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Decreasing Stress Through an Emotion Regulation and Non-Judging Based Intervention with Trauma-Exposed College Students

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DECREASING STRESS THROUGH AN EMOTION REGULATION

AND NON-JUDGING BASED INTERVENTION WITH

TRAUMA-EXPOSED COLLEGE STUDENTS

by

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A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
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ABSTRACT

Among college students, trauma and PTSD symptomatology are associated with negative consequences (e.g., poor academic performance, stress sensitivity, and negative coping). College is often a stressful time, and those who have experienced trauma, particularly those experiencing PTSD symptoms, are vulnerable to heightened stress sensitivity and negative outcomes. It is imperative to identify interventions that decrease stress for trauma-exposed college students to reduce the deleterious effects of related outcomes. The purpose of this study was to examine whether emotion regulation and non-judgment could be enhanced in trauma-exposed college students through a short, mindfulness-based intervention, and whether the intervention would lead to decreased perceived and academic stress. It was proposed that the intervention would contribute to increased emotion regulation and non-judging, resulting in decreased perceived and academic stress, and that the intervention would be significant and substantial for participants with subthreshold PTSD symptomatology, but not for those with PTSD symptomatology above the diagnostic cutoff. The final sample included 209 trauma-exposed college students randomly assigned to mindfulness or control groups. The mindfulness group completed three sessions with an assessment after each, and an assessment three-weeks post-intervention. The present study found that a brief, mindfulness-based intervention reduced academic and perceived stress through increasing emotion regulation and non-judging in trauma-exposed college students. The effects of the intervention on perceived stress were significant only for participants with subthreshold PTSD symptomatology.

The results of the present study suggest that a brief mindfulness-based intervention may have helpful effects for trauma-exposed college students; implications for research and practice will be discussed.

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CHAPTER I

INTRODUCTION

According to the American College Health Association (ACHA), in 2014, 43.7% of college students reported experiencing above average stress levels, and 11% reported experiencing tremendous stress. These rates have remained relatively constant over the past several years; for example, in 2012, 42.9% of college students reported experiencing above average stress, and 10.3% reported experiencing tremendous stress in the past year (ACHA, 2012a). Pierceall and Keim (2007) found that about 13% of college students in their study reported low stress, 75% reported moderate stress, and 12% reported high stress. Also in 2012, more than 80% of college students reported feeling overwhelmed by everything they had to accomplish or complete (ACHA, 2012a). Another large study found that 41.6% of students reported experiencing one to two major stressors in the past year, with 18.4% reporting experiencing three or more major stressors in the past year (Boynton Health, 2015). The most common stressors included the death or serious physical illness of someone close to them, excessive debt, roommate/housemate conflict, and parental conflict. Approximately one-third (34.7%) of the students reported feeling unable to manage their stress (Boynton Health, 2015).

The perception of being unable to manage one's stress is a critical component of the level of stress one experiences. Two of the most common definitions of stress are proffered by Hobfoll (1989) and Lazarus and Folkman (1984). Hobfoll (1989) defined stress as "a reaction to the environment in which there is (a) the threat of a net loss of

resources, (b) the net loss of resources, or (c) a lack of resource gain following the investment of resources" (p. 516). Hobfoll emphasized that stress can come from both perceived or actual losses or gains. In contrast, Lazarus and Folkman (1984) defined stress as "a particular relationship between the person and the environment that is *appraised by the person* as taxing or exceeding his or her resources" (p. 19, italics added). That is, situations or events are perceived as stressful when individuals believe the demands of situations exceed their available resources or their ability to cope (Gnilka, Ashby, Matheny, Chung, & Chang, 2015). The definition of stress from Lazarus and Folkman (1984) was used for the present study.

The sources of stress for college students include a wide range of academic, social, emotional, and financial stressors (e.g., Aselton, 2012; Brougham, Zail, Mendoza, & Miller, 2009; DeRosier, Frank, Schwartz, & Leary, 2013). Lee, Kang, and Yum (2005) discovered that the most common personal stressors reported by college students were developing a future career plan, finances, relationships, appearance, achievement, and goal setting. For many college students, they are away from home for the first time (Greenberg, 2002), having to learn how to balance work, play, and studying (Chen & Feeley, 2015), commonly experience interpersonal challenges and difficulties (Hashim, 2003) and financial strain (Aselton, 2012), and are often worried about job prospects after graduation (Chen & Feeley, 2015).

The most frequently reported academic stressors by college students are grades and competition, career and future success, having too many demands, not being able to meet deadlines, experiencing issues related to classes, and selecting a major (Lee et al., 2005). Additional research supports these findings, demonstrating that academic

pressures of meeting grade requirements, test taking, volume of material to be learned, and time management are all significant sources of stress for college students (Crocker & Luhtanen, 2003; Kumaraswamy, 2013; Misra & McKean, 2000). As noted above, however, the most important factor is not necessarily actual stressors, but rather students' perceptions of stress. Indeed, Adams, Meyers, and Beidas (2016) found that perceived stress in college students mediated the relationship between financial strain and psychological symptoms, suggesting that one's level of perceived stress is a better predictor of psychological difficulties than the stressors themselves.

Not only can stress itself be difficult for students, but as aforementioned, the effects of stress can contribute to a wide variety of negative outcomes. According to the ACHA (2014), 30.3% of college students reported that their academic performance was negatively impacted by stress in the past year, in fact rating stress as the influential factor. Other studies have found college students' stress to be influential in missing or skipping class (Timmins & Kaliszer, 2002), academic disruption and poor academic performance (Adams et al., 2016), and lower GPAs (Pritchard & Wilson, 2003). Given that lower college GPA is a significant predictor of dropping out of college (Araque, Roldán, & Salguero, 2009; Voelkle, & Sander, 2008), and college dropout leads to significant financial costs for the state (Schneider, 2010) and for the student (Carnevale, Rose, & Cheah, n.d.), it is important to understand how stress can be mitigated.

High levels of perceived stress also predict poor physical health (Edlin & Golanty, 2014; Shankar & Park, 2016). College students who reported experiencing higher levels of stress tended to exercise less (Hudd et al., 2000), eat less fruits and vegetables and more junk food (Wichianson, Bughi, Unger, Spruijt-Metz, & Nguyen-

Rodriquez, 2009), experience more physical illness (DeRosier et al., 2013; Edwards, Hershberger, Russell, & Markert, 2001), and experience reduced sleep quality (Lund, Reider, Whiting, & Prichard, 2010). Elevated levels of stress are also related to an increase in problematic substance use (DeRosier et al., 2013; Herman, 2012; Werch et al., 2007). Physical illness, poor sleep, and substance use are each themselves related to negative academic outcomes for college students (ACHA, 2012b; Chiang, Arendt, Zheng, & Hanisch, 2014; Chow, 2010; Gilbert, & Weaver, 2010; Ruthig, Marrone, Hladkyj, & Robinson-Epp, 2011; Wechsler, Dowdall, Davenport, & Castillo, 1995); thus, stress may have not only negative direct effects on academic performance, but also additional negative indirect effects.

Perceived stress, both general and academic, play an influential role in mental health as well (Blanco et al., 2008; Kumaraswamy, 2013). As stress increases for college students, their happiness (Denovan & Macaskill, 2017), life satisfaction (Holinka, 2015), optimism (Denovan & Macaskill, 2017; Saleh, Camart, & Romo, 2017), self-efficacy (Saleh et al., 2017), and self-esteem (Dixon & Kurpius, 2008; Hudd et al., 2000) all decrease. Additionally, a myriad of studies demonstrate a strong relationship between perceived stress and depression and anxiety in college students (e.g., Aselton, 2012; Chavez-Korell & Torres, 2013; Duan, Ho, Siu, Li, & Zhang, 2015; Dyrbye, Thomas, & Shanafelt, 2006; Marin et al., 2011; Zhang, Yan, Zhao, & Yuan, 2014). Perceived stress is also a strong predictor of suicidality (Davis, Witte, & Weathers, 2014; Reynolds, 2015); indeed, Reynolds (2015) found a direct link between perceptions of stress and suicidal behaviors in college students. Linda, Marroquín, and Miranda (2012) further

found that college students' attempts to avoid negative stress were strong predictors of suicidal ideation.

As outlined, college students' experiences of stress have significant negative implications. Importantly, students with trauma exposure may be at greater risk for the negative effects of stress. College students who have been exposed to trauma prior to college tend to experience elevated reactivity to daily stressors (Glaser, van Os, Portegijs, & Myin-Germeys, 2006) and report higher levels of stress in college (Kim, Noh, & Park, 2015). Woolman, Becker, and Klanecky (2015) found that experiences of trauma early in life were positively correlated with perceived academic stress. They additionally found that PTSD symptoms mediated the relationship between academic stress and drinking to cope in college students, suggesting that PTSD symptomatology plays an influential role in the effects of stress on college students.

Impact of PTSD and Trauma Exposure on College Students

The majority of college students in the United States have been exposed to at least one potentially traumatic event, with prevalence estimates ranging from 52% to 85% (e.g., Avant, Davis, & Cranston, 2011; Boyraz, Granda, Baker, Tidwell, & Waits, 2016; Boyraz, Horne, Owens, & Armstrong, 2013; Frazier et al., 2009; Kuhl & Boyraz, 2017; Read, Ouimette, White, Colder, & Farrow, 2011). The DSM-5 defines traumatic events as "exposure to actual or threatened death, serious injury, or sexual violence" through directly experiencing it, witnessing it happen to others, learning that the event was experienced by a close family member or friend, or being exposed to repeated or extreme details of traumatic events (American Psychiatric Association [APA], 2013, p. 271).

In the general college population, the percentage of students who meet full criteria

for PTSD ranges from 7% to 17% (e.g., Marx & Sloan, 2003; McDevitt-Murphy, Weathers, Flood, Eakin, & Benson, 2007; Read et al., 2011; Scarpa et al., 2002; Twamley, Hami, & Stein, 2004). According to the DSM-5, PTSD is conceptualized as the development of negative symptoms across four domains following exposure to traumatic events (APA, 2013). Specifically, a diagnosis of PTSD requires the presence of one to two symptoms in each of these four categories: *intrusions* (i.e., re-experiencing the traumatic event, often through intrusive memories, nightmares, or flashbacks), *avoidance* (i.e., intentionally trying to avoid internal [e.g., memories] or external [e.g., locations] reminders of the traumatic event), *negative alterations in mood and cognitions* (e.g., not remembering the event, self-blame, exaggerated beliefs about others, persistent anger or fear), and *hyperarousal* (e.g., easily angered, heightened startle response, difficulty concentrating or sleeping) (APA, 2013).

PTSD symptomology has been demonstrated to have negative academic effects including poor academic achievement (e.g., Boyraz et al., 2016; Boyraz et al., 2013) and even college dropout (Boyraz et al., 2016; Boyraz et al., 2013; Duncan, 2000). For example, in a sample of African American college students, Boyraz and colleagues (2013) found that PTSD symptomatology experienced in the first semester of college was associated with lower GPAs in the first year of college, which then mediated the effect of PTSD symptomatology on second-year dropout. However, these relationships were only significant for women. Notably, Duncan (2000) discovered that college students who reported having experienced more than one type of childhood abuse and those who reported being sexually abused were more likely to leave college as compared to students who did not report a history of abuse. Duncan (2000) also found that students with higher

levels of PTSD symptomatology were less likely to remain in college as compared to students with lower or no PTSD symptomatology. These findings were further supported and expanded upon by Boyraz and colleagues (2016), who found that, for trauma-exposed college students, the relationship between PTSD symptomatology, effort regulation, and enrollment in their second year of college was mediated by first-year GPA. These findings suggest that PTSD symptomatology likely plays an important role in GPA and, indirectly, college persistence.

Further, PTSD symptomology may negatively affect college students' adjustment to college through the reduction of interpersonal support. Kuhl and Boyraz (2017) found that trauma-exposed college students who reported higher levels of PTSD symptomatology also reported lower levels of social support and interpersonal trust. These findings are consistent with multiple other studies that have demonstrated a significant link between PTSD symptomatology and loss of interpersonal trust in a national sample (Cox, Resnick, & Kilpatrick, 2014) and decreased levels of social support among veterans (e.g., Keane, Scott, Chavoya, Lamparski, & Fairbank, 1985; King, Taft, King, Hammond, & Stone, 2006; Laffaye, Cavella, Drescher, & Rosen, 2008). Treatment-receiving adults with PTSD symptomatology have also reported having a fear of relationships (Dorahy et al., 2013). Therefore, PTSD symptomatology may negatively affect college students' ability to obtain social support; this is especially critical, given that interpersonal support is important to coping with stress (Chao, 2012; Levi-Belz, 2015; Upadhyay & Singh, 2014), and that interpersonal support and campus involvement are predictive of college persistence (Christie & Dinham, 1991; Goguen,

Hiester, & Nordstrom, 2010; Webber, Krylow, & Zhang, 2013; Wilcox, Winn, & Fyvie-Gauld, 2005).

Trauma exposure and PTSD symptomology have been linked to more negative outcomes among college students, including academic and emotional adjustment difficulties (Banyard & Cantor, 2004), elevated rates of depression (Boyraz, Horne, Armstrong, & Owens, 2015; Shah, Shah, & Links, 2012), increased rates of problematic alcohol and other substance use (Avant et al., 2011; Goldstein, Flett, & Wekerle, 2010; Read, Griffin, Wardell, & Ouimette, 2014), higher levels of psychological distress (Anders, Frazier, & Shallcross, 2014; Marx & Sloan, 2003), elevated rates of smoking (Gabert-Quillen, Selya, & Delahanty, 2015), and an increased risk of experiencing traumatic events later in life (see Classen, Palesh, & Aggarwal, 2005, for a review; Werner et al., 2016). Furthermore, Anders and colleagues (2014) found that college students who experienced a potentially traumatic event during the previous two months reported significantly higher levels of distress and decreased mental and physical health than did college students who did not experience a potentially traumatic event.

Taken together, research findings highlight the importance of better understanding PTSD symptomology amongst college students. The negative effects of PTSD and trauma symptomology on students' well-being and academic outcomes are clear; although experiencing a discrete traumatic event or meeting criteria for a diagnosis of PTSD are clearly of some importance, there is evidence to suggest that trauma must also be examined beyond the categorical definition.

Categorical Versus Subthreshold PTSD Symptomology

When studying the impact of PTSD symptomatology, it is important to go beyond

categorical divisions between those who meet diagnostic criteria for PTSD and those who do not, and take into consideration the impact of subthreshold PTSD symptomatology (defined as having at least one symptom in each DSM-5 criterion category; Borsari, Read, & Campbell, 2008). According to the International Consensus Group on Depression and Anxiety (Ballenger et al., 2000), individuals who display subthreshold PTSD symptomatology experience significant psychosocial impairment. This is consistent with Marshall and colleagues' (2001) finding that as the number of PTSD symptoms increased, even without meeting full diagnostic criteria for PTSD, there were significant increases in psychosocial impairment, number of comorbid disorders, and suicidality.

Stein, Walker, Hazen, and Forde (1997) found that individuals with subthreshold PTSD symptomatology reported comparable impairment in their social and familial functioning as individuals who met full diagnostic criteria for PTSD. Those with subthreshold PTSD symptomatology reported significantly higher rates of impairment in work and education than trauma-exposed individuals who did not report PTSD symptoms, though those with full PTSD reported the highest levels of impairment (Stein et al., 1997). As these studies illustrate, experiencing even a few PTSD-related symptoms can lead to significant impairment in one's life (Ballenger et al., 2000; Marshall et al., 2001; Stein et al., 1997). Therefore, it may be more beneficial and informative to focus on the experience of trauma and the presence of PTSD symptomatology as predictors of negative outcomes, rather than a diagnosis of PTSD.

Thus, college students experience significant stressors throughout their time in college; trauma exposure and PTSD symptomatology can further exacerbate the negative

effects of stress; and subthreshold PTSD symptomology is as important to consider as diagnostic PTSD. Given the prevalence of trauma exposure and PTSD symptomatology in college students and the myriad of negative effects associated with trauma exposure and PTSD symptomatology, it is essential to better understand the relationship between trauma and stress for college students as a pathway to identifying interventions.

The Relationship Between Trauma and Stress

Although there is limited information in the literature regarding how trauma exposure and PTSD symptomatology affect college students' responses to stress (e.g., Glaser et al., 2006; Kim et al., 2015; Woolman et al., 2015), there is extensive evidence in the literature which suggests that individuals generally who have experienced trauma tend to display altered, and often heightened, responses to stress throughout their lives (Carpenter, Shattuck, Tyrka, Geracioti, & Price, 2011; Heim, Shugart, Craighead, & Nemeroff, 2010; Lovallo, Farag, Sorocco, Cohoon, & Vincent, 2011; Weltz, Armeli, Ford, & Tennen, 2016). Traumatic events early in one's life result in neurological changes that lead to heightened stress sensitivity (i.e., increased likelihood of perceiving events as stressful and responding as such), resulting in increased experiences of perceived stress (Heim et al., 2010; Nemeroff, 2004; Penza, Heim, & Nemeroff, 2006). Back and colleagues (2008) also found that adults who reported trauma exposure early in life reported elevated levels of perceived stress as compared to adults who did not report exposure to trauma. Wessa, Rohleder, Kirschbaum, and Flor (2006) found that PTSD symptomatology was associated with higher levels of stress reactivity, suggesting that the elevated stress reactivity seen in trauma-exposed individuals may increase the likelihood of them developing PTSD symptomatology.

To explore the neurological impact of traumatic events, Admon and colleagues (2009) assessed the neurological effects of combat exposure on the stress levels of Israeli soldiers. Admon and colleagues (2009) found that stressful events experienced during combat deployments were associated with heightened activity in the hippocampus (a brain region associated with fear and danger sensing) as compared to an age-matched control group. This heightened neural activity was associated with elevated stress symptoms, even several months after the stressful event. Further, Jovanovic, Blanding, and colleagues (2009) found that adults who reported having experienced high levels of childhood physical and sexual abuse displayed higher levels of startle reactivity as compared to those with low abuse histories. Emotional abuse did not predict startle reactivity. Thus, childhood experiences of physical and sexual trauma appear to have long-term effects on the startle reactivity of adults, suggesting that early trauma seems to contribute to a heightened physiological reactivity to stress later in life.

Jovanovic, Norrholm, and colleagues (2009) further observed an elevated startle response among veterans as compared to non-veterans, and veterans with high PTSD symptomatology displayed a reduced ability to inhibit their startle responses as compared to non-veterans and a low-PTSD symptomatology sample. Thus, trauma exposure predicts heightened startle responsiveness, and level of PTSD symptomatology one is experiencing further influences one's ability to inhibit startle responses. Taken together, these findings suggest that experiencing trauma likely increases one's reactivity to stressors (Admon et al., 2009; Jovanovic, Blanding, et al., 2009; Jovanovic, Norrholm, et al., 2009), and greater PTSD symptomatology seems to further decrease one's ability to inhibit such reactivity. As explained previously, the perception of stress is a better

predictor of stress reactions than the stressors themselves (Adams et al., 2016), and since individuals who have experienced trauma exhibit elevated sensitivity to stressors, it follows that trauma-exposed college students may experience elevated levels of perceived stress (Woolman et al., 2015).

Indeed, Woolman and colleagues (2015) found that trauma exposure in college students predicted increased stress sensitivity, which predicted elevated perceptions of academic stress. They propose that this increase in perceived stress likely contributes to elevated PTSD symptomatology. Given that college students experience multiple sources of stress (e.g., Aselton, 2012; Brougham et al., 2009; DeRosier et al., 2013; Hurst, Baranik, & Daniel, 2013; Ruberman, 2014), students who enter college with a history of trauma may experience additional difficulty managing stressors. Managing each stressor requires physical and psychological energy, and since trauma-exposed students— particularly those experiencing PTSD symptoms—tend to have a heightened sensitivity to stress, they likely perceive more events as stressful. This added stress burden can lead to both physical and psychological fatigue (Reynolds, 2015), thereby decreasing the chances that they will have the physical and psychological energy necessary to manage stress. Ballenger and colleagues (2004) found that early experiences of trauma resulted in brain changes that lead to increased vulnerability to stress and challenging situations later in life. College students who have been previously exposed to trauma tend to experience elevated reactivity to daily stressors (Glaser et al., 2006) and higher levels of stress in college (Kim et al., 2015). These heightened stress reactions can contribute to increased negative outcomes (e.g., poor academic performance [ACHA, 2014; Bergin & Pakenham, 2016], poor physical health [Edlin & Golanty, 2014; Shankar & Park, 2016],

substance use (Herman, 2012; Werch et al., 2007], decreased mental health [Blanco et al., 2008; DeRosier et al., 2013], and suicidality [Anastasiades, Kapoor, Wootten, & Lamis, 2017; Reynolds, 2015]) for trauma-exposed college students.

Based on these findings, it appears as though trauma-exposed college students, particularly those experiencing PTSD symptomatology, are very likely to experience heightened stress levels and subsequent negative psychological, physical, and academic outcomes. Although the literature is clear that there is a link between trauma exposure, PTSD symptomatology, and stress, there is limited research on the underlying mechanisms. One proposed factor that seems to play a role in both PTSD symptomatology and stress is emotion dysregulation. Importantly, emotion dysregulation (i.e., difficulty controlling one's affective states and emotion-driven behaviors; Rellini, Zvolensky, & Rosenfield, 2012) has been documented as influential in the development and maintenance of PTSD symptomatology and level of perceived stress (Horowitz, 2011), suggesting that, despite sensitivity to stress, being able to manage one's emotional reactions may mitigate the negative impact of increased stress sensitivity.

Trauma and Emotion Dysregulation

Weltz and colleagues (2016) found that experiences of childhood trauma predicted elevated levels of emotion dysregulation. Horowitz (2011) contends emotion dysregulation is the root of PTSD, asserting that symptoms of PTSD result from attempts to regain emotional equilibrium. He theorized that the symptom clusters in PTSD are all related to difficulties with emotional regulation: that intrusion symptoms are related to emotional under-regulation and the other clusters (numbing, avoidance, and dissociation) are related to emotional over-regulation. Emotion dysregulation can be broadly defined as

difficulty controlling one's affective states and emotion-driven behaviors (Rellini et al., 2012). In a review of the literature on emotion regulation and dysregulation, Gratz and Roemer (2004) summarized emotion regulation as involving four major areas: emotional insight and comprehension, emotional acknowledgment and acceptance, the ability to control impulses and behave in alignment with one's goals even when experiencing negative emotions, and the ability to flexibly adjust emotional responses to align with situational demands and personal goals. The results of a factor analysis on the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) suggested that emotion dysregulation consists of six major dimensions:

> (a) lack of awareness of emotional responses, (b) lack of clarity of emotional responses, (c) nonacceptance of emotional responses, (d) limited access to emotion regulation strategies perceived as effective, (e) difficulties controlling impulses when experiencing negative emotions, and (f) difficulties engaging in goal-directed behaviors when experiencing negative emotions. (p. 52)

According to McDermott, Tull, Gratz, Daughters, and Lejuez (2009), individuals who reported experiencing PTSD symptomatology also reported difficulties with each aspect of emotion dysregulation except for emotional awareness. These same five components have also been found to predict levels of PTSD symptomology in undergraduates, with greater emotion dysregulation related to higher levels of PTSD symptomatology (O'Bryan, McLeish, Kraemer, & Fleming, 2015; Tull, Barrett, McMillan, & Roemer, 2007). Further, Chaplo, Kerig, Bennett, and Modrowski (2015) found that emotional dysregulation and dissociation partially mediated the relationship between sexual abuse and non-suicidal self-injury in youth involved in the juvenile

justice system. This suggests that simply experiencing trauma does not automatically lead to negative outcomes such as non-suicidal self-injury. Instead, one's ability to regulate emotion and one's level of dissociation likely play an important role in trauma-related outcomes.

Another aspect of emotion dysregulation that seems to play an especially important role in PTSD symptomatology is being non-accepting of emotional responses, as non-acceptance displays a strong relationship with the PTSD symptom clusters of avoidance and negative alternations in mood and cognitions (Bennett, Modrowski, Chaplo, & Kerig, 2016). For instance, Bennett and colleagues (2016) found that, in traumatized youth, emotional dysregulation as a whole significantly predicted levels of PTSD symptomatology. Bennett and colleagues (2016) also discovered that particular aspects of emotional regulation predicted certain PTSD symptom clusters. Specifically, non-acceptance of emotions was related to the avoidance cluster and the negative cognitions and mood cluster, whereas lack of emotional clarity and trouble engaging in goal-directed behavior were related to the intrusion and arousal clusters.

When individuals experience trauma, they commonly engage in avoidance behaviors to reduce the pain and distress they experience when they are reminded of trauma-related thoughts, feelings, memories, and/or external reminders of the trauma (U.S. Department of Veteran Affairs, 2015). Avoidance is one of the major symptom clusters of PTSD (criterion C, APA, 2013), and can lead to an increase in other PTSD symptoms (Pineles et al., 2011). Avoidance has been found to play a large role in the negative outcomes associated with PTSD symptomatology; for example, Boyraz and colleagues (2015) found that only the avoidance cluster of PTSD symptoms significantly

negatively predicted the level of social support reported by trauma-exposed college students. Helping trauma-exposed individuals decrease their patterns of avoidance can be difficult, since the avoidant behaviors are self-reinforcing; that is, when individuals avoid an anxiety-provoking event, their anxiety is temporarily reduced, making them more likely to avoid that event in the future (Follette, Palm, & Pearson, 2006). Therefore, in order to reduce avoidance, trauma-exposed individuals would likely benefit by learning how to engage with their internal experiences and anxiety-provoking events using adaptive techniques such as mindfulness.

Breaking the Cycle with Mindfulness

One way of helping trauma-exposed individuals engage with their negative internal experiences, and thereby decreasing avoidance, is through the cultivation of non-judging, an aspect of mindfulness. Mindfulness can broadly be defined 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). Bohlmeijer, ten Klooster, Fledderus, Veehof, and Baer (2011) expanded on this definition by proposing that mindfulness is comprised of five facets: observing (noticing and paying attention to one's internal and external experiences), describing (being able to put one's own thoughts and emotions into words), acting with awareness (being aware of one's own actions in the here-and-now and acting with intentionality), non-judging of inner experience (noticing one's thoughts and feelings without passing judgment on them), and non-reactivity to inner experience (being able to notice and experience thoughts and emotions without responding to them or being overwhelmed by them).

Brown and Ryan (2003) found that being aware, paying attention, and observing oneself—all key aspects of mindfulness—seem to play a large role in the ability to self-regulate one's own behavior and in psychological well-being. Their assertion was supported by Nyklíček and Kuijpers (2008) as well as Chiesa and Serretti (2009), who found that a mindfulness-based intervention resulted in a significant decrease in perceived stress, and a significant increase in positive affect and quality of life. Important to the present study, Vujanovic, Bonn-Miller, Bernstein, McKee, and Zvolensky (2010) discovered that mindfulness interventions improve emotional regulation. As well, increasing mindfulness has been found to reduce distress and PTSD symptomatology in trauma-exposed individuals (e.g., Kelly, 2015; King et al., 2013; Polusny et al., 2015).

Thompson and Waltz (2010) discovered that, in trauma-exposed college students, only non-judging (a facet of mindfulness) significantly predicted PTSD-related avoidance, suggesting that although emotion regulation is important, *how* one engages with emotions may be even more important. Non-judging appears to play a role in the other PTSD symptom clusters as well, as Vujanovic, Youngwirth, Johnson, and Zvolensky (2009) found that non-judging, but no other aspects of mindfulness, significantly predicted all PTSD symptom clusters.

Further supporting the importance of non-judging in PTSD and stress-related outcomes for trauma-exposed individuals, Wahbeh, Lu, and Oken (2011) discovered that, for veterans, simply having higher levels of mindful awareness did not significantly predict level of PTSD symptomatology. However, non-judging explained a significant amount of the variance in PTSD symptom clusters, even above and beyond the variance explained by combat exposure. This suggests that simply being more aware of one's own

internal and external experiences is not sufficient to reduce PTSD symptomatology. Instead, what appears most important is how individuals respond to their internal experiences, whether they judge themselves for their trauma-related thoughts, emotions, and memories, or if they are able to have and be aware of these experiences without judgment. Based on these findings, Wahbeh and colleagues (2011) recommended that interventions for PTSD should focus on cultivating non-judging.

Shapiro, Carlson, Astin, & Freedman (2006) explained that, when individuals are able to practice non-judging, they are able to gain access to additional information, thoughts, memories, and emotions that had previously been too painful or distressing to acknowledge or process. When trauma-exposed individuals learn that they no longer need to condemn themselves for their traumatic experiences, they learn that avoidance is no longer necessary (Shapiro et al., 2006). Shapiro and colleagues (2006) asserted that, as avoidance decreases, trauma-exposed individuals appear to be better able to work toward improved psychological wellbeing and decreased stress.

Thus, it appears that interventions designed to target emotion dysregulation and self-judgment may reduce PTSD symptomatology and stress in trauma-exposed college students. Unfortunately, though, current interventions for trauma that focus specifically on emotion dysregulation and self-judgment are limited. However, there are a few mindfulness-based interventions that are designed to target the negative effects of trauma. Despite the evidence that mindfulness interventions appear helpful for reducing stress and PTSD symptomatology, there is limited research on mindfulness-based interventions specifically for trauma-exposed individuals.

Current Mindfulness Interventions for Trauma

Mindfulness-based interventions for trauma-exposed individuals generally include the following components:

(1) paying deliberate attention to the present moment (e.g., sounds, physical sensations), (2) exploring and accepting emotional experiences (e.g., negative affect, intrusive thoughts), (3) inhibiting automatic behaviors triggered by emotional contexts (e.g., aggressive behaviors, substance use), (4) distancing oneself from one's thoughts using body awareness, and (5) engaging in valued actions. (Deplus, Billieux, Scharff, & Philippot, 2016, p. 776)

Most of the current trauma-focused, mindfulness-based interventions are eight to nine weekly sessions, lasting on average 90 to 120 minutes (e.g., Deplus et al., 2016; King et al., 2013; Polusny et al., 2015).

The two most commonly utilized mindfulness interventions for trauma are Trauma-Informed Mindfulness-Based Stress Reduction (TI-MBSR; e.g., Evans, Ferrando, Carr, & Haglin, 2011; Kearney, McDermott, Malte, Martinez, & Simpson, 2013; Niles et al., 2012; Polusny et al., 2015) and Mindfulness-Based Cognitive Therapy (MBCT; Deplus et al., 2016; Gallegos, Lytle, Moynihan, & Talbot, 2015; King et al., 2013). Other mindfulness-based interventions for trauma-exposed individuals include online mindfulness exercises (Frewen, Rogers, Flodrowski, & Lanius, 2015) and trauma-sensitive yoga (e.g., Johnston et al., 2015; West, Liang, & Spinazzola, 2017).

TI-MBSR has been found to increase mindful awareness and reduce distress in a community sample (Evans et al., 2011); reduce PTSD symptoms and depression in survivors of interpersonal violence (Kelly, 2015); reduce PTSD symptoms in military

combat veterans (Polusny et al., 2015; Kearney, McDermott, Malte, Martinez, & Simpson, 2012; Kearney et al., 2013); and reduce depression and improve quality of life in military combat veterans (Kearney et al., 2013). In general, TI-MBSR consists of eight weekly sessions, each approximately two and a half hours in length; sessions consist of meditation, yoga, and awareness training (Evans et al., 2011). Niles and colleagues (2012) found that TI-MBSR provided through a telehealth approach was also effective for reducing PTSD symptomatology.

King and colleagues (2013) adapted MBCT for combat-related PTSD by substituting the psychoeducation about depression for psychoeducation about PTSD and stress, and focusing on PTSD symptomatology. They found that individuals who engaged in MBCT tended to see their negative thoughts in a different manner: their thoughts may not have changed, but their relationship with their thoughts changed and became more helpful and beneficial. Participants in trauma-focused MBCT have reported reduced PTSD symptoms, less emotion regulation difficulties, and reduced depressive symptoms (Deplus et al., 2016; King et al., 2013).

Another alternative is trauma-sensitive yoga (e.g., Johnston et al., 2015; West et al., 2017). Johnston and colleagues (2015) found that veterans who participated in a 10-week trauma-sensitive yoga intervention reported reduced PTSD symptoms; similarly, West and colleagues (2017) found that adult women who had experienced childhood trauma reported significant improvement following a 10-week trauma-sensitive yoga intervention. The participants reported an increase in compassion for, and acceptance of, themselves and others, greater connection with their own inner experiences and with others, less rumination, and a stronger sense of empowerment.

Deficits in Current Interventions and Literature

Most of the extant literature on the impact of mindfulness in trauma-exposed individuals is either correlational (e.g., Bernstein, Tanay, & Vujanovic, 2011; Dahm et al., 2015; Kalill, Treanor, & Roemer, 2014; Wahbeh, Lu, & Oken, 2011), or experimental with small sample sizes and no control or comparison groups (e.g., Christopher et al., 2015; Deplus et al., 2016; Evans et al., 2011; Goldsmith et al., 2014). There are a few experimental studies that include large samples (Polusny et al., 2015; Young & Baime, 2010) and a limited number of experimental studies that include either a control group or a comparison group (i.e., Kelly, 2015; Kelly & Garland, 2016; King et al., 2013; Niles et al., 2012; Polusny et al., 2015).

Additionally, these studies, like much of the extant literature on mindfulness interventions for trauma-exposed individuals, have been conducted with either military veterans (e.g., Dahm et al., 2015; Gallegos et al., 2015; Kearney et al., 2013; King et al., 2013; West et al., 2017) or other significantly traumatized populations (e.g., survivors of intimate partner violence [Kelly & Garland, 2016]; victims of child abuse [Daigneault, Dion, Hébert, & Bourgeois, 2016]; and survivors of war [Glück, Tran, Raninger, & Lueger-Schuster, 2015]). Although these are important populations to study, it is essential to assess how mindfulness could improve the lives and trauma-related outcomes of college students who have been exposed to potentially traumatic events.

Further, the current model for trauma-focused mindfulness interventions is not practical, or feasible, for the majority of the adult population in the United States, particularly college students. As previously mentioned, many college students are already overwhelmed and stressed by their busy schedules and class demands (ACHA, 2012a;

Boynton Health, 2015; Chen & Feeley, 2015; Crocker & Luhtanen, 2003;

Kumaraswamy, 2013), which may limit those who are able or willing to engage in a

lengthy intervention. To best meet the needs and time-restrictions of trauma-exposed

college students, it would be beneficial to develop and examine the effectiveness of an

intervention that is short and easily accessible. Importantly, Carmody and Baer (2009)

found that the length of mindfulness-based interventions was not significantly related to

the mean effect size of the interventions, suggesting that shorter interventions may be just

as effective as longer ones.

Short-Term Mindfulness Interventions

The current literature on brief, mindfulness interventions is limited. The following

studies, however, provide valuable insight into what has worked in the past as well as

some recommendations for what to do differently in the future. Shearer, Hunt,

Chowdhury, and Nicol (2016) conducted a short (4-week) mindfulness intervention with

college students, with a dog-therapy comparison group and a control group. The

mindfulness intervention was derived from MBSR and focused on breathing, simple yoga

exercises, five to 15-minute meditation sessions, and education about the physiological

aspects of stress reactions. They found that college students in both the mindfulness and

dog comparison groups reported lower levels of anxiety and dysphoric affect compared to

the control group, but the mindfulness group demonstrated a greater reduction in anxiety.

These findings suggest that a short mindfulness intervention may be beneficial for

decreasing the stress experienced by college students. However, the mindfulness-based

sessions for this study were approximately an hour in length, a considerable time

commitment that may not be desirable or feasible for college students. Additionally, the

physical activities included in these sessions may have had a stronger impact on the reduced stress levels than the mindfulness itself; it would be important to assess an intervention that solely focuses on mindfulness to be better able to determine its impact on stress.

A five-week mindfulness intervention with college students was conducted by Phang, Mukhtar, Ibrahim, Keng, and Mohd Sidik (2015). This intervention was based on 8-week MBSR programs, but shorter in duration and with a greater emphasis on informal practice of the mindfulness skills. Compared to the control group, the mindfulness group reported significant reductions in perceived stress and mental distress following the intervention. The reductions in stress and distress, however, were not found at six-month follow-up. This study also suggests that shorter mindfulness interventions may be effective for short-term stress reduction, but that the long-term effects may be negligible. Due to the extended period of time between the intervention and follow-up, however, there is no way to know when the effects were no longer apparent. It would be helpful to have a follow-up closer in time to the intervention to gain insight into how long the effects of the intervention may last. This could provide information as to when an additional intervention may be necessary to maintain the effects long-term.

To assess the effectiveness of a recorded intervention, Docherty (2013) provided working adults with three 20-minute guided mindfulness meditation recordings, and instructed the participants to listen to one per week for three consecutive weeks. Following the intervention, the mindfulness group reported reduced stress levels as compared to the control group. These findings suggest that using a recorded intervention, rather than having an instructor conduct the intervention in person, may be effective for

reducing stress. However, this study was conducted with adults in a workplace environment. It would be beneficial to conduct a similar study with college students to expand the possible generalizability of the results.

Further supporting the efficacy of a recorded intervention, Greer (2015) provided a mindfulness-based intervention once a week for four weeks through a website. Participants in the mindfulness group were instructed to watch a short psychoeducation video about mindfulness, and then complete a guided mediation and a journaling exercise related to their relationship with the stressors in their lives once a week for the following four weeks. Participants in the stress management comparison group were sent psychoeducational information that explained a variety of ways to manage stress, and were instructed to practice these stress management techniques throughout the week. Greer (2015) found that the mindfulness intervention and the stress management comparison group both resulted in statistically equivalent decreases in stress, anxiety, depression, stress, and worry. The only differences between the groups were for rumination: participants in the mindfulness intervention experienced significant decreases in rumination, whereas those who completed the stress management intervention did not.

Cavanagh and colleagues (2013) provided participants access to an online website that included a variety of guided mediations and a brief psychoeducational video about mindfulness. Participants were instructed to listen to a 10-minute guided mediation once a day for 14 consecutive days. Cavanagh and colleagues (2013) found that individuals in the mindfulness group reported significantly lower levels of stress following the intervention as compared to the wait-list control group. However, they also found that participants often failed to consistently participate in the guided meditations, with only

61% reporting that they had practiced mindfulness more than once a week, and only 26% reporting that they had practiced more than once a day. Research by O'Leary and Dockray (2015) further highlighted the difficulty of ensuring participation. They assessed whether an online, guided meditation conducted four times a week for three consecutive weeks would decrease stress and depression. None of their outcomes were significant, and their attrition rate was 43%, suggesting that interventions solely conducted online that require high levels of engagement may not be realistic.

Greer's (2015) results, on the other hand, suggested that a brief, online intervention is feasible and helpful for reducing stress in college students. The drop out rates and limited participation rates found by Cavanagh and colleagues (2013) suggested that when an intervention is solely conducted online, participants may not truly engage in the mindfulness exercises. Based on these studies, an intervention that is shorter in duration, and with minimal requirements for participation would likely be optimal for completion. Furthermore, a study design that combines a video presentation with in-person practices would likely produce the best outcomes, since interventions solely conducted online have limited participation, but interventions that require a high level of training limit the accessibility of interventions. Given that almost all mindfulness-based interventions are conducted in group settings (e.g., Deplus et al., 2016; Goldsmith et al., 2014; Kelly, 2015; Polusny et al., 2015), classrooms may also be a viable option for mindfulness interventions. If classrooms are found to be a viable option for providing mindfulness-based interventions, this could provide valuable information to college communities who could begin to incorporate brief mindfulness-based interventions into current classes.

Part of the difficulty in developing a short mindfulness-based intervention is related to the multi-faceted nature of mindfulness. Teaching every aspect of mindfulness and helping individuals integrate each aspect into their daily lives takes a substantial amount of time and energy, both of which may be limited for college students. Therefore, for the purposes of a brief trauma intervention, it is important to focus on the aspects of mindfulness that seem to play the largest role in mitigating the impact of trauma. As previously discussed, there are several studies that have found strong relationships between emotion dysregulation and self-judgment, and PTSD symptomatology and stress-related consequences (e.g., Bennett et al., 2016; Boyraz et al., 2015; Thompson & Waltz, 2010; Vujanovic et al., 2009; Wahbeh et al., 2011), but notably, none of these studies were experimental. Creating a brief intervention designed to enhance emotion regulation and non-judging would provide a substantial contribution to the existing literature. When designing an intervention, building from a theoretical base is essential. One theoretically based intervention set that focuses on enhancing emotion regulation and non-judging is Dialectical Behavior Therapy (DBT; Van Dijk, 2012).

Dialectical Behavior Therapy as a Targeted Intervention

Van Dijk (2012) explains that the overarching goal of DBT is to help clients accept their current thoughts, emotions, and experiences in a non-judgmental manner, and then work toward improving their emotion regulation through mindfulness. Van Dijk (2012) emphasizes that emotion regulation is not about eliminating painful or difficult emotions, but learning how to understand and balance emotions. Van Dijk (2012) provided several recommendations for enhancing emotion regulation, including "mental noting" (p. 99), which entails focusing on emotions without becoming stuck in them;

focusing on "just this moment" (p. 100), which trains clients to focus solely on the present moment instead of becoming ensnared in the past, the future, their thoughts, the actions of others, or their own emotions; and improving self-talk, which also focuses on non-judging through encouraging clients to become less judgmental of themselves and to talk to themselves with self-compassion instead of judgment. Van Dijk (2012) explained that the process of reducing self-judgment generally consists of four basic steps: (1) Increase clients' awareness of self-judgment; (2) Help clients change judgmental statements into neutral statements; (3) Help clients express their emotions related to themselves or the situation; and, (4) Work through examples of how to engage in this process.

DBT-based interventions have been found to be effective for reducing PTSD symptomatology (Bohus et al., 2013; Harned, Korslund, Foa, & Linehan, 2012; Steil, Dyer, Priebe, Kleindienst, & Bohus, 2011; Wagner, Rizvi, & Harned, 2007). It appears that teaching mindfulness techniques, such as the aforementioned DBT techniques, may decrease the PTSD symptomatology and perceived stress levels of trauma-exposed college students. Notably, previous studies have tended to focus on the application of DBT as a whole, not on the specific aspects previously outlined, which would be a unique contribution of the present study. However, although these techniques generally seem to be beneficial for trauma-exposed individuals, increasing the level of mindfulness may not be beneficial for all trauma-exposed individuals.

PTSD as a Moderator

Lustyk, Chawla, Nolan, and Marlatt (2009) explained that trauma-exposed individuals tend to utilize avoidant coping mechanisms such as numbing, hyperarousal,

and behavioral avoidance, in an attempt to decrease the amount of distress they are experiencing. Much research supports this contention: experiential avoidance partially mediates the relationship between trauma exposure and PTSD symptomatology (Orcutt, Pickett, & Pope, 2005), predicts PTSD symptom severity (Marx & Sloan, 2005), and partially mediates the relationship between PTSD and quality of life (Kashdan, Morina, & Priebe, 2009).

Lustyk and colleagues (2009) asserted that individuals who are experiencing high levels of distress may experience an increase in their distress when they engage in mindfulness-based interventions. Indeed, when King and colleagues (2013) were conducting a mindfulness-based intervention with veterans, two of their participants reported that they were dropping out of the study because they experienced an increase in anxiety during the mindfulness exercises. One such participant stated that specifically engaging in the body scan exercise brought back painful memories of his trauma. Similarly, Kuhl and Boyraz (2017) found that the relationship between mindfulness and social support, as well as the relationship between mindfulness and general trust, were significant for trauma-exposed individuals who were experiencing low or moderate levels of PTSD symptomatology, but not for individuals who reported high levels of PTSD symptomatology. That is, there was not a significant relationship between mindfulness and social support for individuals with high levels of PTSD symptomology, suggesting that mindfulness may not be helpful or effective for individuals who are experiencing high levels of distress.

Since one objective of mindfulness is to increase awareness of external and internal experiences, engaging in mindfulness may cause individuals to become aware of,

and possibly experience, painful thoughts, emotions, and memories they otherwise work to avoid. For individuals who are experiencing high distress, the increased awareness and experiencing that can occur through mindfulness may be overwhelming and no longer helpful. Therefore, in the present study, we will examine whether the relationships between specific aspects of mindfulness (i.e., emotion regulation and non-judging) and the level of stress experienced are different by level of PTSD symptomatology.

The Present Study

The purpose of the present study was to examine whether emotion regulation and non-judgment of emotions could be enhanced in trauma-exposed college students through a short, mindfulness-based intervention; and whether increasing emotional regulation and decreasing self-judgment would reduce the levels of perceived and academic stress reported by trauma-exposed college students. Given that previous studies have indicated that one's level of PTSD symptomatology may influence the efficacy of mindfulness (Kuhl & Boyraz, 2017), we also examined whether the effects of the mindfulness intervention on emotion regulation, non-judging, and stress levels were moderated by level of PTSD symptomatology.

The primary hypothesis of the present study was that trauma-exposed students who participate in a mindfulness-based intervention would report significant reductions in their perceived general and academic stress levels by way of increasing emotion regulation and non-judging, but only for students who were experiencing subthreshold PTSD symptomology. Specifically, it was hypothesized trauma-exposed students who participate in a mindfulness-based intervention would report increased levels of emotion regulation and non-judging (Hypothesis 1a, main effects) and decreased levels of

perceived stress and academic stress (Hypothesis 1b, main effects). Additionally, higher

levels of emotion regulation and non-judging would result in lower levels of both

perceived and academic stress (Hypothesis 1c) and the mindfulness intervention will

indirectly lead to decreases in perceived and academic stress through increasing emotion

regulation and non-judging (Hypothesis 1d). Furthermore, PTSD symptomatology would

moderate the effect of the mindfulness-based intervention, such that students who

reported subthreshold PTSD symptomatology would report an increase in emotion

regulation and non-judging and a decrease in perceived stress and academic stress, but

students who reported PTSD symptomatology above the recommended cutoff score

would not report changes in their emotion regulation, non-judging, perceived stress, or

academic stress levels (Hypothesis 2). See Figure 1 for the hypothesized model.
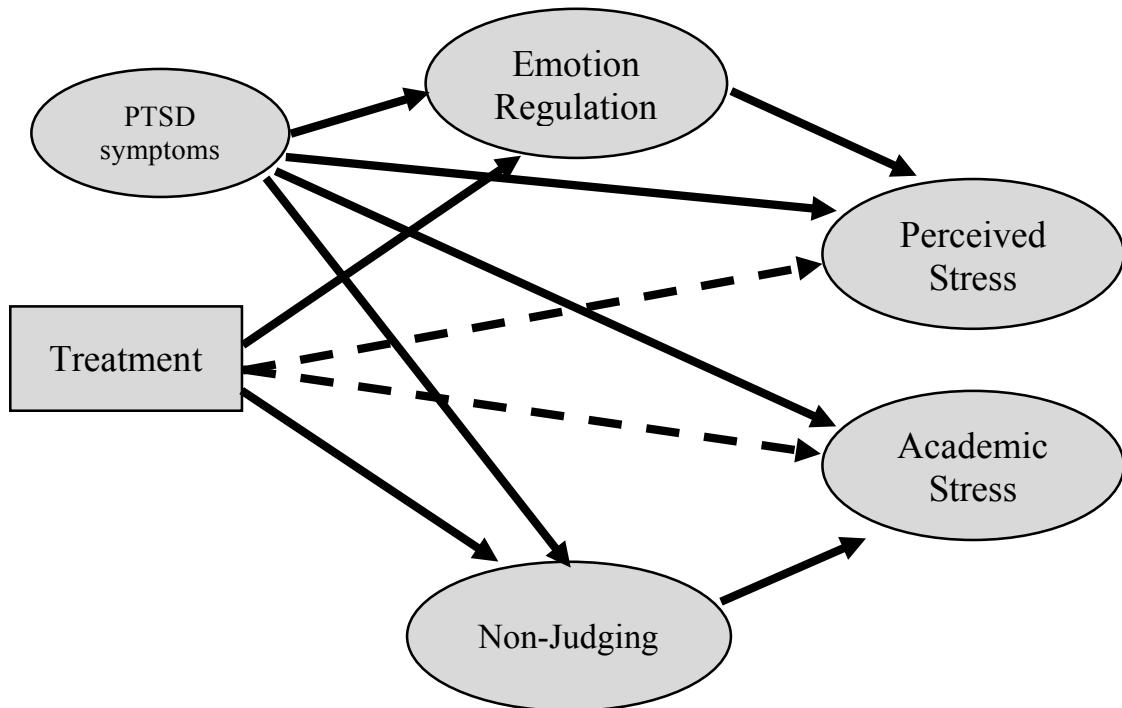
Figure 1. Hypothesized Model of Change

CHAPTER II

METHOD

Participants

An a priori power analysis was conducted to determine the minimum sample sized needed to maximize power while minimizing the probability of Type I and Type II errors. The power analysis was conducted using G*Power software (Faul, Erdfelder, Buchner, & Lang, 2009) based on a linear multiple regression analysis. For this analysis, power was set at .80 to maximize the probability of finding a significant effect if it exists in the population (Cohen, 1977). For this study, eight statistical hypotheses were tested to analyze the significance of the hypothesized model. To account for this, and to control for Type I error, a modified Bonferroni correction using Holland and Copenhaver's (1988) procedure was used to adjust alpha from the conventional .05 level (Cohen, 1992) to a Bonferroni corrected α = .006. The effect size for the a priori power analysis was set at r^2 = .059, based on the current findings in the literature on the relationship between the predictor and criterion variables. Current effect sizes range from d = .09 to d = 1.04 (Aikens et al., 2014; Baer, Carmody, & Hunsinger, 2012; Carmody & Baer, 2008; Christopher et al., 2015; Daigneault et al., 2016; Glück & Maercker, 2011; Mak, Chan, Cheung, Lin, & Ngai, 2015; Nyklíček & Kuijpers, 2008). With a Bonferroni corrected α = .006, β = .80, and r^2 = .059, a sample of approximately 210 participants was needed.

Undergraduate students over the age of 18 from a midsize university in the South were recruited for this study. All undergraduate students who agreed to participate were

allowed to complete the entire study (both trauma-exposed and non-trauma-exposed). This allowed all interested students to benefit from the study. However, only the trauma-exposed participants (as measured by the Life Events Checklist-5; LEC-5) were included in the final data analysis. Cluster sampling was used to randomly assign participating classes to either the mindfulness group or the waitlist control using a random number generator (www.randomizer.org).

The total number of participants who started the study (i.e., completed survey 1) was 629. Of these participants, 296 (47.1%) were removed because they did not persist through the full study (i.e., complete all 5 surveys). An additional 83 (28.0%) participants were removed due to excessive missing data (i.e., they answered less than 80% of the questions on the study instruments; Downey & King, 1998). Of the remaining 250 participants who appropriately completed the study, 232 (92.8%) of them reported lifetime exposure to at least one potentially traumatic event (either experienced or witnessed, as measured by the Life Events Checklist-5; LEC-5). Although the percentage of trauma-exposed students in the study was a bit higher compared to the percentages reported in the literature (e.g., Avant et al., 2011; Boyraz, et al., 2013; Frazier et al., 2009; Read et al., 2011), these rates are comparable to rates reported for other DSM-5 based measures of potentially traumatic events (Kilpatrick et al., 2013). Many of the previous trauma exposure rates were based on DSM-IV-R criteria. The DSM-5 criteria for trauma exposure were expanded to include more types of trauma exposure, which is the criteria utilized in the LEC-5. As such, the rates found using this scale are often higher than previously found using other scales (e.g., 89.7%; Kilpatrick et al., 2013).

Of the remaining 232 participants, 23 (9.9%) of them did not answer at least three of the six manipulation check questions (2 in each of the post-intervention surveys) correctly, and thus were eliminated from the final sample. None of the remaining participants were identified as univariate or multivariate outliers during preliminary data analysis (see results section). Therefore, the final sample of this study included 209 college students who reported lifetime exposure to at least one potentially traumatic event, 103 of whom were in the control group, and 106 of whom were in the mindfulness group.

Participants' ages ranged from 18 to 42 ($M = 20.09$, $SD = 3.39$). The majority were first-year college students (40.9%, $N = 85$); 26.4% ($N = 55$) were sophomores; 13.9% ($N = 29$) were juniors; 16.3% ($N = 34$) were seniors; 1.9% ($N = 4$) were master's students; and 0.5% ($N = 1$) reported their academic classification as other. The mean grade point average (GPA) was 3.37 ($SD = 0.50$) and ranged from 1.5 to 4.0. Of the 209 participants, 66.5% ($N = 139$) identified as female; 31.6% ($N = 66$) identified as male; 1.0% ($N = 2$) identified as gender queer or gender non-conforming; and 1.0% ($N = 2$) identified with a different gender identity.

Most of the sample identified as heterosexual (90.0%, $N = 188$), 3.8% ($N = 8$) as bisexual, 1.9% ($N = 4$) as gay/lesbian, 1.4% ($N = 3$) as pansexual, 1.4% ($N = 3$) as asexual, and 1.0% ($N = 2$) as a different identity. The majority of the sample reported their relationship status as single, never married (60.3%, $N = 126$), 28.2% ($N = 59$) as single, in a committed relationship, 4.8% ($N = 10$) as cohabitating; 4.3% ($N = 9$) as married; 1.4% ($N = 3$) as separated or divorced; and 0.5% ($N = 1$) as a different status. Most of the participants identified their ethnicity as White/Caucasian (82.8%, $N = 173$),

with 13.9% ($N = 29$) as Black/African American, 2.9% ($N = 6$) identifying as Native

American/Alaskan Native, 2.9% ($N = 6$) as Hispanic/ Latinx, 1.0% ($N = 2$) as

Asian/Asian American, 0.5% ($N = 1$) as Native Hawaiian/Pacific Islander, and 1.9% ($N = 4$) as biracial/multiracial.

The majority of the participants indicated that the religion they most identified

with was Christianity (65.6%, $N = 137$), 15.8% ($N = 33$) indicated Catholicism, 14.4% ($N = 30$) none, 0.5% ($N = 1$) Buddhism, 0.5% ($N = 1$) Islam; 0.5% ($N = 1$) Judaism, and

2.9% ($N = 6$) other. The participants rated their perception of their socioeconomic status

(SES) in comparison to others in their community and in the United States using the

MacArthur Scale of Subjective Social Status (Adler, Epel, Castellazzo, & Ickovics,

2000), a hierarchical comparison of oneself to one's community (SES-Community) and

the larger United States (SES-US) from 1 to 10. The mean rating for the community

comparison was 5.40 ($SD = 1.76$) and the modal rating was 5, very similar to the U.S.

comparison of 5.29 ($SD = 1.86$) and 5, respectively. Thus, participants on averaged rated

themselves as middle class. See Table 1 for all demographics characteristics.

Table 1. *Demographic Characteristics of the Sample*

Variable	N	%
Academic Classification		
Freshman	85	40.9
Sophomore	55	26.4
Junior	29	13.9
Senior	34	16.3
Master's student	4	1.9
Other	1	.5
Gender		
Female	139	66.5
Male	66	31.6
Gender queer/Gender non-conforming	2	1.0
Different identity	2	1.0
Sexual Orientation		
Heterosexual	188	90.0
Bisexual	8	3.8
Gay/Lesbian	4	1.9
Pansexual	3	1.4
Asexual	3	1.4
Different identity	2	1.0
Relationship Status		
Single, never married	126	60.3
Single, in a committed relationship	59	28.2
Cohabitating	10	4.8
Married	9	4.3
Separated or divorced	3	1.4
Different status	1	.5
Race/Ethnicity		
White, non Hispanic/Latino(a)	173	82.8
Black/African American	29	13.9
Native American/Alaskan Native	6	2.9
Hispanic/Latinx	6	2.9
Asian/Asian American	2	1.0
Native Hawaiian/Pacific Islander	1	.5
Biracial/Multiracial	4	1.9
Religious Identity		
Christianity	137	65.6
Catholicism	33	15.8
None	30	14.4
Buddhism	1	.5
Islam	1	.5
Judaism	1	.5
Other	6	2.9

Design

The present study was a two-group between-subjects, randomized controlled design. The Life Events Checklist for the DSM-5 (LEC-5; Weathers, Blake, et al., 2013) was used as a screener to determine which participants had been exposed to potentially traumatic events. The independent variables in this study were treatment; emotion regulation, as measured by the Difficulties in Emotion Regulation Scale – 18 item version (DERS-18; Gratz & Roemer, 2004); and non-judging, as measured by the non-judging subscale of the Five-Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The criterion variables were perceived stress, as measured by the Perceived Stress Scale – 10 item version (PSS-10; Cohen & Williamson, 1988), and academic stress, as measured by the stress subscale of the Academic Self-Efficacy and Stress Scale (Zajacova, Lynch, & Espenshade, 2005). PTSD symptomatology was also included as a moderator and was measured by the PTSD Checklist for the DSM-5 (PCL-5; Weathers, Litz, et al., 2013).

Measures

Life Events Checklist-5

The LEC-5 (Weathers, Blake, et al., 2013) is a self-report measure that assesses for potentially traumatic events experienced across the lifespan (Gray, Litz, Hsu, & Lombardo, 2004). The LEC-5 is a revised version of the original LEC designed to match the Criterion A trauma requirement of the PTSD diagnostic criteria per the DSM-5 (APA, 2013; Weathers, Blake, et al., 2013). Participants were provided with a list of 16 Criterion A traumatic events, as well as a category for "Any other very stressful event or experience," and were instructed to select one of the following options for each

potentially traumatic experience: experienced this trauma, witnessed it, learned about it, it was part of their job, they are unsure if the trauma applies to them, or it does not apply to them. Sample items include "Exposure to toxic substance (for example, dangerous chemicals, radiation)," and "Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)".

A total trauma exposure score can be calculated by summing all of the items, or the scores can be divided into four subscales of the number of events experienced, number witnessed, number learned about by the individual, and number that were part of one's job (Weathers, Blake, et al., 2013). For the purposes of the present study, only participants who reported either experiencing or witnessing a potentially traumatic event were included in the trauma exposure group (i.e., included in the analyses of the present study). This more conservative approach was utilized to increase the likelihood that participants would have been impacted by the potentially traumatic events. Scores can range from 0 to 17 for each subscale or 0 to 68 for the total scale score. Higher scores indicate more experiences of potentially traumatic events.

Because the LEC-5 focuses on a variety of traumatic events and is not a unidimensional construct, internal consistency is not assessed (Gray et al., 2004). Therefore, Cronbach's α was not calculated for this scale in the present study. However, the LEC has been found to demonstrate strong test-retest reliability ($r = .82$) over a period of seven days (Gray et al., 2004). The LEC has also demonstrated strong convergent validity with the Traumatic Life Events Questionnaire (TLEQ; $r = -.55$; Gray et al., 2004). Both the LEC and the TLEQ displayed similar correlations with the level of PTSD symptomatology reported per the PCL–Military version (LEC, $r = -.48$; TLEQ, $r = .36$;

Gray et al., 2004). Further supporting convergent validity, the LEC is also significantly

correlated, in the expected directions, with several other measures of psychopathology

that have established relationships with trauma exposure; these include the Beck Anxiety

Inventory (r = -.27), the Beck Depression Inventory (r = -.32), the Mississippi Scale for

Combat-Related PTSD (r = -.33), and the Clinician Administered PTSD Scale (r = -.39)

(Gray et al., 2004).

Difficulties in Emotion Regulation Scale-18

The DERS-18 (Victor & Klonsky, 2016) is a self-report measure that assessed the

extent to which participants have difficulty with emotion regulation. The DERS-18 is

based on the six factor model of emotion dysregulation: Nonacceptance of Emotional

Responses (Nonacceptance; "when I'm upset, I feel guilty for feeling that way"),

Difficulties Engaging in Goal-Directed Behavior (Goals; "when I'm upset, I have

difficulty concentrating"), Impulse Control Difficulties (Impulsive; "when I'm upset, I

become out of control"), Lack of Emotional Awareness (Awareness; "I pay attention to

how I feel"), Limited Access to Emotion Regulation Strategies (Strategies; "when I'm

upset, I believe that wallowing in it is all I can do"), and Lack of Emotional Clarity

(Clarity; "I have no idea how I am feeling") (Victor & Klonsky, 2016). Participants were

instructed to indicate how often 18 statements apply to them (3 items for each subscale),

using a Likert-type scale ranging from 1 (*almost never*, 0-10% of the time) to 5 (*almost*

always, 91-100% of the time). All three of the items from the Awareness subscale were

reverse-scored. Items were summed and then averaged to create a total scale score

ranging from 1 to 5, with higher scores indicating greater difficulty with emotion

dysregulation (Victor & Klonsky, 2016). Subscale scores can be calculated for each of

the factors of emotion dysregulation; only the total scale score was utilized in the present study, since the focus was on decreasing overall emotion dysregulation.

The DERS-18 is a shortened version of the DERS. The DERS-18 overall scale score has been demonstrated to have high internal consistency with a Cronbach's α = .90 in a college sample (Victor & Klonsky, 2016). In the present study, Cronbach's α for the total scale score ranged from .88 to .92. To establish construct validity, the DERS-18 was compared to the original DERS and measures of Borderline Personality Disorder (BPD), since emotion dysregulation is a central component of BPD (Glenn & Klonsky, 2009). The DERS-18 was highly correlated with the original DERS (overall scale, r = .98; Nonacceptance, r = .95; Goals, r = .97; Impulse, r = .95; Awareness, r = .92; Strategies, r = .94; Clarity, r = .93). The DERS-18 was also significantly correlated with measures of BPD, with correlations ranging from .49 to .67, all of which were significant at p < .001 in both community and college samples. Although test-retest reliability has not yet been established for the DERS-18, the original DERS has demonstrated strong test-retest reliability over four to eight weeks (r = .88; Gratz & Roemer, 2004).

Five-Facet Mindfulness Questionnaire

The FFMQ (Baer et al., 2006) includes 39 items that assess five major facets of mindfulness: observing, describing, acting with awareness, non-judging of inner experience (non-judging), and non-reactivity to inner experience (non-reactivity). Only the non-judging subscale of the FFMQ was utilized in the present study to assess the extent to which participants were judgmental of their inner experiences. The non-judging subscale consists of eight statements such as, "I tell myself I shouldn't be feeling the way I'm feeling" (Baer et al., 2006). All items in the non-judging subscale were reverse

coded. Participants were instructed to rate how often each experience had been true for them in the past month, using a Likert-type scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*). Scores for the non-judging subscale were summed and averaged, creating a possible range of 1 to 5, with higher scores indicating higher levels of non-judgment.

The non-judging subscale of the FFMQ has been demonstrated to have strong internal consistency, with an α coefficient of .86 in a sample of college students (Baer et al., 2006). In the present study, Cronbach's α for the non-judging subscale score of the FFMQ ranged from .91 to 1.00. Convergent validity of the non-judging subscale has been supported by significant positive correlations between the non-judging subscale and emotional intelligence and self-compassion (Baer et al., 2006). Convergent validity of the non-judging subscale has been supported by significant negative correlations between the non-judging subscale and alexithymia, dissociation, absent-mindedness, psychological symptoms, neuroticism, thought suppression, difficulties regulation emotion, and experiential avoidance (Baer et al., 2006). All correlations were significant at $p < .001$ (Baer et al., 2006).

Perceived Stress Scale-10

The PSS-10 (Cohen & Williamson, 1988) assessed the degree to which participants have felt stressed in the past month. The PSS-10 is a shortened version of the original PSS (Cohen, Kamarck, & Mermelstein, 1983). On the PSS-10, participants were instructed to indicate how often they have felt or thought a certain way using a Likert scale ranging from 0 (*never*) to 4 (*very often*) (Cohen & Williamson, 1988). The 10 statements assessed experiences of stress-related emotions (e.g., "In the last month, how

often have you felt nervous and 'stressed'?") and stress-related thoughts ("In the last month, how often have you felt that you were on top of things?"). Four of the items were reverse coded, and a total perceived stress score was calculated by summing and then averaging all of the items. Scores can range from 0 to 4, with higher scores indicating higher levels of perceived stress.

Previous confirmatory factor analyses have indicated that the PSS-10 can be divided into two factors: perceived helplessness (6 items) and perceived self-efficacy (4 items) (Roberti, Harrington, & Storch, 2006). The total PSS-10 score and each of the factors demonstrate strong internal consistency in a college student sample, with Cronbach's α for the total scale, the perceived helplessness factor, and the perceived self-efficacy factor demonstrated to be .89, .85, and .82, respectively (Roberti et al., 2006). In the present study, Cronbach's α for the total scale score ranged from .78 to .87. The correlations between each item and the total score ranged from .58 to .72, suggesting that each item makes a direct contribution to one's overall level of perceived stress (Roberti et al., 2006). In this study, only the overall score was utilized.

The convergent validity of the PSS-10 has been supported by significant positive correlations between the PSS-10 and the State-Trait Anxiety Inventory-Trait Version (STAI-T) total score, the STAI-T anxiety factor, the STAI-T depression factor, the Multidimensional Health Locus of Control (MHLC) chance subscale, and the MHLC powerful others subscale (Roberti et al., 2006). The PSS-10 has demonstrated strong test-retest reliability over a two-week period of time ($r = .77$; Remor, 2006) and a one-week period of time ($r = .86$; Reis, Hino, & Rodriguez-Añez, 2010). The PSS-10 has also been utilized in a variety of countries and has demonstrated strong cross-cultural validity in

Spain (Remor, 2006), Turkey (Örücü & Demir, 2009), Brazil (Reis et al., 2010), Hong

Kong (Leung, Lam, & Chan, 2010), Qatar (Chaaya, Osman, Naassan, & Mahfoud, 2010),

Greece (Andreou et al., 2011), China (Wang et al., 2011), and France (Lesage, Berjot, &

Deschamps, 2012).

Academic Self-Efficacy and Stress Scale

The ASESS (Zajacova et al., 2005) measures the perception of academic stress

and perceived self-efficacy in college students. Only the stress section of the scale was

utilized in this study. The stress section consists of 27 common university experiences

related to academic tasks, such as "studying" or "talking to my professors." Participants

rated how stressful each task was for them using a Likert-type scale, ranging from 0 (*not

at all stressful*) to 10 (*extremely stressful*). The stress scale consists of four subscales:

Interaction at School (e.g., "talking to professors"), Academic Performance out of Class

(e.g., "writing term papers"), Academic Performance in Class (e.g., "doing well on

exams"), and Managing Work, Family, and School (e.g., "managing time efficiently").

Scores are generally calculated for each subscale independently, but the subscales can be

combined to create an overall scale score (Zajacova et al., 2005). Scores for the

Interaction at School subscale (7 items) can range from 0 to 70; scores for the Academic

Performance out of Class subscale (8 items) can range from 0 to 80; scores for the

Academic Performance in Class subscale (4 items) can range from 0 to 40; scores for the

Managing Work, Family, and School subscale (4 items) can range from 0 to 40. For the

present study, the total academic stress score (27 items) was calculated by summing and

averaging all of the items, resulting in a possible range of 0 to 10. Higher scores indicate

higher levels of academic stress.

The subscales of the stress scale have demonstrated strong internal consistency, with Cronbach's α of .83 (Interaction at School), .86 (Academic Performance out of Class), .83 (Academic Performance in Class), and .72 (Managing Work, Family, and School) in a sample of college students (Zajacova et al., 2005). In the present study, Cronbach's α for the total stress subscale score ranged from .93 to .97. Construct validity for this scale has previously been assessed and supported through confirmatory factor analysis. Academic stress has also been shown to have a small but significant positive effect on continued enrollment in college, which aligns with the current literature that indicates that a moderate level of stress can be motivating and helpful for overcoming challenging situations, such as college classes (Koob, 1991).

PTSD Checklist-5

The PCL-5 (Weathers, Litz, et al., 2013) was utilized to assess the level of PTSD symptomatology experienced by participants. The PCL-5 items have been revised from the original PCL items to align with the DSM-5 diagnostic criteria for PTSD (APA, 2013). Participants were asked to indicate how often they have experienced 20 different PTSD related symptoms in the past month, using a Likert-type scale ranging from 0 (*not at all*) to 4 (*extremely*) (Weathers, Litz, et al., 2013). The PCL-5 can be used to calculate either a full scale total score, or it can be divided into four subscales based off of the DSM-5 diagnostic clusters for PTSD: intrusions (e.g., "feeling very upset when something reminded you of the stressful experience?"), avoidance (e.g., "avoiding external reminders of the stressful experience"), negative alterations in mood and cognitions (e.g., "having strong negative feelings such as fear, horror, anger, guilt, or shame"), and hyperarousal (e.g., "being "superalert" or watchful or on guard")

(Weathers, Litz, et al., 2013). A previous confirmatory factor analysis has demonstrated that all four subscales demonstrate adequate fit with the DSM-5 diagnostic criteria (APA, 2013; Keane et al., 2014). A total PTSD symptomatology score can be calculated, with scores ranging from 0 to 80. Mean scores can also be calculated for the total scale score, with a possible range of 0 to 4. Higher scores indicate higher levels of PTSD symptomatology. Scores above 33 suggest that the respondent meets criteria for a diagnosis of PTSD (Weathers, Litz, et al., 2013). Only the total PTSD score was utilized in this study.

Convergent validity of the PCL-5 has been established through comparing the PCL-5 to the original PCL ($r = .95$ and $.87$, respectively; Keane et al., 2014), and to the Clinician-Administered PTSD Scale ($r = .81$; Keane et al., 2014). The PCL-5 has demonstrated an overall strong internal consistency (Cronbach's $\alpha = .97$; Keane et al., 2014). Although test-retest reliability has not yet been established for the PCL-5, the PCL has demonstrated strong test-retest reliability over a two-week period ($r = .66$; Conybeare, Behar, Solomon, Newman, & Borkovec, 2012). In the present study, Cronbach's α for the total scale score were .95 (survey 1) and .97 (survey 5).

Procedure

A total of 629 undergraduate students over the age of 18 from a midsize university in the South were recruited for this study. Prior to collecting data, permission was obtained from the Institutional Review Board (IRB) at the author's university. Once IRB approval was obtained, an online-based random number generator was used to create a randomly ordered list of ones and twos. Based on this random list, the researcher assigned potential classrooms to either the mindfulness intervention or the waitlist control

group. Based on these assignments, undergraduate instructors at the university utilized

for the study were emailed a request asking for permission to recruit research participants

from their classes. The email detailed how the study would be conducted and the time

commitment that was required. Instructors in the mindfulness intervention group were

informed that after the original recruitment, three intervention times would be scheduled

with them. These interventions took place in the classroom once a week for three

consecutive weeks. All three of the interventions were completed during either the first or

the last 15 minutes of the scheduled class time. Due to the involved nature of this study,

and the large number of participants needed, it was important to make the study as

accessible as possible to students. Offering the interventions during their scheduled class

times increased the accessibility of the intervention, increasing the likelihood that more

students would be able to benefit from it.

Once the instructors agreed to allow the researcher recruit participants from their

classes and to use the class time for the intervention, the researcher or colleague visited

the classes and provided students with information regarding the nature of the study and

what would be expected of them should they choose to participate. Some participants,

based on whether or not the instructor decided to offer it, were offered extra credit. If

extra credit was provided, the instructor offered an alternative assignment for extra credit

for those who chose to not participate. Students who completed the study in other classes

were not eligible to participate in it again, but every effort was made to provide them

with an alternative source of extra credit. There were no foreseen risks associated with

this study, but since participants were asked about potentially traumatic experiences,

some may have experienced discomfort. In the informed consent, each participant

received contact information for the counseling center at the university and the phone number for a national crisis hotline. The informed consent indicated that participants could skip any questions that cause them discomfort and that they could withdraw from the study at any time without penalty.

If students chose to participate, they were asked to provide their email addresses to the researcher and were told that they would receive an email with a link for a survey that they would complete. Participants were sent a standardized email with an online survey link; the survey included information about the study, an informed consent form, demographic questions, and baseline assessments. Participants also created a unique identification code using their three-letter initials (putting an X as the second letter if they do not have a middle name/initial) and a two-digit day and two-digit month of birthday. This unique code was included on each survey and was utilized to match survey responses for each participant over time. Identification numbers and the email addresses of participants were only kept until data analysis was complete.

Once participants indicated consent to the informed consent form, they were directed to complete the demographic questionnaire and six aforementioned scales. Participants completed a pretest, three surveys once a week for three consecutive weeks after the interventions, and a posttest three weeks after the final intervention, thus completing a total of five surveys. Participants were emailed the surveys after each intervention and instructed to complete them within the next 24 hours. Surveys two through four, which included only the DERS-18, FFMQ subscale, PSS-10, and ASESS subscale, took approximately 10 minutes to complete. Three weeks after the third and

final intervention, the follow-up survey was emailed to all participants (this survey included all of the measures).

At the end of the final survey, all participants were directed to a separate survey where they had the option of providing their name and email to be entered into a raffle for an Amazon gift card. A total of 25 gift cards, valued at $20 each, were available to be won by study participants. By having the respondents provide their name and email separately from the study survey, anonymity was protected. Participants were informed that they must complete the entire study to be entered into the raffle.

Mindfulness Group

Participants in the mindfulness intervention completed the pretest, three in-class interventions with the follow-up survey after each intervention, and the posttest three weeks after the final intervention. In surveys three, four, and five, participants were also instructed to rate how often they had practiced the skills they learned in the intervention during the previous week using a Likert-type scale ranging from 0 (*not at all*) to 4 (*at least once a day*) (adapted from Cavanagh et al., 2013). On the day of the interventions, the researcher or a colleague visited the classroom during the first or last 15 minutes of the scheduled class period and provided standardized instructions for the intervention (see Appendix L). The instructional video (see below for specifics) was played on the projector screen in the classroom, and participants were encouraged to follow all instructions and to focus on themselves and not each other during the activity.

Participants completed mindfulness activities that targeted emotion dysregulation and non-judging. Emotion dysregulation and non-judging are two facets of mindfulness that appear to be the strongest predictors of PTSD symptomatology (e.g., Bennett et al.,

2016; O'Bryan et al., 2015; Thompson & Waltz, 2010; Vujanovic et al., 2009), suggesting that targeting these areas could lead to the greatest reduction in the stress experienced by trauma-exposed individuals (Bennett et al., 2016; Wahbeh et al., 2011). Each week, participants watched a video: either a short, guided meditation from Dietz (2016) or a video created by the researcher. The videos provided instruction and practice exercises related to enhancing emotion regulation and non-judging, and were based on DBT theory and techniques, as described previously (Van Dijk, 2012).

Since emotion dysregulation is comprised of six major facets (Gratz & Roemer, 2004), an intervention designed to decrease emotion dysregulation should address each of these facets. The first two facets of emotion dysregulation involve having a limited awareness of one's own emotions and a lack understanding and clarity regarding these emotions. Therefore, in the first intervention, participants were instructed to complete a short, guided mediation that focused on increasing their emotional awareness and clarity (see Appendix K for the video links). Following the intervention, participants were instructed to practice these skills throughout the week.

The second intervention focused on the third facet of emotion dysregulation, "non-acceptance of emotional responses" (Gratz & Roemer, 2004, p. 52). The intervention began with a short, guided meditation designed to help the participants become more aware of their thoughts and emotions. Participants then watched a video providing psychoeducation (created by the researcher) about adopting a non-judgmental stance toward themselves. Following the video, participants were instructed to practice engaging in non-judgment throughout the week, and given recommendations for how to do so on a handout that was explained by the researcher (see Appendix M).

The third intervention focused on enhancing the ability of participants to engage in emotion regulation strategies to enhance their ability to control their impulses and engage in helpful behavior (behaviors that are the reverse of the remaining three facets of emotion dysregulation). Participants watched a video providing psychoeducation (created by the researcher) that focused on teaching participants how to let go of painful emotions and how to engage in behaviors that are the opposite of their painful emotions in order to increase their impulse control and help them engage in goal-directed behaviors. At the end of the video, participants were provided with suggestions for how to practice the techniques through a handout that was explained by the researcher, and they were encouraged to utilize these techniques throughout the week.

Waitlist Control Group

The waitlist control group only completed the five surveys. They were emailed the surveys on the same days as the mindfulness intervention group and instructed to complete the surveys within 24 hours. After the conclusion of the study, participants in the waitlist control group were emailed the links for the videos used for the mindfulness intervention group.

CHAPTER III

RESULTS

Preliminary Analyses

The final sample included 209 trauma-exposed undergraduate students over the age of 18. Once data collection was complete, the data were assessed to determine whether the missing data were missing completely at random using Little's MCAR. The results of Little's MCAR were nonsignificant, χ^2 (41180, $N = 232$) = 0.00, $p = 1.00$, indicating that the missing values were missing completely at random. Since only people who persisted through all five surveys were included in the final analysis, it is likely that these individuals were more conscientious, which may have contributed to the relatively small number of missing values. The limited amount of missing values likely resulted in the extremely small Little's MCAR value. Since the missing values were found to be missing completely at random, expectation maximization was used to impute missing values on the scales (Tabachnick & Fidell, 2013). To compute missing values in GPA, single imputation using regression was utilized, given that GPA was a singular data point and only five participants' GPAs were missing (Enders, 2010). Comparison of the fit indices and regression weights with and without the imputed GPA values suggested that the single imputation method had a minimal impact on the model; thus, the single imputation data were retained.

Using the pretest (i.e., Survey 1) data, three one-way ANOVAs were conducted to assess for between-group (treatment vs. control) equivalence of scores for the dependent

variables (perceived and academic stress) and the moderator (PTSD symptomatology). No significant between-group differences were found for perceived stress (F[1, 207] = .348, p = .556), academic stress (F[1, 207] = .541, p = .463), or PTSD symptomatology (F[1, 207] = 1.959, p = .163). One-way ANOVAs were also conducted to assess for differences in the dependent variables by gender, partnership status, age, sexual orientation, religion, academic classification, SES-Community, and SES-US. SES-Community had a significant effect on perceived stress, such that those who reported lower SES compared to others in their community also reported higher levels of perceived stress. Linear regressions were also run using GPA as the predictor value (due to its continuous nature) to determine if it was a significant predictor of any of the dependent variables. The results indicated that GPA was a significant predictor of perceived stress (r^2 = .030, p = .013) and academic stress (r^2 = .037, p = .006).

For the primary analysis, a modified Bonferroni correction using Holland and Copenhaver's (1988) procedure was used to adjust alpha from the conventional .05 level (Cohen, 1992) to a Bonferroni corrected α = .006. Prior to conducting the primary analyses, means, standard deviations, and Cronbach's α values were calculated for each scale at each time point throughout the study (see Table 2). Correlations between each of the scales at Survey 1 were also calculated (see Table 3). The LEC-5 was not included in the correlations since it was scored as a dichotomous (yes/no) measure.

Table 2. *Means, Standard Deviations, and Cronbach's Alphas for Variables by Group and Time*

Measure	Mindful Treatment Group		Control Group	
	M (SD)	*α*	*M (SD)*	*α*
PCL[a]				
Survey 1	1.158 (.861)	.950	1.333 (.946)	.956
Survey 5	.959 (.868)	.965	1.297 (.981)	.965
DERS[b]				
Survey 1	2.166 (.475)	.879	2.242 (.667)	.894
Survey 2	2.147 (.626)	.904	2.255 (.694)	.907
Survey 3	2.078 (.603)	.903	2.290 (.701)	.903
Survey 4	2.100 (.610)	.904	2.313 (.696)	.901
Survey 5	1.972 (.651)	.923	2.287 (.744)	.919
FFMQ[c]				
Survey 1	3.279 (.848)	.906	3.333 (.945)	.915
Survey 2	3.412 (.896)	.924	3.602 (1.255)	1.000
Survey 3	3.571 (.823)	.923	3.515 (1.036)	.947
Survey 4	3.713 (.881)	.942	3.458 (1.024)	.945
Survey 5	3.810 (.834)	.933	3.460 (1.034)	.943
PSS[d]				
Survey 1	1.897 (.683)	.868	1.842 (.668)	.827
Survey 2	1.880 (.643)	.811	1.869 (.639)	.791
Survey 3	1.833 (.609)	.781	1.896 (.699)	.848
Survey 4	1.776 (.669)	.822	1.887 (.653)	.818
Survey 5	1.688 (.710)	.829	1.924 (.643)	.795
ASESS[e]				
Survey 1	4.821 (1.873)	.947	5.003 (1.697)	.927
Survey 2	4.593 (1.839)	.951	5.034 (1.782)	.938
Survey 3	4.469 (1.936)	.957	4.855 (1.807)	.939
Survey 4	4.257 (2.086)	.966	4.764 (1.998)	.952
Survey 5	4.219 (2.248)	.971	4.797 (1.934)	.953

Note. Standard deviations appear in parentheses behind means. [a]PTSD Checklist-5 (Weathers, Litz, et al., 2013), [b]Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004), [c]Non-Judging subscale of the Five-Facet Mindfulness Questionnaire (Baer et al., 2006), [d]Perceived Stress Scale-10 (Cohen & Williamson, 1988), [e]Academic Self-Efficacy and Stress Scale (Zajacova et al., 2005)

Table 3. *Correlation Matrix for Measures at Time One*

Variables	PCL	DERS	FFMQ	PSS	ASESS
1. PCL[a]	1.00	.638*	-.601*	.677*	.492*
2. DERS[b]		1.00	-.612*	.682*	.535*
3. FFMQ[c]			1.00	-.564*	-.335*
4. PSS[d]				1.00	.618*
5. ASESS[e]					1.00

Note. [a]PTSD Checklist-5 (Weathers, Litz, et al., 2013), [b]Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004), [c]Non-Judging subscale of the Five-Facet Mindfulness Questionnaire (Baer et al., 2006), [d]Perceived Stress Scale-10 (Cohen & Williamson, 1988), [e]Academic Self-Efficacy and Stress Scale (Zajacova et al., 2005) * $p < .01$

A confirmatory factor analysis (CFA) was performed on the non-judging subscale of the FFMQ to ensure that it had the same structure as it does when used as part of the entire FFMQ scale. Analysis of the fit indices indicated that although the fit indices were not ideal, the scale had an adequate enough fit for the data for the primary analyses ($\chi^2 =$ 95.095, $p < .001$, RMSEA = .127, CFI = .932) (Hu & Bentler, 1999).

Next, the assumptions of the general linear model were tested; specifically, independence or errors, absence of outliers, normality of the residuals, linearity, homoscedasticity, and absence of multicollinearity. Since the present study is a two-group between subjects, randomized controlled trial study design, the assumption of independence of errors was likely met. To further confirm independence was met, the Durbin-Watson value was examined (values ranged from = 1.767 to 2.100). That the Durbin-Watson value was close to two suggested that the assumption of independence of errors was indeed met (Tabachnick & Fidell, 2013).

To identify significant outliers in the data, DFBETA, centered leverage values, discrepancy, and influence were calculated. Cases were considered for deletion that demonstrated centered leverage values > 2k/n, Cook's d > 4/n, DFBETA $\pm$ 1.0, and

standardized deleted residuals $t \geq t\alpha$, *n-k-*2. None of the cases met criteria to be

considered significant outliers. Furthermore, examination of the standard residuals

indicated that all the standardized residuals were less than the absolute value of 3.29.

Multivariate normality was not assessed per the recommendations of Tabachnick &

Fidell (2013), who asserted that multivariate analyses are robust against potential

problems as long as groups are relatively equivalent and the study has more dependent

variables than cases. Both of these criteria were met in the present study.

To test the assumption of normality, histograms of the residuals were created. The

histograms demonstrated relatively normal curves, suggesting that the assumption of

normality was met. Skewness, kurtosis, and Shapiro-Wilk's values were also analyzed;

skewness (-.562 to .904) and kurtosis (-.604 to 1.081) were all relatively close to zero,

and the Shapiro-Wilk's values were non-significant, indicating that the distributions were

normally distributed. To test the assumptions of linearity and homoscedasticity,

scatterplots of the residuals were created. Since all of the residuals aligned with a single

slope, the assumption of linearity was met. Additionally, since the scatterplots of the

standardized residuals and standardized predicted values yielded no distinct patterns, the

assumption of homoscedasticity was met (Tabachnick & Fidell, 2013).

To test the assumption of absence of multicollinearity, the variance inflation

factor (VIF) and tolerance for the predictor variables were examined. Since all of the VIF

values were less than three (ranged from 1.518 to 1.977), multicollinearity was absent

(Tabachnick & Fidell, 2013). Tolerance cutoffs were also used as an indicator of

multicollinearity. To calculate tolerance, r^2 was calculated by regressing the independent

variable (treatment condition) and the mediators (i.e., emotion regulation and non-

judging) onto the dependent variables in the study (i.e., perceived stress and academic stress) and then calculating the value of $1 - r^2$ (Tabachnick & Fidell, 2013). Each of the tolerance values were greater than .10 (ranging from .506 to .659), further confirming the absence of multicollinearity.

Manipulation Check

In surveys three, four, and five, participants in the mindfulness group were given two questions (per survey) about the content of the intervention video they had just watched. The potential answers included one correct answer and two wrong answers. These questions were used as a manipulation check to attempt to measure whether or not participants had watched and paid attention to the intervention videos. Only participants who correctly answered at least one question correct per survey were included in the final analysis. Twenty-three participants did not meet this criterion and were excluded from the final analysis, resulting in the final sample of 209 participants.

Primary Analysis

A growth curve model was analyzed to test the main hypothesis of the present study. Growth curve models have several advantages over repeated measures ANOVAs, including the retention of information on mean changes over time and estimates of mean performance levels at each time point, which provides information about the rate of change over time (Widaman, Ferrer, & Conger, 2010). Furthermore, each of the points of information are latent estimates, thereby taking into account the error variance that ANOVA analyses assume to be non-existent (Widaman et al., 2010). Analyses were conducted with AMOS software (Version 24.0; Arbuckle, 2014). In the model, treatment condition and PTSD symptomatology were included as time-invariant covariates (TIC) to

assess how the relationships in the model were potentially moderated by PTSD symptomatology. PTSD symptomatology was dummy coded as 0 (individuals with subthreshold PTSD symptoms) and 1 (individuals with PTSD symptoms above the recommended cutoff value of 33; Weathers, Litz, et al., 2013).

For the growth curve model, the following fit indices were used to determine goodness of fit for the model: chi-square (χ^2) statistics, the comparative fit index (CFI) value, the root-mean-square of error of approximation (RMSEA) value, and the standardized root mean square residual (SRMR). If the χ^2 statistic is not significant, the CFI value is close to or greater than .95, the RMSEA value is equal to or less than .05, and the SRMR value is less than or equal to .06, the model is considered to be a good fit for the data (Hu & Bentler, 1999). However, in studies with larger sample sizes, χ^2 is almost always significant; as such, the other fit indices listed are better indicators of model fit (Hooper, Coughlan, & Mullen, 2008).

In the present study, the model was fit three times – first as an unconditional means model (i.e., just the intercepts were included), second as an unconditional growth model (i.e., a growth curve model with the effect of time included), and third as a conditional growth model (i.e., time-invariant covariates were added) (Curran, Bauer, & Willoughby, 2004).

Unconditional Means Model

An unconditional means model was constructed to examine the overall model without the potential impact of time (i.e., only the intercepts for each variable were included in the model). Fitting the unconditional means model to the data did not produce acceptable fit indices, $\chi^2(216, N = 209) = 899.156, p = .000$, CFI = .862, RMSEA = .123,

and SRMR = .067. These fit statistics indicated that the unconditional growth model was

not a good fit for the data.

<u>Unconditional Growth Model</u>

An unconditional growth model was then constructed to examine average growth

in the sample, as well as the between-person variability in growth. Since the original

unconditional growth model was under-identified, four additional paths, based on theory

and past literature, were added to the model: emotion regulation intercept to non-judging,

academic stress, and perceived stress intercepts; and, non-judging intercept to academic

stress and perceived stress intercepts. Each of these paths align with the theories

previously explained. Since "nonacceptance of emotional responses" (Gratz & Roemer,

2004, p. 52) is a facet of emotion regulation, it is reasonable to expect that one's baseline

level of emotion regulation would influence one's baseline level of non-judging.

Additionally, since theory suggests that increasing emotion regulation and non-judging

would lead to decreased academic and perceived stress, it follows that one's baseline

level of emotion regulation and non-judging would influence one's baseline level of

academic and perceived stress. Covariances were also added between the intercepts and

slopes of the mediators (i.e., emotion regulation intercept with non-judging intercept;

emotion regulation slope with non-judging slope), in alignment with previous literature

and theory.

When these paths were added, the fit indices were better than the unconditional

means model, but still not ideal: $\chi^2(184, N = 209) = 485.996, p = .000$, CFI = .939,

RMSEA = .089, and SRMR = .051. Although these added paths significantly improved

the model fit (i.e., the change in CFI was greater than .01 [Anderson & Gerbing, 1988]),

the fit statistics indicated that the revised unconditional growth model still was not a good fit for the data.

Conditional Growth Model

Finally, two conditional growth models (i.e., time-invariant covariates were added) were tested. The first model included PTSD symptomatology. Given that categorical PTSD was hypothesized to moderate the effect of treatment, paths were added from PTSD to the intercepts and slopes of each variable. This model resulted in a slightly improved model fit: χ^2(198, N = 209) = 582.707, p = .000, CFI = .924, RMSEA = .097, and SRMR = .132. Although the χ^2 value is slightly higher than the χ^2 for the unconditional growth model, the other fit statistics stayed the same or improved. Since CFI, RMSEA, and SRMR are not sensitive to sample size like χ^2 values, they are more accurate and reliable indicators of model fit (Hu & Bentler, 1999).

A second conditional growth model was then tested with GPA and SES-Community also included as covariates. However, this model resulted in slightly worse fit statistics: χ^2(237, N = 209) = 646.033, p = .000, CFI = .920, RMSEA = .091, and SRMR = .135. The fit statistics indicated that, despite the correlations previously demonstrated, including GPA and SES-Community in the model worsened the fit. Therefore, the original conditional model with only PTSD as a moderator was utilized for the final analysis (see Figure 2 for final model).
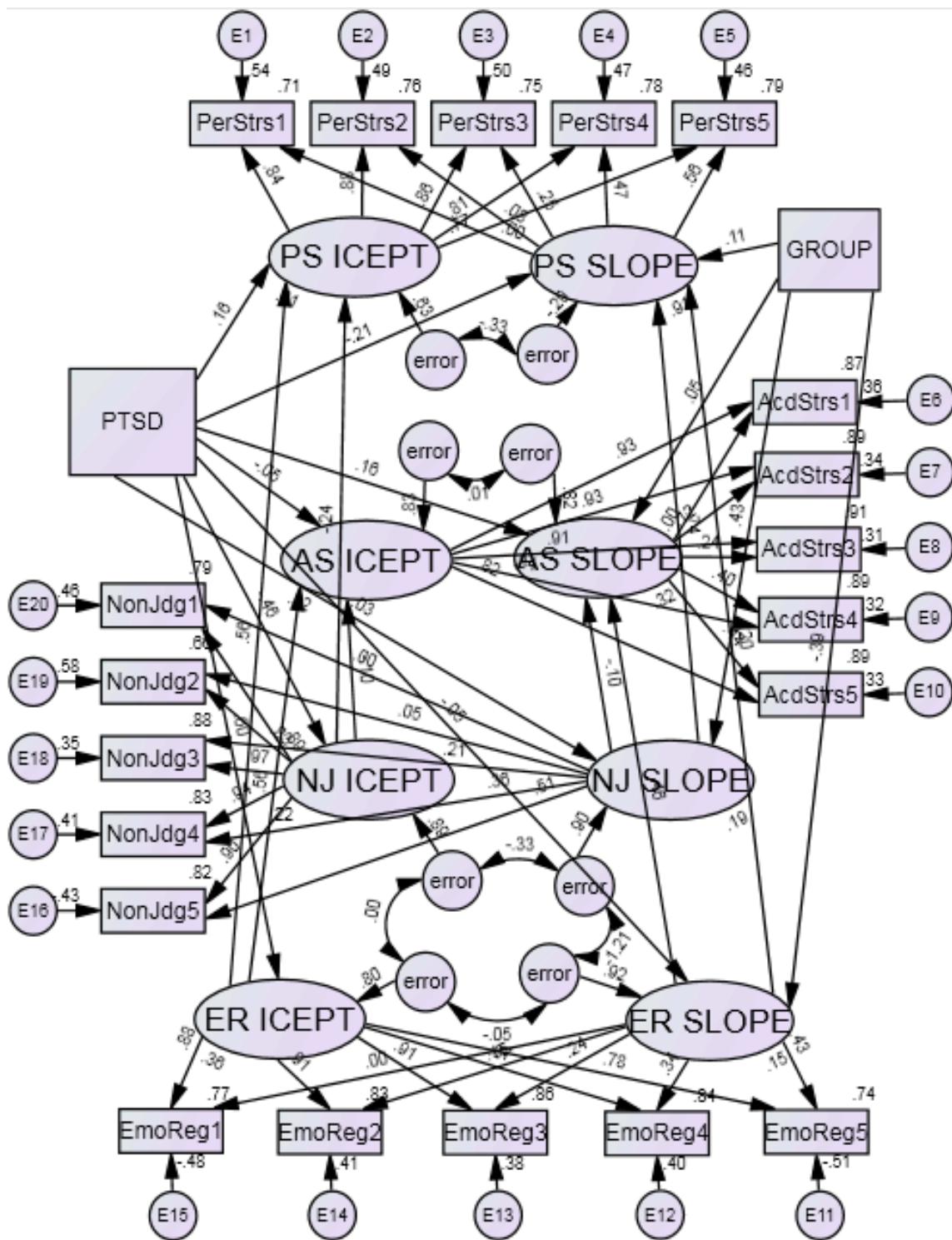
Figure 2. Conditional Growth Model for the Change in Emotional Regulation, Non-Judging, Academic Stress, and Perceived Stress Over Time.

Regression Weights and Coefficients

To assess the significance and proportion of variance accounted for of individual paths within the model, regression weights in the unconditional growth model were analyzed. The direct relationship between treatment condition and academic stress was not statistically significant. However, the relationship between treatment condition and emotion regulation was statistically significant (B = -.246, SE = .067, β = -.391, p < .001, 95% CI for B [-.422, -.101]). The significant, negative slope coefficient indicated that there were significant differences between treatment group in changes in emotion regulation. Examination of the means indicated that emotion dysregulation decreased significantly more for the mindfulness group than for the control group.

The relationship between treatment condition and non-judging was also statistically significant (B = .423, SE = .088, β = .430, p < .001, 95% CI for B [.214, .617]). The significant, positive slope coefficient indicated that there were significant differences by treatment group of increases in non-judging. Examination of the means indicated that non-judging increased significantly more for the mindfulness group than for the control group. The relationship between emotion regulation and academic stress was statistically significant (B = .1.314, SE = .510, β = .461, p = .010, 95% CI for B [-1.398, 6.189]). The significant, positive slope coefficient indicated that, as emotion dysregulation decreased, academic stress also decreased. However, the relationship between non-judging and academic stress was not statistically significant. The indirect effect of treatment condition on academic stress through emotion regulation and non-judging was not statistically significant.

Regression coefficients were then examined to determine if the intervention accounted for not only statistically significant, but also substantial changes, first in academic stress. A change is generally considered to be substantial when the independent variables account for 5% or more of the variance in the dependent variables. Treatment condition and PTSD symptomatology (exogenous variables) combined accounted for 15.5% (r^2 = .155) of the variance in emotion regulation over time (i.e., slope). Emotion regulation and non-judging (mediators) together accounted for 16.8% (r^2 = .168) of the variance in academic stress. Together, treatment condition and PTSD symptomatology (exogenous variables) and emotion regulation and non-judging accounted for 32.3% (r^2 = .323) of the variance in academic stress.

Next, the effects for perceived stress were examined. The direct relationship between treatment condition and perceived stress was not statistically significant. The relationship between emotion regulation and perceived stress was also not statistically significant. The relationship between non-judging and perceived stress was statistically significant (B = -.596, SE = .159, β = -.736, p < .001, 95% CI for B [-9.914, .228]). The significant, negative slope coefficient indicated that as non-judging increased, perceived stress decreased. The indirect effect of treatment condition on perceived stress through emotion regulation and non-judging was statistically significant (B = -.315, bootstrap SE = .317, β = -.396, p = .002, 95% CI for B [-3.517, -.128]).

Regression coefficients were then examined to determine if the intervention accounted for a statistically significant and substantial change in the mediators (emotion regulation and non-judging) and perceived stress. Together, treatment condition and PTSD symptomatology accounted for 18.6% (r^2 = .186) of the variance in non-judging

over time (i.e., the slope). Combined, emotion regulation and non-judging (mediators) accounted for 72.9% ($r^2 = .729$) of the variance in perceived stress. Together, treatment condition, PTSD symptomatology, emotion regulation, and non-judging accounted for 91.5% ($r^2 = .915$) of the variance in perceived stress (see Table 4 for all results).

Table 4. *Bootstrap Analysis of the Magnitude and Statistical Significance of the Direct and Indirect Effects*

Independent Variables	Mediator Variables	Dependent Variables	B (unstandardized)	SE[a]	β (standardized)	z	95% CI[a] (lower, upper)
Group		EmoReg slope	-.246***	.067	-.391	-3691	-.422, -.101
Group		NonJdg slope	.423***	.088	.430	4.816	.214, .617
Group		AcdStrs slope	.085	.182	.047	.468	-.541, .693
Group		PerStrs slope	.089	.078	.112	1.150	-.100, 3.909
EmoReg slope		AcdStrs slope	1.314*	.510	.461	2.578	-1.398, 6.189
EmoReg slope		PerStrs slope	.257	.256	.203	1.004	-5.193, 1.576
NonJdg slope		AcdStrs slope	-.174	.374	-.095	-.466	-2.717, 1.738
NonJdg slope		PerStrs slope	-.596***	.159	-.736	-3.749	-9.914, .228
PTSD		EmoReg slope	-.033	.077	-.048	-.425	-.234, .111
PTSD		NonJdg slope	.034	.104	.033	.331	-.249, .216
PTSD		AcdStrs slope	.305	.180	.158	1.696	-.412, .672
PTSD		PerStrs slope	-.177*	.079	-.206	-2.236	-.421, -.029
Group	EmoReg slope & NonJdg slope	AcdStrs slope	-.397	.411	-.221		-.863, .078
Group	EmoReg slope & NonJdg slope	PerStrs slope	-.315**	.317	-.396		-3.517, -.128

Note. [a]These values based on unstandardized regression coefficients.
* p < .05, ** p < .01, *** p < .001.

PTSD as a Moderator

The categorical PTSD symptomatology variable did not demonstrate significant relationships with the slopes of emotion regulation, non-judging, or academic stress. However, the categorical PTSD symptomatology variable did demonstrate a significant and substantial negative relationship with the slope of perceived stress (B = -.177, SE = .079, β = -.285, p = .025, 95% CI for B [-.421, -.029]). As predicted, PTSD symptomatology moderated the effect of the treatment on perceived stress such that those with subthreshold PTSD symptoms reported a greater decrease in perceived stress over time.

Changes at Each Time Point

Analysis of the effects of each time point on the slopes of each variable provided valuable information on the variance in changes in the variable at each time point of measurement. For emotion regulation, there were significant changes at each time point, with the greatest change at time four (after the final intervention) (see Figure 3). For non-judging, there was not a significant change at the second time point (after intervention 1), but there were significant changes at time three and four, with the greatest change at time four (after the final intervention) (see Figure 4). For academic stress, there were significant changes at each time point, with the greatest change at time four (after the final intervention) (see Figure 5). For perceived stress, there was not a significant change at the second time point (after intervention 1), but there were significant changes at time three and four, with the greatest change at time four (after the final intervention) (see Figure 6). See Table 5 for all statistical results.
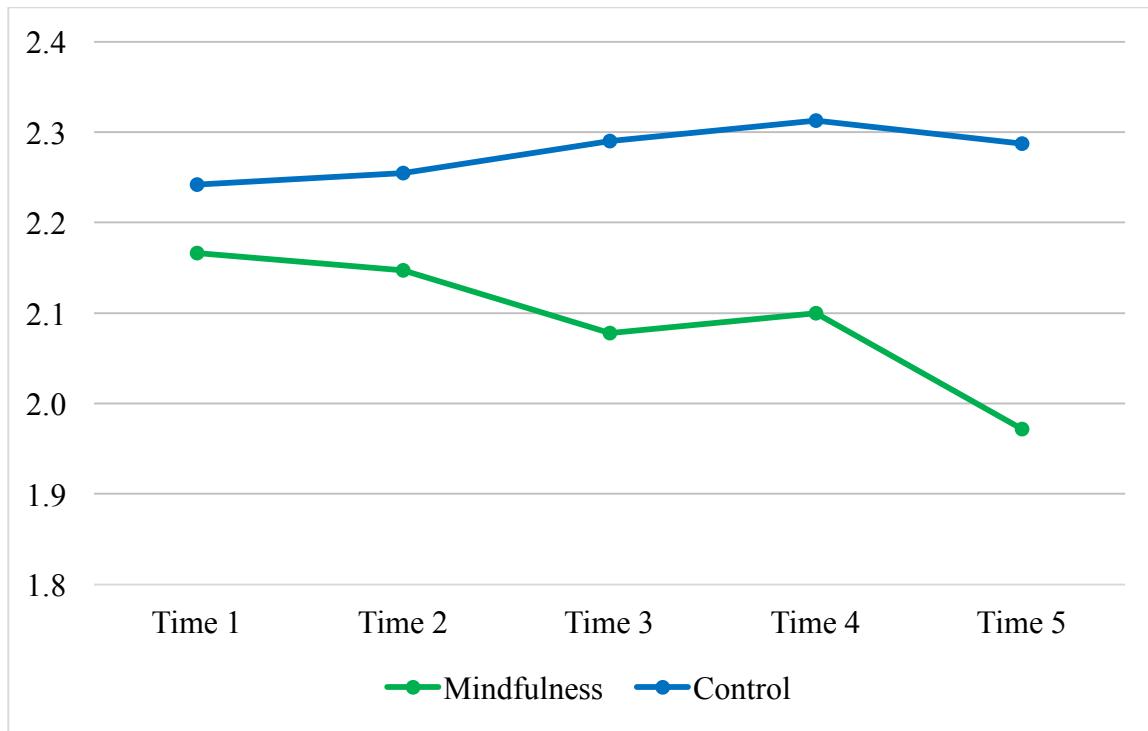
Figure 3. Changes in the Mean Scores for Emotion Dysregulation Over Time.
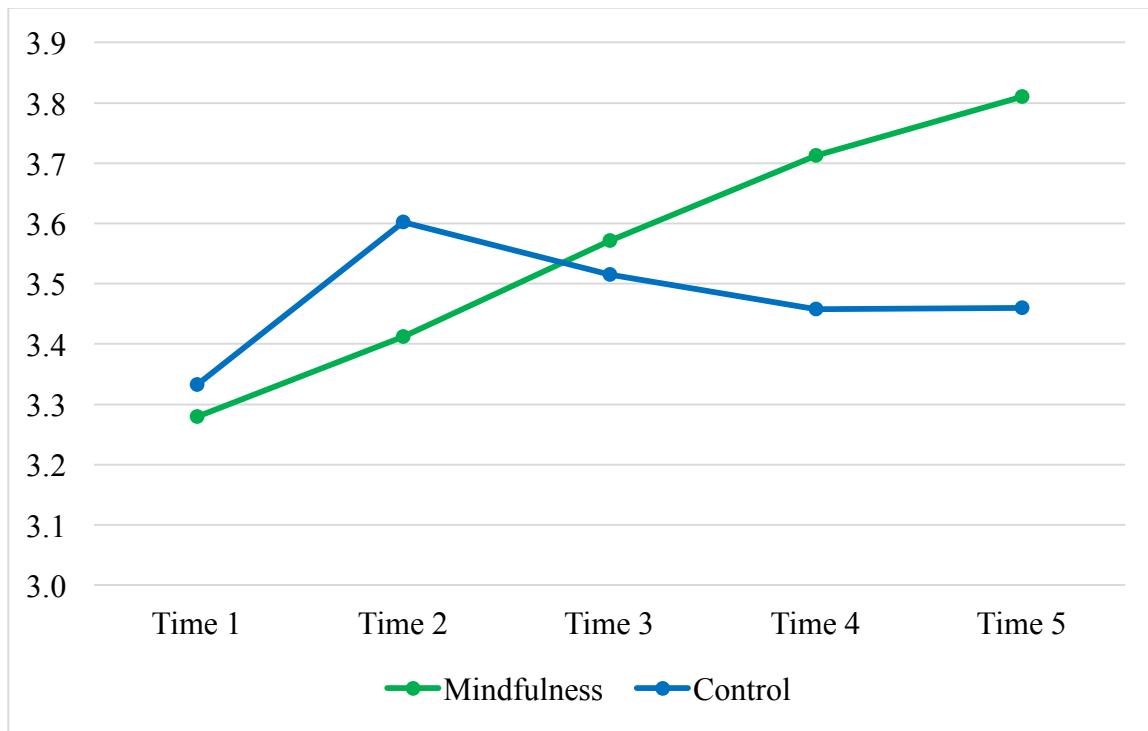
Figure 4. Changes in the Mean Scores for Non-Judging Over Time.
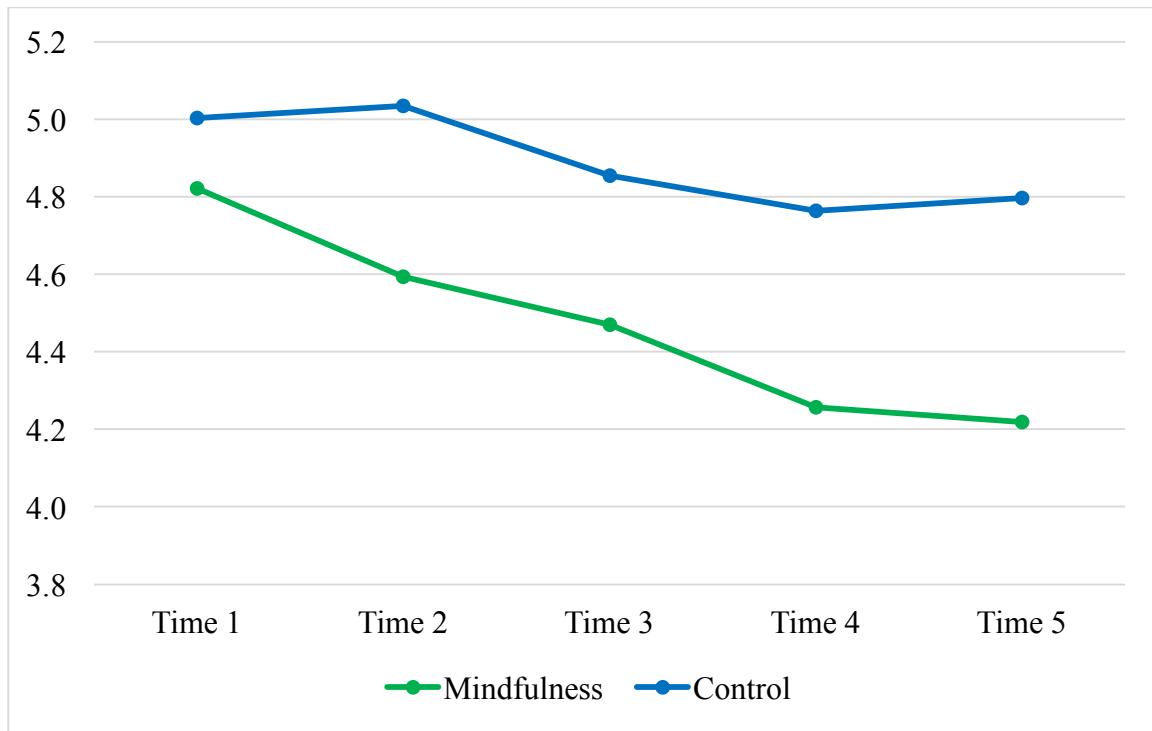
Figure 5. Changes in the Mean Scores for Academic Stress Over Time.
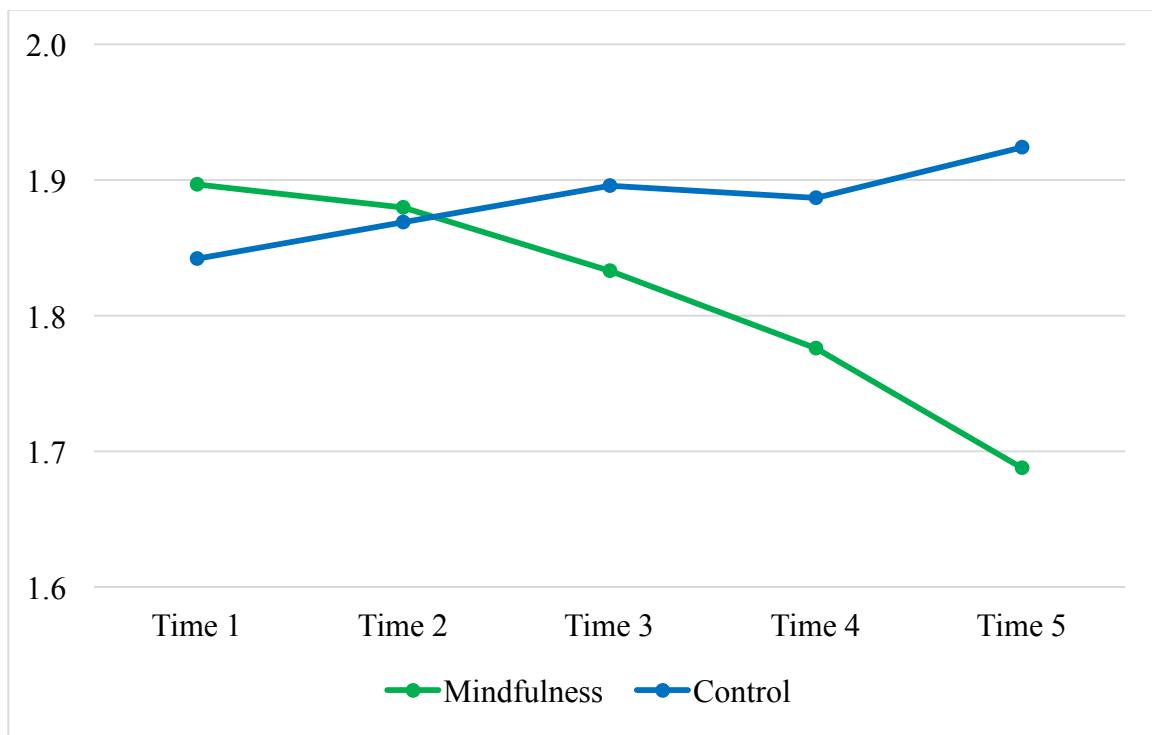
Figure 6. Changes in the Mean Scores for Perceived Stress Over Time.

Table 5. *Bootstrap Analysis of the Magnitude and Statistical Significance of the Changes in the Variables at Each Time Point*

Variables	Time Points for each Variable	*B* (unstandardized)	*SE*[a]	*β* (standardized)	*z*	95% CI[a] (lower, upper)
EmoReg slope	EmoReg time 1	.000	-	.000	.000	.000, .000
EmoReg slope	EmoReg time 2	.310***	.074	.154	4.184	.029, .871
EmoReg slope	EmoReg time 3	.479***	.072	.238	6.604	.086, 1.127
EmoReg slope	EmoReg time 4	.721***	.086	.344	8.389	.302, 1.435
EmoReg slope	EmoReg time 5	1.000	-	.426	1.000	1.000, 1.000
NonJdg slope	NonJdg time 1	.000	-	.000	.000	.000, .000
NonJdg slope	NonJdg time 2	.103	.095	.048	1.078	-.326, .405
NonJdg slope	NonJdg time 3	.383***	.057	.211	6.673	.020, .705
NonJdg slope	NonJdg time 4	.682***	.065	.363	10.461	.301, .992
NonJdg slope	NonJdg time 5	1.000	-	.509	1.000	1.000, 1.000
AcdStrs slope	AcdStrs time 1	.000	-	.000	.000	.000, .000
AcdStrs slope	AcdStrs time 2	.243***	.072	.123	3.399	.009, .413
AcdStrs slope	AcdStrs time 3	.490***	.064	.243	7.707	.298, .674
AcdStrs slope	AcdStrs time 4	.882***	.084	.403	10.469	.701, 1.098
AcdStrs slope	AcdStrs time 5	1.000	-	.444	1.000	1.000, 1.000
PerStrs slope	PerStrs time 1	.000	-	.000	.000	.000, .000
PerStrs slope	PerStrs time 2	.131	.079	.084	1.658	-.106, .506
PerStrs slope	PerStrs time 3	.400***	.076	.252	5.230	.096, .914
PerStrs slope	PerStrs time 4	.801***	.087	.475	9.206	.460, 1.113
PerStrs slope	PerStrs time 5	1.000	-	.561	1.000	1.000, 1.000

Note. [a]These values based on unstandardized regression coefficients.
*** $p < .001$.

Hypothesized Relationships

Although the model did not demonstrate a perfect fit for the data, the fit indices were close to the recommended scores, and a significant and substantial amount of variance in the dependent variables was accounted for by the model. Therefore, it was determined that there was partial support for the hypotheses. Specifically, the relationships between treatment condition and emotion regulation, and between treatment condition and non-judging, were both significant and substantial (Hypothesis 1a, main effects). The relationships between treatment condition and academic stress, and treatment condition and perceived stress, were not significant (Hypothesis 1b, main effects). The relationship between emotion regulation and academic stress was significant and substantial, but the relationship between emotion regulation and perceived stress was not significant. The relationship between non-judging and academic stress was significant and substantial, and the relationship between non-judging and perceived stress was significant (Hypothesis 1c). The indirect relationship from treatment condition to perceived stress, through emotion regulation and non-judging, was significant and substantial, but the indirect relationship from treatment condition to academic stress, through emotion regulation and non-judging, was not significant (Hypothesis 1d, mediation effects).

The hypothesis that PTSD would significantly moderate the impact of the intervention on each of the variables in the model was only partially supported, in that PTSD only moderated the effect of the intervention for perceived stress (Hypothesis 2, moderation effect). Taken together, the main study hypothesis – that a brief, mindfulness-based intervention would reduce academic and perceived stress by way of increasing

non-judging and reducing emotion dysregulation, but only for participants with

subthreshold PTSD symptomatology – was partially supported.

CHAPTER IV

DISCUSSION

The purpose of the present study was to examine whether emotion regulation and non-judgment of emotions could be enhanced in trauma-exposed college students through a short, mindfulness-based intervention; and whether increasing emotional regulation and decreasing self-judgment would reduce their perceived and academic stress. It was hypothesized that trauma-exposed students who participated in a mindfulness-based intervention would report increased emotion regulation and non-judging (Hypothesis 1a) and decreased perceived stress and academic stress (Hypothesis 1b), that higher levels of emotion regulation and non-judging would lead to significant reductions in perceived and academic stress (Hypotheses 1c), and that treatment condition would indirectly lead to decreased perceived and academic stress through increased emotion regulation and non-judging (Hypothesis 1d). It was also hypothesized that these results would only be significant for students with subthreshold PTSD symptomology (Hypothesis 2).

Although the overall model fit was not perfect, fit indices were close to the recommended cutoff scores, and a significant and substantial amount of variance in the mediators and the dependent variables was accounted for by the model. Therefore, these results suggested that there was partial support for the model and underlying hypotheses. Participants in the mindfulness group reported a significantly greater increase in emotion regulation and non-judging over the course of the intervention as compared to the control group. However, treatment did not appear to directly affect perceived stress and academic

stress over time. Participants who reported an increase in emotion regulation reported decreases in academic stress, but the results were significant at $p < .05$, not at the Bonferroni corrected $p < .006$. Changes in emotion regulation did not appear to have an impact on the level of perceived stress. Participants who reported an increase in non-judging also reported a decrease in perceived stress, but changes in non-judging did not appear to have an impact on the level of academic stress. Thus, emotion regulation appeared to be a potentially significant predictor of change in academic stress and non-judging appeared to be a significant predictor of change in perceived stress.

Although direct effects from the treatment condition on perceived and academic stress were not observed in the present study, participants in the mindfulness group did demonstrate significantly greater reductions in perceived stress over time through changes in emotion regulation and non-judging, as compared to those in the control group. However, participants in the mindfulness group did not demonstrate significantly greater reductions in academic stress over time through changes in emotion regulation and non-judging, as compared to those in the control group. PTSD seemed to moderate the observed changes in perceived stress, but these effects were only significant at $p < .05$, not at the Bonferroni corrected $p < .006$. PTSD did not moderate the observed changes in emotion regulation, non-judging, nor academic stress.

Importantly, the intervention seemed to produce the highest rates of change in each of the variables (i.e., emotion regulation, non-judging, perceived stress, and academic stress) after the third and final intervention. This suggests that the effect of the intervention may not be apparent immediately, particularly in relation to non-judging and perceived and academic stress, but that the changes may take some time to manifest. As

previously noted, the main (model) hypotheses were partially supported; below, potential reasons for the observed findings are discussed.

That the model was partially supported suggests that a short, video-based, mindfulness intervention may be effective for improving the emotion regulation and non-judging of trauma-exposed college students. Specifically, the intervention was at least somewhat effective at increasing emotion regulation and non-judging. The effect size of the impact of treatment condition and PTSD symptomatology on emotion regulation was small and the effect size of treatment condition and PTSD symptomatology on non-judging was medium, suggesting that the intervention was more effective at increasing non-judging than emotion regulation. Since non-judging is a subfacet of emotion regulation, it is possible that the shortness of the intervention made it challenging for the participants to learn and apply the larger, more complex skill of emotion regulation as compared to the smaller and less complex skill of non-judging. Additionally, since non-judging was the final skill taught in the series of intervention videos, the recency effect may have influenced how participants responded on the final follow-up survey. This may have led to a possible enhancement of the reported changes in non-judging at the expense of reported changes in emotion regulation.

Notably, changes in emotion regulation potentially predicted change in academic stress and changes in non-judging significantly predicted change in perceived stress. Thompson and Waltz (2010) found that only non-judging significantly predicted PTSD-related avoidance in trauma-exposed college students, suggesting that non-judging may be the most important facet of mindfulness in relation to decreasing avoidance. Given that decreased avoidance has been demonstrated to be related to decreased stress (Shapiro

et al., 2006), it may be that non-judging is more influential than emotion regulation for perceived stress (Wahbeh et al., 2011). It is also possible that the change in emotion regulation was too small to significantly impact perceived stress, or that the significant changes in non-judging and its subsequent impact on perceived stress overshadowed the potential effects of emotion regulation on perceived stress.

Supporting this contention, the indirect effect of the mindfulness intervention on perceived stress through changes in emotion regulation and non-judging was significant. The indirect effect of the mindfulness intervention on academic stress through changes in emotion regulation and non-judging was not significant. The effect size of the model on academic stress was medium and the effect size of the model on perceived stress was large. This aligns with the findings from Nyklíček and Kuijpers (2008) as well as Chiesa and Serretti (2009), who found that participation in mindfulness-based interventions resulted in significant decreases in perceived stress. Horowitz (2011) found that emotion dysregulation was influential in the development and maintenance of PTSD symptomatology and level of perceived stress, suggesting that being able to manage one's emotional reactions may mitigate the negative impact of increased stress sensitivity and decrease one's level of perceived stress.

Gaining a better understanding of how a short, mindfulness-based intervention can be beneficial for trauma-exposed college students provides valuable information to clinicians to better understand how to ameliorate the negative effects of trauma exposure on college students in an effective and time-efficient manner. Being able to offer a brief, conveniently delivered intervention could help increase the accessibility of treatment for trauma-exposed college students.

Although PTSD symptomatology only potentially moderated the effect of the intervention on perceived stress, the partial moderation provides valuable information to clinicians working with trauma-exposed college students. The level of PTSD symptomatology a participant experienced may have had a significant impact of the efficacy of the intervention in relation to perceived stress, underscoring the importance of assessing for PTSD symptomatology when considering potential treatment options for trauma-exposed college students. That PTSD symptomatology may moderate the change in perceived stress aligns with the current literature, which suggests that PTSD symptomatology is associated with higher levels of stress reactivity (Wessa et al., 2006). If a person is experiencing a high level of PTSD symptoms, this would likely make it more difficult to influence their level of perceived stress; indeed, seeking to reduce stress via mindfulness for individuals with high PTSD symptomology may actually exacerbate PTSD symptoms (Kuhl & Boyraz, 2017).

The model fit may have been influenced by several factors. Analysis of the change in the means over time indicated that, although there were significant changes in the predicted directions for each of the variables, the changes in the means were relatively small. The minimal amount of change over time may have negatively impacted the overall model fit. Additionally, since not all of the individual paths within the model were significant, the inclusion of non-significant paths likely decreased the overall model fit as well.

The intervention did not appear to have a significant direct effect on perceived or academic stress. It is possible that since the intervention focused on emotion regulation and non-judging, and the changes in emotion regulation and non-judging were relatively

small, they may not have been substantial enough to lead to changes in perceived and academic stress. It is also possible that since the indirect effect of the intervention on perceived stress through emotion regulation and non-judging was significant, the indirect effects may be a better fit for the data then the direct paths. Zhao, Lynch, and Chen (2010) contended that the direct effects in a model do not have to be significant for a mediation to be significant. It is possible that the mindfulness intervention is only effective for decreasing perceived and academic stress when there are significant changes in emotion regulation and non-judging.

It is also possible that the lack of moderation by categorical PTSD on academic stress may have been influenced by the relatively small changes in perceived stress in the present study. Woolman and colleagues (2015) found that trauma exposure in college students predicted elevated stress sensitivity, which then predicted elevated perceptions of academic stress. It is possible that since the change in perceived stress was relatively small, the impact of PTSD on the changes in academic stress was too small to be detected in the present study. Additionally, since the majority of the participants (68.4%, $n = 143$) were below the recommended cutoff score for PTSD, the large amount of low scores may have influenced the results. The low to non-existent levels of PTSD symptomatology in the sample may have limited the power of the moderation. O'Bryan and colleagues (2015) found that higher levels of PTSD symptomatology were related to greater emotion dysregulation. Without very many participants with high levels of PTSD symptomatology, it is possible that the conditions necessary to demonstrate a moderation effect were not present. A sample with higher rates of PTSD symptomatology may have been better able to demonstrate moderation effects.

An additional factor that may have influenced the model fit were the degrees of freedom for the model. Goodboy and Kline (2017) report that models with higher degrees of freedom tend to have worse fit indices than models with smaller degrees of freedom. In the present study, the degrees of freedom ranged from 183 to 236 for the four models tested, all of which are relatively large degrees of freedom.

Still, overall, there was at least partial support for the efficacy of a short, mindfulness-based intervention in the treatment of trauma-exposed college students. The results of the present study should inform future research and practice, and should also be considered in light of its strengths and limitations.

Strengths

The study design provided several strengths to the present study. The longitudinal and experimental study design suggests a possible cause-effect relationship, providing helpful information about the impact of the intervention on emotion-regulation, non-judging, and perceived and academic stress. As much of the extant literature on the impact of mindfulness for trauma-exposed individuals is either correlational, or experimental with small sample sizes and no control or comparison groups, this study was able to fill in several of these gaps in the literature. A power analysis performed prior to the study allowed for the intentional attainment of a strong sample size; the sample size used ($N = 209$) met the minimum recommended sample size necessary for the present study to maximize power while minimizing the probability of Type I and Type II errors. Additionally, the control group provided valuable comparisons for the outcomes. Having a control group provided additional support for the efficacy of the intervention in that the improved outcomes for the intervention group compared to the control group

suggested that the changes in emotion regulation, non-judging, perceived stress, and academic stress were above and beyond potential changes due to test-retest or maturation effects.

The statistical analysis utilized also contributed important information to the extant literature. Using latent growth curve modeling provided information about the rates of change throughout the course of the intervention, providing a unique contribution to the literature. Furthermore, having a follow-up assessment three weeks after the end of the intervention offered a unique contribution to the literature. Very few extant studies include follow-up assessments (e.g., Cavanagh et al., 2013; Docherty, 2013; Greer, 2015; Shearer et al., 2016), and those that do, tend to be several months later with few demonstrating significant results (e.g., Phang et al., 2015). Only having a three-week interlude before the follow-up assessment helped minimize attrition and demonstrate continued effectiveness over the time period assessed (6 weeks).

Much of the extant literature on mindfulness interventions for trauma-exposed individuals has been conducted with significantly traumatized populations. The present study expanded the generalizability of the current research by conducting a relatively similar mindfulness intervention on trauma-exposed college students who reported experiencing a range of potentially traumatic experiences. The sample utilized also reported experiencing a range of PTSD symptomatology, indicating that this type of intervention can be beneficial for trauma-exposed college students who may not be experiencing high levels of distress related to their past experiences of trauma.

Most of the current trauma-focused mindfulness interventions are time-intensive, and even the current short mindfulness-based interventions often require significant time

commitments (e.g., Phang et al., 2015; Shearer et al., 2016). Time-intensive interventions are often not practical, or feasible, for the majority of the adult population in the United States, particularly college students. A contributing factor to the length of the current interventions is that they often attempt to teach every aspect of mindfulness, which takes a substantial amount of time and energy. The present study sought to fill this gap in the current literature and practice by developing and examining the effectiveness of a mindfulness intervention that is short and easily accessible for busy college students. The present study also provided evidence that a mindfulness intervention that just focuses on two sub-facets of mindfulness, in this case, emotion regulation and non-judging, can be effective for reducing stress levels for trauma-exposed college students. The results of the present study corroborate the extant literature that suggests that emotion regulation and non-judging may be influential facets of mindfulness for trauma-exposed individuals. In addition to the strengths of this study, it is also important to consider the limitations.

Limitations

One of the limitations of the present study was that all participants were recruited from a single university in the southeast, which limited the generalizability of the findings. Follow-up studies with more diverse samples should be conducted to determine if the findings are generalizable. Second, the present study was relatively short, which may have limited the effectiveness of the intervention. Further, some participants ended up completing the final follow-up survey in the last one to two weeks of the quarter, which may have influenced their stress ratings. Additionally, the short period of time before the follow-up assessment limited the ability to assess the longer-term effects of the proposed intervention.

Third, the sample was not randomly selected; as such, self-selection bias may have impacted the internal validity of the present study. Prior to data analysis, the researcher considered that students who were experiencing high levels of stress may not have participated in the study due to feeling overwhelmed by their already high levels of stress or, to the contrary, that only students who were experiencing high levels of stress participated in the study, driven by the desire to earn extra credit. Generally, analysis of the final sample indicated substantial variation in almost all variables; however, as noted previously, a slight floor effect was observed for PTSD symptomology. Thus, it is indeed possible that students who were experiencing high levels of stress or, at least, PTSD symptomology, may not have participated. As this intervention was designed for trauma-exposed students, the low to non-existent levels of PTSD symptomatology in the sample may have had a negative impact on the moderation effects as well as the study as a whole. The overall results suggest, though, that although self-selection bias may have had some impact on the internal validity of the study, it does not appear to have significantly limited the variability of the scores.

Fourth, in the present study, only one self-report scale was used to measure each variable, potentially resulting in self-report bias and mono-method bias (i.e., only using one measurement technique to assess the variables). Only having one measure of each variable may have biased what was truly being measured. All three of these biases may have influenced the internal validity of the present study. Fifth, although participants were encouraged to practice the mindfulness skills throughout the week, how much they practiced could not be regulated nor fully measured. As such, the variability in practice duration may have influenced the outcomes, making it difficult to determine if the results

were influenced by the intervention, by how often participants practiced the skills during the week, or both.

Sixth, because the intervention was conducted in a group setting, there were some difficulties with participants not appearing to pay attention during the mindfulness videos (e.g., talking with other participants or texting on their phones). Participants not paying attention to the videos may have diminished the impact of the intervention. Additionally, since it was impossible to control whether or not participants completed the surveys within the requested 24 hours after the intervention, participants may have completed the survey at later times (e.g., one hour versus 24 hours, or even longer). The varied lengths of time between the interventions and when participants completed the surveys may have contributed to higher within-group variation, which may have weakened the possible effects of the intervention and further weakened the overall model fit. Seventh, it is important to note that the videos presented in the current study were either produced or modified by the researcher for the purposes of the present study, which is to say, they have not been used previously in research. It is possible that the videos themselves were not able to produce the desired intervention.

Three additional psychometric limitations also occurred. First, for three of the paths (non-judging to academic stress, treatment to academic stress through emotion regulation and non-judging, and PTSD to perceived stress), the results were significant at $p < .05$, but were not significant at the Bonferroni corrected $p < .006$. Second, a confirmatory factor analysis of the Non-Judging subscale of the FFMQ demonstrated that it did not have ideal fit indices. As such, using this subscale independent of the rest of the

FFMQ scale items may have altered its factor structure and potentially impacted the results of the present study.

Third, the Likert scale for the PSS-10 had an incorrect label for the second scale option. Instead of being labeled as "almost never," the option was labeled as "almost always." All other scale options were labeled correctly. Analysis of the mean scores of the scale revealed no significant differences between the mean scores reported in the literature (Remor, 2006; Roberti et al., 2006) and the mean scores in the present study, suggesting that the data obtained aligns with data from previous research studies. This suggests that the mislabeling of the item on the Likert scale did not significantly impact the scores obtained in this sample. Additionally, analysis of the reliability of the scale revealed no significant differences between the reliability scores reported in the literature (Remor, 2006; Roberti et al., 2006) and the reliability scores in the present study. Since Cronbach's alpha is a measure of consistency, and errors result in inconsistency, Cronbach's alpha is sensitive to errors (Tavakol & Dennick, 2011). Given that Cronbach's alpha was strong in the present study, and comparable with Cronbach's alpha values in extant literature, this suggests that there were not significant inconsistencies in the data of the present study. Inconsistency in a subsample of the participants would have resulted in inconsistency for the entire sample due to the sensitivity of Cronbach's alpha.

Supporting this, the first recommendation when an unexpectedly low Cronbach's alpha is found is to ensure that all reverse-coded items were properly addressed (Field, 2009). In the present study, to assess for problems resultant from the error, the responses utilizing the response with the error were reverse-coded; the reliability dropped significantly, suggesting that participants in the first place used that response in a way

that was consistent with the rest of the Likert-type scale (i.e., high-stress participants responded using the higher scale numbers, and low-stress participants responded using the lower scale numbers). This is likely due to the anchors being correct; it is likely that participants used the anchors as their reference points, rather than looking at each number separately. Based on this analysis of the data, in addition to the equivalence of the means and reliabilities with those in the extant literature, it was determined that the mislabeling did not reduce the integrity of the data, and that the PSS data were appropriate for use in the present study. However, future research should take into consideration these limitations, as well as the strengths of this study, when building upon the results of the present study.

Implications for Research

Given the current literature and the present study, there are several implications for future research. Addressing the limitations of the present study in future research could be beneficial for further demonstrating and expanding the internal and external validity of this study. Specifically, it may be helpful to conduct longer, more in-depth intervention sessions with practice exercises during the interventions to enhance the effects of the intervention (Carmody & Baer, 2008). Extending the length of the entire study (i.e., more intervention sessions) would likely lead to better results as well. Most of the short mindfulness interventions in the extant literature were at least four sessions in duration, and the sessions ranged from 20 to 60 minutes (e.g., Docherty, 2013; Shearer et al., 2016). Having just three sessions that were only 10 minutes each may have been too short of an intervention to demonstrate significant and substantial treatment effects; thus, future research should attend to this limitation either by extending the length or duration,

or possibly by comparing treatments of different lengths and durations. Although it is necessary to identify an effective intervention that is short and easily accessible for the college student population, such brevity must also be balanced with effectiveness.

Additionally, due to the tendency of participants to be distracted in a large group setting (the classes utilized in this study ranged from 15 to 150 students), it would likely be beneficial to conduct the study in smaller groups outside of a classroom setting. The American Group Psychotherapy Association (2007) in their practice guidelines for group psychotherapy recommend limiting therapy groups to seven to 10 members to increase the security and openness of group members. Conducting this intervention with smaller groups would likely lead to decreased distraction for the group members and increased engagement in the exercises. To increase the internal validity of the study, it would likely be beneficial to have participants complete the surveys directly after the interventions to minimize the time variability between participant responses.

Since the intervention seemed to lead to significant increases in emotion regulation and non-judging in trauma-exposed college students and significant indirect decreases in perceived and academic stress, it is possible that this intervention may be beneficial for other trauma-exposed populations as well. Future research should not only seek to further validate the helpful components of the present intervention, but also expand this study to include a more diverse sample, not only in terms of the general population that is studied, but also in terms of a more demographically diverse sample. Expanding the sample characteristics will help increase the external generalizability of this intervention.

Future studies should evaluate the effectiveness of this intervention with a more distressed population. As this study was designed for a highly distressed population, the relatively low levels of distress reported by participants may have reduced the demonstrated effect of the intervention. It is possible that with more distressed participants, the effects of the intervention may be more pronounced and substantial. Additionally, it may be beneficial to assess for moderation using continuous PTSD symptomatology rather than categorical. Future studies should also explore other variables that may influence the effectiveness of the intervention (moderators and mediators). For example, the potential impact of recent stressful events or past experience with mindfulness.

It would be beneficial for future studies to compare the mindfulness intervention to an active comparison group (e.g., teaching stress management techniques) instead of a control group. This would help provide information about the relative effectiveness of the mindfulness intervention as compared to other interventions and stress reduction strategies. It may also be helpful to explore alternative methods of teaching the skills from the intervention videos utilized in the present study, as it is possible that the interventions would be more efficacious if presented by a live person instead of through a video format.

Implications for Practice

The results of the present study suggest that a short, video-based mindfulness intervention may be effective for increasing emotion regulation and non-judging in a trauma-exposed sample, and that changes in emotion regulation and non-judging may be influential on perceived and academic stress levels. This suggests that when mental

health providers are working with trauma-exposed clients, it may be beneficial to supplement therapy with video-based mindfulness exercises. Adding video-based instructional or practice videos for mindfulness skills may help increase the client's emotion regulation and non-judging, both of which are linked with positive outcomes (Chiesa & Serretti, 2009; Nyklíček & Kuijpers, 2008; Shapiro et al., 2006; Wahbeh et al., 2011). However, the results and the limitations to the present study suggest that some changes may be needed in order to make this type of intervention more effective. It would likely be helpful to practice new mindfulness skills during sessions, rather than only asking clients to practice the skills on their own. Carmody and Baer (2008) found that having participants practice mindfulness skills was influential in the application and impact of the skills in their everyday lives, and having clients practice the new skills in the session would likely help them be better able to apply them in their everyday lives.

In addition to teaching these skills in individual therapy settings, university counseling centers could offer interventions similar to the ones utilized in the present study as a stress reduction group for college students. As participants in the present study tended to be distracted in the large group setting, the intervention would likely be more beneficial and efficacious in smaller groups outside of a classroom setting (American Group Psychotherapy Association, 2007).

Furthermore, although Carmody and Baer (2009) found that the length of mindfulness-based interventions was not significantly related to the mean effect size of the interventions, the intervention in the present study may have been too short to lead to the significant and substantial changes needed to see strong effects in the daily lives of students. Analysis of the rates of change throughout the study indicated that the greatest

effects were found after the third and final intervention. It is possible that the changes may take some time to manifest. As such, a mindfulness-based intervention this short (in terms of both the length of each intervention and in the overall duration) may not be sufficient for increasing emotion regulation and non-judging and reducing stress in trauma-exposed college students. As such, therapists should carefully consider the length and amount of engagement in trauma treatment their clients may need, as very brief treatment may not be sufficient to lead to substantial improvements in the daily lives of their clients.

When working with trauma-exposed clients, particularly college students, the results of the present study highlight the value and importance of focusing on emotion regulation and non-judging, as enhancement of these skills seemed to lead to a decrease in perceived and academic stress. Given that higher levels of perceived and academic stress are linked with negative outcomes (e.g., Anastasiades et al., 2017; Bergin & Pakenham, 2016; DeRosier et al., 2013; Edlin & Golanty, 2014; Herman, 2012; Shankar & Park, 2016), working to decrease perceived and academic stress through enhancing emotion regulation and non-judging likely will help decrease related negative outcomes as well. The results of the present study demonstrate that indirectly targeting stress through increasing emotion regulation and non-judging can be an effective approach for decreasing perceived and academic stress. Since the stressors clients experience often cannot be changed or eliminated, enhancing clients' overall emotion regulation, and especially their non-judging abilities, may alter how they perceive their stressors, which could potentially lead to decreased stress levels.

Importantly, though, this intervention strategy may not be helpful for clients experiencing high levels of PTSD symptomatology. Clients with PTSD symptomatology above the diagnostic cutoff may be able to gain important emotion regulation and non-judging skills, but the changes in these skills may not, at least at first, lead to reductions in their perceived stress. It may be necessary to work toward reducing the PTSD symptoms the client is experiencing before attempting to reduce their levels of perceived stress through emotion regulation and non-judging.

In conclusion, the present study suggests that a brief, mindfulness-based intervention can reduce academic and perceived stress by way of increasing emotion regulation and non-judging in trauma-exposed college students. The effects of the intervention on perceived stress appear to be influenced by one's level of PTSD symptomology, such that the impact on perceived stress is more effective for participants with subthreshold PTSD symptomatology than those with PTSD symptomatology above the recommended diagnostic cutoff score. As such, a brief, mindfulness-based interventions may lead to improved emotion regulation and non-judging for those with diagnosable levels of PTSD symptoms, and this may lead to reductions in their academic stress, but they will likely not experience a decrease in their perceived stress levels. The results of the present study suggest the possibility of important new options; however, for trauma-exposed college students with subthreshold PTSD symptoms.

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APPENDIX A

HUMAN SUBJECTS CONSENT FORM – MINDFULNESS

HUMAN SUBJECTS CONSENT FORM

The following is a brief summary of the project in which you are asked to participate. Please read this information before signing the statement below. You must be of legal age or must be co-signed by parent or guardian to participate in this study.

TITLE OF PROJECT: Stress Management

PURPOSE OF STUDY/PROJECT: The purpose of this study is to explore the benefits of an intervention on stress in college students. This study has been reviewed and approved by the Louisiana Tech University Institutional Review Board.

SUBJECTS: In order to participate in this study, you must be 18 years old older and a student at Louisiana Tech University. You cannot participate in this study if you have already completed it during a previous quarter. Participation in this study is completely voluntary and the decision to not participate in this study will not involve any penalty.

PROCEDURE: Participation will involve completing 5 online surveys and three 15-minute stress management sessions. You will be emailed the first survey today (will take about 15 minutes and must be completed within 24 hours). The stress managements sessions will be conducted during the last 15 minutes of this class once a week for the next three weeks. After each session you will complete a short online survey (about 10 minutes) and be asked to write about what you learned from the session. Three weeks after the final intervention, you will be emailed a final survey to complete (about 10 minutes). You will also be emailed a follow up surveys 3 months and 6 months later. The instruments you will be asked to complete will consist of questions about basic demographic information as well questions about past and current experiences. All data will be kept confidential and only primary investigators will have access to data files.

RISKS, DISCOMFORTS, ALTERNATIVE TREATMENTS: There are no foreseeable risks associated with this study, but you will be asked about experiences of stressful events, which may cause some minor discomfort. You can skip any questions that cause discomfort, and you can withdraw from the study at any time without penalty. If you experience discomfort, please contact the LA Tech counseling center at (318) 257-2488, or call the national crisis hotline at 1-800-273-8255. **The participant understands that Louisiana Tech is not able to offer financial compensation nor to absorb the costs of medical treatment should you be injured as a result of participating in this research.**

This server may collect information and your IP address indirectly and automatically via "cookies". However, this will not be used to identify you, and all identifying information will be deleted once data is collected.

BENEFITS/COMPENSATION: Some instructors may offer extra credit for participation. If extra credit is offered, an alternative extra credit that requires a similar investment of time and energy will also be offered to those students who do not choose to

volunteer for this study. Additionally, if you complete the entire first part of the study (5 surveys and 3 sessions), you can choose to enter your name into a raffle for one of 25 Amazon gift cards valued at $20 each, which will be drawn at the end of the study.

You will also benefit from learning some stress management skills. These skills have been associated with decreased distress, improved psychological well-being, and reduced stress. You also be able to gain some experience with and insight into the process of research.

CONTACT INFORMATION: The principal experimenters listed below may be reached to answer questions about the research, subjects' rights, or related matters.

	Megan Cherry	Dr. Melanie Lantz
	Louisiana Tech University	Louisiana Tech University
EMAIL:	mlk031@latech.edu	mmlantz@latech.edu
PHONE:	(808) 753-6992	(318) 257-4131

Members of the Human Use Committee of Louisiana Tech University may also be contacted if a problem cannot be discussed with the experimenters:
Dr. Richard Kordal, Director of Intellectual Properties (318) 257-2484
rkordal@latech.edu

I have read and understood the description of the study (Stress Management), and its purposes and methods. I understand that my participation in this research is strictly voluntary and my participation or refusal to participate will not affect my relationship with Louisiana Tech University or my grades in any way. Further, I understand that I may withdraw at any time or refuse to answer any questions without penalty. Upon completion of the study, I understand that the results will be freely available to me upon request. I understand that the results of my survey will be confidential, accessible only to the principal investigators, myself, or a legally appointed representative. I have not been requested to waive nor do I waive any of my rights related to participating in this study. I am over 18 years of age and a student at Louisiana Tech University.

○ Accept: Continue to survey
○ Decline: I do not wish to participate

APPENDIX B

HUMAN SUBJECTS CONSENT FORM – WAITLIST

HUMAN SUBJECTS CONSENT FORM

> **The following is a brief summary of the project in which you are asked to participate. Please read this information before signing the statement below. You must be of legal age or must be co-signed by parent or guardian to participate in this study.**

TITLE OF PROJECT: Stress Management

PURPOSE OF STUDY/PROJECT: The purpose of this study is to explore the changes in stress in college students. This study has been reviewed and approved by the Louisiana Tech University Institutional Review Board.

SUBJECTS: In order to participate in this study, you must be 18 years old older and a student at Louisiana Tech University. You cannot participate in this study if you have already completed it during a previous quarter. Participation in this study is <u>completely voluntary and the decision to not participate in this study will not involve any penalty.</u>

PROCEDURE: Participation will involve completing 5 online surveys. You will be emailed the first survey today (will take about 15 minutes and needs to be completed within 48 hours). If you meet the requirements for continuing the study, you will be sent an email with the next survey. If you do not meet the requirements, you will also be notified by email. Survey 2 will be emailed to you within a couple days (will take about 10 minutes) and you will then be emailed the next 2 surveys one week apart. Three weeks later, you will be emailed the last survey. You will also be emailed a follow up surveys 3 months and 6 months later. The instruments you will be asked to complete will consist of questions about basic demographic information as well questions about past and current experiences. All data will be kept confidential and only primary investigators will have access to data files.

RISKS, DISCOMFORTS, ALTERNATIVE TREATMENTS: There are no foreseeable risks associated with this study, but you will be asked about experiences of stressful events, which may cause some minor discomfort. You can skip any questions that cause discomfort, and you can withdraw from the study at any time without penalty. If you experience discomfort, please contact the LA Tech counseling center at (318) 257-2488, or call the national crisis hotline at 1-800-273-8255. **The participant understands that Louisiana Tech is not able to offer financial compensation nor to absorb the costs of medical treatment should you be injured as a result of participating in this research.**

This server may collect information and your IP address indirectly and automatically via "cookies". However, this will not be used to identify you, and all identifying information will be deleted once data is collected.

BENEFITS/COMPENSATION: Some instructors may offer extra credit for participation. If extra credit is offered, an alternative extra credit that requires a similar investment of time and energy will also be offered to those students who do not choose to

volunteer for this study. Additionally, if you complete the entire study first part of the study (5 surveys), you can choose to enter your name into a raffle for one of 25 Amazon gift cards valued at $20 each, which will be drawn at the end of the study.

You will also benefit from learning some stress management skills. These skills have been associated with decreased distress, improved psychological well-being, and reduced stress. You also be able to gain some experience with and insight into the process of research.

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	Megan Cherry	Dr. Melanie Lantz
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rkordal@latech.edu

I have read and understood the description of the study (Stress Management), and its purposes and methods. I understand that my participation in this research is strictly voluntary and my participation or refusal to participate will not affect my relationship with Louisiana Tech University or my grades in any way. Further, I understand that I may withdraw at any time or refuse to answer any questions without penalty. Upon completion of the study, I understand that the results will be freely available to me upon request. I understand that the results of my survey will be confidential, accessible only to the principal investigators, myself, or a legally appointed representative. I have not been requested to waive nor do I waive any of my rights related to participating in this study. I am over 18 years of age and a student at Louisiana Tech University.

○   Accept: Continue to survey
○   Decline: I do not wish to participate

APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE

1. Please create a unique identification code using the following rules (should include 3 letters & 4 numbers): _____
   - your 3 letter initials (put an X as the second letter if you do not have a middle name/initial)
   - a two-digit day and two-digit month of birthday (e.g., if birthday is April 1, put 0104).
   - e.g., MLK0104

2. Please indicate your gender
   a. Male
   b. Female
   c. Trans male/Trans man
   d. Trans female/Trans woman
   e. Gender queer/Gender non-conforming
   f. Different Identity (please state) _____

3. What sex were you assigned at birth, meaning on your original birth certificate?
   a. Male
   b. Female

4. How do you identify your race/ethnicity? Please check all that apply:
   a. Native American/Alaskan Native
   b. Asian/Asian American
   c. Biracial/Multiracial
   d. Black/African American
   e. Hispanic/Latino(a)
   f. Native Hawaiian/Pacific Islander
   g. White, non Hispanic/Latino(a)
   h. Different Identity (please state) _____

5. What is your partnership status (please indicate the item that best describes your situation)?
   a. Single, never married
   b. Single, in a committed relationship
   c. Cohabitating
   d. Married
   e. Separated or Divorced
   f. Widowed
   g. Remarried
   h. Different Status (please state) _____

6. What is your age? _____

7. How would you identify your sexual orientation?
    a. Heterosexual
    b. Bisexual
    c. Gay/Lesbian
    d. Pansexual
    e. Asexual
    f. Different Identity (please state) _____

8. With what religion do you most closely identify?
    a. Buddhism
    b. Catholicism
    c. Christianity
    d. Hinduism
    e. Islam
    f. Judaism
    g. Sikhism
    h. Other (please specify) _____
    i. None

9. Please indicate your current academic classification:
    a. Freshman
    b. Sophomore
    c. Junior
    d. Senior
    e. Master's student
    f. Doctoral student
    g. Other (please specify) _____

10. What is your current GPA? _____

11. What is your major? _____

12. Think of this ladder as representing where people stand in their communities. People define communities in different ways; please define it in whatever way is most meaningful to you. At the top of the ladder are people who have the highest standing in their community. At the bottom of the ladder are the people who have the lowest standing in their community. Where would you place yourself on this ladder? There are 10 rungs on the ladder, numbered from 1 (those with the lowest standing) to 10 (those with the highest standing); please select the number associated with the rung on the ladder which represents where you think you stand at this point in your life, relative to other people in your community.

Which rung of this ladder represents where you think you stand at this point in your life, relative to other people in your community?
a. 1 (Those with the lowest standing)
b. 2
c. 3
d. 4
e. 5
f. 6
g. 7
h. 8
i. 9
j. 10 (Those with the highest standing)

13. Think of this ladder as representing where people stand in the United States. At the top of the ladder are those who are the best off - those who have the most money, the most education, and the most respected jobs. At the bottom are people who are the worst off - who have the least money, the least education, and the least respected jobs or no job. The higher up you are on this ladder, the closer you are to the people at the very top; the lower you are, the closer you are to the people at the very bottom. Where would you place yourself on this ladder? There are 10 rungs on the ladder, numbered from 1 (those who are the worst off) to 10 (those who are the best off); please select the number associated with the rung on the ladder which represents where you think you stand at this point in your life, relative to other people in the United States.

Which rung of the ladder represents where you think you stand at this point in your life relative to other people in the United States?
a. 1 (Those who are the worst off)
b. 2
c. 3
d. 4
e. 5
f. 6
g. 7
h. 8
i. 9
j. 10 (Those who are the best off)

APPENDIX D

LIFE EVENTS CHECKLIST – 5

Life Events Checklist – 5 (Weathers, Blake, et al., 2013)

Instructions: Listed below are a number of difficult or stressful things that sometimes happen to people. For each event check one or more of the boxes to the right to indicate that: (a) it <u>happened to you</u> personally; (b) you <u>witnessed it</u> happen to someone else; (c) you <u>learned about it</u> happening to a close family member or close friend; (d) you were exposed to it as <u>part of your job</u> (for example, paramedic, police, military, or other first responder); (e) you're not sure if it fits; or (f) it <u>doesn't apply</u> to you.

Be sure to consider your <u>*entire life*</u> (growing up as well as adulthood) as you go through the list of events.

Event	Happened to me	Witnessed it	Learned about it	Part of my job	Doesn't apply
1. Natural disaster (for example, flood, hurricane, tornado, earthquake)					
2. Fire or explosion					
3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash)					
4. Serious accident at work, home, or during recreational activity					
5. Exposure to toxic substance (for example, dangerous chemicals, radiation)					
6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)					
7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)					
8. Sexual assault (rape, attempted rape, made to perform any type of sexual act through force or threat of harm)					
9. Other unwanted or uncomfortable sexual experience					
10. Combat or exposure to a war-zone (in the military or as a civilian)					
11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)					
12. Life-threatening illness or injury					
13. Severe human suffering					
14. Sudden violent death (for example, homicide, suicide)					
15. Sudden accidental death					
16. Serious injury, harm, or death you caused to someone else					
17. Any other very stressful event or experience					

APPENDIX E

PTSD CHECKLIST – 5

PTSD Checklist – 5 (Weathers, Litz, et al., 2013):

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

In the past month, how much were you bothered by:	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Repeated, disturbing, and unwanted memories of the stressful experience?	0	1	2	3	4
2. Repeated, disturbing dreams of the stressful experience?	0	1	2	3	4
3. Suddenly feeling or acting as if the stressful experience were actually happening again *(as if you were actually back there reliving it)*?	0	1	2	3	4
4. Feeling very upset when something reminded you of the stressful experience?	0	1	2	3	4
5. Having strong physical reactions when something reminded you of the stressful experience *(for example, heart pounding, trouble breathing, sweating)*?	0	1	2	3	4
6. Avoiding memories, thoughts, or feelings related to the stressful experience?	0	1	2	3	4
7. Avoiding external reminders of the stressful experience *(for example, people, places, conversations, activities, objects, or situations)*?	0	1	2	3	4
8. Trouble remembering important parts of the stressful experience?	0	1	2	3	4
9. Having strong negative beliefs about yourself, other people, or the world *(for example, having thoughts*	0	1	2	3	4

such as: I am bad, there is something seriously wrong with me, no one can be trusted, the world is completely dangerous)?					
10. Blaming yourself or someone else for the stressful experience or what happened after it?	**0**	**1**	**2**	**3**	**4**
11. Having strong negative feelings such as fear, horror, anger, guilt, or shame?	**0**	**1**	**2**	**3**	**4**
12. Loss of interest in activities that you used to enjoy?	**0**	**1**	**2**	**3**	**4**
13. Feeling distant or cut off from other people?	**0**	**1**	**2**	**3**	**4**
14. Trouble experiencing positive feelings *(for example, being unable to feel happiness or have loving feelings for people close to you)?*	**0**	**1**	**2**	**3**	**4**
15. Irritable behavior, angry outbursts, or acting aggressively?	**0**	**1**	**2**	**3**	**4**
16. Taking too many risks or doing things that could cause you harm?	**0**	**1**	**2**	**3**	**4**
17. Being "superalert" or watchful or on guard?	**0**	**1**	**2**	**3**	**4**
18. Feeling jumpy or easily startled?	**0**	**1**	**2**	**3**	**4**
19. Having difficulty concentrating?	**0**	**1**	**2**	**3**	**4**
20. Trouble falling or staying asleep?	**0**	**1**	**2**	**3**	**4**

APPENDIX F

DIFFICULTIES IN EMOTION REGULATION SCALE – 18

Difficulties in Emotion Regulation Scale – 18 (DERS-18; Victor & Klonsky, 2016):

Please indicate how often the following statements apply to you by writing the appropriate number from the scale below on the line beside each item.

1	2	3	4	5
Almost Never (0-10%)	Sometimes (11-35%)	About Half the Time (36-65%)	Most of the Time (66-90%)	Almost Always (91-100%)

1. _____ I pay attention to how I feel.

2. _____ I have no idea how I am feeling.

3. _____ I have difficulty making sense out of my feelings.

4. _____ I am attentive to my feelings.

5. _____ I am confused about how I feel.

6. _____ When I'm upset, I acknowledge my emotions.

7. _____ When I'm upset, I become embarrassed for feeling that way.

8. _____ When I'm upset, I have difficulty getting work done.

9. _____ When I'm upset, I become out of control.

10. _____ When I'm upset, I believe that I will remain that way for a long time.

11. _____ When I'm upset, I believe that I'll end up feeling very depressed.

12. _____ When I'm upset, I have difficulty focusing on other things.

13. _____ When I'm upset, I feel ashamed with myself for feeling that way.

14. _____ When I'm upset, I feel guilty for feeling that way.

15. _____ When I'm upset, I have difficulty concentrating.

16. _____ When I'm upset, I have difficulty controlling my behaviors.

17. _____ When I'm upset, I believe that wallowing in it is all I can do.

18. _____ When I'm upset, I lose control over my behaviors.

APPENDIX G

FIVE-FACET MINDFULNESS QUESTIONNAIRE

Five-Facet Mindfulness Questionnaire – Non-Judging Subscale (Baer et al., 2006):

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

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

_____ I criticize myself for having irrational or inappropriate emotions.

_____ I tell myself I shouldn't be feeling the way I'm feeling.

_____ I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

_____ I make judgments about whether my thoughts are good or bad.

_____ I tell myself that I shouldn't be thinking the way I'm thinking.

_____ I think some of my emotions are bad or inappropriate and I shouldn't feel them.

_____ When I have distressing thoughts or images, I judge myself as good or bad,

depending what the thought/image is about.

_____ I disapprove of myself when I have irrational ideas.

APPENDIX H

PERCEIVED STRESS SCALE – 10

Perceived Stress Scale – 10 (Cohen & Williamson, 1988):

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please indicate how often you felt or thought a certain way using the following scale.

0 = Never   1 = Almost Never   2 = Sometimes   3 = Fairly Often   4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly? _____
2. In the last month, how often have you felt that you were unable to control the important things in your life? _____
3. In the last month, how often have you felt nervous and "stressed"? _____
4. In the last month, how often have you felt confident about your ability to handle your personal problems? _____
5. In the last month, how often have you felt that things were going your way? _____
6. In the last month, how often have you found that you could not cope with all the things that you had to do? _____
7. In the last month, how often have you been able to control irritations in your life? _____
8. In the last month, how often have you felt that you were on top of things? _____
9. In the last month, how often have you been angered because of things that were outside of your control? _____
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them? _____

APPENDIX I

ACADEMIC SELF-EFFICACY AND STRESS SCALE

Academic Self-Efficacy and Stress Scale (ASESS; Zajacova et al., 2005):

Please answer how stressful these tasks are for you:	Not at all stressful 0	1	2	3	4	5	6	7	8	9	Extremely stressful 10
Studying											
Asking questions in class											
Keeping up with the required readings											
Understanding my professors											
Writing term papers											
My parents' expectations of my grades											
Making friends at school											
Doing well on exams											
Getting papers done on time											
Having more tests in the same week											
Taking good class notes											
Managing both school and work											
Preparing for exams											
Managing time efficiently											
Getting along with family members											
Improving my reading & writing skills											
Researching term papers											
Getting the grades I want											
Having enough money											
Talking to my professors											
Getting help and information at school											
Doing well in my toughest class											
Talking to college staff											
Finding time to study											
Understanding my textbooks											
Participating in class discussions											
Understanding college regulations											

APPENDIX J

MANIPULATION CHECK QUESTIONS

Manipulation Check Questions (only for the mindfulness group)

Included in Surveys 2, 3, and 4

Survey 2:
The video this week focused on:
   a. judging my emotions
   b. ignoring my emotions
   c. identifying my emotions

Emotions were compared to:
   a. a wave
   b. a forest
   c. a war

Survey 3:
The video this week focused on:
   a. being nonjudgmental
   b. observing the world around us
   c. how to observe things around you

The following is an example of a nonjudgmental statement:
   a. My roommate is a bad person
   b. Anger is emotion that is not good or bad.
   c. There's something wrong with me because I'm crying

Survey 4:
Letting go of painful emotions means we have to approve of the events that led to the painful emotions.
   a. True
   b. False

The video this week recommended that when I experience painful emotions, I should:
   a. do whatever aligns with my painful emotions
   b. pretend my painful emotions don't exist
   c. do the opposite of my painful emotions

APPENDIX K

INTERVENTION VIDEO LINKS

Mindfulness Intervention Videos

Week 1: Emotional awareness & clarity

- https://youtu.be/QumjNH7_tX0

Week 2: Becoming aware of thoughts & being non-judgmental

- https://youtu.be/RyYffBvABlM

Week 3: Letting go of painful emotions & engaging in goal-directed behavior

- https://youtu.be/LjMjYLrsqFU

APPENDIX L

SCRIPTS FOR INTERVENTIONS

<u>Intervention 1</u>
Thank you for your willingness to participate in this stress management activity. Today we will be engaging in a brief guided meditation. Please watch the following video and follow all instructions provided in the video. During the meditation, please focus on yourself and your own experiences and not on those around you. (*watch video*)

Thank you again for your time today. Please practice the skills you learned today throughout this week. You will be emailed a follow up survey link later today. Please complete this survey in the next 24 hours. Remember, to be entered into the raffle for the Amazon gift cards, you must complete all 3 activities and all 5 surveys. The second session will be 1 week from today.

<u>Intervention 2</u>
Thank you for your willingness to participate in this stress management activity. Today we will start with a short guided meditation and will then watch a video focusing on non-judgment. Please watch the following video and follow all instructions. During the meditation, please focus on yourself and your own experiences and not on those around you. (*watch video*)

Thank you again for your time today. Here is a handout with some recommendations for applying the skills you learned today. Please practice these skills throughout this week. You will be emailed a follow up survey link later today. Please complete this survey in the next 24 hours. Remember, to be entered into the raffle for the Amazon gift cards, you must complete all 3 activities and all 5 surveys. The third and final session will be 1 week from today.

<u>Intervention 3</u>
Thank you for your willingness to participate in this stress management activity. Today we will watch a video focusing on behavior and helpful changes we can make. Please pay attention to the following video. (*watch video*)

Thank you again for your time today. Here is a handout with some recommendations for applying the skills you learned today. Please practice these skills throughout this week. You will be emailed a follow up survey link later today. Please complete this survey in the next 24 hours. The 5th and final survey will be emailed to you 3 weeks from today. Remember, to be entered into the raffle for the Amazon gift cards, you must complete all 3 activities and all 5 surveys.

APPENDIX M

HANDOUTS FOR INTERVENTIONS

Handout for Intervention 2

<div align="center">

<u>Non-Judging</u>
Adapted from Dietz (2016)

</div>

Activity 1 – Notice Judgments
- when you are doing a mundane, everyday activity (e.g., washing dishes, getting dressed, etc.), observe and describe what is happening as you engage in the activity
- notice when your thoughts jump into making a judgment
    - don't get caught up in the judgment or in your thoughts about having made a judgment; just notice that your brain is judging
    - then allow yourself to let the judgment go
- continue paying attention in other circumstances
    - practice noticing when you are judging an observation (e.g., when you see someone you know at Walmart or your dog greets you at the door)
    - allow yourself to let the judgment go & focus on just observing & describing what is happening

Activity 2 – Observe and Describe
- practice just observing and describing in more emotionally heightened situations
    - notice judgments, but don't get caught up in them
        - e.g., notice judgments the same way you would notice tone of voice
    - see if it is easier to let go of negative reactions when you let go of judgments
- part of observing entails withholding assumptions
    - instead of assuming you know why someone did what they did, simply observe and describe the actions to the other person without judgment
        - e.g., "I notice that you're raising your voice. What's going on for you?"
    - As you do this, does the situation seem different to you? Are you seeing it in another way? Is the other way more healing for you?

Handout for Intervention 3

Letting Go
Adapted from Dietz (2016)

Pick one small thing to try, and try it in a simple situation (e.g., how you feel when the mail is late, when you lose a favorite piece of jewelry, or if you get scared watching a horror movie).

Try these:
- Observe your emotion. Stand back.
- Experience your emotion as a wave, coming and going.
- Don't push away your emotion. Accept it.
- Don't judge your emotion. It's not good or bad
- Don't hang on to your emotion.
- Try not to intensify your emotion. Let it be how it is.
- Remember that you are not your emotion.
- Remember that you don't necessarily have to act on your emotion.
- Practice loving your emotions.

Opposite to Emotion Action
Adapted from Dietz (2016)

Think through what you do when you are angry, depressed, sad, guilty, ashamed, afraid, or disappointed
- What are some opposite actions you could take when you have these emotions?
- Pick one of these emotions each day and practice doing the opposite of your natural reaction