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To the Graduate Council:

I am submitting herewith a dissertation written by Amanda Eliza Seavey entitled "The Effects of a Brief Mindfulness Intervention on Lab-based Aggression." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Todd M. Moore, Major Professor

We have read this dissertation and recommend its acceptance:

Kristina Gordon, Gregory Stuart, David Patterson

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

The Effects of a Brief Mindfulness Intervention on Lab-based Aggression

A Dissertation Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Amanda Eliza Seavey
August 2014

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Abstract

Aggression and violence are severe and prevalent problems associated with numerous negative health consequences and increased health care costs. Prevalence rates vary with the highest rates being among young adult populations. Some research indicates that aggression perpetration is an attempt at controlling negative affect. Therefore, many have posited that emotion regulation may be an amenable risk factor for violence and aggression, and interventions such as mindfulness-based therapies designed to enhance emotion regulation and distress tolerance may be helpful. Previous research has found positive effects on psychological well-being using even brief mindfulness interventions. Thus, the current study aimed to investigate how a brief mindfulness intervention affects aggressive responding among 97 college students. Participants completed measures of general aggression and mindfulness. Participants were randomly assigned to receive a brief mindfulness intervention (or no intervention), followed by completion of a 25-minute lab-based aggression exercise in which participants ostensibly competed against an opponent to earn money via button-pressing. Participants then completed a measure of state mindfulness as a manipulation check. Hypotheses that participants in the mindfulness intervention group would respond less aggressively than those in the control group even after controlling for trait mindfulness and previous aggression were not supported. Results indicated that groups did not differ on state mindfulness or aggression. Future research should improve upon the current study by addressing methodological concerns with the mindfulness task in order to better understand the relationship between mindfulness and aggression.

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Chapter 1

Introduction and General Information

It is well known that aggression and violence are prevalent and debilitating problems. Often defined as any behavior that is intended to harm another being (Baron & Richardson, 1994), aggression is an external social behavior that is not accidental (Bushman & Huesmann, 2010). It is important to distinguish between types of aggression. Physical aggression includes harming others physically such as hitting, kicking, stabbing, or shooting (Bushmann & Huesmann, 2010). Verbal aggression involves harming others with words such as yelling, screaming, swearing or name calling. Relational aggression involves intentionally harming a person through social relationships (e.g., group exclusion, withdrawing affection, spreading rumors) (Crick & Grotpeter, 1995). Furthermore, aggression can be direct or indirect (Lagerspetz, Bjorkqvist, & Peltonen, 1988), passive or active, proactive or reactive. Whether or not aggression is direct or indirect is related to the absence or presence of the victim. Active versus passive aggression is determined by whether or not the aggressor responds in a harmful way or chooses not to respond in a helpful way (Bushmann & Huesmann, 2010). Lastly, aggression can be reactive (hostile, impulsive) or proactive (Buss, 1961; Dodge & Coie, 1987) which is precalculated. However, often times it is very difficult to distinguish between the two (Bushman & Anderson, 2001). Moreover, one specific and prevalent type of aggression is known as intimate partner violence (IPV) and includes psychological, physical and sexual acts of aggression or violence by both men and women towards their partners (Capaldi et al., 2012). Many specific types of aggression exist (e.g., stalking, rape, animal abuse, cyber bullying, criminal violence); however, the current manuscript focuses specifically on direct, active and reactive aggression between two people.

Prevalence rates of aggression perpetration and victimization vary widely. The overall rate of criminal victimization is 3.8% for those who are 12 and older. More specifically, rates of physical assault are 3.1% overall and highest among adolescents and young adults (U.S Bureau of Justice Statistics, 1998). A study by Leonard, Quigley and Collins (2002) indicates that 17-22% of young adults endorse having been the victim of aggression within the past year. This rate increased (22-28%) when the participant included instances in which they initiated the aggression. Research also indicates high levels of aggression perpetration among clinical populations such as substance users (Murray et al., 2008). Much of our knowledge of aggression comes from research conducted on a specific type of aggression known as intimate partner violence (IPV). A recent meta analysis revealed that 28.3% of women and 21.6% of males report perpetrating physical violence within an intimate relationship (Desmarais, Reeves, Nicholls, Telford & Fiebert, 2012b). Consistent with research on general aggression, the rates of victimization were highest among college samples, with 36.4% of women and 26.4% of men having experienced physical violence. Rates ranged from 3% to 77% across studies (Desmarais, Reeves, Nicholls, Telford & Fiebert, 2012). One study indicates that rates of psychological perpetration are as high as 80% among college students (Shorey et. al., 2008b). Thus, it is critical to study aggressive behaviors in a young adult population.

Aggression and victimization is a universal public health concern (Straus, 2009). Victimization is associated with numerous mental and physical health problems, including anxiety and depression (Kaura & Lohman, 2007; Harned, 2001; Hines, 2007). The negative effects of physical violence are well documented and include risk for hypertension and chronic disease (Coker et al., 2002), adverse reproductive outcomes (Janssen et al., 2003), posttraumatic stress symptoms (Hines, 2007), somatic complaints (Prospero, 2007), and can result in death (e.

g., Campbell, Glass, Sharps, Laughon, & Bloom, 2007). A meta analysis on the emotional impact of physical abuse within the context of an intimate relationship showed that 48% of victims experienced depression, 18% reported suicidality, 64% had Posttraumatic Stress Disorder, and 19% abused alcohol or drugs (Golding, 1999; Shorey, Stuart, & Cornelius, 2011). Such significant mental health concerns may increase the likelihood of risk taking behaviors such as self-harming suicidal behavior (Campbell, 2002) and substance abuse (Coker et al., 2002; Golding, 1999). Furthermore, mental health concerns increase the likelihood of physical health problems (McNutt, Carlson, Persaud & Postmus, 2002). Not surprisingly, many of these mental and physical health concerns lead to significant economic strain. Research suggests that victimization leads to increased medical costs to the U. S. health care system by 1.4 to 4 times (Arias & Corso, 2005; Bonomi, Anderson, Rivara & Thompson , 2009; Jones et al, 2006; Rivara et al., 2007). Overall, research repeatedly demonstrates that aggression and victimization are associated with increased negative health symptoms and higher health care costs.

Aggression is highly complex and is influenced by several factors and domains. A biopsychosocial model suggests that both distal and proximal factors lead to violence risk (Chermack and Giancola, 1997). Developmental factors (e.g., family history), individual differences (e.g., psychological problems) and social factors (e.g., involvement with a gang) all are domains related to aggression (Chermack and Giancola, 1997; Chermack et al., 2006). For example, developmental factors that are thought to influence aggressive behavior are exposure to intimate partner violence in the family of origin, experience of childhood abuse, and parental permissiveness (Capaldi et al., 2012). Some individual and personality factors that are hypothesized to contribute to aggressive behavior include psychopathy (Hare, Harpur, Hakstian, Forth, Hart & Newman, 1990; Van Baardewijk, Stegge, Bushman, & Vermeiren, 2009),

narcissism (Baumeister, Smart, & Boden, 1996), poor self-control (Pratt & Cullen, 2000; Henry, Caspi, Moffitt, & Silva, 1996), executive functioning and IQ deficits (Giancola, 1995; Giancola, Mezzich, & Tarter, 1998), depression, substance use, anger and hostility (see Capaldi et al., 2012 for review). Furthermore, some social factors that are thought to influence aggressive responding include association with deviant peers, lack of social support, and low socioeconomic status (see Capaldi et al., 2012 for review). In addition, several proximal factors have been shown to be associated with aggression perpetration including stress, negative affect, and substance use (Cornelius & Resseguie, 2007; Moore et al., 2011; O'Leary, Woodin & Fritz, 2006).

Developmentally, aggression is seen in the earliest years of life (ages 1 -3) but most learn to inhibit physically aggressive behaviors during preschool and early elementary school. While most children learn to behave in less aggressive and more socially appropriate ways, elevated aggression in childhood is highly predictive of aggression later in life (Huesmann, Dubow, & Boxer, 2009; Tremblay, 2000). Violent criminal offending is highest between ages 15 and 30 for males and females (U.S. Department of Justice, 2008). Moffit (1993) indicates that aggression is either situational or life-course persistent. Those who exhibit situational aggression are only temporarily aggressive, usually during their adolescent years, while individuals who exhibit life-course persistent aggression, exhibit aggressive behaviors throughout their lifetime. Furthermore, these life-course persistent individuals often exhibit more severe acts of aggression (Moffit, 2007). While gender differences do emerge in early childhood and adolescence, differences exist in type of aggression rather than rate of aggression. That is, females are much more likely to perpetrate indirect aggression, while males are more likely to perpetrate physical aggression (Crick & Grotpeter, 1995; Vaillancourt, 2005).

Much of the research on aggression has focused on male perpetration (Straus, 2009). Frequently, this is due to the supposition that any focus on women as perpetrators of violence will detract attention away from the concerns with women as victims (White, Smith, Koss & Figueredo, 2000) as well as the severe consequences women experience due to being victimized (Archer, 2000). Additionally, studying women's aggression is controversial due to the commonly held belief that violence, at least IPV, is caused by patriarchal power and control (Straus, 2009). Despite such controversies, current research indicates that both males and females perpetrate violence (Archer, 2000; Morse, 1995; Straus, 1997) and, therefore, it is imperative to also study female perpetration. To what extent gender differences exist in aggression perpetration, however, is unclear. While criminal records indicate that women commit fewer violent criminal acts such as murder (U.S. Department of Justice, 2008), some have posited that criminal records are insufficient as female perpetrated aggression may be underreported (Bushman & Huesmann, 2010). One study suggests that there do appear to be gender differences in perpetration of non-partner aggression in clinical samples (i.e., substance use disorders) such that men perpetrate more non-partner aggression than women (Murray et al., 2008). Furthermore, there is much debate about women's aggression in the context of relationships. Many national surveys suggest that men perpetrate higher levels of violence within intimate relationships (National Violence Against Women Survey, 2000). While other studies suggest that females are slightly more likely to use physical aggression against intimate partners (Archer, 2000; Straus, 1997), males are more likely to inflict serious injury on their partners (Archer, 2000). Specifically, data from more than 15,000 married men and women suggest that women, while using different methods, were as controlling as men in their current marriages, and those who were more controlling were more likely to engage in repeated acts of aggression (Felson & Outlaw, 2007). A meta-analysis by

Bettencourt and Miller (1996) suggests that the gender differences typically seen in general aggression are largely eradicated when controlling for provocation. That is, when provoked at equal levels, females respond slightly more aggressively than males (Bettencourt & Miller, 1996). Though some have suggested that gender differences exist in rate and severity of aggression (O'Leary, 2000; Saunders, 2002; White, et al., 2000), a study by Straus and Gelles (1990) suggests that women engage in aggression as severely and as often as men do. Bell and Naugle (2007) found that men and women demonstrate equal victimization and perpetration rates, regardless of type of abuse. Additionally, Johnson and Ferraro (2000) suggest that women engage in "intimate terrorism" in their relationships, which are severe aggressive acts combined with coercive control. In contrast, Hamby (2009) reports that the research on perpetration is often based on small samples and larger samples suggest that females perpetrate roughly 25-30% of violence in intimate relationships. Furthermore, several studies have examined aggression perpetration rates of IPV and found no sex differences (Jenkins & Aube 2002; Riggs & O'Leary 1996; Straus, 2009), suggesting that men and women perpetrate violence at similar rates. Nevertheless, female perpetration remains a heavily debated and understudied phenomenon, especially in the context of experimental lab-based studies.

Chapter 2

Aggression and Predictors of Perpetration

Understanding predictors of aggression is essential for informing intervention efforts. Motivations for perpetration of intimate partner violence have included frustration, alcohol and drug use, jealousy/relationship issues, miscommunication, partner's use of psychological aggression, and anger (Henderson, 1991; Taft et al., 2010). One such study suggests that males perpetrate violence primarily because of anger and attention seeking while, in contrast, females perpetrate out of retaliation for emotional hurt or to express feelings they could not express in words (Shorey et al., 2010). It has been suggested that the controversy surrounding female perpetration may be due to the argument that females are acting out of self-defense when perpetrating (Saunders, 1986); however, research indicates that there are several reasons for female perpetration. For example, results from a study by Straus and Gelles (1990) indicate that 27% of aggression perpetration within an intimate relationship is female-only perpetration, suggesting that these women cannot simply be responding to their partners' aggression. Similarly, Leisring (2009) estimates that 23% of college female perpetrators have never been victims of IPV. While research does indicate that self-defense is one of the many reasons for female-perpetrated aggression, it is often not the primary reason given by perpetrators. In a sample of women arrested for partner violence, only 38.7% indicated that their perpetration was due to self-defense (Stuart, Moore, Gordon, Hellmuth, 2006). Largely, research suggests that anger and hostility are distinctive characteristics of males and females who perpetrate violence (see Norlander & Eckhardt, 2005 for review). Furthermore, substance use is an extensively researched predictor of aggression (Chermack & Blow, 2002; Chermack & Giancola, 1997; Murray et al., 2008). Follingstad and colleagues (1991) suggests that the most common reasons

women report for perpetrating were to show anger, to retaliate for emotional hurt, an inability to express themselves verbally and to have control over their partner. A study by Stuart and colleagues (2006) suggests that the most common reasons for perpetrating violence in a sample of arrested women were self-defense, poor emotion regulation, provocation by a partner, and retaliation for past abuse. Again, it is clear that perpetration of violence is often out of response to negative emotion, making it especially important to study predictors that influence one's behavior in the moment before perpetration occurs (i.e., proximal factors) (Cornelius & Resseguie, 2007; O;Leary, Woodin & Fritz, 2006).

Many researchers have hypothesized that aggression perpetration may be an attempt at controlling negative affect (Jakupcak, Lisak, & Roemer, 2002; Shorey et al., 2008a). Several studies provide support for the association between aggressive responding and negative affect (e.g., anger). For example, a study by Harper and colleagues (2005) suggests that increased difficulty with emotion regulation is associated with increased psychological aggression perpetration. Additionally, Gratz and Roemer (2004) examined the relationship between emotion regulation and perpetration using the Difficulties with Emotion Regulation Scale (DERS) and found that increased difficulty with emotion regulation was associated with increased physical aggression perpetration. Recent research has suggested that negative emotion, or the inability to express emotions (e.g., anger) nonaggressively were found to be common motivations for those perpetrating psychological aggression, suggesting that broad difficulties with emotion regulation is a proximal factor for psychological perpetration within a relationship (Shorey et al., 2011). Furthermore, results of a study by Hines (2008) suggest that Borderline personality traits positively predict physical, psychological and sexual perpetration among women. Taken together, research provides a strong link between violence perpetration and difficulty with

emotion regulation. As such, emotion regulation may be an amenable risk factor for violence perpetration and, therefore, a target of intervention efforts. Thus, further research on the link between emotion regulation and aggression perpetration is necessary. Specifically, researchers have posited that interventions such as mindfulness-based therapies designed to enhance emotion regulation, impulse control and non-avoidant behaviors may be helpful (Shorey et al., 2008a).

Chapter 3

Mindfulness

Mindfulness has been promoted for centuries by Buddhism and other spiritualties; however, its introduction to health and western psychology is relatively in its infancy. Early western mindful practices began with Zen Buddhism in the 50s and 60s. Western mindfulness is usually thought of differently than in the religious traditions in that it is not tied to philosophy, ethical code or a system of practices. Interest in the use of meditation in psychotherapy started in the 60s when early studies demonstrated significant effects at the neural level; that is, individuals who meditated also showed increases in brain waves associated with lower arousal and increased emotion regulation (Anand, Chhina & Sngh 1961; Wallace, 1970; Kasamatzu & Hirai, 1966). In the 1970s, John Kabat-Zinn introduced a mindfulness protocol for individuals with chronic pain as a means to increase psychological well-being (Kabat-Zinn, 1982). By introducing mindfulness as a construct outside of Buddhism, he made it more accessible and generalizable. While this construct has been studied for several decades, the definition still remains somewhat unclear. Early definitions simply referred to mindfulness as present centered awareness. For example, Marlatt and Kristeller (1999) refer to mindfulness as "bringing ones complete attention to the present experience on a moment to moment basis" (p. 68). More recently, mindfulness is defined as having two distinct components: present-centered awareness, and an attitude of acceptance to whatever one is experiencing (Bishop et al., 2004). The attentional component involves deliberately directing one's attention to the observation of physical sensations, thoughts, feelings or other stimuli in the moment. The acceptance-based component involves attending to the present moment with an attitude of nonjudgment and openness (Bishop et al., 2004). One commonly referenced definition is "paying attention in a particular way: on purpose, in the

present moment, and nonjudgmentally" (Kabat-Zinn, 1994, p. 4). In this definition, "nonjudgementally" is defined as the attitude of curiosity, openness and acceptance, and without preoccupation with or suppression of the experience. Kabat-Zinn (1982) has also described mindfulness as intentional self-regulation, and states that it is concerned with cultivating awareness, insight, wisdom and compassion (Kabat-Zinn, 2000).

Many researchers posit that mindfulness can be a state, trait or learned skill (e.g., Brown et al., 2007). In this regard, all individuals can be said to possess some level of characteristic trait-like mindfulness. Some have theorized that mindfulness at this level is based on early relationships (Cordon & Finney, 2008). Further, it can be said that we all possess levels of state like mindfulness that may vary in any given moment. For example, one's level of present centered awareness may be different during driving to and from work versus driving through an unfamiliar winding road. Kabat-Zinn (1982) suggests that we can be taught mindfulness skills. Meditation is one such way to practice and cultivate mindfulness. During a mindfulness meditation individuals may be instructed to attend to internal experiences (e.g., body sensations, thoughts, or emotions) or external experiences (e.g., sights and sounds) (Linehan, 1993b). Several mindfulness based protocols attempt to increase mindfulness through meditation (e.g., Mindfulness-based Stress Reduction); however, many other protocols have been developed to further develop mindfulness skills without much focus on meditative practice. Recently, there has been an influx of research regarding mindfulness and several mindfulness-based treatment interventions have been developed, including Mindfulness-Based Stress Reduction (MBSR), Mindfulness-Based Cognitive Therapy (MBCT), Dialectical Behavior Therapy (DBT) and Acceptance and Commitment Therapy (ACT).

Mindfulness-Based Stress Reduction was originally created by John Kabat- Zinn (1982) in order to improve psychological well-being in individuals experiencing chronic pain. MBSR requires extensive training in mindfulness meditation over the course of 8- 10 weeks. Patients attend 2.5 hour sessions one time per week and one all day silent retreat. Additionally, they are expected to practice mindfulness meditation for 45 minutes per day for 6 days a week as 'homework'. Originally, MBSR was intended to help patients relate differently to their own pain (i.e., accepting and nonjudgmentally). More broadly, MBSR patients become less reactive and thus, given the opportunity to break habitual and maladaptive ways of thinking and behaving (Kabat-Zinn, 1990).

Since its original conception with patients with chronic pain, MBSR has been applied to many different populations. Outcome research reveals that MBSR reduces self-reported anxiety (Anderson et al., 2007; Shapiro et al., 1998; Speca et al., 2000), anger and rumination (Anderson et al., 2007), general psychological distress (Astin, 1997; Shapiro et al., 2005; Speca et al., 2000), cognitive disorganization (Speca et al., 2000), post traumatic avoidance symptoms (Branstrom et al., 2010) and medical symptoms (Williams et al., 2001). For example, individuals diagnosed with cancer report reductions in mood disturbance and stress levels after MBSR (Speca, 2000). Research suggests that even reports of physical symptoms are diminished in patients with fibromyalgia after MBSR (Kabat-Zinn, 1998). Furthermore, extensive research has demonstrated that MBSR increases positive affect (Anderson et. al., 2007), sense of spirituality (Astin, 1997; Shapiro et al., 1998), empathy (Shapiro, 1998), mindfulness (Anderson et al., 2007), forgiveness (Oman et al., 2008), self-compassion (Shapiro et al., 2005), satisfaction with life and quality of life (Grossman et al., 2010; Shapiro et al., 2005). Davidson and colleagues (2003) found that MBSR is associated with brain changes reflective of positive emotional states

and emotional regulatory processes. MBSR has been shown to improve empathy ratings and general psychological symptoms in non-clinical student populations as well (Astin, 1997; Shapiro, 1998).

Mindfulness-Based Cognitive Therapy (MBCT) was developed by Segal and colleagues (2002) based on the MBSR model. Originally developed as a treatment for those in remission from recurrent Major Depressive Disorder, MBCT includes elements of mindfulness and cognitive therapy. MBCT is based on the theory that individuals with recurrent depression have developed strong associations between negative thoughts and depressive mood. It aims to teach patients to disengage from negative thinking and see thoughts as 'mental events' rather than fact (Segal, Teasdale & Williams, 2002). This differs from traditional cognitive therapy in that it does not emphasize altering thoughts themselves; rather, it suggests altering one's relationship to the thoughts will allow for less emotionally reactive responding (Teasdale et al., 2000).

Consistent with research on MBSR, studies have revealed that MBCT is associated with positive psychological outcomes. Specifically, research on MBCT suggests it is extremely promising for individuals who are in remission from recurrent depression. Those with 3 or more previous episodes show reduced relapse rates compared to those who participated in treatment as usual (Teasdale et al., 2000). Godfrin and van Heeringen (2010) showed that MBCT also improves residual depressive symptoms in those recovering from a depressive episode. Furthermore, MBCT has been shown to be effective in those currently depressed as compared to treatment as usual (Hepburn et al., 2009). Since its original conception, MBCT has been adapted for bipolar disorder (Williams et al., 2008) as well as social phobia (Piet et al., 2010).

Dialectical Behavior Therapy (DBT) was designed specifically to treat individuals with Borderline Personality Disorder. It conceptualizes these individuals as having deficits in emotion

regulation and focuses both on acceptance, as well as behavior change (Linehan, 1993a). Comparatively, DBT focuses much less on mindfulness meditation, but does incorporate mindfulness skill building as one of four primary components of treatment. Through individual and group therapy as well as phone consultation, patients learn 'what skills' (observe, describe, participate) and 'how skills' (nonjudgmentally, one-mindfully and effectively). Skills training groups focus specifically on mindfulness skills to increase self-acceptance and reduce avoidance of emotion. Using exercises such as visualizing thoughts or feelings like clouds passing in the sky and noticing breathing or sensations, patients are encouraged to bring mindfulness into their daily living. The other three components are distress tolerance, emotional regulation and interpersonal effectiveness.

Research suggests that DBT reduces the frequency and severity of self-harm behaviors in those with Borderline Personality Disorder (Linehan, 2006). Moreover, participants have shown improvements in global functioning, social adjustment and use of crises services for up to a year after treatment (Linehan et al., 1993; Linehan, 2006). DBT has also been shown to reduce substance use in individuals with comorbid Borderline Personality Disorder and Substance Abuse or Dependence (Linehan et al., 2002) However, it is important to note that, as with most treatment protocols, it is difficult to determine mechanisms of change for the above treatment studies.

Based on the theory that distress is caused by the attempt to avoid or control thoughts and emotions, Acceptance and Commitment Therapy (ACT) was developed to teach greater psychological flexibility. Often, avoidance leads to feeling more of the very emotion we are attempting to avoid. Additionally, failure at avoidance and control, as well as the inability to engage in more goal-directed behaviors, causes distress. As such, ACT aims to decrease an

individual's level of avoidance with their experiences, have them recognize their values, and commit to behaviors that are consistent with those values (Keng, Smoski & Robins, 2011). ACT emphasizes four treatment processes: acceptance, diffusion, contact with the present moment and self as context. While mindfulness meditation practice is not emphasized heavily, it certainly shares present-centered focus and acceptance components with mindfulness. The duration of treatment varies widely from 1 day to 16 weeks (Hayes et al., 2004).

Research on ACT demonstrates that it is effective in reducing symptoms of anxiety and depression, at least as effectively as another intervention (Bond & Bunce 200; Zettle & Hayes 1986). Bach and Hayes (2002) found that it improves affective symptoms, social functioning and overall symptom reporting. Furthermore, ACT has been successful in reduction of substance use and dependence among polysubstance abusing individuals (Hayes et. al., 2004).

Many mindfulness-based interventions have been developed in recent years; however, aside from those listed above, few have been tested in treatment outcome studies. Mindfulness interventions have been proposed for use in clinical populations with ADHD (Zylowska et. al., 2008), Bipolar Disorder (Mikloweitz et al., 2009), Panic Disorder (Kim et al., 2010), Generalized Anxiety Disorder (Craigie, Tees, Marsh & Nathan, 2008; Evans et al., 2008), eating disorders (Baer, Fischer & Huss, 2005), substance use (Bowen et al., 2006; Witkiewitz et al., 2005) and psychosis (Chadwick, Taylor & Abba, 2005). Overall, research suggests that mindfulness-based treatments reduce the symptomology and psychological distress associated with a broad range of psychological and physical health concerns. Given the extensive resources required, many of these studies have not tested such mindfulness interventions in outcome studies. As such, many have attempted to use brief lab-based mindfulness interventions to measure its effects on

psychological functioning within various populations. That is, some research attempts to induce mindfulness in a lab setting in order to better understand its effects.

Lab-induced mindfulness

Many researchers have attempted to understand the effects of mindfulness via brief lab based manipulations in order to increase the efficiency of mindfulness research and better control variables. Arch and Craske (2006) assigned participants to one of three groups (focused breathing, unfocused attention or worry) and had them view and rate emotionally valenced pictures. Only the focused breathing group maintained consistently positive responses to neutral pictures. Additionally, these participants reported lower negative affect in response to negatively valenced pictures and were more willing to view negatively valenced pictures. In a study by Erisman and Roemer (2010), individuals in a brief mindfulness intervention group responded to an affectively mixed film clip with less negative affect and emotion regulation difficulty than those who did not receive the brief mindfulness intervention. Similar effects have been found within clinical populations. For example, individuals with mood and anxiety disorders who were instructed to accept their emotions while watching an emotionally provocative film reported less negative emotions after the film compared with those who were instructed to suppress their emotions. Taken together, this research suggests that even brief mindfulness interventions increase tolerance of negative emotion.

Similarly, many studies have examined the effect of brief mindfulness interventions on individuals who are under high levels of physical stress. For example, in a study by Feldner, Zvolensky, Eifert and Spira (2003) individuals were instructed to mindfully observe and accept feelings, or to try to suppress feelings during a CO_2 challenge (a task that has frequently been used to induce panic attack-like symptoms). Individuals who were highly emotionally avoidant

reported higher anxiety than those who were less emotionally avoidant in the suppression condition but not in the observation condition suggesting that state mindfulness may decrease avoidance of emotion. In a study by Levitt, Brown, Orsillo and Barlow (2004) participants were assigned to one of three groups where they were exposed to 10 minute audio tapes containing rationales for emotional acceptance, emotional suppression or neutral narrative. Participants reported significantly less anxiety in an emotional acceptance group after a CO_2 challenge than those who had been put in an emotional suppression or neutral group. Additionally, individuals in the emotional acceptance group reported that they were more willing to return to another experimental session.

Similar results in response to the CO_2 challenge were also found in a clinical population. High anxiety individuals who participated in brief acceptance training, breathing training or no training were compared on response to a CO_2 challenge. Individuals in the acceptance training group reported less intense fear, fewer catastrophic thoughts and greater willingness to return to another experimental session than the other two groups (Eifert & Heffner, 2003). Overall, these studies show that the components of mindfulness (observation and acceptance) may reduce anxiety and avoidance in the face of physiological arousal. Furthermore, such lab-based mindfulness studies suggest that, consistent with results for long term intensive mindfulness intervention programs, brief (i.e. 5-10 minutes) mindfulness training may have an immediate effect on emotional and physical reactivity. However, it is important to note that most of the previous studies did not use manipulation checks in regard to the brief mindfulness training. Most of the previous research also did not include measures of state and trait mindfulness. Therefore, it is difficult to surmise the extent to which the mindfulness intervention affected the outcome of the studies.

Chapter 4

Rationale for the Present Study

Ongoing research has revealed that there is a link between violence perpetration and difficulty with emotion regulation (Gratz & Roemer, 2004; Jakupcak, Lisak, & Roemer, 2002; Shorey et al., 2011), suggesting that negative affect may be an amenable risk factor for intimate partner violence. Researchers have posited that mindfulness-based therapies may be especially useful to this population given the link between emotion regulation and perpetration (Shorey et al., 2008a). Specifically, researchers have suggested that mindfulness-based therapies would increase adaptive responses to anger, such that it may reduce emotional reactivity and maladaptive responses caused by anger (Wright, Day, & Howells, 2009). Long term mindfulness-based therapies aim to increase cognitive flexibility, decrease emotional reactivity and improve attentional control. Such interventions intend to increase emotional balance known as equanimity that involves acceptance, clarity, flexibility and regulation of internal experience (Hayes & Feldman, 2004). Furthermore, early research has indicated that even brief mindfulness interventions may increase one's ability to tolerate negative emotion (Brown, Orsillo & Barlow, 2004; Feldner, Zvolensky, Eifert &, 2003); however, few have examined the effects of a brief mindfulness intervention on aggressive responding.

A study by Heppner and colleagues (2008) has looked specifically at the relationship between a brief mindfulness task and aggression. Participants were assigned to a social rejection or acceptance group as well as a mindfulness or no mindfulness group. Those in the mindfulness group were guided through a mindful eating exercise in which they mindfully ate a raisin (raisin exercise; see Kabat-Zinn, 1990). Results indicated that heightened mindfulness led to less verbally aggressive behavior following social rejection among college students (Heppner et al.,

2008). The authors conclude that cultivating awareness leads to less attachment to negative emotion, and therefore, less reaction in a social rejection context. Similarly, a study by Borders and colleagues (2010) revealed that higher levels of mindfulness were related to lower levels of physical aggression among college students. Lastly, a study by Gallagher, Hudpohl and Parrott (2010) revealed that higher levels of mindfulness were associated with lower levels of sexual aggression within dating relationships. While these studies add relevant and valuable information to the area of mindfulness and aggression, they have several limitations including the lack of lab-based measures of aggression, lack of manipulation checks and lack of both trait and state mindfulness measures. Thus, the current study aims to examine the relationship between mindfulness and aggression perpetration within a young adult population using a lab-based measure of aggression.

It was primarily hypothesized that individuals who participated in a brief mindfulness intervention would respond less aggressively when provoked by a confederate than individuals who did not participate in the mindfulness intervention, even after controlling for trait mindfulness and previous aggression. Additionally, several secondary hypotheses were proposed. Due to previous research demonstrating that high levels of mindfulness are associated with low aggression perpetration (Heppner et al., 2008; Borders et al., 2010; Gallagher, Hudepohl, & Parrott, 2010), it was hypothesized that trait mindfulness would moderate the relationship between the intervention condition and aggressive responding. That is, individuals with higher trait mindfulness would respond less aggressively when provoked, and this effect would be stronger for individuals who have participated in the mindfulness intervention. Additionally, given the research demonstrating that previous aggression is predictive of future aggression (Huesmann, Dubow, & Boxer, 2009; Tremblay, 2000), it was hypothesized that

previous aggression would moderate the relationship between the intervention condition and aggressive responding. That is, individuals with more previous aggression would respond more aggressively when provoked, and this effect would be weaker for women who participated in the mindfulness intervention. Lastly, it was hypothesized that a three-way interaction would also emerge such that those high in trait mindfulness and low in previous aggression who participated in the mindfulness intervention would respond the least aggressively when provoked.

Chapter 5

Method

Participants

G*power version 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007) was used to calculate the necessary sample size for the primary hypothesis of the present study. Using a one-way fixed ANOVA design (1 independent and 1 dependent variable) with a significance level of .05 (two-tailed) and a power $(1 - \beta) = .80$, the necessary sample size for finding medium to large differences between groups were specified. According to Cohen, a medium effect size for an F test is equal to .25 and a large effect is equal to .40 (Cohen, 1988). Such calculations revealed that samples ranging from 85 participants (effect size = .25) to 34 participants (effect size = .40) would be required.

A sample of 97 male (N = 32) and female (N = 64) undergraduate students were recruited from the University of Tennessee research subject pool. Students in this pool were enrolled in Introduction to Psychology. To be eligible for the study participants had to beat least 18 years of age. The mean age of the sample was 18.79 (SD = 1.19). Ethnically, most participants identified as Caucasian (82.5); 4.1 % identified as African American; the remainder of the sample identified as Asian American (3.1%) or Hispanic (2.1%). The majority of students were freshman (76.3%) followed by sophomores (13.4%), juniors (3.1%), and seniors (2.1%).

Measures

Mindfulness. Mindfulness was assessed using three different measures. Trait mindfulness was measured using the Mindful Attention Awareness Scale (Brown & Ryan, 2003) which inquires about participants' general level of present centered awareness or the extent to which

they are on 'automatic pilot' (see appendix A). Participants indicate how often they experience 15 items (e.g., "I drive places on automatic pilot and then wonder why I went there" and I find myself preoccupied with the future or the past") on a 6-point Likert scale ("*almost always*" to "*almost never*"). The MAAS has demonstrated good reliability and validity (e.g., α = .86; Baer et al., 2006). For the current study, the coefficient alpha was .90.

State mindfulness was assessed using the State Mindful Attention Awareness Scale (Brown & Ryan, 2003; see appendix B). This 5 item scale assesses for the level of present-centered awareness at a given point in time (e.g. I was finding it difficult to stay focused on what was happening). Each item is rated on a 7-point Likert scale ("*not at all"* to *"very much*"). This scale demonstrates excellent psychometric properties (α = .92, Brown & Ryan, 2003). The coefficient alpha for the current project was .86.

General mindfulness was measured using the Five Facet Mindfulness Questionnaire (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; see appendix C). This scale's 39-items are divided into five subscales: Observation of Experience (8 items), Describing with Words (8 items), Acting with Awareness (8 items), Non-judging of Experience (8 items), and Non-reactivity to Experience (7 items). Each of the items are rated on a 5-point rating scale (*1 = never or very rarely true, 2 = rarely true, 3 = sometimes true, 4 = often true, 5 = very often or always true*). This scale was developed based on a factor analysis of mindfulness questionnaires and demonstrates good psychometric properties (α = .76 -. 89; Shorey, Seavey, Quin, & Cornelius, 2012). Internal consistency for the current study was .71.

Aggression. General violence was measured using the General Violence Conflict Tatics Scale (Stuart, Moore, Kahler & Ramsey, 2003; Stuart, Moore, Ramsey & Kahler, 2003; see appendix D). Using items from the original CTS (Straus, 1979), this scale asks participants to list

the number of times they have engaged in physical violence towards friends, coworkers, bosses, adult relatives, acquaintances, strangers, police officers, gang and/or other groups, and others since the age of 18. Higher scores indicate greater frequency of violent acts. Internal consistency for the current project was .79.

The Revised Conflict Tactics Scale (CTS2; Straus, Hamby, Boney-MCCoy, & Sugarman, 1996; see appendix E) was used to assess negative tactics used to resolve conflicts in intimate relationships. Participants are asked to rate their own behavior and their partner's behavior on 78 questions using likert scale (*1 time in the past year, 2 times in the past year, 3-5 times in the past year, 6-10 times in the past year, 11-20 times in the past year, more than 20 times in the past year, not in the past year but it did happen before, and this has never happened*). The CTS2 has demonstrated good reliability and validity across numerous studies (e.g., Straus, 2004). Internal consistency estimates for the current study were .76 (Psychological Aggression), and .88 (Physical Assault).

The Buss Perry Aggression Questionnaire (Buss & Perry, 1992; see appendix F) was also used to measure aggression and its various components. Participants rated each of 29 items on a 5- point Likert scale (*1 = extremely uncharacteristic of me, 5 = extremely characteristic*). Items load on to 4 scales: Physical Aggression (9 items), Verbal Aggression (5 items), Anger (7 items), and Hostility (8 items). This measure demonstrates good psychometric properties ($\alpha = .80$, Buss & Perry, 1992). For the current study internal consistency was .89.

Aggression was measured behaviorally using the Point Subtraction Aggression Paradigm, PSAP (Cherek, 1982), a lab-based behavioral measure of aggression using a computer-based task in which the participant ostensibly competes against another participant to earn money. This task uses a 3-button response panel; A button earns money, B button subtracts money from the

opponent with no gain to the participant, and C-button protects from monetary subtractions by the opponent. Using Baron and Richardson's (1994) definition of aggression as any behavior that is intended to harm another being, B-button response (subtracting money from the opponent) is used as the index of aggression. The PSAP has demonstrated external validity (Cherek, Moeller, Schnapp, & Dougherty, 1997). Relative to other measures of aggression, the PSAP has a number of unique strengths. First, research has demonstrated that individuals are poor self-reporters of their own past aggression. The PSAP improves upon this issue by measuring behaviors rather than asking about them. Furthermore, many lab based measures of aggression do not provide a 'non aggressive' alternative. The PSAP attempts to improve upon this with C-button which allows the participant to protect their own money without aggressing against their opponent. Research using the PSAP has demonstrated that B-button responding is correlated with behavioral violence (Cherek, Moeller, Schnapp, & Dougherty, 1997) as well as biochemical underpinnings of impulsive violence (Cherek & Lane, 2001). In a sample of primarily undergraduate students, the PSAP was correlated with other well-known measures of aggression such as the CTS2 (Golomb, Cortez-Perez, Jaworski, Mednick & Dimsdale, 2007).

Procedure

Participants logged onto a secure UT online portal in order to sign up for the study. Eligible participants were emailed a link to several baseline measures using surveymonkey.com, a secure online survey website. Following the completion of online questionnaires, participants were asked to attend "phase 2" of the experiment in the lab. Each participant was randomly assigned to one of two conditions based on mindfulness intervention (i.e., intervention or no intervention). When participants entered the lab they were given a consent form to read through and sign. Participants in the control group were given a neutral article (see appendix G) that took

about 5-7 minutes to read. Participants in the mindfulness group were told that the study would begin once the second participant (i.e., confederate) arrived. The confederate knocked on the door and stated that they are there to participate in the study. The researcher then indicated that the confederate would be working in the room next door and showed the confederate out. Once the researcher returned, participants in the mindfulness intervention group engaged in a brief mindfulness task where they were guided through a recorded breathing exercise (see appendix H). The mindfulness intervention lasted approximately 7 minutes. Researchers participated alongside the participant in order to encourage a calm and serene environment.

All participants then took part in the Point Subtraction Aggression Paradigm (PSAP) where they were told that they were competing in a button pressing task with the other participant/confederate in order to earn money. In actuality, money was randomly subtracted by the computer program. The PSAP program was set to the highest possible provocation level; that is, the computer took money away from participants at least 13 times with an average of 19 times. The PSAP task lasted for approximately 25 minutes. At the end of the session participants completed the State MAAS, and were debriefed. Additionally, participants were given extra course credit in their General Psychology course as well as $5 for their participation.

Data Analytic Method

Hypothesis 1, which states that individuals who participated in a brief mindfulness intervention would respond less aggressively than individuals who did not participate in the mindfulness intervention, even after controlling for trait mindfulness and previous aggression, was examined using an Analysis of Covariance (ANCOVA). Aggressive responding (i.e., b-button presses) was set as the dependent variable. Intervention condition was specified as the independent variable and trait mindfulness and previous violence were entered as covariates.

To examine Hypothesis 2, that trait aggression would moderate the relationship between intervention condition and aggressive responding such that individuals with higher trait mindfulness would respond less aggressively when provoked, and this effect will be stronger for those individuals who participated in the mindfulness intervention, multiple regression analyses was used. In order to reduce multicollinearity among variables, predictor variables were mean centered as recommended by Aiken and West (1991). An interaction term was created between intervention condition and trait mindfulness and analyses proceeded in two steps. In the first model, main effects were entered as predictors of aggressive responding. In the second model, the interaction between intervention and trait mindfulness was added.

To examine Hypothesis 3, that previous aggression would moderate the relationship between intervention condition and aggressive responding such that individuals with more previous aggression would respond more aggressively when provoked, and this effect would be weaker for women who participated in the mindfulness intervention, multiple regression analyses was used. Predictor variables were mean centered and an interaction term was created between intervention condition and previous aggression. Analyses proceeded in two steps. In the first model, main effects were entered as predictors of aggressive responding. In the second model, the interaction between intervention and previous aggression was added.

Similar to procedures for Hypothesis 2 and 3, Hypothesis 4 was examined using multiple regression. In the first model, intervention condition, trait mindfulness and previous aggression were entered as main effects. In the second model, two-way interactions terms between intervention condition and trait mindfulness, intervention condition and previous aggression, and trait mindfulness and previous aggression were added to the model. In the third step, a three-way

interaction between intervention condition, trait mindfulness and previous aggression were added.

Chapter 6

Results

Descriptive Statistics

All variables were examined for skewness and kurtosis. Variables that evidence a combined skewness and kurtosis of 8 or higher are considered non-normally distributed (Hildebrand, 1986). The only variables that had problematic levels of skewness and kurtosis were the CTSG (skew = 9.46, kurtosis = 90.01), and CTS-2 (Physical perpetration, skew = 5.45, kurtosis = 33.46; Psychological perpetration; skew = 4.21, kurtosis = 21.47). Thus, the CTSG and CTS-2 were log transformed prior to analyses. Group characteristics are presented in Table 1. As displayed, the mindfulness group reported greater BPAQ scores, $t(87) = 3.92$, $p < .01$, including all four subscales. It is also notable that the two groups did not differ on state mindfulness which was assessed after PSAP, suggesting that the mindfulness group may not have been more mindful during the task than the no mindfulness group.

Hypothesis 1. Hypothesis 1, which proposed that individuals who participated in a brief mindfulness intervention would respond less aggressively than individuals who did not participate in the mindfulness intervention, was examined using Analysis of Covariance. The covariates included in the model were CTSG, CTS-2, MAAS, FFMQ and BPAQ. Results demonstrated that the groups did not differ on B-button responding, $F(85) = .00$, $p = .97$. None of the control variables were associated with B-button responding.

Hypothesis 2. Multiple regression was used to examine hypothesis 2, which proposed that trait mindfulness would moderate the relationship between intervention condition and aggressive responding such that individuals with higher trait mindfulness would respond less aggressively when provoked, and this effect would be stronger for those individuals who participated in the

mindfulness intervention. This hypothesis was first examined with the MAAS as the indicator of trait mindfulness. Results demonstrated that the main effects model (i.e., the main effects of group and trait mindfulness) was not significant ($F(85) = .25$, $p = .77$). When the interaction between trait mindfulness and group was added to the model, the model remained non-significant ($F(88) = .71$, $p = .55$). Next, hypothesis 2 was examined using the FFMQ as the indicator of trait mindfulness. Results demonstrated that the main effects model was not significant ($F(89) = .70$, $p = .50$). When the interaction between trait mindfulness and group was added to the model, the model remained non-significant ($F(89) = .82$, $p = .49$). Thus, trait mindfulness did not moderate the relationship between group condition and aggressive responding.

Hypothesis 3. Multiple regression was used to examine hypothesis 3, that previous aggression would moderate the relationship between intervention condition and aggressive responding such that individuals with more previous aggression would respond more aggressively when provoked, and this effect would be weaker for individuals who participated in the mindfulness intervention. This hypothesis was first examined with the CTSG as the indicator of previous aggression. Results demonstrated that the main effects model (i.e., the main effects of group and previous aggression) was not significant ($F(88) = 1.56$, $p = .22$). When the interaction between previous aggression and group was added to the model, the model remained non-significant ($F(88) = 1.07$, $p = .37$). Next, hypothesis 3 was examined using the CTS-2 as the indicator of previous aggression. Results demonstrated that the main effects model was not significant ($F(86) = .15$, $p = .93$). When the interaction between previous aggression and group was added to the model, the model remained non-significant ($F(86) = .21$, $p = .96$). Lastly, hypothesis 3 was examined using the BPAQ as the indicator of previous aggression. Consistent

with previously reported results, the main effects model was not significant ($F(86) = .71$, $p = .50$). Furthermore, when the interaction between previous aggression and group was added to the model, it remained non-significant ($F(86) = .55$, $p = .65$). Thus, previous aggression did not moderate the relationship between group condition and b-button responding.

Hypothesis 4. Multiple regression was used to examine hypothesis 4, which proposed that a three-way interaction would also emerge such that those high in trait mindfulness and low in previous aggression who participated in the mindfulness intervention would respond the least aggressively when provoked. This hypothesis was first examined using the MAAS as the indicator of trait mindfulness and the CTSG as the indicator of past aggression. Results demonstrated that the main effects model (i.e., the main effects of group , trait mindfulness and aggression) was not significant ($F(84) = .76$, $p = .62$). When the two way interactions were added to the model (i.e., group by mindfulness, group by aggression, mindfulness by aggression), the model remained non-significant ($F(84) = .96$, $p = .46$). Finally, when the three way interaction was added to the model (i.e., group by mindfulness by aggression), the model remained non-significant ($F(84) = .93$, $p = .49$). The above analyses were repeated with the FFMQ as the indicator of mindfulness. Results were consistent with those reported above. This was also true when the CTS-2 and BPAQ were used as indicators of past aggression.

Exploratory Analyses

Given that proposed hypotheses were not supported, a number of additional analyses were conducted to determine whether there were significant differences between groups on potentially important distal characteristics and whether distal factors were associated with B-button responding. Furthermore, analyses were examined using a measure of aggressive

responding as related to amount of provocation. That is, the variable B/p is the total B-button pushes divided by the total number of provocations.

T-tests between groups

Differences between the mindfulness and no mindfulness groups were examined on the following variables: A-button responding on the PSAP, C-button responding on the PSAP, B/p-button responding, total money earned on the PSAP, Impulsivity (as measured by the Barratt Impulsiveness Scale, BIS; Patton, Stanford, & Barratt, 1995), Psychopathology (as measured by the Brief Symptom Inventory, BSI: Derogatis, 1993), Attributions (as measured by the Attributions Scale), and Negative Affect (as measured by the Positive and Negative Affect Scale, PANAS; Watson, Clark, & Tellegen, 1988). No significant differences between groups on these variables were found.

Correlations with A, B, and C-button responding

Bivariate associations were examined for A-button, B-button, B/p-button, and C-button responding and the following variables: CTSG, CTS-2, BPAQ, MAAS, SMAAS, FFMQ, BSI, BIS, and PANAS (see Table 2). The only significant correlations were B/p-button and C-button with the CTSG ($r = .22$, $p < .05$; $r = .30$, $p < .01$, for B/p and C, respectively).

Additional moderation analyses

Hypotheses 2, 3, and 4 were also examined with B/p-button, C-button, and A-button responding as the dependent variables. Consistent with B-button responding, no significant models were identified. These hypotheses were also examined controlling for amount of provocation. No significant models were identified. Similarly, these hypotheses were examined controlling for gender of researcher and confederate. No significant models were identified.

For all button responding (A, B, B/p, C), hypotheses 2-4 were examined to see if they varied by gender of participant. That is, gender was examined as a moderator of the group by trait mindfulness interaction (hypothesis 2), the group by aggression interactions (hypothesis 3), and the group by mindfulness by aggression interactions (hypothesis 4). No significant models were identified.

Chapter 6

Discussion

Aggression is a prevalent and debilitating problem associated with various negative outcomes including physical and psychological health problems. Due to its association with better emotion regulation among other positive outcomes, some researchers have posited that mindfulness may attenuate aggressive responding. Thus, the current study aimed to examine whether a mindfulness intervention would be associated with less aggressive responding to provocation among a sample of male and female college students. Overall, the proposed hypotheses were not supported.

Hypothesis 1, which proposed that individuals who participated in a brief mindfulness intervention would respond less aggressively than individuals who did not participate in the mindfulness intervention, was not supported. That is, the groups did not differ on B-button responding. The intervention and control group did not differ on state mindfulness assessed after the PSAP task, suggesting that the intervention did not induce mindfulness. Thus, one possible explanation for why the groups did not differ on B-button responding is that the mindfulness intervention may not have induced the present centered qualities of mindful behavior that would theoretically be associated with reduced aggression (see Wright, Day, & Howells, 2009; Heppner et al., 2008).

Alternatively, an additional explanation for why the groups did not differ on B-button responding may be due to distal differences in previous aggression. Specifically, results demonstrated that the mindfulness group reported higher levels of previous aggression than the control group. Thus, the groups were not comparable at the outset of the study and, therefore, it is possible that it was harder to induce a mindful state in the mindfulness group due to the

influence of distal variables not measured in the current study. For instance, previous research has demonstrated that aggression is associated with increased rumination and negatively associated with emotion regulation and distress tolerance (Collins & Bell, 1997; Bushman et al., 2005), whereas trait mindfulness is positively associated with better emotion regulation and distress tolerance, and decreased rumination (Hayes & Feldman, 2004; Borders, Earleywine, & Jajodia, 2010). Although speculative until empirically investigated, it is possible that the groups also differed on the above mentioned constructs (i.e. emotion regulation, distress tolerance and rumination) which may have hindered the mindfulness task from inducing a mindful state. Due to these potential differences between groups, it is possible that a longer or different type of mindfulness intervention is needed to induce state mindfulness and, therefore, attenuate aggression.

Results also demonstrated that trait mindfulness and previous aggression did not moderate the relationship between intervention condition and b-button responding, thus failing to support hypotheses 2, 3 and 4. As mentioned above, because the mindfulness intervention did not induce state mindfulness, it would be unlikely that trait mindfulness would moderate the intervention to b-button relationship. Similarly, due to failed induction of state mindfulness, and the mindfulness group intervention group scoring higher on previous aggression, it makes sense that prior aggression would not moderate the relationship between intervention and b-button. As discussed below, the failure to find support for these hypotheses suggests that there are a number of potential areas for improvement in future research on brief mindfulness interventions targeting reduced aggression.

Future Directions

It is critical that future research continue to examine the relationship between mindfulness and aggression. Further understanding how induction of mindfulness affects aggressive behaviors may better inform future intervention programs for perpetrators of violence. For example, perhaps ongoing mindfulness training would increase emotion regulation and distress tolerance in violence perpetrators and thus, attenuate future aggression.

While the current study included a measure of state mindfulness as a manipulation check, this measure was given only after participants completed the PSAP task due to concern for demand characteristics. Thus, we are unable to conclude whether the mindfulness task created significant change from baseline. Future research should weigh the possibility of administering the state mindfulness measure before, directly after the induction, and then again after the aggression task. Additionally, future research should consider assessing participant's previous experiences with mindfulness training or meditation in order to better understand the brief mindfulness induction process and feasibility of inducing mindfulness in lab settings.

Given that in the current study groups did not differ on state mindfulness, it is likely that the mindfulness task was not effective at inducing mindfulness for participants. Future research should consider measuring state mindfulness both before and after the induction task. In the current study, the lack of effectiveness of the induction task may have been influenced by both length and content of the exercise. For example, given the exercise itself only lasts about 7 minutes, it is possible that this was not long enough to achieve the desired effect. Alternatively, perhaps the content of the exercise itself affected its success. The exercise involved a mindfulness of breath task meditation that was adapted from MBCT (Segal, Teasdale & Williams, 2002). This task is typically in the context of a 2-hour per week for 8 weeks program

and is usually presented during the later weeks of the program. Perhaps, the extensive psychoeducation about mindfulness that individuals receive prior to the mindfulness of breath meditation is necessary in order for the task to properly induce a mindful state. Furthermore, it is conceivable that the mindfulness exercise itself, without proper education or experience, led many participants to ruminate, an activity associated with anger, hostility and aggression (Collins & Bell, 1997; Bushman et al., 2005; Borders, Earleywine, & Jajodia, 2010). Some previous research has used the 'raisin task' (Heppner et al., 2008), a directive task that guides individuals through the process of eating a raisin mindfully, as their brief mindfulness induction exercise. This task is often the first task assigned during mindfulness protocols (e.g., MBSR, MBCT) and potentially is a more suitable and achievable task for individuals who lack previous training in mindfulness. Another important consideration regarding the effectiveness of the mindfulness intervention is the setting of the task itself. Because the task was given in a lab setting, and given by a researcher whom the participant had not previously met, it is possible that participants felt uncomfortable fully engaging in the task. Future research should carefully consider length, content and setting of the mindfulness task chosen to induce a mindful state in a lab setting.

Though we consider one of the strengths of the current study to be the use of a behavioral measure of aggression (PSAP), some researchers have criticized use of such measures as a true measure of aggressive responding (Tedeschi & Quigley, 1996), suggesting that they lack external validity. Additionally, it is certainly possible that this measure is not a strong enough means of provocation to elicit the levels of aggression that would be most affected by increased mindfulness. Although our own observations suggest that participants were invested in the PSAP task (e.g., banging on the buttons very quickly, expressing frustration to the research assistants), it is also plausible that the amount of investment in the task is too low (i.e., $5) to elicit the

significant levels of aggression that would be most affected by mindfulness. Future research might consider use of a different lab based measure of aggression such as the Taylor Aggression Paradigm (TAP; Taylor, 1967), or even multiple behavioral measures of aggression. Furthermore, given that many researchers have criticized the ecological validity of such lab-based measures of aggression (Tedeschi & Quigley, 1996), future research might consider coding couples behavioral interactions with one another as a measure of aggressive behavior.

Although mindfulness research has grown tremendously in recent history, there is still no theory of mindfulness to guide the extensive research being conducted. Future directions in this area should focus on developing a strong theory from which to base the research on. More specifically, there is no theory of mindfulness as it relates to aggression. Perhaps, mindfulness is not an appropriate means for reducing aggressive behaviors. Future directions should also include developing theories specific to the relationship between mindfulness and aggression.

Limitations

Though the current study has several strengths (e.g., use of lab based measures of aggression), there are also notable limitations. The use of an undergraduate, primarily Caucasian sample limits the generalizability of findings. Future research may consider using a more diverse sample in order to understand how mindfulness and aggression are related across ethnicities. Future research might improve upon this study by using individuals who have a greater history of violence, such as those incarcerated for perpetration.

Corroborating reports of previous aggression were not obtained in the current study, thus we have no means for verifying the reported past aggression. Moreover, as mentioned above, the Point Subtraction Aggression Paradigm was the only lab-based measure of aggression employed in the current study and future research might improve upon this study by using lab-based

measures of aggression such as the TAP (Taylor, 1967). As mentioned above, the manipulation check of mindfulness was only given after the aggression task, thus, we cannot conclude whether or not the mindfulness task created significant change from baseline to the PSAP task. Furthermore, the current study did not measure previous mindfulness or meditation experiences, a factor that could influence the effectiveness of the lab based mindfulness induction task. Unfortunately, a significant limitation of the current study was unsuccessful randomization. Specifically, participants in the mindfulness group reported significantly higher levels of past aggression than the participants in the control group. Future research might consider using controlled randomization in which they attempt to even distribute participants into groups such that no significant differences in past aggression are present.

Summary

The current study intended to examine the effect of mindfulness on aggressive responding in a population of male and female college students. The proposed hypotheses that the mindfulness intervention would induce a mindful state and attenuate aggression responding was not supported. Results indicate that the groups did not differ on state mindfulness or aggressive responding. Though the results of the current study were not significant, we believe that ongoing research on the relationship between mindfulness and aggression is imperative. Understanding ways in which mindfulness qualities attenuate aggression may inform future violence prevention and treatment programs. Furthermore, such research may add to the growing research about the usefulness and effectiveness of mindfulness training with clinical populations. Future research should improve upon methodological weaknesses of the current study through controlled randomization and a longer and more feasible mindfulness task in order to provide a more complete understanding of how mindfulness may attenuate aggression.

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Appendices

Table 1.

Demographics and descriptive statistics across group conditions

	Group 1 (mindfulness)	**Group 2 (control)**
N	51	46
Age, mean (SD)	18.76 (1.42)	18.60 (.88)
Sex, No. (%)		
Male	15 (29.4)	17 (37.0)
Female	36 (70.6)	28 (60.9)
Race, No. (%)		
Caucasian	43 (84.3)	37 (80.4)
African American	3 (5.9)	1 (2.2)
Hispanic/Latino	1 (2.0)	1 (2.2)
Asian American	2 (3.9)	1 (2.2)
Other	1 (2.0)	---
Academic level, No. (%)		
Freshman	39 (76.5)	35 (76.1)
Sophomore	9 (18.0)	4 (8.7)
Junior	1 (2.0)	2 (4.3)
Senior	1 (2.0)	2 (4.3)
A, mean (SD)	3708.86 (1146.18)	4004.70 (996.18)
B, mean (SD)	326.00 (325.27)	307.35 (293.09)
B/p, mean (SD)	19.55 (22.06)	16.51 (17.71)
C, mean (SD)	353.71 (318.18)	325.43 (292.82)
MAAS, mean (SD)	3.68 (.78)	3.79 (.90)
FFMQ, mean (SD)	126.62 (15.37)	126.81 (16.58)
SMAAS, mean (SD)	3.03 (1.45)	3.17 (1.57)
BPAQ	66.68 (14.63)*	55.05 (13.08)
CTSG	1.82 (11.28)	.12 (.40)
CTS-2, mean (SD)		
Physical Perpetration	.12 (.60)	.12 (.46)
Psychological Perpetration	4.80 (11.93)	2.10 (5.17)

Note: MAAS = Mindful Attention Awareness Scale; FFMQ = Five Factor Mindfulness Scale; SMAAS = State Mindful Attention Awareness Scale; BPAQ = Buss Perry Aggression Questionnaire; CTSG = General Violence Conflict Tactics Scale; CTS-2 = Conflict Tactics Scale.

*indicates significant difference between groups

Table 2.

Correlations for all variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A-button	1															
B-button	-.54**	1														
C-button	-.45**	.26**	1													
B/p	-.55**	.98**	.26**	1												
BPAQ	-.12	.17	.30**	.22*	1											
CTSG	-.18	.12	.03	.15	-.08	1										
CTS2 (Phy)	-.01	-.06	-.03	-.05	-.02	.21*	1									
CTS2 (Psy)	.06	-.02	-.09	.02	-.05	.25*	.27*	1								
MAAS	-.14	-.001	.08	.02	.01	-.35**	-.01	-.01	1							
FFMQ	-.14	-.10	.03	-.09	.05	-.34**	-.04	-.21*	.61**	1						
SMAAS	-.16	.15	.19	.15	.12	-.13	-.05	.01	.39**	.24**	1					
BIS	.16	.05	-.11	.06	-.06	.20	.02	.08	-.43**	-.48**	-.23*	1				
BSI	.05	-.06	-.14	-.06	-.01	.28**	-.05	.02	-.39**	-.45**	-.03	.15	1			
PANAS (PA)	-.10	-.12	-.09	-.13	-.02	.03	-.06	-.08	-.11	-.04	-.04	-.06	.18	1		
PANAS (NA)	-.21	.05	.03	.03	-.14	.09	-.05	.05	-.04	-.06	-.19	.08	-.03	.65**	1	
Attributions	-.06	.08	-.15	.07	-.03	.11	-.11	-.05	-.12	-.07	-.001	-.12	.05	.07	-.06	1

Note: BPAQ = Buss Perry Aggression Questionnaire; CTSG = General Violence Conflict Tactics Scale; CTS-2 = Conflict Tactics Scale (Physical and Psychological Perpetration;MAAS = Mindful Attention Awareness Scale; FFMQ = Five Factor Mindfulness Scale; SMAAS = State Mindful Attention Awareness Scale; BPAQ = Buss Perry Aggression Questionnaire; BIS = Barratt Impulsivity Scale; BSI = Brief Symptom Inventory; PANAS = Positive and Negative Affect Scale; Attributions = Attributions Questionnaire.
**Correlations significant at .01
*Correlations significant at .05

Vita

Amanda Seavey received her B.A. from The University of North Carolina- Greensboro in May, 2008 and her M.A. in Psychology from the University of Tennessee – Knoxville in December, 2010. Her current research interests are in the area of aggression, emotion regulation, and the implementation and effectiveness of mindfulness-based therapies. Amanda will be completing her pre-doctoral APA internship in Clinical Psychology at Duke University Medical Center.