri ne sıklıkla deneyimlediğinizi daire içine alarak belirtin.

	Yoğunluk Belirtileri yaşadığınız zaman, bunlar sizi ne kadar rahatsız ediyor? (Not: Geçtiğimiz ay içinde olmadıysa 0'ı işaretleyin.)					**Sıklık** Bu belirtiler ne sıklıkla sizi rahatsız ediyor?					**Şiddet** Yoğunluk ve Sıklık punlarının ortalaması
Belirtiler	Hiç	Biraz	Az çok	Biraz fazla	Çok fazla	Hiç	Ayda 1-2 kez	Haftada 1-2 kez	Haftada 3-5 kez	Neredeyse her gün	(Yoğunluk+Sıklık)/2
1. Travmatik olay ile ilgili kötü rüyalar ya da kabuslar görmek	0	1	2	3	4	0	1	2	3	4	
2. Olumsuz duyguları en aza indirmek için stresli olayla ilgili konuşmamak ya da düşünmemek	0	1	2	3	4	0	1	2	3	4	
3. Aşırı uyanık olmak ya da tetikte olmak	0	1	2	3	4	0	1	2	3	4	
4. Hassas olmak ya da duygusal olarak kolayca incinmek	0	1	2	3	4	0	1	2	3	4	
5. Yenilmiş ya da değersiz hissetmek	0	1	2	3	4	0	1	2	3	4	
6. Diğer insanlardan uzaklaşmış hissetmek	0	1	2	3	4	0	1	2	3	4	
7. Stresli deneyimi tekrar yaşıyormuş gibi hissetmek ya da davranmak	0	1	2	3	4	0	1	2	3	4	

	Hiç	Biraz	Az çok	Biraz fazla	Çok fazla		Hiç	Ayda 1-2 kez	Haftada 1- 2 kez	Haftada 3-5 kez	Neredeyse her gün	(Yoğunluk+Sıklık)/2
8. Travmatik deneyim hakkında düşünmemeye çalışmak	0	1	2	3	4		0	1	2	3	4	
9. Etraftaki tehlikeleri ya da tehditleri gözetmek zorundaymış gibi hissetmek	0	1	2	3	4		0	1	2	3	4	
10. Olumlu duygular yaşamada zorluk (mutlu hissedememe ya da yakın olduğun insanlara karşı sevgi hissedememe gibi)	0	1	2	3	4		0	1	2	3	4	
11. Kötü olduğunu ya da kendisi ile ilgili bir şeylerin yanlış olduğunu hissetmek	0	1	2	3	4		0	1	2	3	4	
12. Diğer insanlarla ilişkilerini sürdürmekte güçlük çekmek	0	1	2	3	4		0	1	2	3	4	
13. Stresli deneyimi hatırladığında fiziksel tepkiler göstermek (çarpıntı, terleme, nefes almada zorluk gibi)	0	1	2	3	4		0	1	2	3	4	
14. Travmatik deneyimi hatırlatan insanlardan, yerlerden, aktivitelerden uzak durmaya çalışmak	0	1	2	3	4		0	1	2	3	4	
15. Kolayca irkilmek ya da gergin hissetmek	0	1	2	3	4		0	1	2	3	4	

Visit https://psychology.unt.edu/cti for additional resources

	Hiç	Biraz	Az çok	Biraz fazla	Çok fazla		Hiç	Ayda 1-2 kez	Haftada 1-2 kez	Haftada 3-5 kez	Neredeyse her gün	(Yoğunluk+Sıklık)/2
16. Rüyada yaşıyormuş gibi gerçek dışı hissetmek	0	1	2	3	4		0	1	2	3	4	
17. Stresli olay için ya da stresli olayın sonuçları için kendini suçlamak	0	1	2	3	4		0	1	2	3	4	
18. Diğer insanlardan soyutlanmış hissetmek	0	1	2	3	4		0	1	2	3	4	
19. Öfke patlamaları ya da asabi davranışlar göstermek	0	1	2	3	4		0	1	2	3	4	
20. Kasten kendine zarar vermeye çalışmak (tırmalamak, ısırmak, kendini kesmek, yakmak gibi) ya da kendini tehlikeli durumlara sokmak	0	1	2	3	4		0	1	2	3	4	

Visit https://psychology.unt.edu/cti for additional resources

Annex D: Depression Anxiety Stress Scale – 21 (DASS-21)

Lütfen aşağıdaki soruları son 1 haftadaki durumunuza göre yanıtlayınız.

EK6: Depresyon Anksiyete Stres Ölçeği (DASS)

Son 1 Haftadaki Durumunuz	Hiçbir zaman	Bazen/ arasıra	Oldukça sık	Her zaman
Ağzımda kuruluk olduğunu fark ettim	0	1	2	3
Hiç olumlu duygu yaşayamadığımı fark ettim	0	1	2	3
Soluk almada zorluk çektim (*örneğin fizik egzersiz yapmadığım halde aşırı hızlı nefes alma, nefessiz kalma gibi)*	0	1	2	3
Olaylara aşırı tepki vermeye meyilliyim	0	1	2	3
Kendimi rahatlamakta zorlandım	0	1	2	3
Hiçbir beklentimin olmadığı hissine kapıldım	0	1	2	3
Çok sinirlendiğimi hissettim	0	1	2	3
Birey olarak değersiz olduğumu hissettim	0	1	2	3
Alıngan olduğumu hissettim	0	1	2	3
Geçerli bir neden olmadığı halde korktuğumu hissettim	0	1	2	3
Hayatın değersiz olduğunu hissettim	0	1	2	3
Gevşeyip rahatlamakta zorluk çektim	0	1	2	3
Fiziki egzersiz söz konusu olmadığı halde kalp atışlarımı hissettim *(kalp atışlarımın hızlandığını veya düzensizleştiğini hissettim)*	0	1	2	3
Kendimi perişan ve hüzünlü hissettim	0	1	2	3
Panik haline yakın olduğumu hissettim	0	1	2	3
Hiçbir şey bende heyecan uyandırmıyordu	0	1	2	3
Beni yaptığım işten alıkoyan şeylere dayanamıyordum	0	1	2	3
Gerildiğimi hissettim	0	1	2	3
Panikleyip kendimi aptal durumuna düşüreceğim kaygısı yaşadım.	0	1	2	3
Vücudumda *(örneğin ellerimde)* titremeler oldu.	0	1	2	3
Bir iş yapmak için gerekli olan ilk adımı atmada zorlandım	0	1	2	3

Annex E: Multidimensional Assessment of Interoceptive Awareness (MAIA-II)

Aşağıda belirli ifadeler göreceksiniz. Lütfen ifadelerin günlük hayatınıza ne sıklıkla uyduğunu belirtiniz. Her bir sırada bir sayıyı yuvalak içine alınız.

- ☐ 0 (hiçbir zaman)
- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5 (her zaman)

1. Gergin olduğum zaman, gerginliğin bedenimin neresinde olduğunu fark ederim.

2. Bedenimin içinde rahat hissetmediğimde, bunu fark ederim.

3. Bedenimin hangi bölgesinde rahat hissettiğimi fark ederim.

4. Nefes alışverişimdeki değişikleri fark ederim, örneğin nefes alışverişimin yavaşlayıp veya hızlandığını.

5. Bedenimdeki fiziksel gerginliği veya rahatsızlığı daha fazla şiddetlenene

6. Rahatsızlık hislerinden uzaklaşmak için dikkatimi dağıtırım.

7. Acı veya rahatsızlık hissettiğimde üstesinden gelmeye çalışırım.

8. Acı hissini yok saymaya çalışırım.

9. Rahatsızlık hislerini başka şeylere odaklanarak uzaklaştırmaya çalışırım.

10. Keyif vermeyen beden duyumları hissettiğimde, kendimi başka bir şey ile meşgul ederim, böylelikle onları hissetmek zorunda kalmam.

11. Fiziksel acı hissettiğimde mutsuz olurum.

12. Rahatsızlık hissettiğimde bir şeylerin yanlış olduğunu düşünerek endişelenmeye başlarım.

13. Keyif vermeyen bir beden duyumunu endişelenmeden fark edebilirim.

14. Acı ve rahatsızlık hissettiğimde, endişelenmem ve sakin kalabilirim.

15. Rahatsızlık veya acı içinde olduğumda, bunları aklımdan çıkaramam.

16. Etrafımda olup bitenlere dikkatimi dağıtmadan nefesime odaklanabilirim.

17. Etrafımda pek çok şey olup bitiyorken bile içsel bedensel duyumlarıma olan farkındalığımı sürdürebilirim.

18. Biriyle sohbet ederken, duruşuma dikkat edebilirim.

19. Dikkatim dağıldığında, farkındalığımı bedenime döndürebilirim.

20. Dikkatimi düşüncelerimden, bedenimi hissetmeye yöneltebilirim.

21. Bir tarafım ağrılı veya rahatsız olsa bile tüm beden farkındalığımı sürdürebilirim.

22. Bedenimin tümüne bilinçli bir şekilde odaklanabilirim.

23. Kızgın olduğumda bedenimin nasıl değiştiğini fark ederim.

24. Hayatımda bir şey yolunda olmadığında, bunu bedenimde hissederim.

25. Huzurlu bir deneyimden sonra bedenimin daha farklı hissettirdiğini fark ederim.

26. Rahat hissettiğimde, nefesimin daha kolaylaştığını fark ederim.

27. Mutlu veya neşeli hissettiğimde bedenimin nasıl değiştiğini fark ederim.

28. Her şeyin üst üste geldiğini hissettiğimde, içimde huzurlu bir yer bulabilirim.

29. Farkındalığımı bedenime yönlendirdiğimde, sakinlik hissederim.

30. Nefesimi, gerginliği azaltmak için kullanırım.

31. Düşüncelerim arasında kaybolduğumda, nefesime ve bedenime odaklanarak zihnimi sakinleştirebilirim.

32. Bedenimi, duygusal durumumla ilgili bilgi almak için dinlerim.

33. Üzgün olduğumda, bedenimin nasıl hissettirdiğini keşfetmek için zaman ayırırım.

34. Bedenimi, ne yapmam gerektiği konusunda beni bilgilendirmesi için dinlerim.

35. Bedenimin içinde evdeyim.

36. Bedenimin güvenli bir alan olduğunu hissediyorum.

37. Beden duyumlarıma güvenirim.

Annex F: Result Of Evaluation By The Ethics Committee

ETHICS BOARD APPROVAL

Ethics Board Approval is available in the printed version of this dissertation.