Investigation of a Mindfulness-Based Intervention with Survivors of Interpersonal Violence

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INVESTIGATION OF A MINDFULNESS-BASED INTERVENTION
WITH SURVIVORS OF INTERPERSONAL VIOLENCE

by

Laura Elise Stayton

A dissertation submitted to the Graduate College
in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
Psychology
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Interpersonal violence is a widespread problem that includes intimate partner violence, sexual violence, and stalking. The National Intimate Partner and Sexual Violence Survey conducted by the Centers for Disease Control in 2010 reported that approximately 1 in 5 women and 1 in 59 men have suffered sexual assault in their lifetime (Breiding et al., 2014). In addition, 1 in 4 women and 1 in 7 men have been a victim of physical violence perpetrated by an intimate partner (Breiding et al., 2014). A number of potential negative consequences of interpersonal violence exposure include the development of posttraumatic stress disorder, substance abuse, depression, and reduced quality of life. Current empirically supported treatments for posttraumatic stress include Cognitive Processing Therapy (CPT; Resick, Monson, & Chard, 2008) and Prolonged Exposure (PE; Foa, Hembree, & Rothbaum, 2007). While these treatments are highly effective in reducing symptoms, both involve repeatedly exposing oneself to details of the trauma, which can be distressing, and may possibly lead to increased dropout rates or reduced engagement.

An alternative treatment that may be less aversive, and potentially increase participant engagement, involves mindfulness-based strategies. While mindfulness has been used as an adjunct to both CPT and PE, few studies have examined its effectiveness as a stand-alone treatment for victims of trauma. The aim of the current study was to investigate the use of a
Mindfulness-Based Stress Reduction (MBSR) group with a sample of 14 women exposed to interpersonal violence recruited from a variety of community settings. Results suggest that participation in the group intervention resulted in a reduction of PTSD symptoms and experiential avoidance across the 8 weeks. All participants reported enjoying the group suggesting it is a feasible intervention for similar populations.
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INTRODUCTION

Interpersonal Violence

Interpersonal violence is a widespread problem that includes intimate partner violence, assault, sexual violence, and stalking. The National Intimate Partner and Sexual Violence Survey (NISVS) conducted by the Centers for Disease Control (CDC) in 2010 reported that approximately 1 in 5 women and 1 in 59 men have suffered sexual assault in their lifetime (Breiding et al., 2014). In addition, 1 in 4 women and 1 in 7 men has been a victim of physical violence perpetrated by an intimate partner (Breiding et al., 2014). Both men and women can be victims and perpetrators of interpersonal violence, although statistics suggest that women are disproportionately more likely to be victims of sexual violence, intimate partner violence, and stalking (Breiding et al., 2014).

Intimate Partner Violence (IPV)

IPV is defined as any form of physical, sexual, or psychological harm caused by one’s current or former relationship partner (CDC, 2014). IPV may be a chronic, repeated problem, or consist of a single episode of violence (CDC, 2014). Approximately 22.3% of women and 14% of men have experienced severe physical violence perpetrated by a relationship partner in their lifetime (Breiding et al., 2014). Intimate partner violence is a problem within the United States, but also internationally. A study by the World Health Organization (WHO) assessed over 35 countries and found that between 10% and 52% of women reported being physically abused by an intimate partner at some point in their lifetime (WHO, 2005). In addition, a study focused on 10 countries throughout the world found that of women who had experienced violence with a
partner, between 19% and 55% of these women sustained physical injury (WHO, 2005). Therefore, the problem of intimate partner violence is occurring worldwide and may lead to a significant risk of physical injuries in women involved in violent relationships.

In addition to the risk of physical injuries, IPV is associated with a variety of other detrimental effects. Studies have shown that victims of IPV are more likely to have higher rates of depression, poorer physical health, and greater utilization of health services (Fletcher, 2010). Furthermore, a meta-analysis conducted by Golding (1999) indicated that victims of IPV had higher prevalence of suicidality, as well as psychological disorders such as PTSD, alcohol abuse and dependence, and drug abuse than the general population. Given these negative health consequences, it is important to understand how to best treat individuals exposed to violence throughout their lifetime and to prevent the development of posttraumatic stress and other health related issues.

In addition to violence perpetrated by intimate partners, women may also be victims of violence perpetrated by non-partners. In a cross-sectional study of 10,815 women recruited from primary care settings in Spain, 32.7% had experienced violence in their lifetime (Montero et al., 2011). Of those who had experienced violence, 52.8% experienced violence by a partner, 30.5% experienced violence by a non-partner, and 16.7% had experienced violence by both a partner and a non-partner throughout their lifetime (Montero et al., 2011). In this study, women who had experienced violence by a partner or by both a partner and non-partner were more likely to be divorced, have lower education, and lower income (Montero et al., 2011). Women who experienced any form of violence reported significantly poorer physical and mental health than women with no history of violence. In addition, women with a history of IPV only (versus multiple types of violence or non-partner violence only) were three times as likely to suffer a
number of negative health outcomes including psychological distress and somatic symptoms, and were three times as likely to be taking antidepressant or tranquilizer medications (Montero et al., 2011).

Lastly, women who had experienced both IPV and non-partner violence were five times as likely to experience psychological distress or somatic complaints, and six times more likely to be taking antidepressant or tranquilizer medications. In general, those women who suffered violence by a partner suffered the worst health outcomes and those who suffered any violence were worse off than those unexposed to violence (Montero et al., 2011). These findings suggest that women who have been exposed to any type of violence, whether perpetrated by a partner or non-partner, should be screened and offered services to reduce the likelihood of negative health outcomes.

In addition to the detrimental effects of IPV on victims, the health care utilization and yearly expenditure is exorbitant. One longitudinal study assessed over 3,000 women and calculated rates of IPV victimization as well as average health care utilization (Rivara et al., 2007). Women exposed to IPV had higher healthcare utilization across all categories compared to women with no IPV history (Rivara et al., 2007). Interestingly, this use of healthcare decreased following cessation of IPV victimization, but still remained up to 20% higher five years following cessation when compared to women who did not experience IPV (Rivara et al., 2007). Rivara and colleagues (2007) calculated the average health care expenditure based on their results and estimate that approximately $19.3 million are spent each year on care related to IPV per every 100,000 women aged 18–64. This suggests that prevention of IPV should be a priority, and additionally, there needs to be low cost treatment available to victims of IPV.
Sexual Violence

Sexual violence includes a number of acts perpetrated against an individual’s will or by use of coercion including rape by a partner, rape by a stranger, unwanted sexual advances or contact, sexual harassment, systemic rape, sexual abuse of children or elderly (WHO, 2012). According to the NISVS, approximately 19.3% of women and 1.7% of men have been raped during their lifetime (Breiding et al., 2014). In addition, approximately 43.9% of women and 23.4% of men experienced some form of sexual violence in their lifetime (i.e., unwanted sexual contact, sexual coercion, being made to penetrate, noncontact unwanted sexual experience) (Breiding et al., 2014). Violence may also be perpetrated by a known individual or close intimate partner. In fact, in the United States, it is estimated that 8 out of 10 women know the perpetrator of sexual assault (WHO, 2012). Sexual violence is also an international problem. In a study conducted by the World Health Organization they found that rates of sexual partner violence ranges from 6% in Japan to 59% in Ethiopia, with most countries falling between 10–50% (WHO, 2012). In addition to being an international problem, there are a number of identified negative consequences of experiencing sexual assault including negative reproductive and mental health, as well as negative behavioral implications (WHO, 2012).

An additional study utilized data from the 2005 Behavioral Risk Factor Surveillance System (BRFSS) survey of participants within the U.S. adult population to attempt to understand the consequences of sexual assault and determine how those consequences differ by gender (Choudhary, Coben, & Bossarte, 2008). Of the 92,357 participants who completed the survey, 378 had experienced sexual victimization in the previous 12 months, and 6,521 had experienced victimization at some point in their lifetime (Choudhary et al., 2008). Of those reporting victimization, a higher percentage were female (73% in past 12 months, and 87% in lifetime).
With regard to negative consequences, Choudhary and colleagues (2008) report that compared to women with no victimization history, women who had endorsed victimization within the past 12 months or prior to the past 12 months reported poorer mental health, lower life satisfaction, activity limitations, smoking (lifetime victimization only), and episodic heavy drinking. Interestingly, men who reported victimization in the past 12 months only reported higher levels of smoking when compared to a non-victimized group, and men who reported victimization prior to the past 12 months reported poor life satisfaction and activity limitations (Choudhary et al., 2008). It should be noted that these findings are correlational in nature and therefore a causal effect cannot be assumed; however, these clearly indicate that individuals who have experienced victimization also endorse higher rates of negative health conditions. These findings not only demonstrate the potential negative consequences of sexual victimization, but they also illuminate the increased correlation between previous victimization and current engagement in risky behaviors such as episodic heavy alcohol consumption, which may put an individual at further risk of re-victimization (Choudhary et al., 2008). Given these results, it is important to prevent further re-victimization by providing adequate treatment for victims of sexual violence.

Specific Consequences of Interpersonal Victimization

Posttraumatic Stress

One potential negative consequence of interpersonal violence exposure is the development of posttraumatic stress. In general, posttraumatic stress is frequently discussed utilizing diagnostic categories from the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Within the category of trauma and stressor related disorders, one may be diagnosed with Acute Stress Disorder if the individual experiences a variety of symptoms within 1 month
following exposure to a traumatic stressor (American Psychiatric Association [APA], 2013). An additional diagnosis following exposure to a traumatic event, including interpersonal trauma, is posttraumatic stress disorder (PTSD). Posttraumatic stress disorder is defined as a possible response upon exposure to actual or threatened death, serious injury, or sexual violation (APA, 2013). In order to qualify for a diagnosis of PTSD, an individual must have directly experienced a traumatic event, witnessed the traumatic event in person, learned of a family member or close friend exposed to a violent or accidental traumatic event, or experienced first-hand repeated exposure to details of a traumatic event (APA, 2013). Individuals must also exhibit dysfunction in a number of areas including intrusion symptoms, avoidance, negative alterations in cognitions and mood, and alterations in arousal and reactivity (APA, 2013).

Intrusion symptoms include such things as re-experiencing aspects of the traumatic event possibly in the form of nightmares or dissociative flashbacks. They may also include distress or physiological reactions following reminders of the event. Avoidance symptoms include engaging in behaviors that attempt to decrease contact with thoughts or feelings related to the traumatic event, or environmental reminders of the traumatic event such as people or places associated with the trauma. Negative alterations in cognitions and mood can be exemplified by a number of symptoms such as difficulty recalling aspects of the event, persistent negative beliefs about the self or world, distorted blame of self or others, negative emotional responses (e.g., fear, horror, guilt, anger, or shame), reduced interest in pre-trauma activities, feelings of alienation, or constricted affect. Lastly, alterations in arousal and reactivity can include a number of behaviors such as aggressiveness, self-destructive behavior, hypervigilance, increased startle response, difficulty concentration, and sleep difficulties (APA, 2013).
While PTSD may develop following exposure to a traumatic event, it is inappropriate to assume that most individuals exposed to trauma will go on to develop symptoms of PTSD. In fact, development of PTSD is relatively uncommon following exposure to trauma. According to the fourth edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)*, the lifetime prevalence of PTSD is approximately 8% in adult community samples (APA, 2000). Additionally, in studies of individuals who have been exposed to traumatic events (i.e., at risk populations) between one third and one half of individuals develop symptoms of PTSD, with those experiencing rape, military combat or captivity, or ethnic or political internment or genocide among the most likely to develop symptoms (APA, 2000). These rates suggest that a significant proportion of people who are exposed to trauma (i.e., one half to two thirds) do not go on to develop all symptoms of PTSD. Therefore, the most likely response to a traumatic event is recovery and normal functioning.

For those who do develop symptoms of PTSD, the symptoms can be quite debilitating. One study found that PTSD symptomatology was the greatest predictor of health related quality of life, with those reporting lower PTSD symptoms reporting higher quality of life and health status (Nachar, Guay, Beaulieu-Prevost, & Marchand, 2012).

**Substance Abuse**

Another problem that may occur following exposure to a traumatic event is substance abuse. One early study found that women with PTSD were 1.4 times as likely to misuse or abuse substances as women with no diagnosis of PTSD (Helzer, Robins, & McEvoy, 1987). Later studies have continued to support this finding, suggesting that interpersonal victimization is a risk factor not only for PTSD but also for substance abuse. One study compared responses of women in a national telephone survey (The National Women’s Study) who indicated previous
treatment for substance abuse to a sample of women presenting in person for a drug and alcohol dependency treatment program to determine the co-occurring rates of substance abuse, PTSD, and victimization (Dansky, Saladin, Brady, Kilpatrick, & Resnick, 1995). More than 80% of women across the two samples reported a history of victimization (e.g., rape, attempted sexual molestation, aggravated assault, or direct experience of crime) (Dansky et al., 1995). With regard to PTSD, across both samples, 15–50% of the women who had sought treatment for substance abuse had a current diagnosis of comorbid PTSD, with 44–56% meeting criteria at some point in their lifetime. In the same telephone sample, it was found that a greater proportion of women who reported a completed rape also reported use of “heavy” drugs (i.e., barbituates, cocaine, heroin, hallucinogens) (Dansky et al., 1995).

A later study corroborated these findings in a sample of 114 individuals seeking treatment for substance use disorders in which 90% reported a history of victimization and 38% met criteria for current PTSD symptoms (Dansky, Saladin, Coffey, & Brady, 1997). In a more recent study, researchers found similar rates of past victimization in a sample of women presenting for substance abuse treatment, with 89% reporting a history of interpersonal violence, and 70% reporting a history of sexual assault (Lincoln, Liebschutz, Chernoff, Nguyen, & Amaro, 2006). The results of these studies all highlight the comorbidity between substance abuse, interpersonal victimization, and PTSD symptoms.

The high co-occurrence of substance abuse and victimization may be partially accounted for by considering substance use as a maladaptive coping strategy to combat difficulties following victimization. In this sense, victims of trauma may use substances as a way to cope with difficulties or avoid unwanted reminders of the trauma. Peters, Khondkaryan, and Sullivan (2012) tested this hypothesis by studying a community sample of 212 women exposed to IPV.
They measured participant’s self-reported alcohol and drug use, problems with substances, expectancies for the effects of substances, and symptoms of PTSD. Expectancy scores measured how much participants expected that the use of drugs and alcohol would serve three functions: inducing relaxation and reducing tension, increase aggression or arousal, and increase assertion. They found that expectancy scores in all three domains were positively correlated with alcohol problem use scores, posttraumatic stress total symptoms and symptoms severity, and depression symptoms (Peters et al., 2012). Additionally higher tension reduction and relaxation expectancies were significantly correlated with number of days of alcohol use, number of days of cocaine use, and severity of physical and sexual IPV (Peters et al., 2012). These findings suggest that women who hold positive expectancies for alcohol and drugs to induce a positive state may be more likely to consume alcohol following a traumatic experience and, therefore, be more susceptible to problem use. This model suggests that alcohol and substance use may be negatively reinforcing, such that it removes the aversive condition of tension and may be positively reinforcing as it induces a pleasant condition of relaxation.

**Depression**

Another potential consequence of interpersonal trauma exposure is depressed mood. In order for an individual to meet criteria for major depressive disorder (MDD) he or she must meet a minimum of five out of nine criteria, including depressed mood most of the day, nearly every day; diminished interested or pleasure in many activities, most of the day, nearly every day; unexplained significant weight loss or weight gain; insomnia or hypersomnia nearly every day; psychomotor agitation or retardation nearly every day; fatigue or loss of energy nearly every day; feelings of worthlessness or guilt nearly every day; difficulty concentrating or indecisiveness, nearly every day; and recurrent thoughts of death or suicidal ideation (APA, 2013).
Within one sample of 44 female victims of IPV, the most common disorder on a lifetime basis was MDD, with 68.2% having ever had a diagnosis of MDD, while 18.2% met criteria for current MDD (Stein & Kennedy, 2001). Stein and Kennedy (2001) also found a statistically significant comorbidity (greater than expected due to chance) between MDD and PTSD, with 13.6% of the sample currently meeting criteria for both disorders. In addition, in the majority of participants MDD occurred in combination with IPV related PTSD rather than alone, and the authors state that this may suggest that depression is a subsequent result of PTSD (Stein & Kennedy, 2001).

Similar findings have led researchers to investigate whether or not PTSD and MDD are indeed distinct responses to trauma exposure or if they may be overlapping symptomatology accounted for by the same pathway. O’Donnell, Creamer, and Pattison (2004) studied a sample of 363 severe injury survivors who presented to a level one trauma emergency room to assess the extent to which diagnostic categories of PTSD and depression were associated with different predictors or individuals. Findings illuminated that in the majority of individuals, a general traumatic stress factor accounted for symptoms following the trauma at both 3 and 12 months, which suggests that PTSD and depression are likely overlapping responses to a traumatic event. However, they also found that in a small proportion of the sample a unique set of predictors was related to depression alone at 3 months that was resolved by 12 months post-trauma (O’Donnell et al., 2004). This suggests that perhaps acute reactive depression may occur independently in a subset of individuals following exposure to trauma.

**Experiential Avoidance and Trauma**

Taken together, the above studies suggest that trauma exposure increases the risk for a variety of negative consequences such as PTSD, substance abuse, and depression. Although most
individuals may not go on to develop all symptoms to meet criteria for a diagnosis of PTSD or depression per se, individuals may develop maladaptive coping strategies following trauma exposure. One of the symptoms thought to perpetuate difficulties following exposure to trauma is avoidance of internal and external reminders of the trauma. Hayes and colleagues have proposed that rather than utilizing a syndromal or categorical diagnostic approach in which an individual either “has” PTSD, depression, or substance abuse disorder or does not, that it may be more important to look at problems and disorders along a functional dimension (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996).

In a functional classification system, behaviors that are thought to produce or maintain difficulties are the primary level of analysis. For example, Hayes and colleagues (1996) emphasize the impact of experiential avoidance in maintaining emotional and behavioral difficulties. They define experiential avoidance as the “unwillingness to remain in contact with particular private experiences and taking steps to alter the form or frequency of these events and the contexts that occasion them” (Hayes et al., 1996, p. 1154). This process of experiential avoidance has been shown to be implicated in a number of different psychological phenomena and can be detrimental to desired changes. Avoidance may take many forms such as using substances, engaging in a high number of activities (e.g., work), thought suppression or distraction techniques, decreasing engagement in a variety of settings, however, the function of this class of behaviors is always the same, to reduce contact with unwanted stimuli.

In general, experiential avoidance is not an effective coping strategy in the long term. As frequently discussed in the thought suppression literature, an attempt to avoid or reduce contact with a stimulus requires bringing that stimulus to mind. In Wegner’s classic publication on thought suppression he and his colleagues demonstrated the paradoxical effect of thought
suppression (Wegner, Schneider, Carter, & White, 1987). In Wegner’s study, participants were instructed to pay attention to their stream of consciousness for a five minute period and some were told to try not to think of a white bear while others were told to think about a white bear, with all participants told to ring a bell if a white bear did in fact come into their stream of consciousness (Wegner et al., 1987). Researchers found that those who were instructed to NOT think of a white bear surprisingly thought of it more than those who were instructed to think of one (Wegner et al., 1987). Therefore, this landmark study demonstrated that attempting to suppress or avoid thoughts leads to a paradoxical increase in the avoided content. In the case of traumatic memories, an individual may spend a great deal of time and effort in attempts to suppress or avoid unwanted thoughts or memories, even though research shows that this is not an effective method of reducing such stimuli.

In addition, strategies to avoid automatic events (i.e., thoughts, memories, sensations) likely lead to an avoidance of situations, people, and contexts that have cued those events in the past. The individual’s behavioral repertoire becomes restricted and in an effort to avoid potential triggers of unwanted internal stimuli leads the individual to engage with a reduced number of external stimuli, and in turn restricts their interaction and exposure to potential reinforcers. By continuing to engage in this avoidance repertoire, the individual is not given the opportunity to learn that feared situations and internal stimuli are not associated with actual danger, and thus they do not learn to change this maladaptive repertoire (Hayes et al., 1996).

Experiential avoidance may also explain the perpetuation or maintenance of difficulties following trauma through negative reinforcement. As stated above, following exposure to a traumatic event such as sexual victimization or IPV, an individual may begin to avoid internal experiences such as intrusive thoughts or memories about the event, in addition to avoiding
situations that elicit these negative internal stimuli. By engaging in various avoidance behaviors, the individual escapes the negative consequence of interacting with these aversive stimuli in the short term, therefore negatively reinforcing their avoidance repertoire and increasing the likelihood of engaging in avoidance in the future. In this sense, avoidance repertoires are functional in the short term. The challenge with this pattern of behavior is that in the long term, avoidance leads to a lack of learning that feared stimuli are in fact safe and in turn perpetuates avoidance. In addition, as stated above, avoidance or suppression may not even be effective at all and may actually increase the frequency of avoided stimuli, thereby increasing an avoidance repertoire and further reducing engagement and interaction with potentially reinforcing stimuli.

One study assessed the impact of avoidance in accumulative trauma among elderly adults (Dulin & Passmore, 2010). The authors surveyed 1,489 participants through public solicitation in New Zealand, and obtained measures of lifetime trauma exposure, depression, anxiety, and avoidance. They found that accumulated trauma exposure (experience of multiple traumas over one’s lifetime) was significantly related to symptoms of anxiety and depression (Dulin & Passmore, 2010). Interestingly, in hierarchical linear models they found that avoidance partially mediated the relationship between accumulative trauma and depression and anxiety. Further analyses showed that avoidance accounted for 49% of the variance between trauma and depression and 46% of the variance between trauma and anxiety (Dulin & Passmore, 2010). This provides evidence that avoidance may be a maintaining factor in the persistence of difficulties following traumatic stressors.

Another study surveyed a sample of new mothers who had a history of substance abuse during pregnancy (Min, Farkas, Minnes, & Singer, 2007). Participants in this study were asked to report on their previous trauma exposure, general psychological symptoms, use of avoidant
coping, substance abuse, and level of attained education. The authors were interested in determining the impact of avoidant coping styles (i.e., efforts to deny, minimize, or delay dealing with a stressor) on psychological outcomes. Using structural equation modeling, they found that the effect of trauma or abuse on psychological adjustment later in life was partially mediated by education level and avoidant coping strategies (Min et al., 2007). More importantly, the use of avoidant coping styles was significantly related to greater levels of psychological distress and to severe substance abuse. These findings further support the hypothesis that avoidance of symptoms and stressors may lead to further psychological distress and maladaptive behavior.

Emphasizing a functional dimensional approach focused on the use of experiential avoidance techniques may impact the type of treatment that could be utilized with victims of interpersonal trauma. In sum, this literature begs to reason that if experiential avoidance is likely maintaining behavioral and emotional difficulties following trauma exposure, treatments should target symptoms of avoidance in order to be effective.

**Current Treatments**

Given the findings that exposure to trauma can lead to detrimental physical and mental health, clinicians and researchers have developed a number of treatments for those exposed to trauma including Cognitive Processing Therapy (CPT) and Prolonged Exposure (PE). Both of these empirically supported treatments will be reviewed below, followed by a discussion of alternative forms of treatment.

**Cognitive Processing Therapy (CPT)**

One of the current empirically supported treatments for PTSD often used in Veteran Affairs (VA) treatment locations is Cognitive Processing Therapy (CPT; Resick, Monson, & Chard, 2008). CPT has been found to reduce symptoms of military-related PTSD when
compared to a wait list control group (Monson et al., 2006). It has also been found to significantly reduce PTSD symptoms in a group of sexual assault victims relative to a wait list comparison group (Resick & Schnicke, 1992). CPT emphasizes the role of thoughts and assumptions in the maintenance of symptoms, and encourages development of adaptive assumptions regarding the trauma to help the individual understand their emotional responding (Resick et al., 2008). Participants are taught cognitive therapy skills to change thoughts and assumptions that are likely perpetuating trauma related difficulties.

Within this treatment, one optional component requires individuals to write a “trauma account” which involves detailing their worst memory of their traumatic experience in writing while including emotional and sensory details. The patient is then asked to read the account on a repeated basis to put them in contact with traumatic memories. Researchers have assessed if the trauma account portion of therapy is particularly necessary, because often patients will not have the coping skills to complete this task (Resick et al., 2008). In a dismantling study, it was found that therapy conducted with the trauma narrative component showed higher dropout rates (i.e., 26%) than CPT without the narrative component (i.e., 16%) (Resick et al., 2008). This may suggest that the emphasis on details of the traumatic experience in the trauma narrative component of CPT may be less tolerable for patients, and may indicate that therapies that utilize less direct trauma exposure may be useful in preventing dropout.

Prolonged Exposure (PE)

Another empirically supported treatment for PTSD is Prolonged Exposure (PE; Foa, Hembree, & Rothbaum, 2007). PE is recognized as a trauma focused treatment and is considered a first line treatment within Veteran Affairs Medical Centers (Department of Veteran Affairs and Department of Defense, 2017). Many studies have found that PE is an effective treatment for
reducing symptoms of PTSD. In a meta-analysis of studies published comparing PE with other active treatments, Powers, Halpern, Ferenschak, Gillihan, and Foa (2010) reported a large effect on primary and secondary outcomes, as well as a large effect of PE at follow-up time points. PE has been used in samples of interpersonal violence victims as well as military combat veterans. An early study compared the use of PE with stress inoculation training, supportive counseling, and a wait list control condition in a sample of female sexual assault victims (Foa, Rothbaum, Riggs, & Murdock, 1991). It was found that all active treatments reduced PTSD symptoms immediately following treatment; however, PE produced the strongest reduction in symptoms at 3-month follow-up (Foa et al., 1991).

PE has also been studied in veteran samples with combat related trauma. In a diverse sample of veterans receiving mental health care services at an urban VA center, participants who completed PE showed significant reductions in PTSD and depression symptoms, as well as an increase in quality of life immediately following completion of treatment (Goodson, Lefkowitz, Helstrom, & Gawrysiak, 2013). It should be noted that no control group was utilized in this study; therefore, a causal effect of PE in reducing symptoms cannot be assumed. Interestingly, this study found a dropout rate of 27%, which they state is similar to other studies for PTSD (Goodson et al., 2013). This high dropout rates suggests that researchers should attempt to better understand current treatments and develop alternative treatments that may be more feasible for participants.

PE involves the use of psychoeducation, breathing re-training, and imaginal and in-vivo exposure exercises related to the traumatic event (Foa et al., 2007). The exposure components involve hierarchically ranking feared stimuli or material from the least to most anxiety provoking and then systematically promoting contact with that material, either in person or through guided
imagery, while preventing escape or avoidance responses (Department of Veterans Affairs, 2017). The exposure component is thought to help with emotional processing of the memories of traumatic event and is the active component of the treatment. The treatment may last between 8 and 15 sessions depending on the type of trauma and protocol used (Department of Veterans Affairs, 2017).

**Criticisms of Current Treatments**

One criticism of treatments that frequently require individuals to be exposed to traumatic memories, including CPT and PE, is that some individuals may not be willing to do the work, or be compliant with exposure based treatments (Mulick, Landes, & Kanter, 2011). While a previous review of the literature found no differences in the dropout rates of exposure based therapies versus cognitive therapies, eye movement desensitization and reprocessing (EMDR), or stress inoculation training (Hembree, et al., 2003), another review suggests that there is a need to find a less aversive means of treating PTSD symptoms (Mulick et al., 2011). It has been suggested that alternative treatments be offered to individuals who are resistant to or unable to engage in, traditional exposure approaches (Follette & Vijay, 2009). In particular, Mulick and colleagues (2011) outline the potential use of third wave behavior therapies in treating PTSD. One commonly utilized skill within a number of third wave therapies is mindfulness.

**Third Wave Behavior Therapies and Mindfulness-based Treatments**

One potential alternative to straight-forward exposure and trauma processing therapies is the use of mindfulness-based therapies to treat trauma related difficulties, including PTSD. Mindfulness is a main component in a number of therapies including Mindfulness-based Stress Reduction (MBSR; Kabat-Zinn, 1994), Mindfulness-based Cognitive Therapy (MBCT; Segal,
Williams, & Teasdale, 2013), Dialectical Behavior Therapy (DBT; Linehan, 1993), and Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012).

Jon Kabat-Zinn is one of the most prominent researchers and trainers of mindfulness in a Western psychotherapy context and is the developer of MBSR. 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). Hence, the training and practice of mindfulness is thought to enhance one’s awareness of the present moment and to let go of judgments as they arise while attending to the present moment. Mindfulness, therefore, involves components of awareness as well as nonjudgmental acceptance (Vujanovic, Niles, Pietrefesa, Schmertz, & Potter, 2011). Third wave behavior therapies and mindfulness interventions aim to increase awareness of the present moment and to decrease experiential and emotional avoidance.

**ACT**

Acceptance and commitment therapy (ACT) is one example of a third wave behavior therapy that promotes acceptance and directly targets experiential avoidance. It was developed by Hayes, Stroshal, and Wilson (updated in 2012). The theory behind ACT is that all humans experience psychological pain and suffering, and that it is actually psychologically healthy to experience pleasant and unpleasant affect (Hayes et al., 2012). ACT emphasizes human language abilities and our instinctive patterns of labeling, categorizing, and judging different stimuli. Although at times this behavior is very helpful, this pattern of responding tends to decrease one’s attention to the present moment, and instead may lead to the individual engaging in a restricted range of behaviors that avoid the “bad” (Hayes et al., 2012).
The goal from an ACT standpoint, which is consistent with a mindfulness-based approach, is to change an individual’s relationship with their thoughts so that they are able to approach rather than avoid thoughts. In ACT, mindfulness is one of the skills taught to patients that facilitates a shift in relationship to one’s thoughts (Hayes et al., 2012). It is theorized that by decreasing avoidance and escape behaviors the person is able to engage in behavioral expansion and instead of being caught up in thoughts they can live a more meaningful, values driven life (Hayes et al., 2012).

ACT has been adapted for use with survivors of trauma, and for those suffering from PTSD. While the current state of the literature is inconsistent with regard to ACT for PTSD, there have been a few single case studies with trauma survivors. ACT, however, has been proven effective in the treatment of a number of other psychological conditions (Engle & Follette, 2014). One case study evaluated the effectiveness of ACT with a female sexual assault survivor (Burrows, 2013). Following 18 treatment sessions over the course of 10 months, the patient displayed a reduction in experiential avoidance, trauma symptoms, and thought suppression and an increase in psychological flexibility (Burrows, 2013).

Another case study discussed the use of ACT with an adult survivor of childhood physical and emotional abuse whose symptoms of PTSD and depression were resistant to change after receiving traditional CBT treatment (Twohig, 2009). In this case study the patient completed 21 sessions of ACT for PTSD and afterwards displayed improvements in PTSD severity, depression, anxiety, and psychological flexibility (Twohig, 2009). Interestingly, posttraumatic thoughts and cognitions did not significantly decrease across treatment for this individual. Twohig suggests that perhaps these findings point to the influence of acceptance and
psychological flexibility (rather than experiential avoidance) in facilitating change in PTSD symptoms more so than typical cognitive change based treatments.

**DBT**

Dialectical Behavior Therapy (DBT) is another example of a third wave behavior therapy that includes mindfulness as an active treatment component and has been utilized in trauma exposed populations. DBT was originally developed by Linehan (1993) for treating chronically suicidal individuals and those with borderline personality disorder (BPD). More recently DBT has been used in a variety of populations, and is considered helpful in treating anyone with emotion dysregulation (Fiorillo & Fruzzetti, 2014). In addition, the overlap of individuals with BPD and trauma or PTSD can range from 33–58%, thus suggesting that perhaps an overlapping intervention may be effective.

The theoretical foundation of DBT is the biosocial theory, which suggests that emotion dysregulation and subsequently BPD occurs in individuals that have a temperamental vulnerability to emotion dysregulation (e.g., emotion sensitivity, reactivity, difficulty returning to baseline). This vulnerability is then coupled with an invalidating environment in which private experiences are often punished (Fiorillo & Fruzzetti, 2014). An invalidating environment may frequently be associated with abuse or trauma, but does not necessarily involve the experience of abuse.

Within DBT one of the main components is teaching the skill of mindfulness in order to facilitate exposure, decrease avoidance, and increase acceptance and emotion regulation capacity (Fiorillo & Fruzzetti, 2014). Within trauma-exposed populations, DBT is regularly used in conjunction with typical exposure based treatments in order to prepare patients by increasing their use of emotion regulation skills prior to beginning exposure therapy. Within DBT the
mindfulness skills taught involve increasing self-observation and self-monitoring of internal and external experiences, and are taught in the context of everyday life (Fiorilo & Fruzzetti, 2014). Mindfulness is a core skill within DBT that is taught across a number of components including distress tolerance, emotion regulation, and interpersonal skills.

A number of studies have assessed the effectiveness of DBT within populations exposed to traumatic events. Stiel and colleagues studied the use of a DBT residential program for victims of childhood sexual abuse experiencing symptoms of PTSD (Stiel, Dyer, Priebe, Kleindienst, & Bohus, 2011). Twenty-nine females with a history of childhood sexual abuse and PTSD as well as one other chronic co-morbid condition were treated in a 6-week intensive residential program focused on DBT skills (including three 25-minute mindfulness exercises a week) and select aspects of trauma focused CBT. The authors found significant improvements in PTSD, depression, anxiety, and general symptoms. In addition, the effect size when comparing PTSD symptoms at pre-treatment to follow-up was found to be 1.22 (Stiel et al., 2011).

Another study assessed the use of a DBT group within 83 veterans presenting for care at a VA hospital (Spoont, Sayer, Thuras, Erbes, & Winston, 2003). A majority of the participants (70% of females and 62% of males) had experienced a traumatic event in their lifetime, with approximately 50% meeting criteria for PTSD and 88% meeting criteria for another psychological disorder. They found that a majority of participants and their clinicians (60%) rated participants as obtaining benefit from the program and 55% reported that they were extremely or very satisfied with the program (Spoont et al., 2003). These findings suggest that DBT is an attractive and feasible intervention in a trauma exposed population.

Taken together, the findings in the sections above suggest that third wave behavior therapies, including ACT and DBT, have been successfully implemented within trauma-exposed
populations and preliminary results suggest that these treatments are helpful in reducing psychological symptoms. Both ACT and DBT firmly emphasize the use of mindfulness skills as a core component. Therefore, it may be that utilizing mindfulness as a standalone treatment may be feasible and effective within trauma-exposed populations.

**Rationale for Mindfulness Treatment**

It is hypothesized that mindfulness might serve a number of functions that make it particularly suitable for treating individuals exposed to trauma. Avoidance is one of the primary diagnostic criteria in PTSD and is often implicated in substance abuse and depression. It is hypothesized that avoidance can be directly targeted by using a mindfulness-based approach. The process of mindfulness may serve a similar function to prolonged exposure by encouraging participants to notice what is happening in the present moment and not try to change it (Baer, 2003). This requires participants to attend to feelings, sensations, and thoughts that they may typically avoid such as traumatic memories or painful feelings. By practicing reducing escape or avoidance of these present moment experiences, the individual may habituate or become desensitized to the thoughts, emotions, or memories (Baer, 2003).

It is further suggested that engaging in mindfulness may improve an individual’s self-management skills (Baer, 2003). By attending to one’s own environment on a moment by moment basis, the individual may become more self-aware and in turn able to utilize coping skills when necessary (Baer, 2003). In addition, by reducing avoidance and increasing self-awareness, mindfulness may increase individuals’ abilities to develop adaptive emotion regulation strategies.

A third function that mindfulness may serve is shifting the person’s cognitive stance by encouraging acceptance of thoughts (Baer, 2003). While people often attach judgments to
feelings or thoughts that arise, mindfulness may be used to help people become more cognitively flexible by viewing thoughts for what they are. Rather than having a thought about a traumatic event and then assigning judgment or blame, an individual can have a thought about their traumatic memories or themselves and accept it as just a thought. Mindfulness encourages just noticing thoughts without attempting to escape or avoid them, and in turn allows the individual to habituate to commonly avoided thoughts or memories.

Mindfulness may function through enhancing relaxation and acceptance (Baer, 2003). While mindfulness may serve similar functions as many traditional cognitive behavioral therapy (CBT) approaches, it differs in a few important ways. Traditional CBT is grounded in cognitive theory and teaches people to evaluate their thoughts and dispute the rationality of such thoughts. Mindfulness approaches teach an opposing strategy of not challenging or disputing thoughts but rather accepting them as they arise. Mindfulness differs from CPT in a similar fashion, such that it does not emphasis altering or challenging thoughts but rather to accept them as they arise. Additionally, in many behavioral approaches utilizing exposure techniques, the individual is induced to actively think about traumatic or avoided content, whereas mindfulness does not induce thoughts or memories, but rather teaches the person to allow them to be there when they arise naturally without the use of escape or avoidance.

Evidence for Mindfulness

Although the literature on mindfulness-based treatments for distress following trauma exposure is less robust than that of CPT or PE, there are a few studies that provide promising results. One study assessed the effect of adding MBSR to usual care for 92 interested veterans at a large VA health care system (Kearney, McDermott, Malte, Martinez, & Simpson, 2012). They found that adding MBSR to usual care led to a reduction in experiential avoidance and an
increase in mindfulness skills at 2- and 6-month follow-up (Kearney et al., 2012). In addition, 47.7% of the veterans in this study showed clinically significant improvements in PTSD symptoms over the course of treatment, while only 6.2% showed worsening of symptoms (Kearney et al., 2012). The authors also found that improvements in mindfulness mediated the outcomes of pre to post-treatment PTSD and depression symptoms as well as quality of life ratings (Kearney et al., 2012). While this study supports the fact that mindfulness is an important component to include in treatment, there was no randomization or control group; therefore, it does not answer the question of whether the treatment as usual or the adjunct mindfulness treatment is responsible for the changes in symptomatology.

Kearney, McDermott, Malte, Martinez, and Simpson (2013) conducted a follow-up clinical trial in which 47 veterans with PTSD were randomized to receive treatment as usual (TAU) or treatment as usual plus MBSR. A greater percentage of the participants who received TAU plus MBSR showed improvements in physical health related quality of life at post-treatment when compared to those who receive TAU alone. Participants in the MBSR condition also demonstrated greater changes in mindfulness skills from pre- to post-treatment. Intention to treat analyses revealed no differences between groups with regard to reduction in PTSD or depression symptoms.

These findings suggest that MBSR delivered in conjunction with TAU did not have a specific effect on PTSD symptomatology. The authors hypothesize that using a generic form of MBSR without adaptation for use with a PTSD sample may have limited the effect on PTSD symptoms (Kearney et al., 2013). Interestingly, in a post hoc analysis the authors did find that a greater proportion of veterans randomized to MBSR had clinically meaningful changes in both PTSD symptoms and health related quality of life (Kearney et al., 2013). Although no specific
effect of MBSR on PTSD symptoms was determined, it is theoretically important to point out that often the goal of mindfulness is not necessarily symptom reduction. Based on foundational theories, improving quality of life may be an equally important factor, regardless of whether symptoms improve.

King and colleagues (2013) studied the effectiveness of an adapted MBCT group intervention in the treatment of veterans diagnosed with combat related PTSD. The authors adapted components of a traditional MBCT program to include psychoeducation about PTSD and common symptoms as well as the physiological stress response (King et al., 2013). Participants in an 8-week MBCT group showed significantly greater improvements in PTSD symptoms as measured by the CAPS, compared to a TAU group (King et al., 2013). The average change in PTSD symptoms in the MBCT group was a reduction of 16 points, which is a clinically significant change. In participants who completed the MBCT group, reductions on the avoidance subscale of the CAPS accounted for the most variance. In contrast, those who received TAU showed no significant reduction in CAPS scores (King et al., 2013). The MBCT group was found to be acceptable based on attendance and homework completion rates, and showed similar dropout rates to the TAU group as well as previous PTSD treatment studies (King et al., 2013). Overall, this study supports the use of MBCT as an adjunctive treatment for PTSD. One limitation of this study is the lack of a randomization procedure.

Another study assessed changes in symptomatology in veterans who were receiving CPT as well as a group format of MBCT for 7 weeks (Owens, Walter, Chard, & Davis, 2012). The authors assessed if changes in four subscales of a mindfulness measure predicted PTSD symptoms following treatment. They found that changes in mindfulness, in particular changes in Acting with Awareness, predicted lower clinician rated PTSD symptom scores. In addition,
changes in the scores on the Describe, Acting with Awareness, and Accepting without Judgment subscales predicted fewer self-reported symptoms (Owens et al., 2012). Interestingly, the overall scores on mindfulness scales utilized in this study did not significantly differ between pre-treatment and post-treatment. This emphasizes the need to evaluate mechanisms of change in mindfulness interventions. Additionally, the same problems exist as with the above study, the lack of a control group leaves the question as to whether improvements are simply due to the treatment typically provided, or if they improved due to the addition of mindfulness training.

One study has assessed the use of an 8-week MBSR program as a standalone treatment for a group of childhood sexual abuse survivors (Kimbrough, Magyari, Langenberg, Chesney, & Berman, 2010). They found that mindfulness skills increased, while depression, anxiety, and PTSD symptoms decreased following treatment (Kimbrough et al., 2010). This finding lends evidence to the fact that MBSR may be sufficient on its own to reduce psychological distress in certain individuals; however, there have been no additional trials evaluating the effectiveness of MBSR as a standalone approach in the treatment of interpersonal trauma victims.

Most recently researchers conducted a randomized clinical trial of MBSR versus Present Centered Therapy (PCT) in 116 veterans with PTSD (Polusny et al., 2015). They found that those in the MBSR group reported greater reductions in PTSD symptoms at post-treatment when compared to those who received PCT. When measured at 2-month follow-up, however, the MBSR group was no more likely to have lost their diagnosis of PTSD than the PCT group. These findings are significant in suggesting that MBSR is more effective than other available treatments in reducing PTSD symptoms. The finding that symptom reduction is not maintained at follow-up leads to additional questions about what strategies might be necessary to increase retention of improvements.
Proposed Research Questions

The primary purpose of the current study was to investigate the efficacy of a mindfulness intervention in reducing psychological distress and increasing psychological flexibility among women who have experienced interpersonal trauma. Participants completed an 8-week mindfulness-based stress reduction group intervention and psychological symptoms were monitored at pre-, post-, and 1-month following the end of treatment. The study aimed to address a number of hypotheses.

Hypothesis 1: Participants who attend at least 50% of the mindfulness classes will exhibit a significant reduction in PTSD symptoms across treatment.

Hypothesis 2: Participants who attend at least 50% of the classes will exhibit a significant decrease in experiential avoidance across treatment.

Hypothesis 3: Participants who attend at least 50% of the mindfulness classes will exhibit a significant reduction in depressive symptoms from pre- to post-treatment.

Hypothesis 4: Participants who attend at least 50% of the mindfulness classes will exhibit a significant reduction in substance use.

Hypothesis 5: Participants who attend at least 50% of the mindfulness classes will exhibit a significant decrease in general psychological distress.

Hypothesis 6: Participants will exhibit a significant increase in mindfulness from pre- to post-treatment.

Hypothesis 7: Participants will exhibit a decrease in perceived stress across treatment.

Hypothesis 8: Participants will demonstrate an increase in areas of growth (as measured by PTGI) at post-treatment than at pre-treatment.
METHOD

Participants

Participants were recruited from a number of local agencies including a sexual assault clinic, a women’s co-op, a YWCA, public university campus, and local settings (i.e., coffee shops and retail stores). Recruitment involved posting flyers with a description of the mindfulness course in the lobbies of agencies as well as direct referral from providers in clinical settings.

Twenty-eight women were referred and subsequently screened for inclusion in the treatment study. Screening appointments occurred at community agencies or on a university campus. Screening sessions involved completion of self-report measures as well as an informal interview with a researcher. Fourteen women were included as participants. Please see Figure 1 for a depiction of the participant screening process. Any woman over the age of 18 with a history of interpersonal trauma exposure was eligible for inclusion in the study. Individuals who currently endorsed suicidal intent, an active psychotic episode, or presented to the screening under the influence of recreational drugs or alcohol were excluded from participating; however, only one individual was determined to be ineligible during the screening process. Nine individuals dropped out between the screening and the initiation of the group, and one was unable to attend the group at the scheduled time. Three additional participants dropped out during the course of the 8-week group. Two of those dropouts occurred due to a change in work schedule and inability to attend the group at the same time. We were unable to obtain a reason for dropout from the third participant. Of the 14 participants who completed the treatment group,
57.1% \((n = 8)\) were recruited from a sexual assault clinic, 21.4% \((n = 3)\) were recruited from the general community, 14.3% \((n = 2)\) were recruited from a women’s co-op, and 7.1% \((n = 1)\) were recruited from a local YWCA.

![Participant flow diagram](image-url)

*Figure 1. Participant flow diagram.*
To determine whether there were significant differences in demographic or pre-treatment psychological symptoms between those who completed the group versus those who did not initiate the group following screening and those who dropped out prior to completing at least 50% of the sessions (i.e., non-completers), a series of independent sample t tests and chi-square analyses were conducted comparing these two groups. Please see Table 1 for a summary of the differences between completers and non-completers on demographic and baseline symptom measures. These two groups only differed significantly in terms of race, with a greater percentage of non-completers identifying themselves as African American \((n = 6, 46.4\%)\) than completers \((n = 0, 0\%)\). Individuals who completed the group all identified as Caucasian. Although the differences were not statistically significant, those who completed the group had lower scores on PTSD (PTSD checklist; \(M = 29.000, SD = 14.347\)), perceived stress (Perceived Stress Scale; \(M = 20.143, SD = 5.803\)), and experiential avoidance (Acceptance and Action Questionnaire; \(M = 26.857, SD = 7.533\)) measures at pre-treatment compared to non-completers. This may suggest that completers were less symptomatic than those who dropped out of the group.

Within the sample of 14 women who participated in the study, their ages ranged from 25 to 72 years with an average age of 45.7 years \((SD = 13.62)\). Although individuals of varying ethnicities participated in the screening, the final sample of individuals who completed at least 50% of the mindfulness groups was entirely Caucasian women. Regarding level of education, 14.3\% \((n = 2)\) of the sample reported that 12th grade was the highest level of education completed, 28.6\% \((n = 4)\) reported some college, 7.1\% \((n = 1)\) reported completing an associate’s degree, 28.6\% \((n = 4)\) reported completing a bachelor’s degree, and 21.4\% \((n = 3)\) reported completing a master’s degree. In terms of income, the majority of the sample (35.7\%) reported
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<td>62.500 (11.131)</td>
<td>62.833 (7.767)</td>
<td>0.085</td>
<td>22</td>
<td>.933</td>
</tr>
<tr>
<td>PSS</td>
<td>23.077 (6.946)</td>
<td>20.143 (5.803)</td>
<td>1.195</td>
<td>25</td>
<td>.243</td>
</tr>
<tr>
<td>FFMQ-Observable</td>
<td>29.692 (4.231)</td>
<td>27.692 (7.387)</td>
<td>0.847</td>
<td>24</td>
<td>.405</td>
</tr>
<tr>
<td>FFMQ-Describe</td>
<td>26.846 (7.459)</td>
<td>26.357 (5.213)</td>
<td>0.199</td>
<td>25</td>
<td>.844</td>
</tr>
<tr>
<td>FFMQ-Act with Awareness</td>
<td>24.833 (6.834)</td>
<td>25.071 (4.582)</td>
<td>0.106</td>
<td>24</td>
<td>.917</td>
</tr>
<tr>
<td>FFMQ-Non-judging</td>
<td>24.308 (4.956)</td>
<td>25.786 (8.396)</td>
<td>0.551</td>
<td>25</td>
<td>.586</td>
</tr>
<tr>
<td>FFMQ-Non-reacting</td>
<td>21.000 (5.543)</td>
<td>21.071 (4.891)</td>
<td>0.035</td>
<td>24</td>
<td>.972</td>
</tr>
<tr>
<td>Hours drank in a typical week</td>
<td>.885 (1.502)</td>
<td>1.786 (2.577)</td>
<td>1.119</td>
<td>21.180</td>
<td>.276</td>
</tr>
<tr>
<td>Days drank in a typical week</td>
<td>.462 (.776)</td>
<td>.857 (1.231)</td>
<td>0.989</td>
<td>25</td>
<td>.331</td>
</tr>
<tr>
<td>SIP</td>
<td>2.077 (3.730)</td>
<td>3.143 (8.075)</td>
<td>0.434</td>
<td>25</td>
<td>.668</td>
</tr>
</tbody>
</table>

*Note.* LEC = Life Events Checklist; PCL = PTSD Checklist; AAQ = Acceptance and Action Questionnaire; MEAQ = Multidimensional Experiential Avoidance Questionnaire; BSI-GSI = Brief Symptom Inventory- General Symptom Index; BSI-DEP = Brief Symptom Inventory-Depression Subscale; PSS = Perceived Stress Scale; FFMQ = Five Facet Mindfulness Questionnaire; SIP = Short Inventory of Problems related to substances.
an annual income between $31,000–50,000. With regard to relationship status, 35.7% (n = 5) reported being currently married, 14.3% (n = 2) were separated, 28.6% (n = 4) were single but currently in a dating relationship, 7.1% (n = 1) reported being divorced, and 14.3% (n = 2) were single and not currently in a dating relationship.

Participants were also asked to report on their familiarity with mindfulness and mindfulness practice. The majority of the sample (42.9%; n = 6) had some experience but did not practice it consistently, while 14.3% (n = 2) had never heard of mindfulness, 14.3% (n = 2) reported they had heard of it but had no extensive knowledge, 21.4% (n = 3) reported they had practiced it a couple times in the past, and 7.1% (n = 1) reported that they practiced mindfulness regularly.

With regard to previous psychiatric treatment, participants reported on the number and types of treatments they were currently receiving as well as treatments they received in the past. The majority of the sample (92.9%, n = 13) reported currently receiving some form of psychological treatment. Of those in treatment, the most common current treatment reported was individual therapy (71.4%, n = 10), followed by group therapy (35.7%, n = 5), medications (28.6%, n = 4), a support group (21.4%, n = 3), and case management (7.1%, n = 1). Fifty percent of participants reported currently receiving at least two forms of current treatment.

In terms of previous treatment received, 92.9% of the women reported receiving some form of psychiatric treatment in the past, and 78.5% of women reported at least two previous treatments. The most commonly reported previous treatment received was individual therapy (85.7%, n = 12), followed by group therapy (64.3%, n = 9), medications (57.1%, n = 8), a support group (57.1%, n = 8), a hospital program (28.6%, n = 4), pastoral care (21.4%, n = 3), case management (7.1%, n = 1), and other form of care (7.1%, n = 1). The highest number of
previous treatments reported was six different treatments reported by 14.3% of the population 
\((n = 2)\).

**Measures**

**Demographic Form**

An investigator-developed demographic measure was used to gather relevant 
demographic information from participants. This form did not include any specific identifying 
information; however, it asked general questions such as age, race, income, education, 
relationship status, and information regarding previous psychiatric treatments. This measure can be found in Appendix A.

**General Symptoms**

The Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983) was used to screen 
for comorbid psychiatric conditions, and to exclude those with current suicidal ideation. The BSI 
is a 53-item self-report measure that was developed based on the Symptom Checklist 90 
(revised) (Derogatis & Melisaratos, 1983). Participants are asked to rate each item on a 0 to 4 
Likert rating ranging from “not at all” to “extremely.” The inventory is comprised of nine 
subscales including somatization, obsessive-compulsive, interpersonal sensitivity, depression, 
anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The scale also provides a 
measure of general severity of symptoms, positive symptom distress index, and positive 
symptom total score (Derogatis & Melisaratos, 1983). The BSI has been normed in three 
populations including psychiatric outpatients, non-patient normal controls, and psychiatric 
inpatients.

The BSI has demonstrated good psychometric properties including test-retest reliability 
ranging from .68–.91 across the nine subscales suggesting stability of scores across time.
(Derogatis & Melisaratos, 1983). The scale also demonstrated good internal consistency in an outpatient population with Cronbach alpha coefficients ranging from .71 to .85 across subscales (Derogatis & Melisatatos, 1983). The BSI was also found to demonstrate good convergent validity with predicted scales on the MMPI (as predicted due to the correlation between SLC-90-R and MMPI). In another study comparing the BSI to a standard diagnostic interview (Brief Psychiatric Rating Scale, BPRS), overall scores on the BSI and BPRS were found to significantly correlate suggesting convergent validity (Morlan & Tan, 1998). While several of the subscales were significantly correlated (i.e., depressive mood, anxiety, and hostility) a number of subscales failed to demonstrate convergent validity (i.e., somatic concerns, psychoticism, and paranoid ideation) (Morlan & Tan, 1998). Overall, the BSI has been frequently utilized in clinical and research settings and found to be an adequate measure of general psychopathology. This measure was administered at pre-treatment, post-treatment, and 1-month follow-up. For the purpose of the present study, this measure was used to track psychological symptoms across treatment, in particular depression and general psychological distress.

**Trauma Exposure**

In order to determine the participants’ lifetime exposure to traumatic events, the Life Events Checklist (LEC-5; Weathers et al., 2013) was administered. This measure was developed to screen for exposure to 16 possible traumatic events across the lifetime. Within each of the 16 events, participants noted whether it happened to them directly, witnessed it, learned about it, or experienced it as part of their occupation. They also have the opportunity to choose “not sure” or “does not apply” for each event. Although psychometric properties are not yet available for the
newest version, the original LEC that was developed based on DSM-IV criteria was shown to have good psychometric properties.

In a study of 108 undergraduate students, the LEC was administered twice, with 1 week between administrations (Gray, Litz, Hsu, & Lombardo, 2004). The LEC demonstrated adequate test-retest reliability, with the majority of kappa values for events falling above .60 (Gray et al., 2004). However, a few items displayed less than adequate kappa values, which authors attributed to low base rates of the events in the non-clinical population. In addition, the LEC displayed strong convergence with the Traumatic Life Events Questionnaire (TLEQ) with an average kappa value of .55. One exception to this finding was endorsement of “sudden, unexpected death of a loved one” which displayed low convergence.

Lastly, both the LEC and TLEQ were similarly correlated to endorsement of PTSD symptoms, suggesting convergent validity (Gray et al., 2004). An additional study with 131 combat veterans found that, as predicted, the LEC correlated with measures of psychopathology known to be associated with trauma exposure including anxiety, depression, and PTSD (Gray et al., 2004). The LEC was administered at pre-treatment, post-treatment, and 1-month follow-up. For the purpose of this study this measure was utilized to determine type and number of traumatic events prior to treatment as well as any traumas experiences during the course of treatment.

PTSD Symptomatology

For the purpose of tracking PTSD symptoms over the course of the study, the PTSD Checklist (PCL) was used (Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL is a 20-item self-report measure that is commonly used in VA settings to diagnose, track, or screen individuals for PTSD. An updated version of the measure was released in 2013 to correspond to
DSM-5 criteria for PTSD. Scores on the measure can range from 0 to 80. The measure can be used to assess change over time, and it is suggested that a 5–10 point change is greater than would be expected due to chance, and a 10–20 point change is likely to be clinically significant (Weathers et al., 2013).

In a study of female Veteran’s Affairs patients, the PCL was said to be an adequate screening method as compared to the “gold standard” diagnostic measure of PTSD symptoms (Clinician Administered PTSD Scale, CAPS) (Dobie et al., 2002). In a review study of the psychometric properties of the previous version of the measure, the PCL-Military version was found that the measure demonstrates good convergent validity as evidenced by high kappa values when compared to the PTSD portion of the SCID (Wilkins, Lang, & Norman, 2011). The PCL was administered at pre-treatment, at the beginning of every other weekly session, at post-treatment, and at 1-month follow-up. For the purpose of this study this measure was included in order to track PTSD symptoms across treatment.

Mindfulness

In order to assess whether or not mindfulness skills changed throughout the course of the intervention, the Five Facet Mindfulness Questionnaire (FFMQ) was used (Baer, Smith, Hopkins, Kriememeyer, & Toney, 2006). The FFMQ is a 39-item self-report questionnaire utilizing a 5-point (1–5) Likert scale, that assesses five areas of mindfulness including non-reactivity to inner experiences, sense of observing, acting with awareness, describing and labeling emotions, and non-judging of experience (Bergomi, Tschacher, & Kupper, 2012). This measure was developed by conducting an in-depth factor analysis of existing mindfulness measures, which resulted in the five-factor structure. The FFMQ is found to correlate with
meditation experience, as well as certain psychological symptoms, suggesting construct validity of the measure (Baer et al., 2008).

In addition, facets within the FFMQ have been found to mediate the relationship between meditation practice and well-being measures (Baer et al., 2008). The FFMQ was given at pre-treatment, post-treatment, and 1-month follow-up. For the purpose of this study this measure was included to determine whether mindfulness skills increased across treatment and whether these increases predicted decreases in psychological symptoms.

**Acceptance and Experiential Avoidance**

Mindfulness approaches are based on the fact that symptom reduction is not necessarily a goal of mindfulness, but rather that acceptance and acknowledgement of symptoms is the goal. In order to measure an outcome that is consistent with the theory of mindfulness, the Acceptance and Action Questionnaire was used to track acceptance of symptoms (AAQ; Bond et al., 2011). This is a seven-item measure using a 7-point Likert scale with total scores ranging from 7 to 49 and higher scores suggesting greater psychological inflexibility. This measure approximates the constructs of psychological flexibility and experiential avoidance. The measure has demonstrated adequate psychometric properties with a mean alpha coefficient of .84, and 12-month test-retest reliability coefficient of .79 (Bond et al., 2011). This measure was administered at pre-treatment, at biweekly group sessions, post-treatment, and at 1-month follow-up. For the purpose of this study this measure was utilized to determine whether experiential avoidance decreased across treatment.

The Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gamez, Chmielewski, Kotov, Ruggero, & Watson, 2011) was also given to obtain a more in-depth measure of experiential avoidance. The MEAQ is a 62-item questionnaire using a 6-point Likert
scale with answers ranging from “strongly disagree” to “strongly agree.” The measure consists of six subscales as well as a total score ranging from 62 to 372. The subscales include a measure of behavioral avoidance, distress aversion, procrastination, distraction and suppression, repression and denial, and distress endurance. The MEAQ has demonstrated good convergent validity with the AAQ as evidence by total score correlations ranging from .37 to .67 in a sample of undergraduate students, and .37 to .74 in a clinical sample (Gamez et al., 2011). This measure was administered at pre-treatment, post-treatment, and 1-month follow-up.

**Substance Abuse**

In order to track substance use prior to the treatment study and after, modified versions of the Daily Drinking Questionnaire (DDQ) and Daily Drug Taking Questionnaire were utilized. The DDQ was first developed by Collins, Parks, and Marlatt (1985) and found to demonstrate convergent validity with the Drinking Practices Questionnaire. This simple measure asks general questions regarding the amount and frequency of alcohol and drug use across a typical week in the past 3 months of the participant’s life. There is an additional question to gauge the amount and frequency of alcohol and drug use during the week that the individual used most heavily in the past 3 months. Collins and colleagues suggest that those who report drinking an average of 12 or more drinks per week are classified as high-volume drinkers, with those who report drinking at least 4 but not more than 11 drinks per week as moderate drinkers, and lastly, those who drink less than once per month or not at all are classified as abstainers/infrequent drinkers. An additional study assessing the relationship between alcohol use, gender, and psychological distress found a Cronbach alpha coefficient of .78 for the DDQ in a college sample, thus demonstrating good reliability (Geisner, Larimer, & Neighbors, 2004). This measure was administered a pre-treatment, post-treatment, and 1-month follow-up. For the purpose of this
study this measure was included in order to determine if substance use decreases from pre- to post-treatment.

In addition, in order to determine the problems potentially caused by participants’ alcohol and drug use, the Short Inventory of Problems (revised; SIP-R) was included (Kiluk, Dreifuss, Weiss, Morgenstern, & Carroll, 2013). The measure contains 17 items related to possible negative consequences of drug or alcohol use and asks participants how frequently they experienced each item in the past 3 weeks ranging from “never,” “once or a few times,” “once or twice a week,” to “daily or almost daily” score on a scale of 0–3. All items are summed to produce a total score as well as five subscale scores. In a study of substance abuse treatment seekers, the SIP-R demonstrated high internal reliability with Cronbach’s alpha values ranging from .95-.96 (Kiluk et al., 2013). In addition, the SIP-R demonstrated good predictive validity as it was related to treatment retention (Kiluk et al., 2013). The SIP-R was administered a pre-treatment, post-treatment, and 1-month follow-up. For the purpose of this study this measure was included in descriptive statistics to determine whether problems associated with substance use decrease across the intervention time period.

**Perceived Stress**

The Perceived Stress Scale (PSS; Cohen, Kamarck, & Mermelstein, 1983) was administered to measure the patient’s appraisal of current life stress. The measure includes 10 items related to appraisal of life stressors over the past month. Each item is rated on a 0–4 Likert scale ranging from “never” to “very often.” In a study assessing the original 14-item version of the PSS, the scale demonstrated high reliability as evidenced by alpha coefficients ranging from .84–.86 in three different samples (Cohen et al., 1983). In another large scale study of 2,387 U.S. participants, Cohen and Williamson (1988) found that the PSS correlated with participants’ self-
report of current stressful events more highly than those who reported that they had experienced stress during their lifetime but not currently, thus demonstrating construct validity. Further, as predicted, the PSS correlated with negative self-report physical health and higher life dissatisfaction (Cohen & Williamson, 1988). The PSS was administered at pre-treatment, post-treatment, and 1-month follow-up. For the purpose of the present study this measure was included to determine if participants’ perceptions of stress decrease across the intervention time period.

**Personal Growth**

The posttraumatic growth inventory (PTGI; Tedeschi & Calhoun, 1996) was included in the current study to assess possible shifts in positive areas of growth that may occur following exposure to stressful life events. This measure is a 21-item self-report questionnaire that assesses five potential areas of growth including subscales, New Possibilities, Relating to Others, Personal Strength, Spiritual Change, and Appreciation of Life. Participants are asked to rate the degree to which they have experienced each area of change following their “crisis” ranging from “not at all,” to “a very great degree” (0–5).

In an initial development study, Tedeschi and Calhoun (1996) found that the PTGI demonstrated high reliability as evidenced by a Cronbach alpha coefficient of .90 for the total scale and ranging from .67–.85 for each of the five subscales. The scale also demonstrated good discriminant validity as evidenced by its lack of correlation with a social desirability scale (Tedeschi & Calhoun, 1996). This measure was administered at pre-treatment, post-treatment, and 1-month follow-up.
Treatment Acceptability

A measure was included to determine the acceptability of the present treatment. This measure was only administered at the post-treatment assessment period. Given that mindfulness has only been studied in a few trials as a first line treatment in trauma exposed populations, a measure to determine acceptability and satisfaction by participants will help to inform researchers if it is feasible to use in similar populations. This measure can be found in Appendix B.

Practice Log

For the purpose of the present study, a practice log was included to determine and control for amount of practice throughout treatment. The log asked participants to keep a record that they turned in each week outlining the duration of minutes practiced per day. This information was used to determine whether the amount of practice throughout the 8-week period differentially impacted treatment outcome. This measure can be found in Appendix C.

Procedures

Prior to initiation of recruitment procedures, the Western Michigan University Human Subjects Institution Review Board (HSIRB) approved this study. Please see Appendix D for a complete approval letter. Participants who inquired about the group were scheduled for a screening appointment with one of two study researchers. In the initial screening session, participants were provided information about the group and reviewed the informed consent document (please see Appendix E). The remainder of the screening appointment involved completion of the above-mentioned self-report measures as well as a brief semi-structured interview to determine eligibility. Following the initial individual screening session, eligible participants were scheduled to receive the next upcoming MBSR group. The duration of wait
time between screening and the first group session varied for each participant. The mean wait time between the screening and first group session was 45 days ($SD = 31.137$, range 6–96). To determine whether length of wait time was significantly related to symptom measures, Pearson’s correlation coefficients were calculated. Wait time between screening and first session was not significantly correlated with pre-treatment PCL ($r = –.403$) or AAQ ($r = –.206$).

Assessments were conducted at pre-treatment, and immediately following the 8-week treatment. The PCL and AAQ were also administered at the beginning of every other group session in order to track when changes in these constructs occurred throughout treatment. Follow-up assessments were conducted with group participants at 1 month. The groups took place at the agencies from which most participants were recruited in order to increase feasibility for participants. If the individual was recruited from the broader community (i.e., coffee shops) they took part in a group at one of the other agencies, or on a university campus.

**Therapists**

The treatment was delivered by the primary author and another master’s-level clinician. The primary author has attended a number of trainings on mindfulness and has utilized mindfulness on an outpatient basis with previous patients. The additional therapist also received training in mindfulness and had experience using mindfulness with previous clients. The primary author trained the additional clinician and provided regular check-ins with regard to the intervention. Both the primary author and additional therapist were supervised by a licensed psychologist on a regular basis throughout the delivery of the treatment.

**Treatment**

Mindfulness-based Stress Reduction is a program developed by Kabat-Zinn (1994), which consists of eight weekly 2-hour group sessions. The current study included a total of five
groups that took place over a 1-year period. Groups ranged from one to seven participants. The smaller group sizes in the present study were often a result of attrition of individuals between screening and initiation of the group.

The treatment focused on psychoeducation around the topic of mindfulness followed by a heavy emphasis on experiential learning of mindfulness practice and discussion regarding implementing a personal mindfulness practice program. Each week, a new experiential exercise was introduced and practiced. These exercises included mindfulness of breathing, body scan, mindful walking, mindful yoga, mindful attention to sensations, and mindfulness of everyday activities (Brantley, 2005).

Throughout the 8-week course, participants were asked to agree to at least 15 minutes of daily mindfulness meditation practice. This amount of practice was reduced from the typical 45 minutes per day in accordance with findings from a study conducted with low-income, African American women survivors of IPV (Dutton, Bermudez, Matas, Majid, & Myers, 2013). In their study they eliminated the required practice to make the program more feasible; however, this study required 15 minutes per day of practice to ensure that members were using the skills outside of session (Dutton et al., 2013). A full day retreat is also typically conducted between the 6th and 7th week. To once again make the program feasible for the intended population, the retreat was removed from the protocol.
RESULTS

Preliminary Analyses

As mentioned above, the means, standard deviations, and ranges of the continuous demographic variables and the frequencies and percentages for categorical variables for all 14 participants who completed the group are displayed in Table 1. Given that group sizes were small, ranging from one to six participants per group, there was not enough power to test differences between the treatment groups in terms of demographic variables.

Primary Analyses

In order to test hypotheses 1 and 2, two repeated measures ANOVAs were conducted to determine whether there were statistically significant differences in PTSD symptoms (as measured by the PCL) and experiential avoidance (as measured by the AAQ) over the course of the 8-week intervention. As discussed above, participants were administered the PCL and AAQ biweekly, resulting in six potential time points per person from the screening to the post-treatment assessment. This resulted in 84 possible data points. In initial exploration of the data, it was realized that 10 (11.9%) of these data points were missing due to participants missing one or more weekly sessions.

Due to missing data that occurred as a result of select participants missing sessions at random throughout the 8-week group, missing weekly data were imputed for participants using multiple methods. First, missing data were entered using last observation carried forward methods (LOCF). This involved carrying forward their last reported score on the PCL or AAQ only for the missed session, or until further data became available again. For example, if a
participant missed session three, his or her score on the PCL for session one would be imputed for the missing week and then in week five the new data would be entered.

**Last Observation Carried Forward Results**

Initial tests were done to ensure that assumptions of the repeated measures ANOVA test were met for PCL and AAQ scores at each time point. PCL and AAQ were normally distributed at each time point as assessed by Shapiro-Wilk’s test (all p > .05). There were two outliers in the data, as assessed by inspection of boxplots, one score for a participant on the PCL at post-treatment, and another for a participant on the AAQ at session one. Due to outliers in the data, the repeated measures ANOVA was run twice for each measure, once with the outliers, and once without to determine whether the extreme scores impacted the results. There was no significant difference in the pattern or strength of the results for the PCL or the AAQ when comparing the analyses with and without the outliers; therefore, the outliers were included in the analyses reported here.

For changes in posttraumatic stress symptoms as reported on the PCL, Mauchly’s test of sphericity indicated that the assumption of sphericity had not been violated, $\chi^2(14) = 16.283, p = .307$. Results of the repeated measures ANOVA suggest that PCL was statistically significantly different at the time points across treatment $F(5, 65) = 14.178, p < .001$, partial $\eta^2 = .522$. Post-hoc comparisons using a Bonferroni adjustment showed there was a decrease in PCL scores across pre-treatment ($M = 29.00, SD = 14.347$) and post-treatment ($M = 16.64, SD = 9.732$), a statistically significant mean difference of 12.357, 95% CI [2.774, 21.940], $p = .007$. There was also a decrease in PCL score at session one ($M = 33.64, SD = 12.689$) and post-treatment ($M = 16.64, SD = 9.732$), a statistically significant mean difference of 17.000, 95% CI [8.709, 25.291], $p < .001$. In addition, session one mean PCL score was significantly greater than all other time
points, except pre-treatment (p values ranging from .02 at session three to < .001 at post-treatment). Estimated means of the PCL at each time point are shown in Figure 2.

![Figure 2](image.png)

*Figure 2. Biweekly PCL data. Graph of biweekly PCL session data using both last observation carried forward imputation (LOCF; black triangles) and Tabachnick and Fidell (2001) imputation method (gray squares).*

For changes in experiential avoidance as reported on the AAQ, Mauchly’s test of sphericity indicated that the assumption of sphericity had been violated, $\chi^2(14) = 27.200$, $p = .020$, therefore the Greenhouse-Geisser correction was utilized. Results of the repeated measures ANOVA suggest that AAQ was statistically significantly different at the time points across treatment $F(3.237, 42.078) = 8.592$, $p < .001$, partial $\eta^2 = .398$. Post-hoc comparisons with a Bonferroni adjustment showed there was a decrease in AAQ scores at pre-treatment ($M = 26.857$, $SD = 7.533$) and post-treatment ($M = 20.714$, $SD = 6.638$), a statistically significant mean difference of 6.143, 95% CI [0.926, 11.360], $p = .015$. There was also a decrease in AAQ score from pre-treatment ($M = 26.857$, $SD = 7.533$) and session five ($M = 22.571$, $SD = 7.111$), a statistically significant mean difference of 4.286, 95% CI [1.489, 7.083], $p = .002$. There was a
A decrease in AAQ scores from session one ($M = 26.714, SD = 7.405$) and session five ($M = 22.571, SD = 7.111$), a statistically significant mean difference of 4.143, 95% CI [.187, 8.098], $p = .036$. Lastly, AAQ at session one ($M = 26.714, SD = 7.405$) decreased at post-treatment ($M = 20.714, SD = 6.638$), a statistically significant mean difference of 6.000, 95% CI [.517, 11.483], $p = .026$. Estimated means of the AAQ at each time point are shown in Figure 3.

![Graph showing biweekly AAQ data](image)

*Figure 3.* Biweekly AAQ data. Graph of biweekly AAQ session data using both last observation carried forward imputation (LOCF; black triangles) and Tabachnick and Fidell (2001) imputation method (gray squares).

Given that the primary analyses were significant using LOCF, an additional imputation method described by Tabachnick and Fidell (2001, p. 430) was utilized and two repeated measures ANOVAs were run again to assess whether the primary findings held with a more conservative approach. This imputation method involved computing the individual’s missing score based on the mean of their overall scores for the measure over time, as well as the means of other participants at the missing time point. Below are the findings for the repeated measures
ANOVA for the PCL and AAQ across treatment using Tabachnick and Fidell imputation method.

**Formal Imputation Method Results**

Initial tests were again conducted to ensure that assumptions of the repeated measures ANOVA test were met for PCL and AAQ scores at each time point. PCL and AAQ were normally distributed at each time point as assessed by Shapiro-Wilk’s test (all \( p > .05 \)). There were three outliers in the data, as assessed by inspection of boxplots, one score for a participant on the PCL at post-treatment, another for a participant on the AAQ at session one, and one for a participant on the AAQ at session seven. Due to outliers in the data, the repeated measures ANOVA was run twice for each measure, once with the outliers, and once without to determine whether the outliers impacted the results. There was no significant difference in pattern or strength of the results for the PCL or the AAQ when outliers were included versus when they were removed; therefore, the outliers were included in the analyses reported here.

For changes in posttraumatic stress symptoms as reported on the PCL, Mauchly’s test of sphericity indicated that the assumption of sphericity had not been violated, \( \chi^2(14) = 14.974, p = .391 \). Results of the repeated measures ANOVA suggest that PCL was statistically significantly different across treatment time points \( F(5, 65) = 16.575, p < .001 \), partial \( \eta^2 = .560 \). Post-hoc comparisons using a Bonferroni adjustment showed there was a decrease in PCL scores at pre-treatment (\( M = 29.00, SD = 14.347 \)) and post-treatment (\( M = 16.64, SD = 9.732 \)), a statistically significant mean difference of 12.357, 95% CI [2.774, 21.940], \( p = .007 \). There was also a decrease in PCL score at session one (\( M = 33.643, SD = 12.689 \)) and post-treatment (\( M = 16.643, SD = 9.732 \)), a statistically significant mean difference of 17.000, 95% CI [8.709, 25.291], \( p < .001 \). In addition, session one mean PCL score was significantly greater than all
other time points, except pre-treatment ($p$ values ranging from .003 at session three to < .001 at post-treatment). Therefore, the results of the repeated measures ANOVA for changes in PCL across treatment held when using an alternative imputation method for missing data. Estimated means of the PCL at each time point are shown in Figure 2 along with estimated means using LOCF methods.

For changes in experiential avoidance as reported on the AAQ, Mauchly’s test of sphericity indicated that the assumption of sphericity had been violated, $\chi^2(14) = 24.251$, $p = .047$; therefore, the Greenhouse-Geisser correction was utilized. Results of the repeated measures ANOVA suggest that AAQ was statistically significantly different at the different time points across treatment $F(3.256, 42.326) = 8.884$, $p < .001$, partial $\eta^2 = .406$. Post-hoc comparisons with a Bonferroni adjustment showed there was a decrease in AAQ scores at pre-treatment ($M = 26.857, SD = 7.533$) and post-treatment ($M = 20.714, SD = 6.638$), a statistically significant mean difference of 6.143, 95% CI [.926, 11.360], $p = .015$. There was also a decrease in AAQ score from pre-treatment ($M = 26.857, SD = 7.533$) and session five ($M = 22.000, SD = 7.162$), a statistically significant mean difference of 4.857, 95% CI [1.536, 8.178], $p = .002$. Pre-treatment AAQ score ($M = 26.857, SD = 7.533$) also differed from session seven ($M = 21.606, SD = 7.526$), a statistically significant mean difference of 5.251, 95% CI [.617, 9.886], $p = .02$.

There was a decrease in AAQ scores from session one ($M = 26.714, SD = 7.405$) and session seven ($M = 21.606, SD = 7.526$), a statistically significant mean difference of 5.109, 95% CI [.188, 10.029], $p = .038$. Lastly, AAQ at session one ($M = 26.714, SD = 7.405$) decreased at post-treatment ($M = 20.714, SD = 6.638$), a statistically significant mean difference of 6.000, 95% CI [.517, 11.483], $p = .026$. The only difference from the results listed above using LOCF imputation is that pre-treatment AAQ significantly differed from session seven AAQ score.
Therefore, the results of the repeated measures ANOVA for changes in AAQ across treatment held when using an alternative imputation method for missing data. Estimated means of the AAQ at each time point are shown in Figure 3 along with estimated means using LOCF methods.

Hypothesis 2, to determine whether participants reported changes in experiential avoidance across treatment, was also tested using paired samples $t$ tests on pre- and post-treatment MEAQ scores. Difference scores were created for the total MEAQ score and each of the six subscales in order to test assumptions for the paired $t$ tests. An examination of the Shapiro-Wilk’s tests for normality showed that all variables were normally distributed ($p > .05$) with the exception of the repression and denial subscale of the MEAQ ($p = .014$). An examination of boxplots indicated that the repression and denial subscale of the MEAQ had one significant outlier. An alternative test was utilized to account for non-normal distribution and outliers present in the repression and denial subscale and results are outlined below.

Participants reported a statistically significant reduction in overall experiential avoidance from pre-treatment ($M = 188.000, SD = 38.976$) to post-treatment ($M = 161.692, SD = 39.552$), $t(12) = 3.550, p = .004, d = .985$. When assessing the different subscales of the MEAQ, participants showed a significant decrease in behavioral avoidance from pre-treatment ($M = 39.929, SD = 11.718$) to post-treatment ($M = 28.571, SD = 8.864$), $t(13) = 2.684, p = .019, d = .717$; distress aversion from pre-treatment ($M = 42.231, SD = 14.031$) to post-treatment ($M = 37.539, SD = 13.575$), $t(12) = 3.272, p = .007, d = .908$; procrastination from pre-treatment ($M = 24.214, SD = 8.257$) to post-treatment ($M = 20.571, SD = 7.997$), $t(13) = 2.804, p = .015, d = .749$; and distraction and suppression from pre-treatment ($M = 27.071, SD = 5.942$) to post-treatment ($M = 21.500, SD = 7.272$), $t(13) = 2.963, p = .011, d = .792$. In contrast, there was no
significant improvement in distress endurance from pre-treatment \((M = 49.000, SD = 7.656)\) to post-treatment \((M = 52.357, SD = 9.361)\), \(t(13) = -1.582, p = .138, d = .423\).

Given that the repression and denial subscale of the MEAQ violated the assumptions of outliers and normality for the paired \(t\) test, a Wilcoxon signed-ranks tests was conducted; however, it also violated the assumption of symmetry of difference scores. Therefore, an exact sign test was conducted to account for the violation of various assumptions. Of the 14 participants in the sample, 11 showed a reduction in their repression and denial subscale score across treatment, two showed an increase in their repression and denial score, and one saw no change in their score. There was a statistically significant median difference between pre-treatment repression and denial scores (median = 35.500) and post-treatment repression and denial scores (median = 31.500), \(z = -2.219, p = .022\). The results of all paired \(t\) tests can be found in Table 2.

**Secondary Hypotheses**

In order to test hypotheses 3 through 8, a series of paired samples \(t\) tests were conducted to determine whether other symptoms decreased from pre-treatment to post-treatment. More specifically, the tests compared pre-treatment depression (BSI- depression subscale), general psychological distress (BSI- general distress index), mindfulness (FFMQ), perceived stress (PSS), and posttraumatic growth (PTGI) with individual’s own post-treatment scores on the same measures. With regard to hypothesis 4, the belief there would be a significant reduction in substance use across treatment, we were unable to test this hypothesis due to a floor effect. In essence, there were not enough individuals in the sample that endorsed using substances on a regular basis to test this question.
Table 2

Paired \( t \) Test Analyses Identifying Differences in Continuous Study Variables Between Pre-Treatment and Post-Treatment

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean/Median (Std. Dev.)</th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
<th>( t ) or z</th>
<th>df</th>
<th>( p )</th>
<th>( d )</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAQ Total</td>
<td>188.000 (38.976)</td>
<td>161.692 (39.552)</td>
<td>3.550</td>
<td>12</td>
<td>0.004*</td>
<td>0.985</td>
<td></td>
</tr>
<tr>
<td>MEAQ-Behavioral Avoidance</td>
<td>33.929 (11.718)</td>
<td>28.571 (8.864)</td>
<td>2.684</td>
<td>13</td>
<td>0.019*</td>
<td>0.717</td>
<td></td>
</tr>
<tr>
<td>MEAQ-Distress Aversion</td>
<td>42.230 (14.031)</td>
<td>37.539 (13.575)</td>
<td>3.272</td>
<td>12</td>
<td>0.007*</td>
<td>0.908</td>
<td></td>
</tr>
<tr>
<td>MEAQ-Procrastination</td>
<td>24.214 (8.257)</td>
<td>20.571 (7.997)</td>
<td>2.804</td>
<td>13</td>
<td>0.015*</td>
<td>0.749</td>
<td></td>
</tr>
<tr>
<td>MEAQ-Distress Suppression</td>
<td>27.071 (5.942)</td>
<td>21.500 (7.272)</td>
<td>2.963</td>
<td>13</td>
<td>0.011*</td>
<td>0.792</td>
<td></td>
</tr>
<tr>
<td>MEAQ-Distress Endurance</td>
<td>49.000 (7.656)</td>
<td>52.357 (9.361)</td>
<td>–</td>
<td>13</td>
<td>0.138</td>
<td>0.423</td>
<td></td>
</tr>
<tr>
<td>MEAQ-Repression and Denial</td>
<td>35.500</td>
<td>31.500</td>
<td>–</td>
<td>13</td>
<td>0.022*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BSI GSI</td>
<td>66.167 (6.590)</td>
<td>61.250 (5.545)</td>
<td>2.184</td>
<td>11</td>
<td>0.051</td>
<td>0.630</td>
<td></td>
</tr>
<tr>
<td>BSI DEP</td>
<td>67.000</td>
<td>60.500</td>
<td>–1.664</td>
<td>11</td>
<td>0.092</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFMQ-Observe</td>
<td>27.667 (7.715)</td>
<td>28.833 (4.877)</td>
<td>–0.855</td>
<td>11</td>
<td>0.411</td>
<td>0.247</td>
<td></td>
</tr>
<tr>
<td>FFMQ-Describe</td>
<td>26.357 (5.213)</td>
<td>26.357 (3.153)</td>
<td>0.000</td>
<td>13</td>
<td>1.000</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>FFMQ-Act with Awareness</td>
<td>24.385 (3.948)</td>
<td>26.154 (3.262)</td>
<td>–1.982</td>
<td>12</td>
<td>0.071</td>
<td>0.550</td>
<td></td>
</tr>
<tr>
<td>FFMQ-Non-judgment</td>
<td>25.786 (8.396)</td>
<td>27.143 (6.871)</td>
<td>–1.391</td>
<td>13</td>
<td>0.188</td>
<td>0.372</td>
<td></td>
</tr>
<tr>
<td>FFMQ-Non-reactivity</td>
<td>21.071 (4.891)</td>
<td>21.571 (2.209)</td>
<td>–0.534</td>
<td>13</td>
<td>0.602</td>
<td>0.143</td>
<td></td>
</tr>
<tr>
<td>PSS</td>
<td>20.154 (6.039)</td>
<td>18.154 (4.776)</td>
<td>1.299</td>
<td>12</td>
<td>0.218</td>
<td>0.360</td>
<td></td>
</tr>
<tr>
<td>PTGI-Relating to others</td>
<td>20.143 (8.151)</td>
<td>19.214 (7.029)</td>
<td>0.443</td>
<td>13</td>
<td>0.665</td>
<td>0.118</td>
<td></td>
</tr>
<tr>
<td>PTGI-Personal Strength</td>
<td>12.143 (4.897)</td>
<td>13.571 (4.052)</td>
<td>–1.179</td>
<td>13</td>
<td>0.260</td>
<td>0.315</td>
<td></td>
</tr>
<tr>
<td>PTGI-Appreciation for Life</td>
<td>9.692 (3.750)</td>
<td>9.539 (3.479)</td>
<td>0.147</td>
<td>12</td>
<td>0.886</td>
<td>0.041</td>
<td></td>
</tr>
<tr>
<td>PTGI-New Possibilities</td>
<td>15.000 (6.276)</td>
<td>14.857 (6.431)</td>
<td>0.118</td>
<td>13</td>
<td>0.908</td>
<td>0.031</td>
<td></td>
</tr>
<tr>
<td>PTGI-Spiritual Change</td>
<td>4.714 (3.173)</td>
<td>4.643 (2.872)</td>
<td>0.107</td>
<td>13</td>
<td>0.916</td>
<td>0.029</td>
<td></td>
</tr>
</tbody>
</table>

Note. MEAQ = Multidimensional Experiential Avoidance Questionnaire; BSI-GSI = Brief Symptom Inventory- General Symptom Index; BSI-DEP = Brief Symptom Inventory-Depression Subscale; FFMQ = Five Facet Mindfulness Questionnaire; PSS = Perceived Stress Scale; PTGI = Posttraumatic Growth Inventory.

*Significant at the .05 level.
In order to determine whether assumptions were met for paired \( t \) tests, preliminary descriptive tests were run on difference scores for each variable of interest. The difference scores were created by subtracting the individual’s post-treatment score from their pre-treatment score.

An examination of the Shapiro-Wilk’s tests for normality showed that all variables were normally distributed \((p > .05)\). An examination of boxplots indicated that one variable had a significant outlier, the depression subscale of the BSI. Corrections for normality and outliers will be described within each of the subsections below. Each test will be described separately below; however, as mentioned above, the results for all paired \( t \) tests are summarized in Table 2.

**Depression**

Hypothesis 3 was tested to determine changes in depression symptoms across treatment. As mentioned above, the assumption of normality was met as assessed using the Shapiro-Wilk’s test \((p > .05)\); however, there was one outlier. Inspection of the data suggested that the outlier was an individual whose depression score increased by 10 \( t \)-score points across treatment. A Wilcoxon signed-rank test was conducted to correct for the outlier; however, the assumption of symmetrical distribution of the difference scores was violated. Therefore, an exact sign test was conducted to compare the difference between pre- and post-treatment depression scores. Of the 14 participants in the sample, 13 had available data for this analysis. Of those 13 participants, 10 showed a reduction in their depression score across treatment and 3 showed an increase in their depression score. There was no statistically significant median difference between pre-treatment depression scores \((\text{median} = 67.000)\) and post-treatment depression scores \((\text{median} = 60.500)\), \( z = -1.664, p = .092 \).
General Psychological Distress

Hypothesis 5 was tested to determine changes in general psychological distress across treatment. As mentioned above, the assumption of normality was met as assessed using the Shapiro-Wilk’s test ($p > .05$) and there were no outliers in examination of a boxplot. Participants general distress was higher at pre-treatment ($M = 66.167, SD = 6.590$) than at post-treatment ($M = 61.250, SD = 5.545$); however, this result was not statistically significant, $t(11) = 2.184, p = .051, d = .630$.

Mindfulness

Hypothesis 6 was tested to determine changes in mindfulness skills across treatment. Mindfulness was measured in the current sample using the FFMQ, which contains five subscales assessing different facets of mindfulness. Separate paired $t$ tests were conducted to determine changes on each of the different facets across treatment. As mentioned above, the assumption of normality was met for all subscales as assessed using the Shapiro-Wilk’s test ($p > .05$) and there were no outliers in examination of a boxplot. Surprisingly, there was no significant change in participants report on any of the subscales of mindfulness including describing $t(11) = –.855, p = .411, d = .247$, observing $t(13) = 0.00, p = 1.00, d = .000$, acting with awareness $t(12) = –1.982, p = .071, d = .550$, non-judgment $t(13) = –1.391, p = .188, d = .372$, or non-reactivity $t(13) = –.534, p = .602, d = .143$. However, this finding is similar to previous research showing that mindfulness skills did not significantly change over the course of a 7-week residential PTSD treatment program that included mindfulness classes (Owens et al., 2012).

This finding is still particularly surprising given the emphasis on teaching mindfulness skills throughout the 8-week group in the current study. In addition, as described above, experiential avoidance significantly decreased on both the AAQ and MEAQ across treatment,
and mindfulness has been found to negatively correlate with experiential avoidance (Thompson & Waltz, 2010). In order to further explore possible explanations why shifts in mindfulness were not observed, bivariate correlations were calculated to determine whether the FFMQ correlated with measures of experiential avoidance in the current sample. None of the facets of the FFMQ correlated with the MEAQ total score ($r$ ranging from .015 to -.547, $p$ ranging from .962 to .053). In addition, only three of the five facets correlated with the AAQ, including observing ($r = -0.623$, $p = .023$), acting with awareness ($r = -0.717$, $p = .004$) and non-judgment ($r = -0.605$, $p = .022$). Results of these analyses can be found in Table 3.

Table 3

Correlations Between Measures of Experiential Avoidance and Mindfulness

<table>
<thead>
<tr>
<th>Variable</th>
<th>AAQ</th>
<th>MEAQ-Total Score</th>
<th>FFMQ-Observe</th>
<th>FFMQ-Describe</th>
<th>FFMQ-Aware</th>
<th>FFMQ-Non-judge</th>
<th>FFMQ-Non-react</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAQ</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEAQ-Total Score</td>
<td>.245</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFMQ-Observe</td>
<td>-0.623*</td>
<td>-0.231</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFMQ-Describe</td>
<td>-0.040</td>
<td>-0.547</td>
<td>.416</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFMQ-Aware</td>
<td>-0.717**</td>
<td>-0.235</td>
<td>.778**</td>
<td>.498</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FFMQ-Non-judge</td>
<td>-0.605*</td>
<td>-0.092</td>
<td>.297</td>
<td>-.030</td>
<td>.572*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>FFMQ-Non-react</td>
<td>-0.401</td>
<td>-0.015</td>
<td>.533</td>
<td>.040</td>
<td>.412</td>
<td>.443</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*Note. AAQ = Acceptance and Action Questionnaire; MEAQ = Multidimensional Experiential Avoidance Questionnaire; FFMQ = Five Facet Mindfulness Questionnaire.  
*p < .05. **p < .01.*

Perceived Stress

Hypothesis 7 was tested to determine changes in participants’ report of perceived stress across treatment. As mentioned above, the assumption of normality was met as assessed using
the Shapiro-Wilk’s test ($p > .05$). In addition, there were no outliers in examination of a boxplot. Participants perceived stress was higher at pre-treatment ($M = 20.154, SD = 6.039$) than at post-treatment ($M = 18.154, SD = 4.776$); however, this result was not statistically significant, $t(12) = 1.299, p = .218, d = .360$.

**Posttraumatic Growth**

Hypothesis 8 was tested to determine changes in posttraumatic growth across treatment. Posttraumatic growth was measured in the current sample using the PTGI, which contains five subscales assessing different facets of growth. Separate paired $t$ tests were conducted to determine changes in the different facets in posttraumatic growth across treatment. As mentioned above, the assumption of normality was met for all subscales as assessed using the Shapiro-Wilk’s test ($p > .05$) and there were no outliers in examination of boxplots. There was no significant change in participants report on any of the subscales of posttraumatic growth including relating to others, $t(13) = .443, p = .665, d = .118$, personal strength $t(13) = −1.179, p = .260, d = .315$, appreciation of life $t(12) = .146, p = .886, d = .041$, new possibilities, $t(13) = .118, p = .908, d = .031$, or spiritual change $t(13) = .107, p = .916, d = .029$.

**Acceptability**

In order to determine acceptability of the treatment group, mean scores on the four objective items on the Acceptability Questionnaire were examined. Each item was rated on a scale of 1 to 5, with 1 being the lowest and 5 being the highest rating. With regard to satisfaction, participants reported being satisfied to very satisfied with the course ($M = 4.733, SD = 1.032$). When asked how likely they would be to recommend the course to a friend, participants reported being 75–100% likely to recommend the course to a friend ($M = 4.467, SD = 1.060$). When asked how much they learned throughout the 8-week course, participants stated they learned
between five skills and a great deal more ($M = 4.533$, $SD = .743$). Lastly, when asked how much they enjoyed the course, all participants reported the highest possible option indicating that they enjoyed the course very much ($M = 5.000$, $SD = 0.00$). These findings suggest that an 8-week MBSR group is highly feasible and accepted within similar community populations.

**Follow-up Analyses**

Given that posttraumatic stress (as measured by PCL) and experiential avoidance (as measured by both AAQ and MEAQ) significantly differed from pre-treatment to post-treatment, it was of interest to determine whether those changes held 1 month following completion of the group. Additional $t$ tests were conducted to determine whether changes in posttraumatic stress and experiential avoidance were maintained from post-treatment to 1-month follow-up. Table 4 includes a list of means and standard deviations for symptoms measures at 1-month follow-up.

Prior to running paired samples $t$ tests, differences scores were calculated by subtracting the individuals’ 1-month follow-up score from their pre-treatment and post-treatment scores on the PCL, AAQ, and MEAQ total scale. Shapiro-Wilk tests were run on these differences scores to test for normality. All tests demonstrated normality ($p > .05$) with the exception of the difference between individual’s post-treatment PCL and 1-month PCL scores. Boxplots were inspected to test for any possible outliers in the difference scores. There was one outlier for the AAQ pre-treatment to 1-month difference score and one for the PCL pre-treatment to 1-month difference score. These outliers happened to be the scores of the same participant; therefore, that individual was removed from the analysis for both AAQ and PCL $t$ tests.
Table 4

Means and Standard Deviations of Symptom Measures at 1-Month Follow-Up

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (Std. Dev.)</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PCL</strong></td>
<td>19.333 (15.552)</td>
<td>2</td>
<td>52</td>
</tr>
<tr>
<td><strong>AAQ</strong></td>
<td>22.667 (8.026)</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td><strong>MEAQ Total</strong></td>
<td>167.667 (45.693)</td>
<td>96</td>
<td>246</td>
</tr>
<tr>
<td><strong>MEAQ-Behavioral Avoidance</strong></td>
<td>29.333 (10.290)</td>
<td>11</td>
<td>47</td>
</tr>
<tr>
<td><strong>MEAQ-Distress Aversion</strong></td>
<td>38.917 (11.603)</td>
<td>21</td>
<td>63</td>
</tr>
<tr>
<td><strong>MEAQ-Procrastination</strong></td>
<td>20.583 (8.826)</td>
<td>8</td>
<td>38</td>
</tr>
<tr>
<td><strong>MEAQ-Distress Suppression</strong></td>
<td>22.833 (6.365)</td>
<td>12</td>
<td>36</td>
</tr>
<tr>
<td><strong>MEAQ-Distress Endurance</strong></td>
<td>50.333 (8.669)</td>
<td>38</td>
<td>62</td>
</tr>
<tr>
<td><strong>MEAQ-Repression and Denial</strong></td>
<td>29.333 (8.721)</td>
<td>18</td>
<td>48</td>
</tr>
<tr>
<td><strong>BSI GSI</strong></td>
<td>59.667 (8.804)</td>
<td>45</td>
<td>71</td>
</tr>
<tr>
<td><strong>BSI DEP</strong></td>
<td>59.000 (10.135)</td>
<td>42</td>
<td>73</td>
</tr>
<tr>
<td><strong>FFMQ-Observe</strong></td>
<td>25.917 (5.583)</td>
<td>16</td>
<td>36</td>
</tr>
<tr>
<td><strong>FFMQ-Describe</strong></td>
<td>25.917 (4.188)</td>
<td>19</td>
<td>34</td>
</tr>
<tr>
<td><strong>FFMQ-Act with Awareness</strong></td>
<td>26.167 (3.904)</td>
<td>21</td>
<td>34</td>
</tr>
<tr>
<td><strong>FFMQ-Non-judgment</strong></td>
<td>26.167 (7.626)</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td><strong>FFMQ-Non-reactivity</strong></td>
<td>21.500 (3.205)</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td><strong>PSS</strong></td>
<td>19 (6.768)</td>
<td>10</td>
<td>32</td>
</tr>
<tr>
<td><strong>PTGI-Relating to others</strong></td>
<td>21.364 (6.407)</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td><strong>PTGI-Personal Strength</strong></td>
<td>12.667 (3.701)</td>
<td>6</td>
<td>17</td>
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<tr>
<td><strong>PTGI-Appreciation for Life</strong></td>
<td>9.167 (3.713)</td>
<td>4</td>
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<tr>
<td><strong>PTGI-New Possibilities</strong></td>
<td>15.500 (5.745)</td>
<td>6</td>
<td>25</td>
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<tr>
<td><strong>PTGI-Spiritual Change</strong></td>
<td>5.333 (2.229)</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

*Note. PCL = PTSD Checklist; AAQ = Acceptance and Action Questionnaire; MEAQ = Multidimensional Experiential Avoidance Questionnaire; BSI-GSI = Brief Symptom Inventory- General Symptom Index; BSI-DEP = Brief Symptom Inventory-Depression Subscale; FFMQ = Five Facet Mindfulness Questionnaire; PSS = Perceived Stress Scale; PTGI = Posttraumatic Growth Inventory.*
With regard to the PCL, given that the assumption of normality was not met for the post-treatment to 1-month follow-up difference, a Wilcoxon signed-ranks test was conducted; however, the assumption of symmetrical difference scores was also violated. In order to correct for these assumption violations, an exact sign test was used. There was no significant difference in the median PCL score at post-treatment (median = 14.000) compared to median 1-month follow-up PCL score (median = 16.000), z = 12.000, p = 1.00. This suggests that participants did not report a significant increase or decrease in PCL score from post-treatment to 1-month follow-up. However, when comparing pre-treatment PCL score (M = 25.455, SD = 12.902) to 1-month follow-up score (M = 19.636, SD = 16.274), a paired samples t test was nonsignificant t(10) = 1.701, p = .120, d = .512. Therefore, while scores did not significantly change 1-month following treatment, the mean score on the PCL at 1-month follow-up was not significantly different from that at pre-treatment.

With regard to the AAQ, there were no significant differences between participants’ report of AAQ scores at post-treatment (M = 20.583, SD = 6.815) and 1-month follow-up (M = 22.667, SD = 8.026), t(11) = –1.923, p = .081, d = .555. This suggests that their self-reported experiential avoidance did not significantly increase or decrease from end of treatment to follow-up. Interestingly, when comparing pre-treatment AAQ scores (M = 26.091, SD = 8.215) to 1-month follow-up scores (M = 23.364, SD = 8.028), a paired samples t test was nonsignificant t(10) = 2.180, p = .054, d = .657. Therefore, while AAQ scores did not significantly change 1 month after treatment, the mean score at 1-month follow-up was not significantly different from that at pre-treatment.

With regard to the MEAQ, there were no significant differences between participants’ report of MEAQ scores at post-treatment (M = 164.167, SD = 40.606) and 1-month follow-up
\( M = 167.667, \ SD = 45.693 \), \( t(11) = -0.837, \ p = .420, \ d = .242 \). This suggests that their experiential avoidance did not significantly increase or decrease from end of treatment to follow-up. When comparing pre-treatment MEAQ total scale scores to 1-month follow-up, participants reported a statistically significant reduction in overall experiential avoidance from pre-treatment \( (M = 184.455, \ SD = 41.625) \) to 1-month follow-up \( (M = 160.546, \ SD = 40.399) \), \( t(11) = 2.485, \ p = .032, \ d = .749 \).
DISCUSSION

The current study assessed the impact of an 8-week mindfulness-based stress reduction group in a sample of 14 female interpersonal violence victims recruited from a variety of community locations. It was hypothesized that the group would result in reductions in PTSD symptoms and experiential avoidance across treatment. These hypotheses were supported in that both PTSD and experiential avoidance symptoms were significantly lower at post-treatment compared to pre-treatment, and they consistently decreased across all assessment time points as evidenced by changes in the PCL, AAQ, and MEAQ.

Additional analyses were conducted to determine whether these changes in PTSD symptoms and experiential avoidance held at 1-month follow-up. Interestingly, tests for all three constructs (PCL, AAQ, and MEAQ) suggested that there was no significant increase or decrease in scores from post-treatment to 1-month follow-up. However, when differences between pre-treatment and 1-month follow-up were examined, only the MEAQ significantly differed. These findings are somewhat perplexing, and may be due to a small sample size resulting in limited power to detect differences in mean scores. Given that a number of differences from pre-treatment to 1-month follow demonstrated medium effect sizes, but were nonsignificant, it may be that an increased sample size would show different results. Given that only 12 participants completed the 1-month follow-up assessment, the samples size may be particularly influential in follow-up analyses findings.

Interestingly, mean scores on the PCL at pre-treatment, used to assess for PTSD symptoms, was below the cutoff score of 33 that authors propose is suggestive of a diagnosis of
PTSD (Weathers et al., 2013). This may indicate that the current sample was relatively low in terms of posttraumatic stress symptoms. Prior research has found MBSR effective in reducing PTSD symptoms in samples of military veterans and child sexual abuse survivors recruited from the community (Kearney et al., 2012; Kimbrough et al., 2010; Polusny et al., 2015). However, these studies all utilized a previous version of the PCL, so unfortunately pre-treatment mean PCL scores cannot be compared to the prior research. The current findings add to the literature in confirming that an 8-week MBSR course is effective for subthreshold PTSD.

An additional hypothesis was that mindfulness skills would increase across treatment given the emphasis on teaching mindfulness in the eight sessions. Very surprisingly, none of the facets of mindfulness measured by the FFMQ were shown to increase across the 8-week treatment group. Previous research findings have shown that mindfulness skills improve across an 8-week MBSR course (Kearney et al., 2012); however, an additional study did not find any significant change in mindfulness skills over the course of a 7-week residential PTSD treatment program (Owens et al., 2012). The current findings, in combination with previous research, suggest that further study is needed to understand the mechanisms of change in mindfulness-based interventions.

One possible explanation of the lack of change in the mindfulness variables may be due to the wide range of at home practice individuals engaged in. Some individuals reported engaging in practice zero days of the week, while others engaged in practice seven days of the week. In addition, a significant proportion of individuals forgot to turn in practice logs throughout the group (17 practice logs out of a possible 98 were not turned in). It may be that a proportion of participants did not engage in the practice exercises regularly enough to experience shifts in mindfulness skills. Alternatively, it may be that the FFMQ did not accurately capture
mindfulness skills within this sample. As discussed above, the FFMQ did not correlate as predicted with measures of experiential avoidance, as would be expected based on prior research (Thompson & Waltz, 2010). This suggests that further research should continue to differentiate how these overlapping constructs are related. An additional explanation for these findings may, again, be related to small sample size and limited power.

Another hypothesis predicted that substance use would decrease across treatment. Due to a small sample size, and a minimal report of substance use, it was not possible to determine the impact of treatment on reported substance use. While this is disappointing, it is also promising that the report of substance use in the current sample of violence victims is below what would be expected given previous findings that women who experience intimate partner violence are 1.7 times as likely to report substance abuse (CDC, 2008). One possible explanation for this finding is that, as mentioned above, the individuals’ report of PTSD symptoms was below the suggested cutoff for PTSD at screening. Therefore, it may be that individuals with lower levels of posttraumatic stress symptoms may be less likely to endorse substance use difficulties.

Additional hypotheses predicted that other psychological symptoms, including depression, general psychological distress, and perceived stress would decrease across treatment. None of these hypotheses were supported. Although some of these symptoms appeared to decrease across treatment, the results were nonsignificant even for variables demonstrating medium effect sizes. This may be due to a small sample size resulting in limited power to detect an effect. Alternatively, the theoretical underpinnings of mindfulness do not suggest that symptom reduction is necessary to reduce suffering. Therefore, although individuals did not see reductions in other psychological symptoms, it does not necessarily suggest that they did not receive benefit from the group.
One final hypothesis was that participants would see increases in posttraumatic growth over the course of the 8-week treatment. This hypothesis was not supported, as there were no significant changes in PTGI scores. No previous study, to the researcher’s knowledge, has assessed for changes in posttraumatic growth following MBSR. Future research should investigate this question with larger and more diverse samples.

Lastly, this study aimed to determine how feasible and well accepted an adapted 8-week MBSR group would be in a community sample of female interpersonal violence victims. Results of a simple acceptability form suggest that 100% of participants enjoyed taking part in the course. They also reported they were likely to recommend the course to a friend, and every one endorsed learning something new. This overwhelmingly positive feedback may be one of the most important pieces of information obtained in this study, because it suggests that further research and resources should be devoted to delivering MBSR groups to women who have experienced interpersonal violence.

Clinical Implications

The results of the current study may help to inform treatment for victims of interpersonal violence. As previously discussed, interpersonal violence is unfortunately common (Breiding et al., 2014), and can result in damaging physical and emotional consequences (Choudhary et al., 2008; Fletcher, 2010). While there are a number of evidence-based treatments available for trauma victims including CPT (Resick et al., 2008) and PE (Foa et al., 2007), others have called for alternative treatments for victims of violence (Follette & Vijay, 2009). As suggested by Lang et al. (2012) mindfulness may be a helpful adjunct to other treatments or a stand-alone treatment; regardless, additional research, such as the current study, is needed to help determine the unique impact and mechanisms of action for PTSD.
Consistent with prior research, the current study found that an 8-week group was well accepted, and produced significant reductions in PTSD symptoms as well as experiential avoidance. While there are clear limitations that reduce the ability to make any causal statements about the impact of the active treatment components, participants universally enjoyed participating in the group, and once they attended at least one group session, showed relatively low drop out (17.6%). One implication is that clinics that serve victims of interpersonal violence may consider offering a mindfulness-based intervention in addition to their usual care.

**Limitations and Future Directions**

The current study poses a number of limitations that reduce the ability to make more concrete conclusions. Primarily, due to difficulties in the recruitment of a community sample, the sample size of 14 completed participants is quite low. As shown in the recruitment flow chart, 27 individuals were screened and considered appropriate for the group, but many \((n = 9)\) were lost between screening and group initiation. The current study could have possibly improved the screening and scheduling process to ensure more participants were able to take part in the group sessions. This naturally results from the limited funds and resources available in this particular study.

Due in part to a small sample and the longitudinal nature of the study, there was the problem of missing data in the current study. While there are numerous documented problems with a last observation carried forward approach (Lachin, 2016; Lavori, Brown, Duan, Gibbons, & Greenhouse, 2008), it was utilized due to simplicity and the seemingly random nature of data missing in the current study. In order to minimize the possibility that results found using LOCF methods were due to chance, an additional imputation method was utilized based on Tabachnick and Fidell’s (2001, p. 431) method for imputing longitudinal data. While neither of these
solutions is ideal, both produced consistently significant and similar results. An alternative solution would be to use multilevel modeling to negate the issue of missing data; however, that was not feasible in the current study due to very small sample size. Future studies would benefit from designs that minimize missing data and use of more sophisticated analysis when sample size allows.

An additional limitation was the lack of diversity in the current sample, with 100% of participants who completed at least 50% of the group being Caucasian. It is possible that the restriction in demographics may have occurred due to the geographic location of the groups, or simply due to a selection bias in those who chose to follow through in participating with the group. While previous research has shown that MBSR is effective when used in a sample of low-income, African American women (Dutton et al., 2013), future research would benefit from including a more diverse sample to improve generalizability.

**Strengths**

Despite having significant limitations, the current study also demonstrated a number of strengths. The use of a community sample theoretically allows for a broader generalization than if conducted with samples of convenience such as college students or a specific clinical setting (i.e., veterans). In addition, the use of longitudinal data and 1-month follow-up data allows for analysis across the 8-week group. Lastly, the inclusion of an acceptability questionnaire is unique and important for a clinical study. While there is often significant research evidence behind commonly used therapies, the emphasis is commonly placed on symptom reduction rather than patient satisfaction. If a treatment is effective, but most people did not enjoy participating in it, one could assume that engagement might be lower. The field should strive to
provide not only effective treatments, but also a variety of treatments that allow patients to choose what might be the best fit for them.
REFERENCES


Centers for Disease Control and Prevention (CDC). (2008). *Adverse health conditions and health risk behaviors associated with intimate partner violence—United States, 2005* (No. 2008-


Appendix A

Demographic Questionnaire
Demographic Questionnaire

ID#: ___________  Date: ______________

1. Age: ______

2. Race:
   ___ White    ___ Native American
   ___ African American    ___ Asian or Pacific Islander
   ___ Latino/Latina    ___ Other: _____________________
   ___ I prefer not to answer this question

4. Last year completed in school:
   ___ Less than 8th grade    ___ 11th grade    ___ Bachelor’s degree
   ___ 8th grade    ___ 12th grade    ___ Master’s degree
   ___ 9th grade    ___ Some college    ___ Doctoral degree
   ___ 10th grade    ___ Associate’s degree

5. Have you earned your high school diploma?
   Yes    No

6. If no to question 5, did you obtain your GED?
   Yes    No

7. If you attended college, what was your major: _____________________________

8. Gross Family Income (yearly):
   ___ < $10,000    ___ $10,000 – 30,000
   ___ $10,000 – 30,000    ___ $31,000 – 50,000
   ___ $31,000 – 50,000    ___ Over $90,000

9. What is your relationship status:
   ___ Married    ___ Divorced
   ___ Separated    ___ Single, no relationship
   ___ Single, in a relationship*    ___ I prefer not to answer this question

*If in a relationship, how long have you been in your current relationship? ______________
10. Please circle the statement that best describes your experience with meditation or mindfulness practice:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never heard of it</td>
<td>Have heard about it but no extensive knowledge</td>
<td>Have practiced it one or a few times</td>
<td>Have experience and practice but not consistently</td>
<td>Practice it regularly and consistently</td>
<td></td>
</tr>
</tbody>
</table>

10a. If you circled 3, 4, or 5 in the question above, please briefly describe your experience:

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

11. PREVIOUS Psychological Treatment(s) (Circle All That Apply):

1 = None
2 = Medication
3 = Individual Therapy
4 = Group Therapy
5 = Support Group
6 = Case Management
7 = Pastoral Care
8 = Hospital Program (inpatient or partial hospitalization)
9 = Other __________________________________________________________

12. CURRENT Psychological Treatment(s) you are receiving (Circle All That Apply):

1 = None
2 = Medication
3 = Individual Therapy
4 = Group Therapy
5 = Support Group
6 = Case Management
7 = Pastoral Care
8 = Hospital Program (inpatient or partial hospitalization)
9 = Other __________________________________________________________

13. Please list any medications you are currently taking:

_________________________  ____________________________  ____________________________
_________________________  ____________________________  ____________________________
_________________________  ____________________________  ____________________________
Appendix B

Treatment Acceptance Form
Treatment Acceptance Form

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>Very Unsatisfied</td>
<td>Slightly Unsatisfied</td>
<td>Neutral</td>
<td>Satisfied</td>
<td>Very Satisfied</td>
</tr>
</tbody>
</table>

2. Please rate how likely you would be to encourage a friend to take 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>0% likely to recommend to a friend</td>
<td>25% likely to recommend to a friend</td>
<td>50% likely to recommend to a friend</td>
<td>75% likely to recommend to a friend</td>
<td>100% likely to recommend to a friend</td>
</tr>
</tbody>
</table>

3. Please rate how much you feel learned in 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 new skill</td>
<td>I learned a few skills</td>
<td>I learned at least five skills</td>
<td>I learned a great deal</td>
</tr>
</tbody>
</table>

4. Please rate how much you enjoyed 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>I disliked the course very much</td>
<td>I slightly disliked the course</td>
<td>I feel neutral about the course</td>
<td>I slightly enjoyed the course</td>
<td>I enjoyed the course very much</td>
</tr>
</tbody>
</table>

5. Please share any comments about aspects you enjoyed or liked about this course:

________________________________________________________________________

________________________________________________________________________

6. Please share any suggestions for improvement you may have for this course.

________________________________________________________________________

________________________________________________________________________

THANK YOU!!!
Appendix C

Example Practice Log
## Example Practice Log

<table>
<thead>
<tr>
<th>Week</th>
<th>Day</th>
<th>Date</th>
<th>Practice? (Yes/No)</th>
<th>Number of Minutes Practiced</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Monday</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tuesday</td>
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<td>Wednesday</td>
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<td>Thursday</td>
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<td>Friday</td>
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<td>Saturday</td>
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<tr>
<td></td>
<td>Sunday</td>
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</tbody>
</table>
Appendix D

Human Subjects Institutional Review Board Approval Letter
Date: September 18, 2015

To: Amy Naugle, Principal Investigator
    Laura Stayton, Student Investigator for dissertation

From: Daryle Gardner-Bonneau, Ph.D., Vice Chair

Re: HSIRB Project Number 15-08-02

This letter will confirm that your research project titled “Investigation of a Mindfulness Based Intervention with Survivors of Interpersonal Violence” has been approved under the full category of review by the Human Subjects Institutional Review Board. 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 in 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 HSIRB 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: August 18, 2016
Appendix E

Informed Consent
Western Michigan University
Psychology Department

Principal Investigator: Amy E. Naugle, Ph.D.
Student Investigators: Laura E. Stayton, MA

Title of Study: Investigation of a Mindfulness Based Intervention with Survivors of Interpersonal Violence

You have been invited to participate in a research project called "Investigation of a Mindfulness Based Intervention with Survivors of Interpersonal Violence." This consent document will explain the purpose of this research project. We will also go over the time commitment, the methods used in the study, and the risks and benefits of participating in this project. Please read this consent form carefully and completely. When you're finished please ask any questions you have.

What are we trying to find out in this study?
We are trying to understand whether a mindfulness based group is helpful in reducing distress and improving quality of life in women who have experienced interpersonal violence. We are also interested in how much participants enjoy the group.

Who can participate in this study?
You may participate in this study if you are at least 18 years old and have been through a traumatic event during your life. You must be able to read, write, and speak English. If you are currently having thoughts of hurting yourself or active psychotic thoughts you will not be eligible to participate in the study and you will be provided information about other services that are better suited for your difficulties. In addition, if you are currently intoxicated or under the influence of drugs or alcohol you may not participate as it may keep you from learning the skills taught in the mindfulness groups.

Where will this study take place?
The initial session will take place in an individual room at the community agency from which you were referred. All future sessions will take place in a group room at the same agency. One month after you complete the group you will be asked to complete a packet of questionnaires either at the agency or at home. At the end of the 8-weeks we will ask your preference for how you’d like to complete the last packet of measures.

What is the time commitment for participating in this study?
The initial meeting will take about 1.5 to 2 hours. Each weekly meeting will be 1.5 hours for 8 weeks. In addition, the final group session will be longer in order to complete assessments.

In total, including the assessment sessions, weekly groups, suggested daily practice, and follow-up assessments, this study will take approximately 27 to 30 hours.

What will you be asked to do if you choose to participate in this study?
If you choose to participate in this study, you will be asked to fill out a number of forms in an individual session with a researcher. You will then participate in a brief interview with the
researcher and have the opportunity to ask any questions. If you are eligible to participate and agree to participate in the study, you will be asked to attend 8 weekly group sessions lasting 1.5 hours. You will be encouraged to practice the skills taught in the group for around 15 minutes per day. Finally you will be asked to fill out forms at the end of the final group session, and one month after the end of the group. All responses to forms will be kept confidential, and personal information will not be stored with your answers.

**What information is being measured during the study?**
There are a number of forms used in this study. These include a measure of posttraumatic stress symptoms, history of traumatic experiences, general psychological symptoms, mindfulness skills, level of avoidance, substance use and problems with substances, level of stress, areas of growth, acceptability of the group, and a practice log. These forms are commonly used in research, and have been found to be valid.

**What are the risks of participating in this study and how will these risks be minimized?**
One possible risk of participating in this study is that some people may notice an increase in symptoms when filling out questionnaires or upon starting the mindfulness practices, although, an increase in symptoms is not necessarily expected. In the event that you feel worse during or following a group, a research assistant will speak with you individually and provide you with brief counseling as well as available resources including a 24-hour crisis hotline. You will also be encouraged to access services from the agency you were recruited from in the event that you notice an increase in symptoms. To minimize these risks and ensure confidentiality, group sessions will be provided in private community locations. You are also free to withdraw from the study at any time without penalty.

Participants should be aware that staff at the community agency from which you were recruited may be aware of your participation in the group. However, no staff will be present during the group sessions, and they will not have access to any forms you complete as part of the group. Although they may be aware of your participation, taking part in the group will in no way affect your standing at the agency, or any services you currently receive at the agency.

**What are the benefits of participating in this study?**
One potential benefit of this study is you may notice a reduction in symptoms or distress. In addition, the group will be provided free of charge. While there is no direct financial compensation for participation, food will be provided during the group sessions. An additional benefit is that your participation in the study may increase our knowledge of treatments for victims of interpersonal trauma.

**Are there any costs associated with participating in this study?**
The main cost of participating in the study is the time you will spend in the assessment and group sessions. In total, the study will take approximately 27 to 30 hours across 8-12 weeks.
One additional cost of participating is the money required for transportation to and from the group sessions.

Is there any compensation for participating in this study?
There is no direct compensation for participating in this study.

Who will have access to the information collected during this study?
Only the primary investigator and graduate student investigator will have access to the data collected in this study. The results of this study may be presented at research conferences or submitted to a publication; however, no participant identifying information will be included in the papers. All data will be kept separate from identifying information.

What if you want to stop participating in this study?
You can choose to stop participating in the group and study at anytime for any reason. You will not suffer any prejudice or penalty by your decision to stop your participation. You will experience no consequences if you choose to withdraw from this study.
If necessary, the investigator can also decide to stop your participation in the study without your consent.

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 Amy.Naugle@wmich.edu. You may also contact the graduate student investigator, Laura Stayton. Laura.E.Stayton@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 take part in this study.

Please Print Your Name

Participant’s signature Date