Mindfulness and Technology: Evaluating an Online Mindfulness Intervention for Symptoms Related to Sexual Assault

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MINDFULNESS AND TECHNOLOGY: EVALUATING AN ONLINE MINDFULNESS INTERVENTION FOR
SYMPTOMS RELATED TO SEXUAL ASSAULT

by

Erica Catherine Johnson

A dissertation submitted to the Graduate College
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
Psychology
Western Michigan University
August 2020

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MINDFULNESS AND TECHNOLOGY: EVALUATING AN ONLINE MINDFULNESS INTERVENTION FOR SYMPTOMS RELATED TO SEXUAL ASSAULT

Erica Catherine Johnson, Ph.D.
Western Michigan University, 2020

Sexual assault has been found to increase the risk of distressing psychological symptoms including PTSD, depression, somatization, drug and substance use, lower quality of life and experiential avoidance. As such, interventions for reducing the distress and negative impacts of sexual assault are of importance. Mindfulness is of particular interest as it addresses one of the prominent factors known to maintain psychological distress after trauma, experiential avoidance (Polusny et al., 2004; Merwin et al., 2009). Furthermore, an online mindfulness-based intervention can increase the accessibility and reduce the barriers to treatment. A within subjects repeated measures open clinical trial design was used to investigate the effectiveness of an online mindfulness based intervention for trauma related symptoms among college students. Specifically, the impact an online mindfulness-based intervention has on mindfulness, experiential avoidance, and PTSD using self-report measures was evaluated. In order to participate, individuals needed to be 18 years or older, endorse a history of unwanted sexual experiences and endorse moderate PTSD symptoms (scoring at least a 21 or over on the PCL-5). A sample of 10 students currently enrolled at a Midwestern university participated. Participants completed an eight-week online mindfulness based intervention. In addition, participants completed assessments evaluating psychological symptoms throughout the duration of the study.
Results of the current study support the use of an online mindfulness-based intervention in reducing PTSD symptoms, experiential avoidance, general psychological distress, and in increasing mindfulness skills among college students. The current study did not support the use of an online mindfulness-based intervention in improving quality of life or in reducing depressive and somatic symptoms.
ACKNOWLEDGMENTS

I would not have successfully completed this project without the tremendous support and encouragement I have received. First, I would like to thank my advisor, Dr. Amy Naugle. I greatly appreciate the guidance you have provided not only in completing this project but also as a developing psychologist. To my committee members, Drs. Scott Gaynor, Amy Damashek, and Eric Sauer, thank you for serving on my committee and providing helpful suggestions. I would also like to thank my fellow lab members; you have provided support throughout this process. I would like to thank my family, especially my parents, Dr. Rod and Cathy Johnson. I would not be where I am today without your support, you truly made it possible for me to pursue my dreams. Finally, I would like to thank my partner, Nathan Damratowski. Thank you for always being by my side even at a far. You have always believed in me and have provided me with support and encouragement throughout this process.

Erica Catherine Johnson
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INTRODUCTION

Sexual Violence

Sexual violence, including sexual assault and victimization is a frequent occurrence that results in varying adverse effects. Sexual violence refers to any sexual experience that occurs without consent (Centers for Disease Control and Prevention [CDC], 2014). This includes, “forced or alcohol/ drug facilitated penetration of a victim; forced or alcohol/drug facilitated incidents in which the victim was made to penetrate a perpetrator or someone else; non-physically pressured unwanted penetration; intentional sexual touching; or non-contact acts of a sexual nature (CDC, 2014).” In the United States, nearly 1 in 2 women (44.6%) and 1 in 5 men (22.2%) experience some form of sexual violence in their lifetime (NISVS, 2010). About 27.2% of women have experienced some form of unwanted sexual contact in their lifetime and about 1 in 8 women (13%) report experiencing sexual coercion. Another form of sexual violence involves sexual assault (SA), which is defined by Rape, Abuse, Incest National Network (RAINN) as involving attempted rape, fondling or unwanted sexual touching, forced sexual acts (including oral sex or penetration of the perpetrator), and penetration of the victim or rape (RAINN, 2018). SA is a common occurrence, impacting the general population as well as students in college and universities.

Studies regarding college samples have found that about one in five women experience attempted or completed SA (Krebs, et al., 2009). About 6% of college men report experiencing attempted or completed SA (Krebs, et al., 2007). Further, a more
recent study involving nine colleges, found that the prevalence of completed SAs among undergraduate women was 10.3%, with 4.1% experiencing completed rape (Krebs, et al., 2016). Among men, the rate was lower, in which 3.1% reported completed SA and 0.8% reported rape (Krebs, et al., 2016). The majority of sexual assault cases in college samples occur when the victim is incapacitated due to the use of a substance (i.e.; drugs or alcohol) and is perpetrated by a known assailant rather than a stranger (Krebs, 2007). Freshmen and sophomores are at a greater risk for victimization than juniors and seniors (Krebs, 2007).

While the above rates are high, the known rates of SA among college samples may not accurately reflect the extent of SA occurrences. In fact, in an epidemiological study of college women, only about 11.5% reported their assault; this rate was even lower in cases in which alcohol or drugs were involved (2.7%; Wolitzky-Taylor, 2011). The low report rates on college campuses are due to multiple barriers. The most commonly endorsed reasons for not reporting a sexual assault include feelings of shame, guilt, embarrassment, concerns regarding confidentiality and fear of not being believed (Sable, Danis, Mauzy & Gallagher, 2006). Therefore, the current estimates of SA within this population are likely an underestimation (Sable, Danis, Mauzy & Gallagher, 2006). Not only is sexual assault a too frequent occurrence, the impact is extensive.

**Consequences of Sexual Assault**

**Physical and Mental Health**

SA is a particularly deleterious traumatic experience and has been found to have a negative impact on mental and physical health. Men and women with a history of sexual assault have an increase in reported health problems, poorer perception of overall health,
higher rates of medical service utilization, increased rates of medical diagnoses, and increased mortality (Schnurr & Green, 2004; Street, Stafford, Mahan, & Hendricks, 2008). Findings also indicate that individuals with sexual assault histories have more frequent as well as severe somatic symptom complaints, greater functional impairments, and sexual difficulties (Golding, 1994; Kimerling & Calhoun, 1994). Furthermore, individuals who have experienced SA have a two to three fold increase in risk for future sexual victimization (Messman-Moore, Ward, Zerubavel, 2013; Coxell & King, 2010). When compared to other forms of trauma, SA is associated with greater posttraumatic stress disorder symptom severity (Kelley, Weathers, McDevitt-Murphy, Eakin, & Flood (2009). In fact, SA increases the risk of all forms of psychopathology (Dworkin, Menon, Bystrynski, & Allen, 2017).

Posttraumatic Stress Disorder (PTSD) is identified as being one of the more common psychological impacts among individuals who have experienced SA (Campbell, 2009). In fact, an estimated 17-65% of individuals with a history of SA develop PTSD. PTSD may develop following exposure to a life-threatening event including actual or threatened death, serious injury, or sexual violence (APA; American Psychiatric Association, 2013). With regards to the most updated Diagnostic and Statistical Manual (DSM-5), PTSD has four symptom clusters: intrusion, avoidance, negative alterations in cognitions and mood, and hyper-arousal. Intrusive symptoms include unwanted distressing memories of the traumatic event, nightmares with content related to the trauma, flashbacks, and intense distress when exposed to stimuli that remind one of the traumatic event (APA, 2013). Avoidant symptoms include avoiding memories, thoughts, reminders, and other stimuli that remind one or are associated with the traumatic event (APA, 2013). Negative alterations in cognitions and mood include difficulty in remembering aspects of the event, exaggerated negative believes, distorted cognitions, negative
emotional states, and withdrawal from others (APA, 2013). The last symptom cluster, hyperarousal, includes having irritable behavior and angry outbursts, self-destructive behaviors, hypervigilance, exaggerated startle response, a difficulty in concentration, and sleep problems (APA, 2013).

Research has illustrated that those who do not meet the diagnostic criteria of PTSD, but experience posttraumatic stress symptoms still experience clinically relevant distress (Zlotnick et al., 2002). Individuals with subthreshold PTSD symptoms have been found to experience social and work morbidity similar to that associated with those who meet diagnostic criteria for PTSD (Zlotnick, et al., 2002). In addition, those with posttraumatic stress symptoms have high rates of comorbidity with other psychological diagnoses and psychosocial impairment (Pietrzak et al., 2011).

In addition to PTSD symptoms, individuals with SA histories also have an increased risk of developing other mental health conditions (Campbell, Dworkin & Cabral, 2009; Krahe & Berger, 2017). An estimated 13-51% of individuals develop major depressive disorder (MDD), 12-40% develop symptoms of anxiety, and 23-44% experience suicidal ideation (Campbell, 2009). Individuals with SA histories also have an increase risk in developing a substance use disorder (SUD). In fact, 13-49% of survivors develop alcohol use disorders and 28-61% develop a drug use disorder (Campbell, 2009). Research has found that strong negative affect and difficulty in handling distress may increase the risk for developing a SUD (Daughters, Lejuez, Kahler, Strong & Brown, 2005). Furthermore, evidence links negative emotions in predicting substance abuse (Sinha, 2009). Therefore, the difficulty in handling distress increases the risk for developing a SUD.
**Experiential Avoidance**

Experiential avoidance (EA) is a commonly found impact of SA and interpersonal victimization (Polusny et al., 2004; Merwin et al., 2009) and may be a functionally relevant factor to understanding the outcomes described above. EA is similar to one of the core diagnostic features of PTSD, engaging in behaviors to avoid thoughts and feelings associated with the traumatic experience (APA, 2013). There is increasing evidence that EA may explain the relationship between SA and the increased risk in developing a multitude of mental health conditions (Merwin et al., 2009; Polusny et al., 2004). In fact, EA is a hypothesized transdiagnostic factor associated with many mental health conditions (Hayes, Wilson, Gifford, Follett & Strosahl, 1996). EA, as defined by Hayes et al (1996) is:

"The phenomenon that occurs when a person is unwilling to remain in contact with particular private experiences (e.g.; bodily sensations, emotions, thoughts, memories, behavioral predispositions) and takes steps to alter the form or frequency of these events and the contexts that occasion them (p. 1154)."

Given the high rate of distress individuals experience after SA, EA is a mechanism of interest that has been found to influence the development as well as maintenance of psychological distress (Hayes et al., 1996).

EA involves an individual engaging in certain behaviors to get rid of unwanted internal experiences, including thoughts and emotions. When evaluating the functional classes of behavior, EA can manifest in a variety of different behaviors that may serve the same function. These include dissociation, substance abuse, self-harm, and risky sexual behaviors, which are commonly found among those with a history of interpersonal trauma (Polusny & Follette, 1995). The short-term impact of EA is an immediate reduction in
unwanted internal experiences, which in turn reduces one’s distress. However, the long-term consequences lead to an increase in EA behaviors, an increase in psychological distress, and a continuation of experiencing fear when presented with traumatic stimuli (memories and emotions (Kumpula, Orcutt, Bardeen, & Varkovitzky, 2011).

Evidence indicates that engaging in EA can actually exacerbate the very internal experiences that individuals are attempting to avoid (Hayes et al., 1996; Merwin et al., 2009). Overtime, EA has been found to increase unwanted trauma related thoughts and emotions leading to an increase in distress (Batten, Orsillo, Walser, 2005). Literature evaluating thought suppression and control illustrate a counterproductive impact, in which attempts to avoid certain thoughts actually create or increase those very thoughts (Purdon, 1999; Silva, et al, 2018). This form of avoidant coping may inadvertently increase the re-experiencing and intrusive thought symptoms associated with PTSD and has been found to increase the severity of PTSD symptoms (Boden, Bonn-Miller, Vujanovic, & Drescher, 2012).

EA can be a helpful coping mechanism in certain contexts, such as in situations that are extremely distressing and short lived (Linehan, 2013). EA becomes problematic when used repeatedly under distress and when it interferes with living a valued life (Linehan, 2013; Follette, Palm & Rasmussen Hall, 2011). EA is hypothesized to lead to a narrowing of behavioral repertoires and therefore the inability to be present in the current moment (Hayes et al., 2006). EA has been associated with PTSD symptom severity; in fact, EA is more predictive of PTSD symptom severity than the severity of the traumatic experience (Merwin et al, 2009; Plumb et al., 2004; Polusny et al., 2004). EA can also lead to an increase in psychological inflexibility (Palm & Follette, 2011).
Psychological flexibility is defined as the ability to change or persist in behaviors that serve one’s values (Hayes, 2011). There is evidence linking cognitive inflexibility and PTSD symptomatology as well as general psychological distress (Palm & Follette, 2011). As discussed by Hayes (2006) as cognitive flexibility decreases, individuals may develop more rigid rules about the need to avoid or control unwanted experiences. Palm and Follette found that EA mediated the relationship between cognitive inflexibility and psychological distress. Evidence suggests that EA can become an unhealthy coping mechanism for individuals who have a history of traumatic experiences, leading to an increase in psychological inflexibility and psychological distress. Therefore, experiential avoidance is an important factor to target in treatment.

Current Treatments

Trauma-Focused Cognitive-Behavioral Treatments

Given the high rate of sexual assault among college students and the known adverse effects of SA, research evaluating interventions aimed at reducing psychological distress is necessary. Currently, there are a limited number of empirically supported treatments for PTSD; however, Trauma-Focused Cognitive Behavioral Therapies are the treatments that have the most empirical support. The most commonly implemented and researched Trauma-Focused Cognitive Behavioral Therapies include Cognitive Processing Therapy (CPT) and Prolonged Exposure (PE; United States, 2010). Both of these treatments were originally developed for women who had experienced sexual assault and have now been adapted and researched in application to a wide range of traumatic experiences (United States, 2010). CPT and PE have been found to significantly reduce PTSD and depressive
symptomatology when compared to a waitlist control condition (Resick, Nishith, & Griffin, 2003; Resick et al., 2002; Schnurr, et al., 2007).

Though these treatments have been found to significantly reduce symptoms associated with trauma, a substantial percentage of individuals do not improve with treatment (Kilpatrick, Amstadter, Resnick & Ruggiero, 2007). On average about 30-50% of individuals who receive CPT or PE do not respond or do not reach clinically significant reductions in PTSD symptoms (Resick, Nishith, Weaver, Astin & Feuer, 2002; Schnurr et al., 2007; Steenkamp, Litz, & Hoge, 2015; Suris, Link-Malcolm, Chard, Ahn, & North, 2013). In addition, drop out rates for these treatments are problematic. Drop out rates for PE and CPT are high, with about 30-38% of individuals dropping out of treatment prior to completion or before clinically recommended (Suris, et al., 2013; Schnurr et al., 2007).

An additional factor interfering with one seeking and completing either CPT or PE is the time commitment. CPT and PE consist of weekly or twice weekly 60-90 minute sessions for a total of 12 sessions. Therefore, both of these treatments are time consuming and add to the cost and difficulty for individuals to complete the treatment packages. In addition, there are unique barriers for potential clients seeking treatment for distress related to a trauma. CPT and PE focus on addressing and discussing the traumatic experiences directly, giving some individuals pause before engaging in treatment.

A potential reason some individuals may be hesitant to engage in Trauma-Focused Cognitive Behavioral Therapies is how these treatments specifically identify and target avoidance. Exposure to avoided stimuli that are associated with the trauma is an essential feature of PE. CPT also targets avoidance, urging clients to recognize avoidant behaviors when addressing memories of the trauma and to come into contact with thoughts and
beliefs about the trauma. However, the current mechanisms used to approach experiential avoidance is limited with CPT and PE. These treatments address experiential avoidance in a similar more direct way including challenging beliefs or inviting memories and uncomfortable emotions. This approach may be anxiety producing to many sexual assault survivors. Many sexual assault survivors have an unwillingness to experience certain emotions. Potentially the lack of coping skills and the unwillingness to contact certain emotions and thoughts interfere with treatment engagement for PE and CPT. An intervention that specifically targets EA as well as provides skill training for coping with distressing thoughts and feelings may be beneficial for many survivors of SA.

Given the current limitations of the empirically supported treatments for PTSD and trauma related conditions, further research is needed to identify alternative, additional, or supplemental treatment approaches. One such intervention that may help reduce trauma related psychological distress are mindfulness-base interventions.

**Mindfulness Based Interventions**

Mindfulness is a difficult concept to operationally define; as such there are many definitions of mindfulness available in the literature. One of the more commonly used definitions of mindfulness is provided by Kabat-Zinn. He defines mindfulness as “the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment (Kabat-Zinn, 2003, p. 145).” Historically, the origination of mindfulness is from the teachings of Buddhist meditation (Kabat-Zinn, 2003). This practice has been incorporated into empirically supported psychological treatments; specifically, mindfulness skills are a key component in Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012) as well as
Dialectical Behavioral Therapy (DBT; Linehan, 2013). Mindfulness as a stand-alone intervention has been found to have promising effects in improving mental and physical health (Baer, 2003), and various forms of mindfulness interventions have been gaining traction in the field of psychology. The most widely researched and supported mindfulness-based treatments are Mindfulness Based Stress Reduction (MBSR; Kabat-Zinn, 2013) and Mindfulness-based Cognitive Therapy (MCBT; Segal, Williams & Teasdale, 2013).

Mindfulness-based interventions may be beneficial for individuals with a history of trauma for a number of reasons. Mindfulness interventions aim to reduce avoidance (Batten, Orsillo & Walser, 2005), a core diagnostic feature on PTSD in which individuals avoid trauma-related thoughts and feelings (APA, 2013). Furthermore, evidence suggests that EA may be an important factor that influences the development and maintenance of psychological distress in those with a history of trauma (Orsillo & Batten, 2005). Mindfulness is hypothesized to directly target EA by encouraging individuals to notice whatever is occurring in the present moment (Bear, 2006). Counter to avoidance, mindfulness aims at increasing acceptance of all internal experiences, including distressing unwanted cognitions and emotions. Therefore, mindfulness encourages participants to be open and accepting of internal processes such as feelings, thoughts, and sensations that they may normally aim to avoid. This process exposes individuals to the thoughts and sensations that are normally avoided.

Second, mindfulness is hypothesized to improve coping (Bear, 2006). As mentioned, individuals with trauma histories, engage in various EA mechanisms, which are not only ineffective but can also be problematic and harmful. Some avoidant coping
mechanisms found among those with a history of interpersonal trauma include alcohol and other substance use, self-harm, and other potentially problematic behaviors (Campbell et al., 2009; Ullman et al., 2016). Mindfulness is aimed at providing an alternative way to experience and relate to internal processes without resorting to potentially problematic coping mechanisms. Mindfulness is hypothesized to increase relaxation and improved self-awareness, which may improve one’s ability to cope with stressful experiences (Bear, 2006; Chiesa & Serretti, 2009; Follette et al., 2006).

Third, mindfulness is hypothesized to increase cognitive flexibility and reduce cognitive reactivity (Follette et al., 2006; Bear, 2006; Kuyken, et al., 2010). As individuals practice just noticing sensations and thoughts, this allows them to distance themselves from their thoughts (Teasdale, 1999). Individuals are instructed to notice thoughts as sensations, instead of as facts (Bear, 2006; Teasdale, 1999). Mindfulness encourages one to take a non-judgmental and acceptance stance of being aware of thoughts, which may increase cognitive flexibility (Teasdale, 1999; Thompson & Waltz, 2010).

**Mindfulness-Based Stress Reduction.** Mindfulness Based Stress Reduction (MBSR) is a mindfulness-based intervention that has an increasing amount of empirical support for the utility in aiding a wide range of psychological and physical health conditions (Kabat-Zinn, 2013). MBSR was established in 1979 to reduce stress and improve stress related conditions (Brantly, 2005). The mindfulness practices that are introduced in MBSR are based on the traditional Buddhist meditation practices (Brantly, 2005). There are three foundational principles on which MBSR is based. First, “there is more right with you than wrong with you” (Kabat-Zinn, 2013, p. xlix). This illustrates that all individuals have the capacity for compassion and in cultivating an accepting awareness (Brantly, 2005). The
second principle is being, not doing (Kabat-Zinn, 2013). Instead of engaging in behaviors of constantly doing, mindfulness is the practice of non-doing (Kabat-Zinn, 2013). The last core principle is adapting a way of not knowing, illustrating adapting an open awareness to the present moment and not engage in judgments and thoughts about one’s experience (Brantly, 2005; Kabat-Zinn, 2013).

There are also important attitudinal foundations to mindfulness practice that are taught in the MBSR program. Kabat-Zinn (2013) identifies and describes these seven core attributes, which include non-judging, patience, beginners mind, trust, non-striving, acceptance, and letting go. Kabat-Zinn describes non-judging as the cultivation of the moment-to-moment awareness while not getting pulled into the judgments, thoughts and opinions of these experiences. He identifies patience as involving the acceptance of things unfolding in their own time. Beginner’s mind is identified by Kabat-Zinn as the willingness to see everything as if you were seeing it for the first time. Trust is the development of basic trust in yourself and your experiences, honoring your feelings and developing an understanding of oneself. He identifies that non-striving is the practice of non-doing, in which one is not trying but instead just practicing being. Kabat-Zinn defines acceptance as seeing things as they are in the present moment; not resisting what is fact, which aids in making positive changes. The last attitudinal foundation is letting go, which is described as cultivating an attitude of non-attachment to our inner-experience, not trying to hold onto or rid of inner experiences (Kabat-Zinn, 2013).

MBSR is an eight-week program with one session a week. Each session lasts about two and a half to three hours (Lehrhaupt & Meibert, 2017). In addition to the eight sessions, there is an all-day retreat that takes place between the sixth and seventh session.
As discussed by Lehrhaupt and Meibert (2017), each mindfulness session includes formal mindfulness exercises including a body scan, mindful yoga, sitting meditation, and walking meditation traditionally in a group format. After the exercises, individuals can share their experiences. In addition, psychoeducation is provided during each session covering the meaning of mindfulness, the origin and impact of stress, and mindful self-care (Lehrhaupt & Meibert, 2017). Individuals are asked to practice the mindfulness exercises each day at home and are given suggestions on how to integrate mindfulness into their daily lives, with a distinction of informal and formal mindfulness practice. Formal mindfulness practice is where one sets aside time to practicing one or more of the mindfulness exercises introduced during the sessions whereas informal practice involves bringing mindfulness into daily life, being present for different everyday events (i.e.; washing dishes, taking a shower, eating, and brushing one’s teeth; Brantly, 2005).

Mindfulness-based Cognitive Therapy. Mindfulness-based Cognitive Therapy (MBCT; Segal et al., 2012) is adapted from MBSR with incorporated cognitive components (Bear, 2006). The cognitive elements within MBCT aim to distance or detach individuals from their cognitions (Bear, 2006). The focus is placed on changing one’s relationship to their thoughts, rather than changing and challenging thoughts, which is the focus in traditional Cognitive Behavioral Therapies (Teasdale et al., 1999). MBCT was originally developed to help in preventing the relapse of major depressive disorder episodes (Bear, 2006). Similar to MBSR, MBCT is a manualized treatment program that consists of eight weekly sessions with an all day mindfulness session. Similar to MBSR, individuals are taught to take a nonjudgmental attitude towards thoughts and emotions.
Effectiveness of Mindfulness-Based Treatments

Research evaluating mindfulness-based interventions has provided evidence that mindfulness-based interventions aid in skin clearing among individuals with moderate to severe psoriasis (Kabat-Zinn, Wheeler, Light, Skillings, 1998); reducing stress (Vieten & Astin, 2008); chronic pain (Kabat-Zinn, 1982; Kabat-Zinn, Lipworth, & Burney, 1985); and increased sleep efficiency and increased total sleep time for individuals with sleep disturbance (Gong et al., 2016). Furthermore, there is evidence that mindfulness leads to alterations in brain (Farb, et al., 2007; Holzel, et al., 2011; Holzel, et al., 2010) and immune functioning (Rosen et al., 2013).

A systematic review evaluating the efficacy of overall mindfulness-based interventions for mental health conditions illustrates the promising effects of mindfulness. The Department of Veterans Affairs (2014) conducted a systematic review of literature evaluating mindfulness interventions including MBSR, MBCT, and general mindfulness meditation, or interventions that include mindfulness. This review found positive effects for mindfulness-based interventions for depression, somatization, mental illness, distress related to cancer, psychosis, general anxiety, pain, and chronic illness. However, the systematic review found unclear evidence regarding the effectiveness of mindfulness interventions for substance use, stress, PTSD, Multiple Sclerosis and more.

When compared to other interventions for PTSD, such as CPT and PE, the literature evaluating the efficacy of mindfulness interventions for individuals with trauma related distress is not comprehensive. Currently, there is a growing body of evidence indicating the benefits of mindfulness for trauma related distress.
Effectiveness of Mindfulness Interventions for PTSD. The RAND corporation (Hilton et al., 2017) conducted a systematic review as well as a meta-analysis of randomized controlled trails (RCT) evaluating the use of mindfulness for those with PTSD. The systematic review illustrates that there is evidence to support the use of mindfulness interventions. Evidence has found an improvement in PTSD and depressive symptoms for individuals who undergo mindfulness training compared to a control group. Overall, the systematic review did not find statistically significant effects for quality of life nor anxiety (Hilton et al., 2017). The authors point out that the current evidence is limited regarding the efficacy of mindfulness on PTSD and trauma related conditions, calling for the need of additional research.

The current evidence evaluating mindfulness based-interventions for Veterans with PTSD illustrate that those who undergo mindfulness training experience a significant reduction in PTSD symptoms (Bormann Thorp, Wetherrell, Golshan & Lang, 2013; Heffner, Creap & Kemp, 2016; Hicks & Centofanti, 2017; Kang et al., 2018; Kearney et al., 2013; Kearney et al., 2012; King et al., 2013; Polusny et al., 2015; Seppal et al., 2014), depressive symptoms (Bormann et al., 2013; Kang et al., 2018; Kearney et al., 2018), somatic symptoms (Kang et al., 2018; Polusny et al., 2015), experiential avoidance (Kang et al., 2018; Kearney et al., 2012; Polusny et al., 2015), and alcohol consumption (Hicks et al., 2017). In addition, findings support that those who undergo mindfulness training experience an increase in quality of life (Kang et al., 2018; Kearney et al., 2012; Polusny et al., 2015), self-compassion (Kearney et al., 2013), and mindfulness skills (Heffner et al., 2016; Kang et al., 2018; Polusny et al., 2015).
Effectiveness of Mindfulness Interventions for Interpersonal Trauma: Evidence evaluating mindfulness interventions specifically for those who have PTSD from interpersonal trauma, such as sexual assault is limited. Kimbrough, Magyari, Langenberg, Chesney, and Berman (2010) evaluated the efficacy of a MBSR program for adult survivors of childhood sexual assault and abuse. The authors found support for the use of a mindfulness intervention for this population. Individuals who participated in the MBSR program experienced a statistically significant reduction in depressive symptoms, general anxiety, and PTSD symptoms. In addition, the authors found a statistically significant increase in individual’s mindfulness skills. Caldwell and Shaver (2015) also evaluated the use of a mindfulness-based intervention for women who experienced child maltreatment, including child sexual abuse. The authors found that when compared to a waitlist control group, those who received the mindfulness intervention experienced a reduction in rumination, emotion suppression and an increase in emotion regulation.

Kelly and Garland (2016) conducted a RCT of a MBSR program that was slightly modified for interpersonal trauma. Women with a history of interpersonal trauma were randomly assigned to a waitlist control condition or MBSR. The authors found a significant reduction from pre-to post-intervention scores on PTSD and depressive symptoms for those who underwent the mindfulness intervention. Furthermore, the number of minutes of mindfulness practiced each week was associated with greater reductions in PTSD symptoms. However the number of minutes in which one practiced mindfulness was not associated with a greater reduction in depressive symptoms.

Gallegos, Lytle, Moynihan and Talbot (2015) investigated the effects of a MBSR program for women with histories of interpersonal trauma. The authors investigated not
only psychological symptoms but also inflammatory biomarkers. The authors found that those who participated in the MBSR program experienced an increase in mindfulness skills as well as a decrease in perceived stress, depression, anxiety and PTSD symptoms. In addition, the authors found that the number of sessions attended was associated with a significant decrease in an inflammatory biomarker, cytokine IL-6.

**Barriers to Mindfulness Based Interventions**

The existing studies illustrate the promising effects that a mindfulness-based intervention has for individuals with a history of sexual assault or other interpersonal trauma. However, there are barriers and limitations regarding mindfulness-based interventions. Many mindfulness-based interventions are time-intensive, consisting of eight two and a half-hour sessions occurring once a week. In addition, MBSR has an all day, six to seven hour mindfulness training retreat. The time commitment can make mindfulness interventions difficult for some populations who may benefit. In fact, one study utilizing MBSR inquired why potential participants declined to participate and found that 45% of potential participants declined to participate due to the time requirement (Minor, Carlson, Mackenzie, Zernicke, & Jones, 2006). This compounds the already low treatment utilization among those with PTSD. Many individuals with PTSD do not seek mental health treatment (Hoge et al, 2004). Among those who do seek mental health treatment for PTSD, many drop out of treatment (Chard, Schumm, Owens & Cottingham, 2010; Garcia, Finley, Lorber, & Jakupcak, 2011; Schottenbauer, Arnkoff, Tendick & Gray, 2008).
**Brief Mindfulness Interventions**

There is a lack of literature evaluating the dose requirements for mindfulness interventions to have an impact. However, literature has illustrated the impact that even a brief mindfulness intervention can have. A single eight-minute mindfulness practice after a mood induction task is associated with significantly less negative mood (Broderick, 2005). Niles and colleagues (2012) found that an eight-week mindfulness intervention using Telehealth, where participants engaged in mindfulness exercises on average 20-50 minutes a week was related to a significant reduction in PTSD symptoms.

Some of the barriers to seeking and continuing mental health treatment include time commitment, travel expenses, lack of availability or access to effective treatments, and stigma (Gulliver, Griffiths & Christensen, 2010). Given the barriers to individuals obtaining mental health treatment for PTSD, computerized or online formats of mindfulness training may increase treatment adherence, reduce cost, and increase access to treatment. Web-based interventions may specifically have a broad reach among college students as the majority of this population (90-97%) report having daily access to the Internet (Fortson, Scotti, Chen, Malone, & Del Ben, 2007). In addition, young people aged 14-25 report that online interventions are less stigmatizing than in-person or over the phone options (Kauer, Mangan, & Sanci, 2014).

**Online Mindfulness-Based Interventions**

There is evidence to suggest that online or computerized formats of various interventions aid in reducing distress among those with interpersonal trauma (Hirai & Glum, 2005; Littleton, Buck, Rosman & Grills-Taquechel, 2012; Nguyen-Feng et al., 2015).
Currently, there are a limited number of studies evaluating the efficacy of computerized mindfulness-based interventions; however, from the limited research available, there is support illustrating the positive impacts of a computerized mindfulness intervention.

Krolikowski (2013) reviewed literature regarding internet-based mindfulness interventions. Within this review, the author found that internet-based mindfulness interventions reduced suffering among those who experience chronic pain, improved individual’s quality of life, reduce anxiety related to Irritable Bowel Syndrome, and reduced negative behavioral habits among those with diabetes. Furthermore, research has found internet-based mindfulness interventions have reduced depressive symptoms and stress, and improved sleep quality.

Spijkerman, Pots and Bhlmeijer (2016) conducted a meta-analysis investigating the effectiveness of online mindfulness interventions on mental health. The authors found that online mindfulness interventions significantly reduce depressive symptoms (g = .29) and anxiety symptoms (g = .22). Online mindfulness interventions were also found to have a small effect on mindfulness skills (g = .32) and a moderate effect on stress (g = .51).

An RCT conducted by Boettcher and colleagues (2014) evaluated an 8-week internet-based mindfulness treatment for anxiety disorders. The researchers randomly assigned participants to either the online mindfulness treatment group (MTG) or an online discussion forum control group (CG). The researchers found that those in the MTG showed a significantly larger decrease in anxiety symptoms from pre to post assessment than participants in the CG. There was a large effect size (d = 1.33) when comparing pre and post anxiety symptoms for those in the MTG. In fact, 40% of those in the MTG experienced a clinically significant change in anxiety symptom reduction. Individuals in the MTG also
experienced significant reduction in depressive and insomnia symptoms as well as an increase in quality of life when comparing pre and post measures.

Another RCT, conducted by Cavanagh and colleagues (2013), evaluated a brief online mindfulness-based intervention compared to a waitlist control group. The online mindfulness-based intervention consisted of eight modules that included brief psychoeducation as well as mindfulness exercises that lasted 10 minutes. The individuals who received the brief online mindfulness intervention illustrated a significant increase over time in mindfulness skills. In addition, those who received the mindfulness training had a significant decrease in perceived stress, anxiety, and depression symptoms. Furthermore, the researchers found that the increase in mindfulness skills was associated with decreases in stress, depression, and anxiety. This study supports the use of an online mindfulness intervention in increasing mindfulness skills and reducing psychological symptoms.

Gluck and Maercker (2011) investigated an online mindfulness based intervention for individuals experiencing psychological distress. The authors randomized individuals to a 2-week mindfulness intervention or a waitlist-control group. The authors found that individuals who completed at least 50% of the protocol experienced significant reductions in perceived stress and improved emotion regulation, with those who had higher distress pre-intervention experiencing the most change. This study illustrates the use of even a shorter (2-weeks) mindfulness intervention in reducing perceived stress and improving emotion regulation.

An additional study illustrating the utility of an Internet-based program was conducted by Morledge and colleagues (2013). The authors investigated an eight-week
Internet-based stress management program that is based on mindfulness principles. This intervention introduced participants to a meditation skill each week via an audio clip or Web page and included 20-25 minute guided mediation audio recordings. The authors found that the program reduced stress, with outcomes comparable to that of other traditional mindfulness interventions. This study provides strong evidence of the utility of an online mindfulness intervention in stress reduction.

Nguyen-Feng, Greer and Frazier (2017) conducted a study evaluating the use of an online stress management and mindfulness intervention for college students, including students with a history of interpersonal trauma. Participants were randomly assigned to three five-week conditions including a skill based stress management program, an enhanced skill based stress management program, and a condition that combined the stress management program along with mindfulness training (Nguyen-Feng, Greer, & Frazier, 2017). The authors found that students in the mindfulness training only condition with a history of interpersonal trauma did not experience a reduction in depression, anxiety, or perceived stress. As the authors note, this provides evidence that online mindfulness only interventions, may not lead to a reduction in distress for students with a history of interpersonal trauma. However, the researchers do not provide the specific mindfulness skills taught in the five-week mindfulness-based intervention, making generalizations of the findings more difficult.

Overall, Internet or online-based mindfulness interventions provide a flexible format in which individuals can learn mindfulness skills. This format increases access with the hope that this increases the ability for participants to engage in treatment. Currently,
research has found that individual’s who do engage in online mindfulness training, report feeling satisfied with their treatment (Boettcher et al., 2014).

**Limitations of Online Mindfulness-Based Interventions**

There are numerous limitations of the current literature evaluating online mindfulness-based interventions. There is a lack of literature evaluating the impact of an online mindfulness intervention among those with a history of sexual victimization. In addition, the literature evaluating the impact of mindfulness-based interventions, especially online mindfulness-based interventions, lack a unified operational definition of mindfulness and lack a unified mindfulness-based intervention. Therefore, the generalizability of the current literature to the application of a specific mindfulness program is difficult. As such, there is a need to evaluate the utility of a well-researched mindfulness interventions adapted for online.

Literature evaluating the impact of a mindfulness-based intervention for those with PTSD has found support in decreasing PTSD symptoms, depressive symptoms, somatic symptoms, experiential avoidance, and alcohol consumption (Bormann, et al., 2013; Hicks et al., 2017; Kang et al., 2018; Kearny et al, 2013; Polusny et al., 2015 ). Literature specifically applying mindfulness to populations with a history of sexual assault is more limited. There is evidence that mindfulness interventions for those who have experienced interpersonal trauma reduce PTSD, depressive, and anxiety related symptoms with an increase in mindfulness (Caldwell & Shaver, 2015; Gallegos et al., 2015; Kelly & Garland, 2016; Kimbrough et al., 2010). Mindfulness-interventions do have limitations, as they tend to be time intensive, expensive, and have limited availability. A computerized or online mindfulness intervention increases access and reduces many of the barriers to treatment.
The limited literature evaluating online mindfulness-based interventions indicate promise, specifically, findings have found individuals who participate in online mindfulness training experience a reduction in psychological symptoms with an increase in mindfulness skills (Boettcher et al., 2014; Cavanagh et al., 2013; Cluck & Maercker, 2011; Morledge et al., 2013; Spijkerman et al., 2016). Currently, there is no known study investigating the efficacy of an online mindfulness program based on a well-established mindfulness intervention (such as MBSR or MBCT) for individuals with a history of sexual assault. More research is needed to evaluate the use of a mindfulness intervention for those who have PTSD symptoms with a history of sexual assault.

**The Current Study**

The purpose of the current study is to investigate the efficacy of an online self-help less intensive mindfulness intervention for college students with a history of sexual assault. The study aimed to evaluate the effect of this intervention on mindfulness skills, psychological distress, and experiential avoidance. Participants were asked to complete an eight-week online mindfulness training intervention that is based on the well-researched MBSR program with notable deviations. First, the current study implemented the mindfulness trainings and psychoeducation in an online format similar to the module format utilized by Boettcher and colleagues (2007). Second, as the current study is aimed at researching the impact of a less intense mindfulness intervention, the number of minutes of daily mindfulness exercise was reduced. Within the MBSR program, participants are asked to engage in incrementally longer sessions of formal mindfulness practice. By the fifth week of the MBSR program participants are asked to practice formal mindfulness daily for 40-45 minutes. The current study asks participants to engage in only 10-15 minutes of
mindfulness exercises daily (similar to the time commitment found in Boettcher et al., 2014). Third, MBSR consists of an all-day mindfulness retreat, in which participants engage in mindfulness practice for six to eight hours. The current study did not include an all day mindfulness retreat similar to other online mindfulness interventions (Boettcher et al., 2014; Gluck & Maercker, 2011; Morledge et al, 2013). Last, some of the session-by-session content deviates from the MBSR program (see Appendix E for full module outline). The first session included psychoeducation regarding trauma experience and rationale for using mindfulness based skills, the third module included information on how individuals respond to stress with a focus on the physiological reactions to trauma (i.e.; fight/flight/freeze response). These additions were incorporated into the trauma informed MBSR course used by Kelly et al. (2016). In addition, a love and kindness mindfulness exercise was introduced in session eight. A love and kindness exercise is incorporated into the all-day mindfulness retreat of the MBSR program, however not part of the eight standard sessions. The incorporation of the love and kindness mindfulness exercise is based on the impact mindfulness self-compassion has among those with PTSD (Kearney et al., 2013).

A within subjects repeated measures open clinical trial design was used to investigate the effectiveness of an online mindfulness based intervention for trauma related symptoms among college students. For the current study, participant engagement in the online mindfulness skills training modules was monitored. In addition, participant mindfulness skills, psychological symptoms and experiential avoidance were also tracked. The current study aimed to identify if an online mindfulness intervention leads to an increase in mindfulness among college students with a history of sexual assault. In
addition, the current study aimed to identify if an online mindfulness intervention impacts PTSD symptoms, psychological distress, substance use, and quality of life.

METHOD

Participants

Participants were recruited from a large midwestern university. Both male and female students were recruited via in-person class recruitment, online postings (through E-learning, sorority Facebook pages, and emails from instructors), and flyers placed around campus. Recruitment involved providing a description of the study and contact information. Interested participants were instructed to email the student researcher to schedule a meeting. Once the researcher and potential participant met, they first underwent the informed consent process, and then the participant was instructed to complete questionnaires online via Qualtrics. The study procedures and consent process were reviewed and approved by the Human Subjects Institutional Review Board of the university in which the study took place (see Appendix F).

Twenty-one students were assessed for eligibility. To participate, individuals were required to be current students at a Midwestern university, be 18 years of age or older, endorse a history of unwanted sexual experiences resulting in moderate or higher symptoms of PTSD (as indicated by scoring at least a 21 or higher on the PCL-5), and understand English. Individuals were excluded from participating if they endorsed current suicidal thoughts, intentions, or plans. In addition, participants were excluded if they reported current psychotic symptoms. To be eligible, an individual could not have been engaged in concurrent psychological services for PTSD, such as PE, CPT, or EMDR. Last,
participants were excluded if they had recently started a psychiatric medication within the prior 8 weeks. A total of three individuals were excluded from participating due to not meeting criteria of an unwanted sexual experience, scoring below a 21 on the PCL-5, and starting a new psychiatric medication. Please see Figure 1 for a participant flow chart.

Figure 1. Participant Flow Chart
If the individual met the inclusion criteria, psychoeducation regarding mindfulness and trauma was provided. Of note, given the event of the COVID-19 pandemic, which led the Centers of Disease Control (CDC) to recommend social distancing, campus was closed during a portion of this study. As such, some of the study procedures were modified in order to limit direct interactions. The changes that were implemented include moving the first assessment meeting to an online platform, Webex, and requiring participants to complete the post-assessment measures through Qualtrics. Two participants were screened virtually using Webex.

A total of eight participants dropped out of the current study before completing five or more modules (44.44%). One participant dropped out after completing five modules and is included in analyses. Of those who dropped out, four reported the reason of discontinuing participation. Three participants reported dropping out due to time restraints. One participant dropped out of the current study due to additional life stressors (i.e.; family illness). The remaining five participants discontinued participating and did not respond to contact. For more information regarding mindfulness and assessment completion, please see table 1.

Table 1

<table>
<thead>
<tr>
<th>Participant Assessment Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment Period</td>
</tr>
<tr>
<td>Baseline</td>
</tr>
<tr>
<td>1st bi-weekly</td>
</tr>
<tr>
<td>Mid-assessment</td>
</tr>
<tr>
<td>2nd bi-weekly</td>
</tr>
<tr>
<td>3rd bi-weekly</td>
</tr>
<tr>
<td>Post assessment</td>
</tr>
<tr>
<td>One month follow-up</td>
</tr>
</tbody>
</table>
Table 1 – Continued

<table>
<thead>
<tr>
<th>Mindfulness Module</th>
<th>Number Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1</td>
<td>10</td>
</tr>
<tr>
<td>Module 2</td>
<td>10</td>
</tr>
<tr>
<td>Module 3</td>
<td>10</td>
</tr>
<tr>
<td>Module 4</td>
<td>10</td>
</tr>
<tr>
<td>Module 5</td>
<td>9</td>
</tr>
<tr>
<td>Module 6</td>
<td>9</td>
</tr>
<tr>
<td>Module 7</td>
<td>9</td>
</tr>
<tr>
<td>Module 8</td>
<td>9</td>
</tr>
</tbody>
</table>

When evaluating those who completed treatment (completing 5 or more modules), the majority of the participants identified as White, not Hispanic ($n = 8; 80.00\%$), with the remainder identifying as Black or African American ($n = 1; 10.00\%$), and Hispanic or Latin(a/o/x; $n = 1; 10.00\%$). Participants’ average age was 20.80. Student status ranged from undergraduate freshmen to graduate student, with three reporting being a freshman when initiating the study, two identified as juniors, and three identified as seniors with the last two participants identifying as graduate students. Ten (100\%) of participants stated they were full-time students. Half of participants reported being employed (50.00\%, $n = 5$) in addition to being a student, working an average of 16.08 hours of work per week. Six of the participants (60.00\%) identify as heterosexual, 30.00\% identify as bisexual ($n = 3$), and one reported “other” stating they were questioning (10.00\%). In terms of relationship status, the majority of the sample reported being legally single, but in a current relationship ($n = 7, 70.00\%$) with the remaining reporting being single ($n = 3, 30.00\%$).

Participants were also asked about their prior experience with mindfulness and mental health treatment. The majority of participants ($n = 7, 70.00\%$) reported having practiced mindfulness once or a few times before, two (20.00\%) reported having heard
about mindfulness but do not have extensive knowledge on mindfulness, and two (20.00%) reported having experience with mindfulness but not consistently. The majority (n = 9) of participants had some prior psychological treatment. Participants reported having a combination of prior treatment including individual psychotherapy (n = 9), medications (n = 8), inpatient or partial hospitalization (n = 2), group psychotherapy (n = 2), and a support group (n = 1). Nine of the participants were currently engaged in some form of psychological treatment. This includes medications (n = 7; no new medications within the last 8 weeks), individual therapy (n = 6; supportive therapy, not for PTSD), and group psychotherapy (n = 1; not for PTSD).

Participants reported experiencing numerous potentially traumatic experiences as reported by the LEC-5 (M = 19.50, SD = 3.24). Participants endorsed various sexual assault experiences as reported by the SES-SFV, with the majority of the participants (n = 9, 90.00%) endorsing multiple forms of sexual assault. Participants reported sexual contact without consent (n = 8, 80%), attempted sexual assault via coercion (n = 5, 50%), coercion (n = 7, 70%), attempted rape (n = 5, 50%), and rape (n = 7, 70%). All participants endorsed experiencing unwanted sexual experiences in childhood (as assessed with the CTQ; M = 12.40, SD = 7.25).

In order to determine if there were significant differences in demographics and pre-treatment psychological symptoms between those who completed the study (completing at least 5 of the 8 mindfulness modules) and those who dropped out, independent samples t-tests and chi-square analyses were completed to compare these two groups. Please see table 2 and 3 for group differences. There were no significant differences between those who completed at least five sessions and those who dropped out of treatment when
evaluating age, gender, race and ethnicity, sexual identity, class standing, average hours of work a week, relationship status, and prior mindfulness experience. There was no significant difference between those who completed and dropped from the mindfulness intervention when looking at sexual assault severity (as measured by the SES-SVF), potentially traumatic event exposures (as measured by the LEC), or childhood sexual trauma experiences (as measured by the CTQ). There were also no differences between completers and non completers on psychological symptoms, including PTSD symptoms (as measured by the PCL-5), mindfulness skills (as measured by the FFMQ), experiential avoidance (as measured by the AAQ and MEAQ-30), psychological distress (as measured by the BSI), quality of life (as measured by WHOQOL-BREF), and substance use (as measured by AUDIT-C and SUQ).
### Table 2

**Summary of Demographic Variables for Completers and Non-Completers**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completers M/ Frequency (SD/%)</th>
<th>Non-completers M/ Frequency (SD/%)</th>
<th>t/χ²</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20.80 (1.87)</td>
<td>24.13 (11.37)</td>
<td>0.92</td>
<td>16</td>
<td>0.37</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>0.03</td>
<td>1</td>
<td>0.87</td>
</tr>
<tr>
<td>Female</td>
<td>9 (90.00)</td>
<td>7 (88.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1 (10.00)</td>
<td>1 (12.50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transgender</td>
<td>0 (0.00)</td>
<td>0 (0.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
<td>7.20</td>
<td>4</td>
<td>0.13</td>
</tr>
<tr>
<td>White</td>
<td>8 (80.00)</td>
<td>4 (50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American/Asian/Latino(o/a/x)</td>
<td>2 (20.00)</td>
<td>4 (50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Identity</td>
<td></td>
<td></td>
<td>5.04</td>
<td>4</td>
<td>0.28</td>
</tr>
<tr>
<td>Heterosexual/straight</td>
<td>6 (60.00)</td>
<td>3 (37.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesbian/gay</td>
<td>0 (0.00)</td>
<td>2 (25)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bisexual</td>
<td>3 (30.00)</td>
<td>2 (25)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pansexual</td>
<td>0 (0.00)</td>
<td>1 (12.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1 (10.00)</td>
<td>0 (0.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class Standing</td>
<td></td>
<td></td>
<td>7.92</td>
<td>5</td>
<td>0.16</td>
</tr>
<tr>
<td>Freshman</td>
<td>3 (30.00)</td>
<td>1 (12.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sophomore</td>
<td>0 (0.00)</td>
<td>3 (37.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Junior</td>
<td>2 (20.00)</td>
<td>1 (12.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Senior</td>
<td>3 (30.00)</td>
<td>3 (37.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graduate</td>
<td>2 (20.00)</td>
<td>0 (0.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Currently employed</td>
<td></td>
<td></td>
<td>2.81</td>
<td>1</td>
<td>0.09</td>
</tr>
<tr>
<td>Yes</td>
<td>5 (50.00)</td>
<td>7 (88.00)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>5 (50.00)</td>
<td>1 (12.50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hours of work a week</td>
<td>16.08 (5.52)</td>
<td>22.71 (10.87)</td>
<td>1.35</td>
<td>11</td>
<td>0.21</td>
</tr>
<tr>
<td>Relationship Status</td>
<td></td>
<td></td>
<td>0.75</td>
<td>1</td>
<td>0.39</td>
</tr>
<tr>
<td>Single, in relationship</td>
<td>7 (70.00)</td>
<td>4 (50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single, no relationship</td>
<td>3 (30.00)</td>
<td>4 (50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mindfulness experience</td>
<td></td>
<td></td>
<td>0.58</td>
<td>2</td>
<td>0.75</td>
</tr>
<tr>
<td>Heard about it</td>
<td>2 (20.00)</td>
<td>1 (5.26)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practiced 1-3 times</td>
<td>7 (70.00)</td>
<td>4 (50)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice without consistency</td>
<td>1(10.00)</td>
<td>3 (37.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SES-SVF severity</td>
<td>128.10 (207.23)</td>
<td>49.38 (39.27)</td>
<td>-1.05</td>
<td>16</td>
<td>0.31</td>
</tr>
<tr>
<td>Childhood Trauma</td>
<td>12.40 (7.25)</td>
<td>10.38 (6.72)</td>
<td>-0.61</td>
<td>16</td>
<td>0.55</td>
</tr>
<tr>
<td>LEC</td>
<td>19.50 (3.24)</td>
<td>19.50 (4.54)</td>
<td>0.00</td>
<td>16</td>
<td>1.00</td>
</tr>
<tr>
<td>Pre-Intervention Expectations</td>
<td>3.75 (0.61)</td>
<td>3.53 (0.97)</td>
<td>-0.59</td>
<td>16</td>
<td>0.57</td>
</tr>
</tbody>
</table>

*Note: SES-SVF = Sexual Experiences Survey-Short Form Victimization; LEC-5 = Life Events Checklist for DSM-5*
### Table 3

**Summary of Psychological Variables for Completers and Non-Completers**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Completers</th>
<th>Non-completers</th>
<th>$t$</th>
<th>$\chi^2$</th>
<th>$df$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCL-5</td>
<td>42.70 (17.95)</td>
<td>43.00 (15.04)</td>
<td>0.04</td>
<td>16</td>
<td>0.97</td>
<td></td>
</tr>
<tr>
<td>MEAQ-30 Total</td>
<td>112.6 (19.11)</td>
<td>103.25 (19.49)</td>
<td>-1.02</td>
<td>16</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>AAQ-II</td>
<td>30.13 (6.47)</td>
<td>32.50 (7.76)</td>
<td>-0.69</td>
<td>16</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>BSI Global Severity Index</td>
<td>1.44 (0.73)</td>
<td>1.20 (0.48)</td>
<td>-0.81</td>
<td>16</td>
<td>0.43</td>
<td></td>
</tr>
<tr>
<td>BSI Depressive Scale</td>
<td>9.40 (5.58)</td>
<td>8.13 (3.94)</td>
<td>-0.55</td>
<td>16</td>
<td>0.59</td>
<td></td>
</tr>
<tr>
<td>BSI Somatic Scale</td>
<td>6.60 (5.54)</td>
<td>6.38 (4.66)</td>
<td>-0.09</td>
<td>16</td>
<td>0.93</td>
<td></td>
</tr>
<tr>
<td>FFMQ Total</td>
<td>104.00 (17.86)</td>
<td>112.63 (13.21)</td>
<td>1.14</td>
<td>16</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>WHOQOL-BREF physical</td>
<td>57.86 (14.17)</td>
<td>62.95 (15.73)</td>
<td>0.72</td>
<td>16</td>
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<tr>
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<td>46.88 (14.04)</td>
<td>0.08</td>
<td>16</td>
<td>0.94</td>
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<tr>
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<td>53.13 (17.78)</td>
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<td>AUDIT-C Total</td>
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<td>0.39</td>
<td>16</td>
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<tr>
<td>SUQ</td>
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<td>0.50 (0.54)</td>
<td>0.83</td>
<td>16</td>
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*Note:* PCL-5 = PTSD checklist for DSM-5; MEAQ-30 = Multidimensional Experiential Avoidance Questionnaire-30; AAQ = Acceptance and Action Questionnaire; BSI = Brief Symptom Inventory; FFMQ = Five Facet Mindfulness Questionnaire; WHOQOL-BREF = WHO Quality of Life – BREF; AUDIT-C = Alcohol Use Disorders Identification Test-Consumption; SUQ = Substance Use Questionnaire.

### Measures

A timeline of assessment measure administration is provided in Appendix B. All assessments, except for the pre-screening interview were administered via Qualtrics.

**Pre-Screening Interview.** In order to determine if participants met some of the exclusion and inclusion criteria, a brief in-person or virtual interview was conducted after the participant provided consent to participate in the research project. This interview inquired about the participant’s preferred written and spoken language, whether they were currently a student, use of pharmaceutical drugs, psychotic symptoms, and suicidal ideation. The Pre-Screening Interview is found in Appendix C.
Demographic questionnaire. A demographic questionnaire was provided online via Qualtrics. The questions that were included in the questionnaire are found in Appendix E.

Sexual Experiences Survey – Short Form Victimization (SES-SFV; Koss et al., 2007) The SES-SFV is a 10-item self-report questionnaire that assesses for victimization of unwanted sexual experiences. The SES-SFV is a revised version of the Sexual Experiences Survey (Koss & Oros, 1980). The SES is the most widely used measure of sexual assault experiences (Davis et al., 2014). The SES-SFV addressed some of the deficiencies found in the SES, specifically revising some of the definitions, providing language clarifications, and making items more gender neutral (Davis et al., 2014). The SES-SFV provides an estimate of the frequency, type and rate of unwanted sex. This assessment asks for individuals to report their unwanted sexual experiences at two time periods, within the past 12 months and since the age of 14, not including the prior 12 months. This assessment asks behavioral specific questions, as not all individuals identify coercive experiences as sexual assault or rape. More behaviorally specific questions have been found to yield more reliable data (Fisher, Cullen, & Turner, 2000). The participants are asked to indicate if they have experienced any of the following unwanted sexual experiences; including unwanted sexual touching or contact, forced or attempted oral, and anal or vaginal sex via penetration with one’s penis, fingers, or object. In addition, the assessment inquires regarding the tactic used during the attempted or completed sexual assault, including two forms of verbal coercion (a) telling lies, verbal threats, making promises unknown to be untrue, or using verbal pressure and (b) showing displeasure, criticizing, or getting angry; incapacitation (i.e.; taking advantage when the victim is passed out, too drunk to consent, or unable to
stop what was happening); two forms of physical force (a) threatening of physical force or harm and (b) the use of physical force. Participants are asked to indicate the number of times they have experienced these forms of sexual assault within the past 12 months and since the age of 14, excluding the prior 12 months (0 = never to 3+ = occurred 3 or more times). To score the SES-SFV, the “sum of frequency of ranks” method used by Davis and colleagues (2014) will be followed. The frequency and severity of experiences will be assessed by multiplying each experience (ranging from 0-3) by the victimization experience (1 = sexual contact by verbal coercion, 2 = sexual contact by incapacitation, 3 = sexual contact by force, 4 = attempted or completed rape by verbal coercion, 5 = attempted or completed rape by incapacitation, 6 = attempted or completed rape by force) to account for the amount of variations of experiences as well as severity. The sum of the total number of experiences will be obtained, with zero being the lowest (indicative of no sexual assault history). The SES-SFV has demonstrated to have acceptable internal validity $\alpha = .70$ (Cecil & Matson, 2006). The internal consistency in the current study was found to be high ($\alpha = .97$).

**Childhood Trauma Questionnaire—Short Form (CTQ-SF; Bernsteain et al., 2003)** The CTQ-SF is a 28-item self-report measure of various forms of childhood trauma including emotional abuse, physical abuse, sexual abuse, emotional neglect, and physical neglect. This assessment was used as a screener to assess for participant’s experiences of childhood sexual abuse and was administered only at baseline. Therefore, only questions regarding sexual abuse were used in the current study. Test items are rated on a 5-point, Likert-type scale, ranging from “never true” to “very often true”. Participants are instructed to consider their experiences growing up as a child and as a teenager. Among a clinical
sample, averages for the sexual abuse subscale range from 10.50 - 19.70 (Spinhoven et al., 2014). Scoring a five or greater on this measure suggests having experienced some form of Childhood Sexual Abuse (CSA) and indicate being eligible to participate in the current study. In the current study this measure was found to have high internal consistency ($\alpha = .92$).

**Posttraumatic Stress Disorder Checklist-5 (PCL-5; Weathers, Litz, Keane, Palmieri, Marx & Schnurr, 2013)** The PCL-5 is a 20-item self-report measure of PTSD symptoms consistent with the DSM-5. This assessment can be used to track symptom change across time and was used to assess PTSD symptom severity over the course of the intervention. The PCL-5 is a primary outcome measure administered at baseline, week 3, week 5, week 7, post-intervention, and at the 1-month follow-up. This assessment is commonly used to measure and track PTSD symptoms in clinical settings as well as in research. Participants are instructed to identify how much they were bothered by symptoms within the past month, ranging from not at all to extremely (0 to 4 respectively). Scores range from 17-85, with higher scores indicating more sever symptomatology. A score of 33 is the current recommended cut-off score for a probable PTSD diagnosis (U.S. Department of Veterans Affairs [VA], 2017). It is suggested that a 5-10 point change in symptoms reported represent a reliable change (a change that is not due to chance), a 10-20 point change represents clinically significant change (Weathers et al., 2013). A 10-point or greater change in reported symptoms is identified as the minimal clinically important difference (Monson, Gradus, Young-Xu, Schnurr, Price, Schumm, 2008). The PCL-5 has been found to have high internal consistency ($\alpha = .95$), test-retest reliability ($r = .82$), convergent
(rs = .74 to .85) and discriminant (rs .31 to .60; Blevins, Weathers, Davis, Witte, & Domino, 2015). The internal consistency found for the current study was high (α = .94).

**Life Events Checklist-5 (LEC-5; Weathers, Blake, Schnurr, Kaloupek, Marx & Keane, 2013)** The LEC-5 is a self-report measure designed to screen for the exposure to potentially traumatic events and was administered at baseline. This assessment includes 16 possible traumatic events that are known to potentially cause PTSD or distress. Participants are instructed to consider their entire lives and endorse all that apply indicating if an event happened to them personally, if they witnessed an event, learned about an event happening to a close family member or close friend, and if they were exposed to an event as part of their job. Respondents can also indicate if they are “not sure” or if an event “doesn’t apply”. The LEC-5 does not provide a formal scoring protocol. The average number of endorsed potentially traumatic life events among a clinical sample was 5.00 (Karatzias, et al., 2016). Though the LEC-5 currently does not have psychometric data available, the LEC designed for the DSM-IV has demonstrated good psychometric properties, with test retest reliability ranging from k = 52 to k = .84 (Gray, Litz, Hsu, & Lombardo, 2004). The LEC has demonstrated good convergence with measures of psychopathology that have been found to be associated with trauma exposure including the CAPS (r = -.39), and the PCL (r = -.43) (Gray, et al., 2004).

**Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006)** the FFMQ is a 39-item measure that assesses for mindfulness skills. This measure consists of five different subscales including observing, describing, acting with awareness, non-judgment of internal experiences, and non-reactivity to internal experiences. This measure is a primary outcome measure and was
used to track mindfulness skills, administered at baseline, week 3, week 5, week 7, post-intervention, and at the 1-month follow-up. Participants are asked to rate on a 5-point Likert-type scale of how much the items are true for them (1 = never or very rarely true to 5 = very often or always true). FFMQ is commonly used in research investigating mindfulness interventions (Baer et al, 2006a). The average score in a clinical sample ranged from 26.00 – 19.66 (Williams, Dalgleish, Karl, & Kuyken, 2014). The FFMQ has been found to be sensitive to change and has good internal consistency with alpha coefficients ranging from .72 to .92 (Baer et al., 2008). In the current study, alpha coefficients ranged from .62 to .91 across the five different subscales, observing ($\alpha = .62$), describing ($\alpha = .82$), acting with awareness ($\alpha = .70$), non-judgment of internal experiences ($\alpha = .91$) and non-reactivity to internal experiences ($\alpha = .85$).

**Multidimensional Experiential Avoidance Questionnaire-30 (MEAQ-30; Sahdra, Ciarrochi, Parker & Scrucca, 2016)** The MEAQ-30 is a 30-item self-report measure of experiential avoidance. This assessment is adapted from the MEAQ (Gamez, Chielewski, Kotov, Rugger & Watson, 2011). This measure was used to assess experiential avoidance across time, administered at baseline, week 4, post-intervention, and at the 1-month follow-up as a primary outcome measure. Responders were asked to report how strongly they agree or disagree on a six-point Likert scale measuring the six dimensions, behavioral avoidance, distress aversion, distraction and suppression, repression/denial, procrastination, and distress endurance. There is high convergence for each of the six dimensions of the MEAQ-30 with the original long form, with correlations ranging from .90 to .97. The MEAQ-30 has been shown to have good internal consistency (Cronbach’s alpha ranging from .78 to .80). In the current study, internal consistency ranged from .64 to .94.
across the six dimensions, behavioral avoidance ($\alpha = .71$), distress aversion ($\alpha = .78$), distraction and suppression ($\alpha = .94$), repression/denial ($\alpha = .64$), procrastination ($\alpha = .68$), and distress endurance ($\alpha = .84$).

**Acceptance and Action Questionnaire – II (AAQ-II; Bond et al., 2011)** The AAQ-II is a 7-item self-report measure that was used to assess for experiential avoidance and psychological inflexibility at baseline, post-intervention, and at the 1-month follow-up as a secondary measure. This measure uses a seven point Likert scale in which respondents are asked to rate how much each statement is true to them (1 = never true, 7 = always true). Scores can range from seven to 49, in which higher scores indicate greater psychological inflexibility. The average score in a clinical sample is 28.34 (Bond et al., 2011). This measure has alpha coefficients ranging from .78-.88 and test-retest reliability ranging from .81 to .79. In the current study, the AAQ-II had acceptable internal consistency ($\alpha = .82$).

**The Brief Symptom Inventory (BSI; Derrogatis, 1993)** The BSI is a 53-item self-report measure that assesses nine patterns of psychological symptoms. This measure was administered at baseline, post-intervention, and at the one month follow-up as a secondary measure. The nine dimensions include somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. This measure also provides three indices of global distress including the Global Severity Index (GSI; current or past symptomatology), Positive Symptom Distress Index (symptom intensity), and Positive symptom Total (total number of endorsed symptoms). Participants were asked to report how much they have been distressed or bothered by various symptoms during the past seven days using a 4-point Likert scale (0 = not at all to 4 = extremely). When looking at a clinical sample, the average mean score for
the somatization dimension is 0.83, the depression dimension is 1.80, and for the Global Severity Index the mean score is 1.32 (Derogatis, 1993). The BSI has Cronbach’s alpha coefficients ranging from .75 to .89. (Boulet & Boss, 1991). The BSI has been found to have good test-retest reliability coefficients, ranging from .68 to .91 (Derogatis and Spencer, 1983). In the current study, internal reliability ranged from .46 to .95. All nine dimensions had acceptable internal reliability alpha coefficients except for the psychoticism dimension ($\alpha = .46$, $r = .15$).

**Alcohol Use Disorders Identification Test-Consumption (AUDIT-C; Saunders, Aasland, Babor, de la Fuente, Grant, 1993)** The AUDIT-C consists of the first three questions of the AUDIT, and is used as a brief screen to assess alcohol consumption. This three-item self-report questionnaire was used to assess alcohol consumption at baseline, post-intervention, and at the 1-month follow-up as a secondary outcome measure. The AUDIT-C demonstrates high levels of sensitivity for identifying possible alcohol use disorder and for identifying risky drinking. Among college students, a cutoff score of 5 or more points is sensitive in identifying risky drinking (Dawson, Grant, Stinson, & Zhou, 2005). The AUDIT-C has been found to have a Cronbach’s alpha of 0.80. In the current study, the AUDIT-C was found to have poor internal reliability ($\alpha = .47$, $r = .11$).

**Substance Use Questionnaire (SUQ)** The SUQ assesses drug use across eight different drug categories and is used as a secondary outcome measure. This questionnaire was adapted from the Substance Use Disorder/ Abuse module of the MINI International Neuropsychiatric Interview 6.0.0 (Sheehan et al., 2010) by the student investigator. The questionnaire asks responders to indicate if they have used any of the drugs from the eight drug categories within the last 30 days. If participants endorse using a substance they are
asked to estimate the number of days they used the substance in the last 30 days. As the student investigator developed this measure, the psychometric properties are unknown.

**World Health Organization Quality of Life-BREF (WHOQOL-BREF; Bonomi, Patrick, Bushnell, Martin, 2000)** The WHOQOL-BREF is a shorter version of the WHOQOL and was administered at baseline, post-intervention, and at the 1-month follow-up as a secondary outcome measure. This self-report measure was used to assess perceptions of quality of life within the respondent's context. This instrument is comprised of 26 items measuring the following domains, physical health, psychological health, social relationships, and environment. Participants were asked to answer questions on a five point rating scale (i.e.; 1 = very dissatisfied to 5 = very satisfied) regarding the last two weeks. The average scores across all four domains among a clinical sample with major depressive symptoms are 27.60 for the physical health domain, 34.40 for the psychological domain, 45.5 for the social life domain, and 52.20 for the environment domain (Aigner, Forster-Streffleur, Prause, Freidl, Weiss, & Bach, 2006). The WHOQOL-BREF has been found to have acceptable to high internal consistency reliability with a Cronbach's alpha ranging from .82-.68 (with the lowest alpha score for the social relationships domain; Skevington, Lotfy, O’Connel, WHOQOL Group, 2004). The internal reliability ranged from .44 to .86 across the four domains, with all domains having acceptable reliability except for the environmental domain ($\alpha = .44, r = .10$).

**Treatment Acceptability Pre and Post Questionnaire** The Pre Treatment Acceptability Questionnaire included four items administered during the pre-treatment session after the introduction to the online mindfulness modules. Items assessed the participants expected helpfulness of the intervention, how aligned the intervention is with
their own treatment goals, and how much improvement they are expecting to make from the intervention. The post treatment acceptability questionnaire was administered after the completion of the 8-week online mindfulness intervention. This questionnaire included items inquiring about the degree of satisfaction with the intervention, how much the intervention met their goals, if they are likely to continue practicing mindfulness, how much they learned, and if they felt the intervention was accessible and flexible. Both questionnaires can be found in Appendix E.

**Procedures**

**Subject recruitment.** Students were informed about the opportunity to participate in the current study by class recruitment and campus flyers. Instructors of undergraduate classes were asked to inform their students about the possibility of participating in this research project. The instructors were contacted via email, inquiring if they would allow recruitment of students from their class. The instructors were asked if they would be willing to (a) have a research assistant or the student investigator read a recruitment script during their scheduled class (b) share information regarding the study via a provided Power Point slide in which they can present to their class or upload on their e-learning class page (c) present via online information regarding the study (i.e.; email, etc.). Information about the study was posted around campus via flyers. The flyers included a tear-off slip with the student researcher’s contact information. Interested students were instructed to contact the student researcher via the provided email address or phone number. Last, sorority representatives were emailed to inquire if they would be willing to post or share information regarding the study to their communities (i.e.; online posting on their Facebook page, etc.).
Students who contacted the researcher scheduled a meeting to either occur online via Webex or in-person. During this meeting, the researcher provided and read over the informed consent document (see Appendix G). Following the informed consent process, each participant underwent a brief pre-screening interview in which they were asked about current suicidality and psychotic symptoms (Appendix C). Of note, neither of these situations occurred during the duration of this study. Eligible participants were then administered the SES-SFV, PCL-5, and the Childhood Sexual Experiences survey. These measures were used to assess and identify if the individual met the inclusion criteria of having had experienced a sexual assault as well as endorse enough symptoms of PTSD (scoring a 21 or more on the PCL-5). If the participant met the inclusion criteria, they were instructed to complete the remaining online assessment questionnaires though Qualtrics. Following the online assessments, participants were introduced mindfulness and to the online mindfulness-based program. After this, they were asked to complete a pre-treatment acceptability form (Appendix E) to assess their expectations of the program and if they feel this program meets their desired treatment goals.

Subjects received emails reminding them to complete the online questionnaires for the bi-weekly assessments, the mid-intervention assessment, the post-treatment assessment, and the one-month follow-up (a timeline of assessment administration is provided in appendix B). In addition, if the online questionnaires were not completed, reminder emails were sent three additional times, every two days. The PCL-5 and the FFMQ were administered bi-weekly along with a question asking the participant to estimate the number of minutes they engaged in formal mindfulness practice in the prior two weeks.
These bi-weekly assessments were also administered in Qualtrics with reminder emails given the day the assessment is to be completed and the following day.

**Mindfulness training.**

**Orientation and first training.** After the completion of the assessments, the participants were provided with psychoeducation regarding mindfulness and PTSD symptoms. Following this, participants were provided with a brief introduction to mindfulness. Next, participants were introduced to the online mindfulness modules on eLearning and were added to the course. Participants were shown how to use these modules as well as introduced to additional materials provided on eLearning including how to create reminders for homework, frequently asked questions, and tips for practicing mindfulness daily (an outline of the modules is provided in Appendix D). Participants were provided with eight practice log worksheets with the date in which they should plan to complete the modules (Appendix A). They were asked to track and record the number of minutes they engage in mindfulness exercise which were reported as part of the bi-weekly assessment measures. Next, participants were introduced to a short in-person mindful eating exercise, called the “raisin” exercise, where they were taken through a short mindful exercise of eating a raisin. The raisin exercise consists of the participant eating a raisin slowly and mindfully; the researcher walked through this exercise with each participant. If the participant endorsed a food allergy to raisins, another candy was offered. For those who completed a virtual first meeting, the participant was asked if they had any current raisins, candy or gum available to engage in this mindfulness exercise. Last, the participants were asked to complete the first online mindfulness training. The first online training exercise consisted of a 10-minute body scan.
**Homework.** Participants were asked to practice mindfulness everyday between each of the next scheduled mindfulness modules. The participants were asked to continue the body scan exercise that they completed during the first online training. In addition, an optional mindfulness of eating audio was provided, in which the individual had the option of engaging in the “raisin exercise” again.

**Second online training.** The second online mindfulness training was completed online, via the participant’s smart phone, computer, or other Internet connected device. The participants were instructed to log-on to eLearning and access the second module. The second module had a link to a short introductory audio recording of the new mindfulness skill, additional information regarding mindfulness, and psychoeducation regarding the role of avoidance. In addition, the audio introduced informal and formal practice of mindfulness, how to be present with the present moment, and introduced the homework assignment of being present with one pleasant activity daily. The mindfulness practice included a five-minute mindfulness of breathing exercise.

**Homework.** The subjects were asked to practice mindfulness everyday alternating between mindfulness of breath and the body scan exercises. In addition, participants were instructed to complete the pleasant events calendar. Participants are asked to be present with one pleasant activity as it is happening each day, including noticing one’s thoughts, feelings and sensations and to record this information on the pleasant events calendar.

**Third online training.** The third online training consisted of an audio recording reminding the participant of the resource link, which included tips on how to practice mindfulness daily and frequently asked questions. In addition, an overview of how humans respond to stress, including the fight/flight/freeze response was discussed. Then an
introduction to the homework, which consisted of being present with an unpleasant or stressful event each day including the individual's thoughts, feelings, and sensations. The participants were asked to complete a 10-minute mindfulness exercise of being present with difficult thoughts and feelings.

**Homework.** Participants were instructed to alternate between the “sitting with the difficult” mindfulness exercise and mindfulness of breathing exercises daily. They are asked to complete the unpleasant events calendar, in which the participant was asked to be present with one unpleasant event each day, being aware of any thoughts, feelings, and sensations they may experience.

**Fourth online training.** An audio recording was made available, which consisted of an introduction of moving mindfulness and yoga. The participant is instructed to notice the sensations associated with the movement of the body and be fully aware of the sensations while engaged in the mindfulness exercise. The participant is then instructed to complete a 15-minute mindful movement exercise.

**Homework.** Participants were instructed to engage in a mindfulness exercise daily, alternating between the mindfulness of movement exercise and a body scan or mindfulness of breathing exercises. They were also provided with a handout of sitting and standing yoga postures that they can engage in as practice. An additional optional longer mindful of movement track was made available, which was a 35 minute exercise.

**Fifth online training.** Participants were instructed to listen to a fifth audio recording that discussed breath practice, introduced participants to just notice and observe sensations, including thoughts. Participants were instructed to practice the mindfulness of breathing exercise with a 10-minute mindfulness of breathing.
**Homework.** Participants were instructed to practice mindfulness of breathing once a day until the next mindfulness module. The participants were provided with the track used to introduce the mindfulness of breath to use for homework.

**Sixth online training.** Participants were instructed to listen to the audio recording that includes an introduction to a sitting meditation. The audio recording included instruction to focus on the breath, and expanding the awareness to sensations, sounds, thoughts, and emotions. They were instructed to engage in two 10-minute mindfulness exercises, mindfulness of breath and body and mindfulness of sounds and thoughts.

**Homework.** Participants were encouraged to practice self-guided mindfulness, practicing without audio guidance. Participants are instructed to practice a mindfulness exercise of their choosing each day, with all prior audio made available in the module for participants to use if they desire to utilize guided audio.

**Seventh online training.** Participants were introduced to walking meditation via the online audio recording. They were instructed to utilize the audio and practice walking meditation in an area in which they have room and are comfortable. Participants were instructed to pay attention to all of the sensations associated with walking as well as notice the environment around them. They were instructed to listen to and participate in a 10-minute walking meditation.

**Homework.** Participants were instructed to participate and practice a form of mindfulness of their choosing each day, with encouragement to mix a variety of mindfulness exercises. Participants were encouraged to continue engaging in self-guided practice. If desired, all mindfulness tracks used in the prior modules were made available in the current module. In addition, participants were encouraged to continue informal
mindfulness practice, specifically with walking (such as when the participant is walking to class, their car, in the store, etc.).

**Eighth online training.** Participants were instructed to listen to an audio recording that included a review of the skills learned and the mindfulness exercises they have engaged in throughout this program. Participants were encouraged to continue to practice mindfulness after completing of this intervention. The participants were instructed to listen to the last mindfulness audio recording, a “love and kindness” mindfulness exercise. The participants were provided with a list of additional mindfulness resources.

**Post-assessment questionnaires.** After completing the eighth mindfulness module, participants were emailed to schedule a meeting with a researcher. During this meeting, the researcher provided the participant a computer and was emailed the post assessment questionnaires asking them to complete these via Qualtrics. If the participant was unable to meet with a researcher, as occurred during the Coronavirus pandemic, the participant was emailed the questionnaires via Qualtrics and were asked to complete these independently. The participants were sent reminder emails to complete these questionnaires in which they were sent three reminder emails every three days if not completed.

**One-month follow-up questionnaires.** Participants were emailed a link to complete the one-month follow-up questionnaires via Qualtrics. They were reminded to complete the questionnaires with an email every three days for a total of three email reminders until the participant completed the follow-up assessment questionnaires.

**Participation incentives.** Participants were compensated for completing the study in a stepwise fashion, in which the more modules and assessments completed the greater
amount of money the participant received up to $25 (see Appendix H). Once the participants completed the one-month follow-up questionnaires, they were emailed to schedule a time to stop by and obtain their gift card. If the participant was unable to come and pick up the gift card, they were asked to provide an address in which the gift card could be mailed.

**Research Questions**

The current study has the following research questions:

Research question 1: Participants who complete at least five of the 8 mindfulness intervention modules will have a significant reduction in PTSD symptoms from pre to post treatment, which will be maintained at the one-month follow-up.

Research question 2: Participants who complete at least five of the 8 mindfulness intervention modules will have a significant decrease in experiential avoidance from pre to post treatment, which will be maintained at the one-month follow-up.

Research question 3: An increase in participant mindfulness skills will be associated with a decrease in PTSD symptoms.

Research question 4: Participant mindfulness skills will increase with the number of online mindfulness modules completed across the intervention.

Research question 5: Participants who complete at least five of the 8 mindfulness intervention modules will have a significant reduction in psychological distress including depressive and somatic symptoms as assessed by the BSI from pre to post treatment, which will be maintained at the one-month follow-up.
Research question 6: Participants who complete at least five of the 8 mindfulness intervention modules will have a significant improvement of quality of life from pre to post treatment, which will be maintained at the one-month follow-up.

Research question 7: Participants who complete at least five of the 8 mindfulness intervention modules will have a significant reduction in alcohol and drug use from pre to post treatment, which will be maintained at the one-month follow-up.

RESULTS

Primary Analyses

Due to participants not completing all of the assessment time periods, there were missing data. To ensure missing data were missing completely at random (MCAR), Little’s Missing Completely at Random test was performed. Results indicate that missing data were missing at random ($\chi^2 = .00, p = 1.00$). As such, to handle missing data, the last observed carried forward (LOCF) method was used.

In order to explore the first and second research questions, two repeated measures $t$-tests were completed to determine if there were significant differences in PTSD symptoms (as measured by the PCL-5) and experiential avoidance (as measured by the MEAQ-30) from pre- to post-treatment. A repeated measures $t$-test was completed instead of the planned repeated measures ANOVA due to a lack of power to complete contrasts given the limited data from the one month follow-up assessment. Only a total of six participants completed the one-month follow-up.

First, the data were evaluated to ensure the assumptions of repeated measures $t$-tests were met. A Shapiro-Wilk’s test ($p > .05$) and a visual inspection of the histograms
were completed to assess if the differences between the paired outcomes were normally distributed. The PCL-5, and MEAQ-30 were found to be normally distributed at all time points (baseline, bi-weekly, mid-assessment, and post-intervention). In addition, the PCL-5 and MEAQ-30 did not violate a normal distribution when evaluating the difference between pre and post scores. Boxplots were used to identify outliers. No outliers were found for the PCL-5 or MEAQ-30 at any time point. The AAQ-II was found to be normally distributed at baseline and post-intervention; however, there was one outlier found. As such, the analysis was completed with the outlier and with the outlier removed to assess for influence. The results did not change when the outlier was included; as such, the outlier was included in the t-test.

First, a t-test was used to determine whether participants who completed at least five of the eight mindfulness intervention modules demonstrated a significant reduction in PTSD symptoms from pre to post treatment. On average, individuals who completed five or more mindfulness modules had a statistically significant reduction in PTSD symptoms as measured by the PCL-5, \( t(9) = 3.49, p = .007, CI [7.03, 32.97], d = 1.11 \), when comparing baseline \( (M = 42.70, SD = 17.95) \) and post-intervention \( (M = 22.70, SD = 19.60) \) PCL-5 scores. The Reliable Change Index (RCI) for the PCL-5, as suggested by Weathers and colleagues (2013), is a 5-10 point change in symptoms reported. In the current sample, 70% reported a reliable improvement in PTSD symptoms when comparing baseline and post-intervention PCL-5 scores. For a clinically meaningful difference in the PCL-5, a 10-point change or greater is recommended (Monson, Gradus, Young-Xu, Schnurr, Price, Schumm, 2008). A total of seven participants, 70% of the sample, experienced a clinically
meaningful change in PTSD symptom reduction. Of note, one participant experienced a clinically significant increase in PTSD symptoms.

An additional t-test was conducted to compare PCL-5 scores after completing the intervention and at one month follow-up to assess if participant level of PTSD symptoms was maintained. This analysis included only the six participants who completed the follow-up assessment. On average, when comparing the PCL-5 scores at post-intervention ($M = 19.67$, $SD = 13.50$) and at the one month follow-up ($M = 19.83$, $SD = 12.16$), individuals did not significantly experience a change in PTSD symptoms ($t(5) = -.16$, $p = .88$, CI [-2.86, 2.52], $d = -0.01$). This illustrates that on average, participants’ PTSD scores maintained after one month following completion of the mindfulness intervention.

Similar analyses were conducted to determine pre-post changes on experiential avoidance and whether participants who completed at least five of the eight mindfulness intervention modules showed a significant reduction in EA from pre to post treatment. Participant EA as measured by the MEAQ-30 significantly reduced when comparing scores at baseline ($M = 112.60$, $SD = 19.11$) and post-intervention ($M = 94.40$, $SD = 27.20$; $t(9) = 3.20$, $p = .01$, CI [5.34, 31.06], $d = 0.95$). Similarly, when evaluating EA as measured by the AAQ-II, there was a significant reduction when comparing participant scores at baseline ($M = 32.50$, $SD = 7.76$) and post-intervention ($M = 21.60$, $SD = 10.39$; $t(9) = 3.36$, $p = .01$, CI [3.55, 18.25], $d = 1.05$).

To evaluate whether EA changes were maintained at one month follow up, additional $t$ – tests were completed. On average, when comparing MEAQ-30 scores from post-intervention ($M = 92.67$, $SD = 24.95$) to one month following the intervention ($M = 95.83$, $SD = 24.89$), individuals did not significantly experience a change in EA ($t(5) = -0.83$,
p = .044, CI [-13.00, 6.66], d = 0.13), suggesting that EA scores were maintained at one month following the mindfulness intervention. Similarly, participants’ AAQ-II scores at post-intervention (M = 20.67, SD = 8.33) and one month follow-up (M = 21.00, SD = 9.38), did not significantly differ (t (5) = -0.13, p = .90, CI [-7.03, 6.36]).

To assess whether participant mindfulness skills increase and PTSD symptoms decrease over time, a repeated measures Multivariate Analysis of Variance (MANOVA) was completed with a Trend Analysis. First, the data were analyzed to check if the data violated any of the assumptions for a MANOVA. A Shapiro-Wilk’s test (p > .05) and a visual inspection of the histogram and box plot illustrates that the FFMQ has one outlier. As such, to assess if the outlier influenced the results of the analysis, the analysis was completed once with the outlier and once without. The outlier was not found to change the results and is included in the analyses. The assumption of sphericity was violated for the PCL-5 as found by the Mauchly’s test of Sphericity (W = .09, p = .04), as such the Greenhouse-Geisser correction was used to compare the within-subjects effects.

When evaluating the change in participant mindfulness skills and PTSD symptoms across baseline, the three bi-weekly administrations, and post-intervention assessment time periods, there was a significant difference across time for both PCL-5 scores (F (2.12, 19.05) = 6.75, p = .01, MSe = 234.49, n² =0.43) and FFMQ scores (F(4, 36) = 10.62, p = 0.00, MSe = 168.98, n² = 0.54). Of specific interest, there was a linear trend for both PTSD symptoms (F (1, 9) = 12.69, p = .01, MSe = 247.92, n² =0.59) and mindfulness symptoms (F (1 , 9) = 20.10 , p = .002, MSe = 348.62, n² =0.69) across the assessment time periods. Specifically, PTSD symptoms trended downward as mindfulness skills trended up across time. A visual depiction of the linear trends are found in Figure 2.
Bonforoni corrected contrasts were completed to evaluate where statistically significant differences between assessment time periods occurred for both the PCL-5 and FFMQ. No significant difference between PCL-5 scores across time periods that was found. Given there was a significant difference across time without any significant contrasts indicates a lack of power to detect differences between contrasts. There were significant differences in mindfulness skills (as measured by the FFMQ) across time when comparing scores at baseline ($M=104.00$, $SE=5.65$) to the third-biweekly ($M=118.00$, $SE=3.69$) and post-intervention ($M=135.70$, $SE=7.66$) assessment scores. The second bi-weekly assessment scores ($M=111.50$, $SE=4.68$) significantly differed from the third-bi-weekly ($M=118.00$, $SE=3.69$) and post-intervention assessment scores ($M=135.70$, $SE=7.66$).

*Figure 2. Changes in FFMQ and PCL-5 Scores*
Secondary Analyses

In order to explore whether participant mindfulness scores increase with the number of mindfulness modules completed, a Pearson’s correlation was completed. First, the data were assessed for violating the assumptions for a Pearson’s correlation. After completing a Shapiro-Wilk’s test (p > .05) and a visual inspection of the histogram and box plot, the number of modules completed was non-normally distributed, with a skewness of -1.32 (SE = .661). As such, a non-parametric test, a Spearman’s rank correlation was implored; however, the assumptions of this test were also violated. Therefore, a Kendall’s tau-b correlation was completed.

A Kendall’s tau-b correlation found no significant relationship between mindfulness skills (as measured by FFMQ) and mindfulness module completion ($t_b = .22$, $p = .43$). This finding is likely due to the lack of variability of module completion among the sample as the majority of the sample completed all 8 of the modules (eight of the 10 participants completed all modules).

Repeated samples $t$-tests were conducted to evaluate changes in psychological distress including depressive and somatic symptoms, quality of life, and substance use from pre- to post-treatment. First, the data were evaluated to ensure the assumptions of repeated measures $t$-tests were met. A Shapiro-Wilk’s test (p > .05) and a visual inspection of the histograms and boxplots were completed to assess if the differences between the paired outcomes were normally distributed and to identify outliers.

The WHOQOL-BREF psychological, social and environmental indices (assessing quality of life) at all time points, BSI Depressive Scale (to assess for depressive symptoms) at all time points, and the BSI Somatic Scale (to assess for somatic symptoms) at baseline
and post-intervention were found to be normally distributed and without outliers. The BSI Global Severity Index (to assess general psychological distress) was found to have two outliers and the WHOQOL-BREF physical health had one outlier, as such the repeated t-test analyses were completed once without the outliers and once with the outliers to assess if the outliers influenced the analysis. The findings did not change when the outliers were removed or included for the BSI Global Severity Index and the WHOQOL-BREF physical health. As such the outliers were included in the repeated samples t-tests. The BSI Somatic Scale at follow-up was found to violate the assumption of normality, with Kurtosis of -3.15 (SE = 1.74). A non-parametric test, specifically a Wilcoxon Signed Rank Test, was completed to evaluate if there was a difference between the post-intervention and follow-up somatization scores.

Both the AUDIT-C and the SUQ (measuring alcohol and substance use) violated the assumption of normality. The AUDIT-C (measuring alcohol use) was non-normally distributed, with skewness of -1.44 (SE = .717). To address the violation of normality, a non-parametric test, specifically, a Wilcoxon Signed-Ranks Test was used. The SUQ was also found to be non-normally distributed, with skewness of 3.00 (SE = .72) and kurtosis of 9.00 (SE = 1.40). Upon further inspection of the SUQ scores, there were a limited number of participants endorsing any drug use. In fact, only three of the participants reported any drug use at baseline and two-reported drug use at the post-intervention. Given the limited number of participants endorsing any drug use, it is not possible to evaluate a change in drug use due to floor effects.

The question of whether participants who completed at least five of the eight mindfulness intervention modules would have a significant reduction in psychological
distress including depressive and somatic symptoms from pre to post treatment was partially supported. There was a statistically significant reduction in psychological distress as measured by the BSI Global Severity Index ($t (9) = 2.94, p = .02, \text{CI} [.12, .91], d = 0.71$) when comparing scores from baseline ($M =1.44, SD = 0.73$) to post-intervention ($M = 0.93, SD = 0.68$). To assess if these scores changed at the one-month follow-up, an additional $t$-test was completed. There was not a statistically significant difference ($t (5) = -0.85, p = .433, \text{CI} [-0.71, 0.35], d = 0.42$) when comparing BSI Global Severity Index scores at post-intervention ($M = 0.70, SD = 0.43$) and one-month follow-up ($M = 0.88, SD = 0.87$).

To evaluate if there were changes in depressive and somatic symptoms, additional $t$-test were completed to assess if these symptoms changed when comparing baseline and post-intervention scores. On average, participants’ depressive symptoms, as measured by the BSI Depressive Scale, did not statistically change when comparing baseline ($M = 9.40, SD = 5.58$) and post-intervention ($M = 6.10, SD = 7.23$) scores ($t (9) = 1.96, p = .08, \text{CI} [-0.50, 7.10], d = 0.59$). There was no statistically significant difference between BSI Depressive Scale scores at post-intervention ($M = 4.33, SD = 3.98$) and one month follow-up ($M = 5.50, SD = 5.50; t (5) = -0.64, p = 0.55, \text{CI} [-5.83, 3.50], d = 0.29$).

On average, participants’ somatic symptoms, as measured by the BSI Somatic Scale, did not statistically change from baseline ($M = 6.60, SD = 5.54$) to post-intervention ($M = 4.30, SD = 4.50$) scores ($t (9) = 1.99, p = 0.08, \text{CI} [-0.31, 4.91], d = 0.42$). There was also not a statistically significant change when comparing BSI Somatic Scale scores at post-intervention ($Mdn = 4.00$) and one month follow-up ($Mdn = 4.50, z = -0.41, p = 0.68, r = -0.17$).
The question regarding whether participants who completed at least five of the 8 mindfulness intervention modules would have a significant improvement of quality of life from pre to post treatment, was not supported when evaluating the four quality of life indices (physical health, psychological, social, and environmental). There was no significant difference \( t(9) = -0.62, p = 0.55, \text{CI} [-11.60, 6.60], d = 0.18 \) when evaluating participants’ baseline \((M = 57.86, SD = 14.17)\) and post-intervention \( (M = 60.36, SD = 19.67) \) scores on the WHOQOL-BREF physical health index. On average, participants’ post-intervention scores on the WHOQOL-BREF physical health index \( (M = 61.31, SD = 20.88) \) did not significantly differ \( t(5) = -1.57, p = 0.18, \text{CI} [-14.15, 3.43], d = -0.26 \) when compared to their scores one month following the intervention \( (M = 66.67, SD = 17.74) \).

On average, there was not a significant difference, \( t(9) = -2.11, p = 0.06, \text{CI} [-25.00, 0.83] \), when comparing participants’ baseline WHOQOL-BREF psychological index \( (M = 46.25, SD = 18.99) \) from their post-intervention scores \( (M = 58.33, SD = 21.52) \). Participant WHOQOL-BREF psychological index did not significantly differ \( t(5) = 1.44, p = 0.21, \text{CI} [-6.02, 21.30], d = 0.49 \) when comparing individuals scores at post-intervention \( (M = 61.81, SD = 15.68) \) and one month following the intervention \( (M = 54.17, SD = 19.90) \).

When evaluating participants quality of life in the social domain using the WHOQOL-BREF social index, there was no significant change \( t(9) = -1.58, p = 0.15, \text{CI} [-20.26, 3.59], d = 0.33 \) when comparing participant scores at baseline \( (M = 60.83, SD = 25.47) \) and post-intervention \( (M = 69.17, SD = 25.47) \). There was also not a significant difference \( t(5) = 1.00, p = 0.36, \text{CI} [-2.18, 4.96], d = 0.06 \) when comparing participant WHOQOL-BREF social index scores post-intervention \( (M = 69.44, SD = 23.96) \) to the one month follow-up \( (M = 68.06, SD = 22.62) \).
When evaluating participants’ quality of life in the environmental domain using the WHOQOL-BREF environmental index, there was no significant difference ($t (9) = 0.21, p = 0.84$, CI $[-16.28, 19.61], d = 0.08$) between baseline ($M = 170.00, SD = 26.41$) and post-intervention ($M = 168.00, SD = 38.04$) scores. There was no significant difference ($t (5) = -0.25, p = 0.82$, CI $[-31.87, 26.31], d = -0.06$) when comparing participant WHOQOL-BREF environmental index scores post-intervention ($M = 170.83, SD = 43.38$) and at one month following the intervention ($M = 173.61, SD = 27.60$).

Last, the final research question regarding whether participants who completed at least five of the 8 mindfulness intervention modules would have a significant reduction in alcohol from pre to post treatment was not supported. A Wilcoxon Signed Ranks Test found that there was no significant difference between participants’ alcohol use as measured by the AUDIT-C at baseline ($Mdn = 1.80$) and after completing the intervention ($Mdn = 2.20$), $z = -1.07, p = .29, r = -24$. In addition, when evaluating those who completed the follow-up assessment, there was not a significant difference when looking at post-intervention AUDIT-C scores ($Mdn = 2.00$) when compared to one month follow-up ($Mdn = 2.00$), $z = -0.00, p = 0.00, r = 0.00$.

To assess treatment acceptability, the Treatment Acceptability Post Questionnaire was examined. Response items ranged from 1 to 5, in which lower scores indicated a lower rating and higher scores indicating higher ratings. When evaluating participant satisfaction, individuals reported on average being slightly satisfied with the mindfulness program ($M = 4.00, SD = 0.37$). Participants reported that this program on average moderately to significantly met their goals for treatment ($M = 3.56, SD = 0.29$). Participants reported on average that there is a 75% chance that they will continue practicing
mindfulness ($M = 4.22, SD = 0.32$). When asked how much participants learned from the program, individuals reported that on average they learned 3-5 skills ($M = 3.67, SD = 0.41$). Participants reported that this program was slightly to very accessible and flexible with their schedule ($M = 4.56, SD = 0.24$).

DISCUSSION

The purpose of the current study was to evaluate an 8-week self-help online mindfulness-based program for individuals with symptoms related to sexual assault. A sample of 10 students from a Midwestern university participated. The research questions for the current study include evaluating if participants who complete at least five modules of the online mindfulness-based intervention experience a reduction in PTSD symptoms, experiential avoidance, psychological distress (including depressive and somatic symptoms), substance use, mindfulness skills and quality of life. In addition, we were interested if the number of mindfulness modules completed was related to increased mindfulness skills.

The findings from current study support the usefulness of an online mindfulness based intervention for those who have symptoms related to sexual assault. Participants reported significant increases in mindfulness skills and reduction in PTSD symptoms, experiential avoidance, and overall psychological distress. In fact, when comparing baseline and post intervention scores, there is a large effect in the reduction in PTSD symptoms and experiential avoidance and a medium effect in psychological distress. Furthermore, these changes were maintained one month following treatment. There were no significant changes in participant scores on the PCL-5, MEAQ-30, FFMQ and BSI GSI one
month following the completion of the intervention. These findings support that the changes in PTSD symptoms, EA, psychological distress and mindfulness skills maintained one month following treatment.

The current study did not find support for an online mindfulness-based intervention in reducing alcohol use, depressive and somatic symptoms, or an increase in quality of life. Depressive and somatic symptoms, quality of life and alcohol use also did not significantly change one month following the intervention. Last, the current study did not find a relationship between the number of mindfulness modules completed and participants' mindfulness skills.

The findings add to the literature evaluating mindfulness-based interventions for individuals with symptoms of PTSD. The findings from the current study are similar to those found in prior research evaluating traditional (i.e.; in-person, longer session length) mindfulness-based interventions, finding a reduction in PTSD symptoms (Bormann Thorp, Wetherrell, Golshan & Lang, 2013; Heffner, Creap & Kemp, 2016; Hicks & Centofanti, 2017; Kang et al., 2018; Kearney et al., 2013; Kearney et al., 2012; King et al., 2013; Polusny et al., 2015; Seppal et al., 2014), experiential avoidance (Kang et al., 2018; Kearney et al., 2012; Polusny et al., 2015), an increase in mindfulness skills (Heffner et al., 2016; Kang et al., 2018; Polusny et al., 2015), and a decrease in psychological distress (Jain et al., 2007). Furthermore, this study provides support for the use of a less intensive mindfulness based intervention to increase mindfulness skills and to reduce psychological distress (Niles et al., Broderick, 2005). These findings add to the limited literature supporting the use of an online modality when delivering a mindfulness-based intervention (Krolikowski, 2013; Spijkerman, et al., 2016; Boettcher et al, 2014; Cavanagh et al, 2013).
To the author's knowledge, this study is currently the only study that has evaluated a less intensive online mindfulness-based intervention for individuals with symptoms related to sexual assault. The results of this study indicate that there is support for this intervention in addressing PTSD symptoms, EA, mindfulness skills, and general psychological distress. These results are consistent with literature evaluating traditional mindfulness programs (in-person and lengthier sessions) suggesting that the skills taught as well as the impact of these traditional mindfulness programs may successfully translate to an online program to reduce EA and PTSD symptoms. Furthermore, this study illustrates that the skills taught in an online mindfulness intervention are maintained at least a month following treatment.

The current study found that both PTSD symptoms and mindfulness skills significantly changed across the treatment as measured by the PCL-5 and FFMQ. In fact, there was a linear increase in mindfulness skills and a linear decrease in PTSD symptoms across the intervention. However, when looking at differences across the five assessment time points (baseline, the three bi-weekly, and post-intervention assessments), only mindfulness skills were found to have a significant difference. Mindfulness skills significantly increased when comparing baseline and week five scores to week seven and week eight mindfulness scores. This indicates that by week seven, mindfulness skills significantly increased. Though there was a significant difference in PTSD symptoms across time, the analyses to evaluate and compare each time period did not find a significant difference. However, when just comparing participants’ PTSD scores at baseline and post-intervention, PTSD symptoms do significantly decrease. Furthermore, when observing the data, it appears that PTSD symptoms decrease across time as mindfulness skills increase.
As such, the lack of finding a significant difference when evaluating PTSD scores across all five assessments time periods is likely due to the number of contrasts made with a small sample size. Therefore, the current study has found that PTSD symptoms decrease from baseline to post-intervention and mindfulness skills significantly increase by week seven.

On average there was a significant change in participant overall psychological distress as measured by the BSI Global Severity Index (GSI); however, there was not a significant change in participants depressive symptoms (BSI depression index) or somatic symptoms (BSI somatization index). This differs from literature finding that mindfulness has an impact on depressive symptoms (Bormann et al., 2013; Kang et al., 2018; Kearney et al., 2018, Hilton et al, 2017) and somatic symptoms (Kang et al., 2018; Polusny et al., 2015). Furthermore, when looking specifically at literature evaluating online mindfulness interventions, the findings of the current study conflict with prior research showing a significant impact on depressive symptoms (Krolakowski, 2013, Spijkerman et al., 2016, Boettcher et al., 2014, Cavanagh et al., 2013). Of note, the current study found a reduction in both depressive symptoms and somatic symptoms; however, this reduction was not statistically significant.

The BSI GSI consists of all nine indices that the BSI measures including somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism. Therefore, when accounting for participants’ general psychological distress across indices, there was a significant decrease over the course of the mindfulness intervention. When independently evaluating depressive and somatic symptoms, the reduction in symptoms was not significant. Of note, there was a
small effect in reducing somatic symptoms and a medium effect in the reduction in depressive symptoms.

Given the current study found a significant reduction in EA, but did not find a significant reduction in depressive symptoms or somatic symptoms is of specific interest. Theoretically EA is a hypothesized transdiagnostic factor (Hayes et al., 1996); as such one would expect a reduction in various psychological symptoms, including depressive and somatic symptoms. This is supported in the current study, given general psychological distress was reduced along with a decrease in EA. However, depressive and somatic symptoms were not found to significantly reduce. One possible explanation for this finding is perhaps participant depressive and somatic symptoms were not clinically elevated prior to the start of the mindfulness program, reducing the amount of change likely. To evaluate this, participant depressive and somatic symptoms were compared to the BSI Raw Score symptom dimension means across normative samples. When compared to a non-patient normal sample \( M = .28 \) and a psychiatric outpatient sample \( M = .180 \), the depressive dimension BSI mean for the current sample at baseline \( M = 1.52 \) was lower than that of an outpatient sample; however, larger than a normal non-symptomatic sample. Participant somatic BSI dimension mean score in the current sample \( M = 1.03 \) was above that of the normative psychiatric outpatient sample \( M = .83 \). As such participants in the current sample endorse clinical levels of somatic symptoms and slightly lower depressive symptoms when compared to clinical samples indicating the possibility for symptom reduction. When evaluating the depressive and somatic means at baseline and post-intervention, both depressive and somatic symptoms reduce. There was a small effect in the reduction in somatic symptoms and a medium effect in the reduction of depressive
symptoms. These reductions are not statistically significant. As such, another possible explanation is that participants did not experience a strong enough reduction in experiential avoidance to lead to a large enough reduction in depressive and somatic symptoms. Perhaps a mindfulness intervention that incorporated longer mindfulness practices would have led to greater reductions in depressive and somatic symptoms. Last, perhaps a significant change is present; however, the current study lacks the power to detect a statistically significant change due to the small sample size.

The current study did not find a significant difference in quality of life as measured by the WHOQOL-BREF in any of the four (physical health, psychological, social, and environmental) domains. A review of the literature illustrates that there are mixed findings regarding the use of a mindfulness based intervention for improving quality of life. The current study does not support an online mindfulness based intervention in improving quality of life, which is similar to the findings of the RAND corporations systematic review (Hilton et al., 2017); however, these findings differ from some literature evaluating in-person mindfulness-based interventions (Kang et al., 2018; Kearney et al., 2012; Polusny et al., 2015) and studies evaluating online mindfulness based interventions (Krolifikowski, 2013; Boettcher et al., 2014).

When evaluating the psychological and social domains of the WHOQOL-BREF, there was a slight increase when comparing scores from baseline and at post-intervention; however, these changes were not significantly different. The physical health and environmental domains remained relatively consistent when comparing baseline and post-intervention scores. As such, these results may support that participants’ quality of life scores in the psychological and social domains were trending in the direction of
improvement. One possible explanation for the lack of significant changes may be due to the need for a larger dose of mindfulness practice.

The current study did not find a statistically significant reduction in alcohol use over the course of the mindfulness intervention. One possible explanation for the lack of change in alcohol use in the current sample is the low AUDIT-C scores at baseline. As suggested by Dawson and colleagues (2005), a cutoff score of 5 or more in the AUDIT-C is sensitive to identifying risky drinking among college students. In the current sample, zero participants scored at or above a five, indicating that there may not have been room for a statistical significant reduction in alcohol use. Similarly, the current study was unable to analyze drug use. This is due to the low amount of drug use endorsed by the current sample. The lack of drug use and alcohol use in the current study is inconsistent with other studies finding an increase rate of drug and alcohol use among those with a history of sexual assault (Campbell et al., 2009; Ullman et al., 2016). When compared to college samples in general, the drug use in the current sample is consistent. Substance Abuse and Mental Health Services Administration (SAMHSA, 2013) found that the rate of illicit drug use was 22.3% among full-time college students aged 18-22. In the current sample, there were only two participants who endorsed drug use (20%). Among full-time college students, 12.7% are heavy drinkers with 39.0% engage in binge drinking (SAMHSA, 2013). As such, perhaps the current sample more accurately reflects that of a general student sample in terms of substance use, and may not generalize to community samples that have symptoms related to sexual assault and endorse greater substance use.

As mentioned, given the current study does not support the use of a less intensive online mindfulness-based intervention to reduce depressive symptoms, somatic symptoms,
or improved quality of life whereas other research has found support, may indicate that there are dose effects related to mindfulness practice. The current study was unable to evaluate if the number of minutes of mindfulness practiced influenced participant outcomes given the lack of participant data (only one participant responded to the estimated number of minutes spent practicing mindfulness at each assessment time period). Participant engagement in mindfulness practice outside of completing the mindfulness modules may have a large impact in the likelihood or amount of change in PTSD symptoms and experiential avoidance. Perhaps if individuals engaged in greater mindfulness practice outside of the modules, there would be a reduction in depressive and somatic symptoms, alcohol use, and improved quality of life. In addition, these findings indicate that there may be differences in outcomes when comparing intervention modalities (online vs. traditional in-person interventions). As literature has found an improvement in quality of life and a reduction in somatization among those who complete a mindfulness-based intervention conducted in person for longer session lengths, there may be differences in effectiveness between in-person and online mindfulness. Therefore, further research is needed to evaluate the dose effect requirements as well as differences in mindfulness-based intervention modalities in addressing various psychological symptoms.

Clinically, the findings of the current study support the use of an online mindfulness based intervention to address PTSD symptoms, EA, and mindfulness skills for those who have symptoms related to sexual assault. Though PTSD symptoms reduced among participants in the current study, some participants still experienced significant PTSD, depressive, and somatic symptoms following this intervention. This illustrates that less intensive online mindfulness as a stand-alone intervention does not lead to as strong a
reduction of PTSD symptoms when compared to evidence-based interventions for PTSD, such as CPT and PE. However, an online mindfulness-based intervention could reach individuals who may be less likely to seek traditional mental health treatment and may provide individuals with PTSD symptoms the skills and tools to target and reduce PTSD symptoms and experiential avoidance to a degree, which may assist in greater treatment engagement with evidence-based treatments for PTSD in the future. Mindfulness-based interventions may serve as an adjunctive treatment to evidence-based treatments such as CPT and PE (Miller et al., 2020). Adjunctive use of a mindfulness intervention may further reduce EA allowing for individuals to relate to distressing internal stimuli differently during an EBP for PTSD. In fact, Owens, Walter, Chard, and Davis (2012) found that improvements in mindfulness skills among Veterans who were engaged in a mindfulness intervention concurrently with CPT was predictive of fewer PTSD symptoms at post-treatment. In addition, mindfulness as an adjunctive treatment may lead to improved coping (Bear, 2006). Last, mindfulness skills may provide further benefit to those who complete an evidence-based treatment and continue to experience some symptoms. This intervention may assist in generalizing the reduction of experiential avoidance. However, further research of the use of mindfulness-based interventions during aftercare is needed.

Given the limited literature on identifying predictors for participants that benefit from a mindfulness-based intervention, further research is needed to identify who would benefit. In the current study, those who endorse at least moderate symptoms of PTSD were found to experience a reduction of PTSD symptoms. As such, it is unknown if those who report more mild symptoms would experience similar improvements. To engage in the current study, participants needed access to Internet and a device to access the online
modules. As such, this specific intervention is less feasible among populations in which these resources are not available. Given that participants PTSD symptoms reduced and depressive and somatic symptoms did not significantly reduce, this intervention may not be as beneficial for individuals whose primary complaint is not related to PTSD symptoms.

**Limitations**

This study is not without limitations and the results should be interpreted with these limitations in mind. The sample of the current study consists of undergraduate students. Undergraduate students may differ from the general population in a few ways. First, undergraduate students have access to more resources than compared to the general population, such as smart phones, computers, and Internet; therefore, this sample is more likely to have access and understand how to utilize an online treatment program, which may not reflect the general populace. Second, undergraduate students represent a higher functioning sample. The findings from the current sample may then not generalize to a clinical sample.

This study evaluated the impact of an online mindfulness based intervention among those who have moderate to more severe PTSD symptoms; therefore, results may not generalize to individuals who have more severe psychological distress regarding their traumatic experiences or other severe comorbidities (i.e.; psychotic symptoms, severe substance use, severe depression). In order to participate, individuals were required to endorse PTSD symptoms; however, a diagnosis of PTSD was not required nor assessed. As such the findings may not generalize to those who meet the full diagnostic criteria of PTSD. Overall, the reduction in PTSD symptoms, psychological distress, and experiential
avoidance found in the current study may be not generalize to those who have more severe psychopathology and comorbidities.

Another limitation of the current study is the lack of a control condition. Due to the limited amount of research regarding online mindfulness interventions, this study aimed at identifying if an online mindfulness intervention leads to an increase in mindfulness skills and a reduction in psychological symptoms. As such, a control condition was not included. Given the current study has found support for an online less intensive treatment modality, additional research that includes a control condition is necessary. A control condition would allow greater confidence that the changes found in the treatment group are due to the introduction of the intervention and not due to other confounding variables.
Specifically, the current study was unable to control for the lapse of time by comparing changes in symptoms across time among those who have and have not undergone the mindfulness intervention. As such, it is unclear if participants in the current study would have experienced a reduction in PTSD symptoms without any intervention.

The current study had a low sample size. The low sample size is a limitation in the current study as this reduces power and limits the ability to find effects even if effects exist in the sample. It is recommended for future research to increase sample sizes to increase power, allowing for more advanced statistical analyses. The limited sample size is due to low recruitment and retention of participants. This may indicate individuals are not interested in the opportunity to engage in a mindfulness intervention. However, there are other potential explanations for the low sample size: students may have not been comfortable to disclose a history of sexual assault, believed their symptoms were not significant enough to warrant intervention, or felt they were not able to engage in
treatment due to time restrictions. Though individuals are becoming more aware of mindfulness, another potential reason for low recruitment is the lack of awareness of what mindfulness entails.

There was a high dropout rate for the current study (44.44%). When evaluating dropout rates from internet-based treatments for psychological disorders, Melville and colleagues (2010) found that dropout ranged from 2 to 83% with a weighted average of 31%. Therefore, the dropout rate for the current study is slightly above the weighted average, however, within the range. Currently there is not a lot of research evaluating factors that increase dropout for Internet based interventions (Melville, Casey & Kavanagh, 2010). As mentioned, some participants reported time restraints and/or additional life stressors as reasons to discontinue. However, many participants did not follow-up to report the reason for discontinuing. Given this intervention was developed to maximize participant access and reduce treatment barriers, future research into the barriers to and predictors of withdrawing from self-help mindfulness based interventions is suggested. Potential reasons that individuals discontinued include, discomfort in engaging in mindfulness, a dislike for the mindfulness modules, lack of motivation, or difficulties in problem solving how to fit a new behavior (practicing mindfulness) in an already busy daily routine. As such, it may be beneficial for self-guided interventions to first utilize methods to increase motivation such as enhancing psychoeducation and other motivational enhancement techniques. It may be beneficial for participants to engage in problem solving with a provider regarding how to incorporate a daily mindfulness practice into their schedules prior to starting the intervention. More research is needed to guide recommendations to improve online treatment programs.
The current study reassessed participant symptoms after one month post intervention to evaluate if the change in symptoms maintained. The findings support that the effects of an online mindfulness intervention maintains after one month. The current results do not illustrate the long-term impacts that this intervention may have, such as six months or more post intervention. In addition, due to the lack of response to the follow-up assessment, the current results are restricted to those who responded to the follow-up assessment and may miss important changes that occurred in those who did not respond to the follow-up assessment. Additional research to evaluate the long-term impact of an online mindfulness-based intervention is warranted.

The current study was reliant on self-report outcome measures. As such, they may be limited in assessing impact. Participant self-report is more susceptible to biases and may not include functional or behavioral changes. Future studies that include additional measures that evaluate observable changes are recommended.

Finally, it is not known the exact number of hours of mindfulness practice that is necessary for maximum benefit. The current study supports the use of a less intensive mindfulness based intervention, in which participants are asked to engage in 10-15 minutes of mindfulness a day. This intervention supports improvements in mindfulness skills, reduction in PTSD symptoms, psychological distress, and EA. This is similar to prior research indicating improvements in mindfulness skills and reduction in psychological symptoms with 50-70 minutes of mindfulness practice a week (Taylor, Strauss, Cavanagh & Jones, 2014; Niles et al., 2012). However, research supports the need for intense practice to gain expertise in a variety of activities (e.g.; Ericcson, Krampe, Tesch-Romer, 1993; Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007). Therefore, additional
minutes of mindfulness practice each day may result in greater improvements in symptoms. Currently, there is limited research evaluating the impact of various levels of mindfulness exercise. Research investigating the dose response effects of mindfulness practice is warranted.

To the author's knowledge this is the first study investigating the impact of a less intensive online mindfulness-based intervention for symptoms related to sexual assault. This study supports the use of an online mindfulness based intervention to reduce PTSD symptoms, EA, psychological distress, and to increase mindfulness skills. Overall, participants reported finding they learned new skills, found the intervention accessible, reported the intervention as being helpful, and somewhat aligned with their goals. Clinically, the use of an online mindfulness-based intervention may be beneficial as an adjunctive, prior to or post-care intervention to assist in symptom reduction and enhance mindfulness skills.
References


from the National Epidemiologic Study on Alcohol and Related Conditions. Archives of General Psychiatry, 65, 1429–1437.


doi:http://dx.doi.org.libproxy.library.wmich.edu/10.1037/ser0000154


Cognitive Behavioral Therapy for Posttraumatic Stress Disorder in Women: A Randomized Controlled Trial. JAMA, 297(8), 820-830.


Appendix A

Practice Log
<table>
<thead>
<tr>
<th>Day</th>
<th>Date</th>
<th>Practice (Y/N)</th>
<th>Minutes Practiced</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td></td>
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<tr>
<td>Tuesday</td>
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<tr>
<td>Wednesday</td>
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<td>Saturday</td>
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<tr>
<td>Sunday</td>
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</tbody>
</table>
Appendix B

Timeline of Assessment Administration
<table>
<thead>
<tr>
<th>Assessment/Questionnaire</th>
<th>Purpose</th>
<th>Time Administered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Screening Interview</td>
<td>Identify inclusion criteria</td>
<td>Baseline</td>
</tr>
<tr>
<td>Demographic Questionnaire</td>
<td>Obtain demographic data</td>
<td>Baseline</td>
</tr>
<tr>
<td>Sexual Experiences Survey-Short Form Victimization (SES-SFV)</td>
<td>Assessment of unwanted sexual experiences</td>
<td>Baseline</td>
</tr>
<tr>
<td>Childhood Trauma Questionnaire (CTQ)</td>
<td>Assessment of childhood sexual abuse</td>
<td>Baseline</td>
</tr>
<tr>
<td>Life Events Checklist-5 (LEC-5)</td>
<td>Screen for exposure to potentially traumatic events</td>
<td>Baseline</td>
</tr>
<tr>
<td>Posttraumatic Stress Disorder Checklist-5 (PCL-5)</td>
<td>Assesses PTSD symptom severity in past month</td>
<td>Baseline, week 3, 5, 7, post-intervention, 1 month follow-up</td>
</tr>
<tr>
<td>Acceptance and Action Questionnaire-II (AAQ-II)</td>
<td>Assesses for experiential avoidance and psychological flexibility</td>
<td>Baseline, post-intervention, 1 month follow-up</td>
</tr>
<tr>
<td>Five Facet Mindfulness Questionnaire (FFMQ)</td>
<td>Assesses mindfulness skills</td>
<td>Baseline, week 3, 5, 7, post-intervention, 1 month follow-up</td>
</tr>
<tr>
<td>Multidimensional Experiential Avoidance Questionnaire-30 (MEAQ-30)</td>
<td>Assesses experiential avoidance</td>
<td>Baseline, mid-intervention, post-intervention, 1 month follow-up</td>
</tr>
<tr>
<td>Question regarding average minutes of mindfulness practice in the past 2 weeks</td>
<td>Obtain an estimated number of minutes practicing mindfulness</td>
<td>Bi-weekly, post-intervention, 1 month follow-up</td>
</tr>
<tr>
<td>Brief Symptom Inventory (BSI)</td>
<td>Assesses for various clinically relevant psychological symptoms</td>
<td>Baseline, post-intervention, 1 month follow-up</td>
</tr>
<tr>
<td>Alcohol Use Disorders Identification Test-Consumption (AUDIT-C)</td>
<td>Screen for Alcohol consumption</td>
<td>Baseline, post-intervention, 1 month follow-up</td>
</tr>
<tr>
<td>Substance Use Questionnaire (SUQ)</td>
<td>Assesses for drug use</td>
<td>Baseline, post-intervention, 1 month follow-up</td>
</tr>
<tr>
<td>WHO Quality of Life-BREF (WHOQOL-BREF)</td>
<td>Assesses quality of life</td>
<td>Baseline, post-intervention, 1 month follow-up</td>
</tr>
<tr>
<td>Treatment Acceptability Pre- and Post</td>
<td>Assesses for perception regarding intervention</td>
<td>Pre and Post-intervention</td>
</tr>
</tbody>
</table>
Appendix C

Pre-Screening Interview
1. What is your preferred written and spoken language? Are you fluent in English?

2. Are you currently enrolled at Western Michigan University? What grade level are you currently?

3. Are you currently or have you in the past sought/received mental health services?
   a. IF yes:
      i. For what reasons are you receiving/having had received mental health services?
      ii. What kind of treatment are you receiving?
      iii. Where are you receiving services/how long ago have you received services?
   b. IF no: Have you ever been interested in receiving mental health services?
      i. If yes: What do you think prevents you from seeking out/receiving mental health treatment?

4. Have you in the past 8 weeks started a new psychopharmacological treatment?
   a. IF yes:
      i. When did you start treatment?
      ii. What drug have you recently started?

5. Have you ever had the sensation of hearing or seeing things that other people could not hear or see themselves?
   a. IF yes:
      i. Describe what you saw/heard
      ii. How long ago was the last experience of hearing/seeing something?
      iii. How often does this occur?

6. Do you have thoughts of hurting yourself or others?
   a. IF yes:
      i. Do you have a plan?
      ii. Do you have the means?
      iii. What is your current living situation? Are others in the home with you?
Appendix D

Outline of Intervention Modules
<table>
<thead>
<tr>
<th>Module 1</th>
<th>Content</th>
<th>Mindfulness exercise</th>
<th>Homework</th>
</tr>
</thead>
</table>
| | • Introduction to mindfulness/psychoeducation  
• Review importance of daily practice  
• Raisin exercise  
• Body Scan | Body Scan (15 min) | Body Scan (15 min)  
*Optional: The raisin exercise*

<table>
<thead>
<tr>
<th>Module 2</th>
<th>Content</th>
<th>Mindfulness exercise</th>
<th>Homework</th>
</tr>
</thead>
</table>
| | • Reflect on homework if having difficulty in practicing daily- look the tips to practicing mindfulness page  
• Discuss avoidance.  
• Differentiate between formal and informal mindfulness exercise  
• Awareness of the present moment.  
• Mindfulness of breathing | Mindfulness of breathing (5 min) | Mindfulness of breathing (5 minutes)  
*Alternate with*  
Body Scan (15 min)  
*Pleasant events calendar*

<table>
<thead>
<tr>
<th>Module 3</th>
<th>Content</th>
<th>Mindfulness exercise</th>
<th>Homework</th>
</tr>
</thead>
</table>
| | • Reflect on homework  
• Discuss stress response, triggering the fight/flight/freeze response, physiological responses, and the impact of chronic activation.  
• Be present with an unpleasant or stressful event.  
• Sitting with the difficult | Sitting with the difficult (10 min) | Handout: Stress response  
Sitting with the difficult (10 min)  
*Alternate with*  
Mindfulness of breathing (5 min)  
*Unpleasant events calendar*

<table>
<thead>
<tr>
<th>Module 4</th>
<th>Content</th>
<th>Mindfulness exercise</th>
<th>Homework</th>
</tr>
</thead>
</table>
| | • Reflect on homework  
• Introduction to moving mindfulness/yoga.  
• Mindful movement | Mindful of movement (15 min) | Mindful of movement (15 min)  
*Alternate with*  
Body Scan (15 min) and/or  
Mindfulness of breathing (5 minutes)  
*Handout: Sitting and standing yoga postures*  
*Optional: Mindful of movement (Longer version, 35 min)*

<table>
<thead>
<tr>
<th>Module 5</th>
<th>Content</th>
<th>Mindfulness exercise</th>
<th>Homework</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Discussion of breath practice and observation.</td>
<td>Mindfulness of breathing</td>
<td>Mindfulness of breathing (10 min)</td>
</tr>
<tr>
<td>Module</td>
<td>Activity</td>
<td>Time</td>
<td>Instructions</td>
</tr>
<tr>
<td>-------------</td>
<td>----------------------------------------------------------------------------------------------</td>
<td>-------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Module 6</td>
<td>• Mindfulness of breathing</td>
<td>(10 min)</td>
<td>Participants were encouraged to try and practice mindfulness without audio guidance. If desire to practice with a guided mindfulness exercise all prior audio exercises were made available.</td>
</tr>
<tr>
<td></td>
<td>• Introduce sitting meditation focused on breath and expanding awareness to sensations, sounds, thoughts, emotions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module 7</td>
<td>• Introduce walking meditation • Discussion of mindlessness walking.</td>
<td>Walking meditation (10 min)</td>
<td>Participants were encouraged to practice without audio guidance. Participants could choose a favorite mindfulness exercise to practice or mix a variety of mindfulness exercises. All tracks were made available.</td>
</tr>
<tr>
<td>Module 8</td>
<td>• Discuss/review skills learned. • Additional mindfulness resources were made available • Introduced to love and kindness meditation with an audio of a Love and Kindness meditation</td>
<td>Love and Kindness meditation (9 min)</td>
<td>Participants were encouraged to continue practicing, incorporating mindfulness exercise into their daily self-care practice. Additional resources were made available, such as readings, guided mindfulness exercises, and other mindfulness classes they can participate if desired.</td>
</tr>
</tbody>
</table>
Appendix E

Demographic and Treatment Acceptability Questionnaires
Demographic Questionnaire

1. What is your current age: __________
2. What is your identified gender: M F Transgender Other: __________
3. Race and ethnicity:
   a. Asian/Asian American, including Chinese, Japanese, Pacific Islander and others
   b. Black or African American
   c. Hispanic or Latin(a/o), including Mexican American, Central American and others
   d. White, Caucasian, Anglo, European American; not Hispanic
   e. American Indian/Native American
   f. Mixed; identify as multiple race/ethnicities
   g. Other (write in): __________
4. What is your current class standing:
   a. Freshman
   b. Sophomore
   c. Junior
   d. Senior
   e. Graduate student/Graduate Special
   f. Non-degree seeking student
   g. Other (write in): ________
5. What best describes your current educational status?
   a. Full-time student (taking 12 or more credit hours this semester)
   b. Part-time student
   c. Other_____
6. In addition to being a student, are you currently employed?
   a. IF yes: How many hours on average do you work a week?
7. Which of the following best describes your sexual identity?
   a. Heterosexual, straight
   b. Homosexual, Lesbian, Gay
   c. Bisexual
   d. Pansexual
   e. Other (write in): ______
8. What is your current relationship status:
   a. Married
   b. Single, not in a relationship
   c. Single, in a current relationship
      i. IF yes: How long have you been with your current partner? ______
   d. Divorced
   e. Separated
9. Please circle the statement that best describes your experience with meditation or mindfulness:
   a. I have never heard of it
   b. I have heard about it but do not have extensive knowledge about it
   c. Have practiced if one or a few times before
d. I have experience and practice with it but not consistently

e. I practice it regularly and consistently
   i. IF endorsed: Please briefly describe your experience: 

10. Previous psychological treatment(s) (check all that apply):
   a. None
   b. Medication
   c. Individual therapy
   d. Group therapy
   e. Support group
   f. Case management
   g. Pastoral care
   h. Hospital program (inpatient or partial hospitalization)
   i. Other (write in): 

11. Current psychological treatment(s) you are receiving (check all that apply):
   a. None
   b. Medication
   c. Individual therapy
   d. Group therapy
   e. Support group
   f. Case management
   g. Pastoral care
   h. Hospital program (inpatient or partial hospitalization)
   i. Other (write in): 

12. Please list any medications you are currently taking:
**Treatment Acceptability Pre-Intervention**

Now that you have learned about mindfulness and the mindfulness-based online intervention, please answer the following questions using this scale:

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td>Somewhat</td>
<td>Moderate</td>
<td>A lot</td>
<td>Extremely</td>
</tr>
</tbody>
</table>

1. I feel that the things I will do in treatment will help me to accomplish the changes that I want

2. I believe the way the researcher and I are working with my problem(s) is correct.

3. The researcher and I are working towards mutually agreed upon goals.

Using the following scale answer the next question:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Not at all</td>
<td>Very Slight</td>
<td>More than slight</td>
<td>Moderate</td>
<td>A good amount</td>
<td>A lot</td>
<td>A great amount</td>
</tr>
</tbody>
</table>

1. Overall, how much improvement do you expect to experience as a result of treatment?
Treatment Acceptability Post-Intervention

1. **Please rate your satisfaction with this course:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsatisfied</td>
<td>Slightly unsatisfied</td>
<td>Neutral</td>
<td>Slightly satisfied</td>
<td>Satisfied</td>
</tr>
</tbody>
</table>

2. **Please rate the degree to which this course met your goals for treatment:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%, did not meet my goals at all</td>
<td>25%, slightly met my goals</td>
<td>50%, moderately met my goals</td>
<td>75%, significantly met my goals</td>
<td>100%, completely met my goals</td>
</tr>
</tbody>
</table>

3. **Please rate how likely it is that you will continue practicing mindfulness:**

<table>
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<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0% chance I will continue practicing</td>
<td>25% chance I will continue practicing</td>
<td>50% chance I will continue practicing</td>
<td>75% chance I will continue practicing</td>
<td>100% chance I will continue practicing</td>
</tr>
</tbody>
</table>

4. **Please rate how much you feel you learned during this 8-week course:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I learned nothing</td>
<td>I learned at least one skill</td>
<td>I learned a few skills</td>
<td>I learned four or five skills</td>
<td>I learned many skills</td>
</tr>
</tbody>
</table>

5. **Please rate how much you feel the course was accessible and flexible with your schedule:**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all accessible or flexible</td>
<td>Slightly not accessible and flexible</td>
<td>Neutral about accessibility and flexibility</td>
<td>Slightly accessible and flexible</td>
<td>Very accessible and flexible</td>
</tr>
</tbody>
</table>

6. **Please share any comments you have regarding things you learned or enjoyed about this course:**

7. **Please share any comments or suggestions you have for this course:**
Appendix F

Human Subjects Institutional Review Board Approval Letter
Date: January 16, 2019

To: Amy Naugle, Principal Investigator
    Erica Johnson, Student Investigator for dissertation

From: Michelle Suarez, Ph.D., Vice Chair

Re: IRB Project Number 19-01-10

This letter will confirm that your research project titled “Mindfulness and Technology: Evaluating an Online Mindfulness Intervention for Symptoms Related to Sexual Assault” has been approved under the full category of review by the Western Michigan University Institutional Review Board (IRB). The conditions and duration of this approval are specified in the policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note: This research may only be conducted exactly in the form it was approved. You must seek specific board approval for any changes to this project (e.g., you must request a post approval change to enroll subjects beyond the number stated in your application under “Number of subjects you want to complete the study”). Failure to obtain approval for changes will result in a protocol deviation. In addition, if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the IRB for consultation.

Reapproval of the project is required if it extends beyond the termination date stated below.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: January 15, 2020
Appendix G

Informed Consent
Informed Consent
Western Michigan University
Department of Psychology

Principal Investigator: Amy E. Naugle, Ph. D.
Student Investigator: Erica C. Johnson, M.A.

You are invited to participate in a research project titled “Mindfulness and Technology: Evaluating An Online Mindfulness Intervention for Symptoms Related to Sexual Assault”. This study is being conducted by Dr. Amy Naugle and Erica Johnson from Western Michigan University and will serve as Erica Johnson’s doctoral dissertation project.

Purpose of study
This study is investigating the use of an online mindfulness-based intervention for individuals with symptoms related to sexual assault. Mindfulness, as defined by Kabat-Zinn is “the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment (2003 pg. 145).” We will be investigating if a self-help, less intensive online mindfulness-based intervention will reduce psychological distress, increase mindfulness, and decrease attempts to avoid unwanted thoughts and feelings. The results of this study will aid in understanding how to help individuals with sexual assault experiences.

Who can participate?
Currently enrolled college students who are 18-years or older, understand English, who have a history of unwanted sexual experiences, and who are currently experiencing some psychological distress.

Where will the study take place?
The pre-intervention and post-intervention assessment sessions will take place on campus in Wood Hall. The mindfulness modules and repeated assessments that will take place throughout the study will be conducted online via a secure survey platform. You will receive email reminders to complete these assessments.

What is the time commitment to participate in this study?
You will be asked to complete and participate in an 8-week online mindfulness intervention. Each week, you will be asked to complete one online module that will take approximately 15-25 minutes to complete. In addition, you will be asked to practice mindfulness daily for 10-15 minutes. For the first meeting, the pre-intervention assessments, an introduction to mindfulness, and the first mindfulness module will take approximately 1.5 - 2 hours to complete. Depending on how quickly one answers the survey questions, it may take more or less time to complete the first meeting. You will be asked to complete online questionnaires every two weeks (at weeks 3, 5, and 7) and a mid-intervention (week 4) questionnaire. These questionnaires will be completed online and will take approximately 5-10 minutes to complete. At the end of the 8-week online intervention as well as one-month after the completion of the intervention, you will be asked to complete an assessment session that will take approximately 1 hour to complete. Therefore, throughout the entire duration of the study you will be asked to commit approximately 15-17 hours of your time averaging about 1.5 – 2 hours per week.
bi-weekly assessment, and the post-assessment. Individuals are able to receive a $15 gift card if they complete 5-8 modules, the baseline assessment, at least one bi-weekly assessment, and the post assessment. Last, individuals are able to receive a $10 gift card if they complete 5-8 mindfulness modules and the baseline and post assessment. A participant will not receive a gift card if they complete 4 or fewer mindfulness modules and or does not complete the baseline and or the post assessment measures.

**Who will have access to the information collected during the study?**

All information collected during the study is confidential. Your name will not be included on the online survey. Only the investigators and research assistants will have access to the information you provide. A form with your name, identification code, and contact information will be destroyed after the completion of this study. Identifiable information will be kept in a locked file cabinet, separate from all other data. All hard copies of the data collected will be kept in a locked file cabinet in the principal investigator’s lab for three years.

Your identity will be protected by the full extent allowed by the law. However, there are certain circumstances that cannot be kept confidential and must be reported to law enforcement, emergency mental health services or protection agencies. These circumstances include: If you are a danger to yourself or someone else or if you report knowledge of current child or elder abuse. Within the extent of the law your participation in this project as well as your responses during the study will be kept strictly confidential.

**What are alternative treatments options if not interested in participating in this study?**

If you are not interested in participating in this study or desire to obtain further treatment after completing the study a list of referral sites will be provided. Recommended evidence based treatments for PTSD symptoms include Cognitive Processing Therapy (CPT) and Prolonged Exposure (PE), please consult providers if interested.

**What if you decide to stop participating in this study?**

You can choose to stop participating in this study at anytime for any reason without penalty by the investigators or the university. There will be no consequences academically or personally if you chose to withdraw from this study. In addition, the investigator can decide to stop your participation of the study without your consent due to concern of safety or intoxication during study procedures.

Should you have any questions prior to or during the study, you can contact the primary investigator, Dr. Amy Naugle at 269-387-4726 or at amy.naugle@wmich.edu, or Erica Johnson at 616-747-0299 or at ericac.johnson@wmich.edu. You may also contact the Chair, Human Subjects Institutional Review Board at 269-387-8293 or the Vice President for Research at 269-387-8298 if questions arise during the course of the study.
This consent document has been approved for use for one year by the Human Subjects
Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board
chair in the upper right corner. Do not participate in this study if the stamped date is older than
one year.

I have read this informed consent document. The risks and benefits have been explained to me. I
agree to participate in this study.

Please Print Your Name

Participant’s signature Date
Appendix H

Payment Scale
<table>
<thead>
<tr>
<th>Payment amount</th>
<th>Required module completion</th>
<th>Required assessment completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25</td>
<td>7-8</td>
<td>All assessment time periods including: Baseline, bi-weekly assessments, mid-assessment, post-assessment, and one-month follow-up</td>
</tr>
<tr>
<td>$20</td>
<td>6-8</td>
<td>Baseline, mid-assessment, at least one bi-weekly assessment, and post-assessment (can miss two bi-weekly assessments and the one-month follow-up)</td>
</tr>
<tr>
<td>$15</td>
<td>5-8</td>
<td>Baseline, at least one bi-weekly assessment, and post-assessment (can miss two bi-weekly assessments, the mid-assessment, and one-month follow-up)</td>
</tr>
<tr>
<td>$10</td>
<td>5-8</td>
<td>Baseline and post assessment (can miss the bi-weekly assessments, mid-assessment, and one-month follow-up)</td>
</tr>
</tbody>
</table>