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Dispositional Mindfulness and Perceived Stress

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Abstract

Mindfulness-based interventions (MBIs) have been shown to reduce stress. Additionally, those with higher dispositional levels of mindfulness tend to exhibit lower levels of stress. While there is a clear relationship between the cultivation of mindfulness and reduced stress levels, the particular aspects of mindfulness that are associated with stress have not been elucidated. This study investigates the relationship between dispositional mindfulness facets and perceived stress, as measured by the Five Facet Mindfulness Questionnaire (FFMQ), Mindful Attention Awareness Scale (MAAS), and the Perceived Stress Scale (PSS). Undergraduate students (n=114) completed these self-report measures. Of the five facets investigated through the FFMQ, results showed that the nonreactivity, nonjudging, and acting with awareness facets of mindfulness were significant predictors of lower levels of perceived stress while the observing and describing facets were not. These results indicate that certain aspects of mindfulness are more strongly associated with stress than others. This study illuminates the potential benefit of tailoring MBIs to their intended outcomes based on the unique dimensions of mindfulness.

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Introduction

Jon Kabat-Zinn describes mindfulness as “awareness that arises through paying attention, on purpose, in the present moment, non-judgmentally” (Kabat-Zinn, 2013). With origins in Eastern philosophy and tradition, mindfulness was brought into the Western world of psychology in the 20th century. It has since been a widely researched topic in both traditional and alternative medicines due to its versatility in treatment. Mindfulness is most widely taught in Mindfulness-Based Stress Reduction (MBSR) and Mindfulness Based Cognitive Therapy (MBCT), as well as in supplementation to various other treatments. Mindfulness has been proven to be a beneficial treatment approach for numerous psychological disorders, as well as in prevention of professional care ‘burnout’, stress reduction, pain management, and fostering overall well-being (Gotnik et al., 2015; Victorson et al., 2014; Shapiro & Carson, 2009).

Many studies have focused on the effects of mindfulness-based interventions, but less is known about the intricacies of dispositional mindfulness. Dispositional or trait mindfulness is the level of mindfulness one naturally exhibits without being the immediate result of intervention. It can be understood as a measurement over time, and represents one’s level of mindfulness across situations and contexts. This level of mindfulness is subject to less fluctuation than state mindfulness, which refers to one’s level of mindfulness in the present moment (Rau & Williams, 2015). While mindfulness is a skill developed and cultivated through practice, some psychology researchers have developed questionnaires to measure dispositional mindfulness as an individual difference variable of naturally occurring mindfulness in daily life. Two of the most empirically supported questionnaires to measure

dispositional mindfulness are the Five Factor Mindfulness Questionnaire and the Mindful Attention Awareness Scale (Baer et al., 2006; Brown et al., 2003).

The Mindfulness Questionnaire (FFMQ) is a 39-item measure that conceptualizes mindfulness as five facets: observing, describing, acting with awareness, non-judging of inner experience, and nonreactivity to inner experience (Baer et al., 2006) (See Appendix A). The Mindful Attention Awareness Scale (MAAS) is a 15-item scale that measures mindfulness through reports of attentional awareness (Brown et al., 2003) (See Appendix B). Both of the FFMQ and MAAS have been proven to be psychometrically sound, and effective in measuring mindfulness through self-report. Both of these measures are used in the current study to measure dispositional mindfulness.

Mindfulness and stress have been empirically explored in conjunction since the popularization of mindfulness in Western theory. Stress has been defined as “the extent to which persons perceive (appraise) that their demands exceed their ability to cope” (Cohen et al., 1983). Mindfulness has been utilized in approaches targeting the reduction of stress due to its aid in focusing on the present moment without judgment and unnecessary reaction, therefore decreasing rumination rooted in the past and future-oriented catastrophizing. The most commonly used approach is Mindfulness-Based Stress Reduction, which is a weekly program aimed at reducing stress using mindfulness-based strategies and practices such as body scans and meditation (Kabat-Zinn, 2013).

The Perceived Stress Scale (PSS) consists of ten items and is one of the most commonly used instruments for measuring the perception of stress (Cohen et al., 1983) (See Appendix C). The PSS is used in conjunction with the FFMQ and MAAS in this study to explore the relationship between dispositional mindfulness and perceived stress.

Stress continues to be of interest to interdisciplinary researchers due to its potentially detrimental effects on health (Cohen et al., 2007). When one perceives possibility of threat to some aspect of their external or internal self, stress is felt as the body's own personal warning system. Psychological and physiological reactions are experienced in proportion with this sense of threat, so that if the stress is high, reaction is high. However, if the possibility of threat is found to be neutral or is later reappraised, extended reaction to such stress is minimal (Kabat-Zinn, 2013). Kabat-Zinn describes a mindful alternative to the automatic stress reaction called "mindfulness-mediated stress response" (2013, p. 337) (See Appendix D). In this alternative, Kabat-Zinn describes how mindfulness is used to transition from a stressful reaction to a mindful response. This response encompasses a purposeful awareness that allows arousal (as a reaction to stress) to be reduced (Kabat-Zinn, 2013). While some automatic reaction to stress is inevitable, the mindfulness-mediated stress response aims to reduce the intensity of such reactions and prevent their escalation when they are maladaptive, i.e. when perceived threat level exceeds realistic threat. Given the direct relationship between stress level and automatic reaction, it can be proposed that those who perceive their stress to be low experience minimal or less reactions to stress. Nonreactivity toward inner experiences is one of the five facets being assessed in the FFMQ.

While recent research has shown that higher levels of dispositional and state mindfulness have been correlated with lower levels of stress, little research has been conducted to discern which particular aspects of dispositional mindfulness affect perceived stress levels, and if certain aspects can in fact predict these levels (Zimmaro et al., 2016; Bao et al., 2015). I will explore these associations throughout this thesis. My hypotheses are as follows: (1) higher levels of dispositional mindfulness results in lower levels of perceived

stress, and (2) the facet of nonreactivity is most predictive of lower levels of stress among the investigated facets in the Five Facet Mindfulness Questionnaire.

In order to test these hypotheses, participants completed an online survey that measured dispositional mindfulness through self-report measures FFMQ and MAAS, as well as the PSS. Individual scores across these measures were analyzed, and total mindfulness scores, as well as scores of five aspects of mindfulness were compared to scores of perceived stress. I predicted that the results would show an association between higher levels of dispositional mindfulness and lower levels of perceived stress. Though several different aspects of mindfulness were being investigated in this study, I also predicted that the facet of nonreactivity within the FFMQ in particular would be more strongly associated with lower levels of perceived stress than other facets. With mindfulness being of multidisciplinary interest in research and application, I anticipated the results of this study would allow for a better understanding of the conceptualization of mindfulness across fields. By investigating this conceptualization in its relation to perceived stress, researchers will be able to explore and expand upon the possibility of utilizing more effective mindfulness-based interventions in the context of facet specificity.

Literature Review

I. Mindfulness

A. Overview

Mindfulness, or nonjudgmental present moment awareness, can be traced back to early Eastern philosophy. According to an excerpt from Jon Kabat-Zinn's book *Full Catastrophe Living*, "the systematic cultivation of mindfulness has been called the heart of

Buddhist meditation” (Kabat-Zinn, 2013, pp.lxi). Over time, interest in Buddhist philosophy has grown, and westernized versions of such traditional concepts have emerged. Thought to be developed through meditation and other targeted trainings, mindfulness in the modern Western world as an intervention base was popularized after the founding of the Stress Reduction Clinic by Jon Kabat-Zinn (Rau & Williams, 2015). Kabat-Zinn’s approach to stress reduction included teachings and exercises that he learned in his own Zen Buddhism training (Rau & Williams, 2015). According to recent sources, it was Kabat-Zinn’s “secularized representation of mindfulness as an “internal resource”” that allowed mindfulness to be brought to a large multidisciplinary audience (Rau & Williams, 2015, p.33). Kabat-Zinn’s integration of Eastern practices into Western medicine provided a fresh perspective to the field, and has laid the foundation for modern research in the area of mindfulness.

Buddhist scholar and monk Nyanaponika Thera describes mindfulness as “the unfailing master key for *knowing* the mind and is thus the starting point; the perfect tool for *shaping* the mind, and is thus the focal point; and the lofty manifestation of the achieved *freedom* of the mind, and is thus the culminating point” (1970, p.9). In essence, the power of the mind is harnessed in such a way that attentional awareness is placed on each moment-to-moment experience without judgment and without automatic reaction. Mindfulness in its full capacity has also been referred to as entire fields of knowing and awareness (Kabat-Zinn, 2013). While acknowledging mindfulness as a universal and inborn capacity, researchers and scholars continue to explore, develop, and define mindfulness across various contexts. As its primary ideas and methodologies have spread across the world and over time, the Western interpretation of mindfulness has narrowed to a more decisive, yet still inherently

complex, interpretation. For the purpose of this paper and current field of investigation, mindfulness can most easily be understood within a clinical context as “[A] kind of nonelaborative, nonjudgmental, present-centered awareness in which each thought, feeling, or sensation that arises in the attentional field is acknowledged and accepted as it is” (Bishop et al., 2004).

As an inherently complex concept due to its multiple facets and cultivation methods, mindfulness lends itself to a host of related understandings and applications. Among current research, it seems that mindfulness plays a role in both physical and psychological health, acting as both a buffer to certain diseases and disorders, as well as through the use of mindfulness-based interventions to aid in the primary and supplementary treatment in a variety of physical and psychological health-related issues (Victorson et al., 2014; Arch & Craske, 2010; Khoury et al., 2014; Brown, Weinstein & Creswell, 2012). The evidence of these understandings and applications will be explored throughout this literature review, and illuminate the importance of investigating mindfulness in the entirety of its intricacies in order to improve the efficacy of mindfulness-based interventions in relation to their specificity.

B. Applications

Since its integration from Eastern thought and development in the field of Western medicine, mindfulness has been studied across disciplines. Multidisciplinary research has shown associations between mindfulness and both better psychological and physical health (Khoury et al., 2013). Mindfulness-based stress reduction (MBSR) and mindfulness-based cognitive therapy (MBCT) are two mindfulness-based interventions that are commonly used in both the primary and adjunct treatment of various psychological disorders, such as stress-

related disorders, depression, and eating disorders (Victorson et al., 2014). While MBSR was originally developed to help individuals respond more effectively to stress and MBCT was originally intended to help those with recurrent depression, both interventions utilize mindfulness as a tool to remain in the present and process life's challenges more effectively (Victorson et al., 2014). In a 2015 review of mindfulness-based interventions in healthcare, investigated studies showed that both MBSR and MBCT alleviated mental and physical symptoms in the adjunct treatment of cancer, cardiovascular disease, chronic pain, depression, anxiety disorders, and prevention in healthy adults and children (Gotink et al.). A separate systematic review of mindfulness-based therapy (MBT) that investigated over 200 studies came to the conclusion that MBT served as an effective treatment for a variety of psychological problems, especially anxiety, depression, and stress (Khoury et al., 2013). For example, a 2008 publication highlighted the use of MBSR in the adjunct treatment of cancer patients, finding that the intervention aided in relieving anxiety, stress, fatigue and general mood and sleep disturbances across 10 randomized controlled trials and observations (Ledesma & Kumano). The review also found that MBSR helped to improve psychological aspects of the patients' quality of life, in particular those with breast cancer (Ledesma & Kumano, 2008). The uses and capabilities of mindfulness-based interventions are vast, and have demonstrated efficacy across various disorders.

Other populations have been explored in relation to mindfulness-based interventions as well. MBCT has shown promise in the treatment of ADHD in adolescents and its effects on their parents (Haydicky et al., 2013). The 2013 study found that the 8-week program, as revealed through results of repeated measures ANOVA, reduced inattention, conduct problems, and peer relation problems among adolescents; parents also reported positive

results, experiencing reductions in stress and increases in mindful parenting (Haydicky et al.). The efficacy of MBSR has also been displayed in individuals suffering from pain-related disorders; a study examining the effects of MBSR on patients with rheumatoid arthritis found that the MBSR group experienced significant improvements in relation to psychological distress and overall well-being as compared to those in a 4-month maintenance program or waitlist control group (Pradhan et al., 2007). Investigations in mindfulness extend to nonclinical samples as well. For example, research suggests that trait mindfulness may moderate cortisol and affective responses to social stressors, finding that individuals with higher trait mindfulness (as measured through the Mindful Attention Awareness Scale) were shown to have lower cortisol responses to the Trier Social Stress Test, as well as lower levels of self-reported anxiety and negative affect (Brown, Weinstein & Creswell, 2012). These studies help to illuminate the variety of ways mindfulness can be used as an effective intervention base.

While mindfulness-based interventions (MBIs) have proven effective in the treatment of varying psychological and physical disorders as mentioned above, questions still remain regarding their mechanisms of change, or the underlying processes that are responsible for these behavioral, psychological, and physical changes. According to a review conducted by Chiesa, Anselmi, & Serretti, the psychological mechanisms could be attributed to the enhancement of positive emotion regulation strategies, increases in self-compassion levels, and decreases in rumination and experiential avoidance (2014). However, more investigative research has to be conducted before any assertions can be made. One of the greatest problems in mindfulness research is the difficulty to directly observe the concept and therefore

operationalize it (Eberth & Sedlmeier, 2012). There exists distinct differences in the types of investigated mindfulness, and the measures used to evaluate them.

C. Dispositional vs. State Mindfulness

It is important to acknowledge that some existing measures of mindfulness are meant to target different aspects and applications of mindfulness. For example, the Freiburg Mindfulness Inventory (FMI) was developed to measure mindfulness among meditators, while the Toronto Mindfulness Scale (TMS) measures mindfulness as a more state-based experience following practice (Bergomi, Tschacher, & Kupper, 2013). The largest conceptual distinction that can be made in mindfulness differentiates dispositional mindfulness from state mindfulness. Dispositional (or trait) mindfulness refers to mindfulness as a trait or result of cultivation through extended practice, and is measured as a habitual response (Rau & Williams, 2015). For example, the dispositional mindfulness measure of the Five Facet Mindfulness Questionnaire asks participants to respond to statements in terms of what is “generally true” for them, reflecting the level of mindfulness in their natural responses to everyday situations (Baer et al., 2006). State mindfulness is conceptualized as a direct product of immediate training or practice, and is based on the time of measurement (Rau & Williams, 2015). In measuring state mindfulness, participants would be asked to rate their level of mindfulness in that moment rather than rate how they respond across time. Dispositional mindfulness and the trait-related effects of mindfulness meditation practice can be interpreted to have stability over time, whereas state mindfulness is subject to more fluctuation. However, dispositional mindfulness can either refer to innate tendencies or be represented as a cultivated trait--as an individual difference variable it has the potential to be

higher in some individuals without practice, as well as be more easily developed through practices such as mindfulness meditation (Baer, Smith, & Allen, 2004).

Research has also operationalized dispositional mindfulness in these two different ways by utilizing both questionnaires to measure the practice (such as the FFMQ among non-meditators) and selecting specific mindfully inclined populations (i.e. experienced meditators, or individuals who have learned to meditate as part of the study) in comparison to control groups. Less is understood about dispositional mindfulness than state mindfulness because it is not as easily investigated; state mindfulness can be induced/trained and immediately measured, whereas dispositional mindfulness is a result of varying lifestyle factors over time. Dispositional or trait mindfulness has become of particular interest to recent research due to its inherent complexity and attempts to understand its mechanisms in the clinical setting. While the field is still exploring the intricacies of dispositional mindfulness and its impact on health, it has been shown that dispositional mindfulness can serve as a protective characteristic which will be further explored in the section on mindfulness and stress (Atanes et al., 2015; Brown & Ryan, 2003).

D. Measures of Mindfulness

1. Overview

As interest in mindfulness in empirical investigation has continued to grow, various methods to measure mindfulness have developed. A 2013 overview of current self-report measures describes the eight available and validated mindfulness scales used by researchers: The Five Facet Mindfulness Questionnaire (FFMQ), The Mindfulness Attention Awareness Scale (MAAS), The Cognitive and Affective Mindfulness Scale (CAMS), The Southampton Mindfulness Questionnaire (SMQ), The Freiburg Mindfulness Inventory (FMI), The Toronto

Mindfulness Scale (TMS), The Philadelphia Mindfulness Scale (PHLMS), and the Kentucky Inventory of Mindfulness Scale (KIMS) (Bergomi, Tschacher, & Kupper). The review theoretically derives nine main aspects of mindfulness as measured through the scales as a whole: (1) observing, attending to experiences; (2) acting with awareness; (3) non-judgment, acceptance of experiences; (4) self-acceptance; (5) willingness and readiness to expose oneself to experiences, non-avoidance; (6) nonreactivity to experience; (7) non-identification with own experiences; (8) insightful understanding; and (9) labeling, describing (Bergomi, Tschacher, & Kupper, 2013). Whereas some of the aforementioned mindfulness scales were designed to measure state mindfulness or mindfulness among specific populations, the Five Facet Mindfulness Questionnaire (FFMQ) and Mindfulness Attention Awareness Scale (MAAS) were designed to measure dispositional, or trait mindfulness among populations with and without meditation experience (Baer et al., 2006; Brown & Ryan, 2003). All of these self-report measures have aided in the creation and contributed to the use of the dispositional mindfulness measures in this study.

1.a. FFMQ

The FFMQ was developed in 2006 through examination of psychometric characteristics of available mindfulness questionnaires, such as the MAAS, FMI, KIMS, CAMS, and the SMQ (Baer et al.) (See Appendix A). Through exploratory factor analysis of a combined 112 items from existing measures, the following facet structure of the mindfulness construct was created: nonreactivity to inner experience, observing/noticing/attending to sensations/perceptions/thoughts/feelings, acting with awareness/automatic pilot/concentration/no distraction, describing/labeling with words, and nonjudging of experience (Baer et al., 2006). These facets can be more concisely categorized

as: nonreactivity, observing, acting with awareness, describing, and nonjudging. These five facets are the primary aspects of mindfulness investigated in this study and will be more thoroughly discussed in the methods section.

The FFMQ is a 39-item scale that measures the aforementioned five facets on a 5-point Likert-type scale. Participants rate responses from “never or rarely true” to “very often or always true” across statements pertaining to the five facets. For example, a statement representing the nonreactivity facet reads, “When I have distressing thoughts or images, I “step back” and am aware of the thought or image without getting taken over by it.” A higher response indicates a higher level of mindfulness in respect to this particular facet. The FFMQ has proven to be a psychometrically sound measure of multiple aspects of mindfulness across varying populations, including meditators and non-meditators alike (Baer et al., 2008).

1.b. MAAS

The MAAS is a 15-item instrument that measures the tendency to be attentive to and aware of present-moment experience in daily life using a 6-point Likert-type scale (Brown & Ryan, 2003) (See Appendix B). Responders rate their agreement with an item in responses ranging from “almost always” to “almost never”. For example, one of the items reads, “I tend to walk quickly to get where I’m going without paying attention to what I experience along the way”. Unlike the FFMQ, the MAAS measures mindfulness in terms of a single dimension related to attention.

The MAAS has been found to be significantly positively correlated with openness to experience, emotional intelligence and well-being, as well as being negatively correlated with rumination and social anxiety (Baer, 2008). The MAAS differs from the FFMQ in its general emphasis on awareness and attention as a combinatorial role in mindfulness, though

both are the most commonly used self-report measures of mindfulness in empirical research (Bergomi, Tschacher, & Kupper, 2013). In fact, the MAAS is suggested to be the “most widely used unidimensional measure of mindfulness” (Rau & Williams, 2015). By using both the FFMQ and MAAS in this study, we were able to investigate the construct of mindfulness in relation to stress more thoroughly.

II. Stress

A. Overview & Health Implications

Psychological stress occurs when an individual perceives that environmental demands tax or exceed his or her adaptive capacity (Cohen, Janicki-Deverts, & Miller, 2007).

Psychological distress often co-occurs with physical distress, which can be defined as any disruption to the optimal homeostasis of an organism--however the two can be mutually exclusive (Dow, 2014). Not only can excess and repeated psychological stress contribute to a host of negative psychological and short-term physical symptoms (i.e. emotional and physical states similar to depression and anxiety), but studies have also shown chronic and excess stress to have detrimental and sustained physical effects on the body (Cohen, Janicki-Deverts, & Miller, 2007). These short and long-term effects include susceptibility to diseases such as depression, cardiovascular disease, and HIV/AIDS, as well as resistance against autoimmune diseases, upper respiratory tract infections, and wound healing (Kiecolt-Glaser et al., 2002; Rozanski et al., 1999; Cohen, Janicki-Deverts, & Miller, 2007). Recent data suggest that stress-related health risks are higher among women, younger adults, those of lower socioeconomic status, and men who are faced with the possibility of loss of income/wealth (Cohen & Janicki-Deverts, 2012). While acute stress does not automatically

result in these detrimental effects, prolonged exposure to or excess of can have nonadaptive biological and behavioral effects on the body—these effects are often seen in maladaptive coping behaviors, such as alcohol use, poor diet, smoking, and lack of exercise, all of which can contribute to more serious diseases and disorders (Cohen et al., 2007). Not only are the physical and psychological effects of stress staggering, but the fiscal implications of stress-related diseases are astonishing. The leading cause of death in 2015 was cardiovascular disease (CVD), with a reported 614,348 deaths in the United States (CDC, 2016). Studies have shown that the aforementioned maladaptive coping behaviors are strongly related to the onset and exacerbation of CVD, further suggesting that stress can play a large role in alarming narrative of this disease (Yusuf, 2004). It just so happens that CVD is also one of the most costly diseases in the United States, with a reported \$193.4 billion being spent in 2010 on direct medical expenses related to the disease (Go et al., 2014). Excess stress is an undeniable concern for various parties, and remains of current interest to researchers to explore symptomatically and cost effective ways to reduce stress.

B. Perceived Stress Scale (PSS)

The Perceived Stress Scale was designed in 1983 to measure stress, and in particular “the degree to which situations in one’s life are appraised as stressful” (Cohen, Kamarch, & Mermeistein, p. 385) (See Appendix C). While the original Perceived Stress Scale consisted of 14 items, both a 4-item and 10-item version of the scale have also been validated (Cohen & Williamson, 1988). The 10-item version of the scale has been shown to have internal consistency reliability, as well as greater psychometric quality than the original 14-item version of the scale (Lee, 2012; Cohen & Williamson, 1988).

Respondents rate how often they have felt a certain way during the past month on a five point Likert-type scale ranging from 0 (never) to 4 (very often) in the measure. For example, an item on the PSS reads, “In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?” A higher score on the PSS indicates a higher level of perceived stress. By examining the levels of perceived stress through measures such as the PSS among varying populations, one can better predict the possible physical and psychological implications of such stress.

III. Mindfulness and Stress

Extensive research has been conducted on the relationship between mindfulness, stress, and overall well-being. A recent study assessed responses from both individuals with clinically fear-based anxiety disorders and non-anxious controls in hyperventilation and meditative relaxation tasks. The study examined the relationship of trait mindfulness to anxiety-related task responding and found that among healthy, non-anxious individuals, trait mindfulness (as assessed by the MAAS) was significantly inversely related to anxiety responses across tasks (Arch & Craske, 2010). These results indicate that trait mindfulness may act as a buffer against such responses. In a separate correlational study, 590 participants who worked in community-oriented primary care facilities completed the MAAS, PSS, and Subjective Well-being Scale (SWS) (Atanes et al., 2015). According to the article, “trait mindfulness has proved to be a protective characteristic, showing negative correlations with stress and positive correlations with well-being” (Atanes et al., 2015, p. 2; Brown & Ryan, 2003). While the results of this article indicated higher levels of both the PSS and MAAS in participants based on the nature of the population’s profession, higher MAAS scores were positively correlated to satisfaction of life and positive affect scores (Atanes et al, 2015).

Cumulative research reflects similar findings across groups in terms of the effects of mindfulness. In a meta-analysis of mindfulness-based RCTs, mindfulness-based interventions (MBIs) were found to provide short-term benefits across a wide range of lifestyle medicine-relevant populations and study outcomes (Victorson et al., 2014). Some examples of the MBIs studied included Mindfulness-Based Cognitive Therapy, Mindfulness-Based Stress Reduction, and meditation interventions. A number of the beneficial effects of MBIs in the 184 articles investigated included improved management of symptom burden and changes related to health behaviors (i.e. smoking, drinking, and eating behaviors) (Victorson et al., 2014). While these effects were short-term, it can be supposed that the nature of the interventions may play a role. The positive buffering effects of mindfulness are most commonly observed in relation to dispositional mindfulness, which can take a great deal of time to develop and require maintained practice if not more so inherent based on previous learning and continued lifestyle.

The potentially adverse effects of stress on both psychological and physical health highlight the importance of mindfulness in current and future research. Mindfulness has displayed significant improvements in overall health related to stress-based factors (Kabat-Zinn, 2013). These positive results related to health are seen in mindfulness as both an intervention base, and in the potential role of dispositional mindfulness to act as a buffer against adverse stress-related responses (Victorson et al., 2014; Arch & Craske, 2010).

Given the many benefits of mindfulness, it is important to acknowledge existing methods aimed to increase mindfulness as well. Mindfulness applications are generalizable across groups, with various mindfulness interventions having proven to increase levels of mindfulness among diverse populations (Eberth & Sedlmeier, 2012; Gotink et al., 2015;

Goyal et al., 2014). MBSR and MBCT have yielded significant results in the increase of mindfulness among individuals including, but not limited to those with anxiety and depressive disorders, populations with pain-related ailments, and cancer patients (Gotink et al., 2015; Khoury et al., 2014). In addition, mindfulness-based interventions have increased mindfulness among nonclinical samples, such as randomized samples from the undergraduate populations across a host of universities (Vinci et al., 2016; Canby et al., 2015). The effects of implementing mindfulness continues to be of interest due to its applicability across diverse populations.

Evidence of the continued use of the FFMQ, MAAS, and PSS in conjunction can be seen across many recent studies as well. According to a 2015 study of the effects of brief mindfulness intervention on romantic partners' physiological responses to conflict stress, partners with high FFMQ scores showed better stress regulation in the mindfulness condition vs. those with low FFMQ scores (Laurent et al.). A separate study conducted in 2016 found that higher levels of dispositional mindfulness (measured by the MAAS) were related to lower perceived stress (measured by the PSS), lower levels of cortisol, and higher levels overall psychological well-being among undergraduate students (Zimmarro et al.). A 2015 article yielded similar main results; 380 adults created the non-clinical population in this study, and the measures used included the MAAS, PSS, and Wong Law Emotional Intelligence Scale (WLEIS). Main findings consisted of the following: (1) mindfulness was associated with lower perceived stress, (2) mindfulness was associated with emotional intelligence, and (3) use and regulation of emotion mediated the mindfulness-perceived stress relationship (Bao et al., 2015). All of the aforementioned studies support the use of the FFMQ, MAAS, and PSS in empirical research. Given most recent findings, it is clear that

there is an identifiable relationship between mindfulness and health. However, the particular mechanisms behind the benefits of mindfulness still require further research.

It is apparent that both mindfulness-based interventions and dispositional mindfulness can greatly affect health in a variety of ways, but the intensity of results has not always been consistent. A 2014 meta-analysis of 47 trials and a total of 3515 participants investigated the efficacy of meditation (a mindfulness-based intervention) on a variety of health-related outcomes. While interventions were shown to improve anxiety, depression, and pain, less evidence was found for improvement of stress/distress and quality of life in terms of mental health. No effects were found in terms of positive mood, attention, sleep, or eating habits (Goyal et al., 2014). This falls in contrast to other existing evidence of the utility of MBIs. For example, in relation to eating habits, a separate 2014 publication comprised of 4 studies found a positive relation between mindfulness and healthier eating--the studies included both the effects of trait mindfulness and state-induced mindfulness (Jordan et al., 2014). Incongruous results such as these indicate that there exists discrepancy among effects, but a question remains as to why. It is possible that different interventions may target different aspects of mindfulness, thus yielding different results, but a better understanding of the individual aspects and their utilities is necessary in order to accurately assess the subject.

Knowing the adverse effects of stress, mindfulness is illuminated as an important concept in the fields of psychology and medicine. Given its ability to reduce perceived and objective measures of stress and knowing how to effectively increase mindfulness across a host of populations, one can consider that stress and therefore its adverse effects can be improved through mindfulness-based interventions and practices across a variety of populations. While research has laid a solid foundation for the link between mindfulness and

stress, the particular aspects of mindfulness involved are not yet clear. Current research attempts to explore the facets more distinctly, yet overarching conclusions cannot yet be made (Bodenlos et al., 2015). It is essential to continue this area of research in order to better understand these particular facets, and how they may be used to target stress more effectively.

IV. Recent Advances and Existing Questions

Research has just begun to explore such mechanisms through the facets outlined in current self-report measures. While the particulars of the multiple facets of mindfulness are still being investigated, it is important to acknowledge the research that has attempted to study these individual facets thus far. A 2012 publication containing three separate studies related to cognitive skills found that the observing facet, as measured by the FFMQ, was significantly correlated with performance on visual working memory and temporal order tasks (Anicha et. al, 2012). In the same publication, it was found that the nonreactivity, but not the observing, facet was strongly correlated with cognitive control flexibility (Anicha et. al, 2012). This further suggests that the different aspects of mindfulness influence performance in different ways. In the context of a stress induction task, research has shown that the nonreactivity facet was negatively correlated with rumination and negative bias among male participants, further asserting that the nonreactivity facet in particular can buffer the risk for depression (Paul et al., 2013). A separate study conducted in 2013 found similar results, in that the nonreactivity and nonjudging facets were inversely correlated with general distress, with describing being inversely associated with anxious arousal. Interestingly, observing was positively associated with anxious arousal (Desrosiers, Kiemanski, & Nolen-

Hoksema, 2013). The results of this study further highlight the discrepancies between facets, and support the notion that they are not created equal in their associations.

In one of the first studies to explore the facets of mindfulness as individual predictors of psychological well-being and the reduction of psychological symptomology, it was found that nonjudging of inner experience and acting with awareness yielded the most significant results (Cash & Whittingham, 2010). Using the Depression, Anxiety, and Stress Scale (DASS) in conjunction with the FFMQ, higher scores on the nonjudge subscale predicted lower levels of depression, anxiety, and stress-related symptoms, while higher scores on the acting with awareness subscale predicted lower symptomology of depression in a nonclinical sample (Cash & Whittingham, 2010). The results of both of these facets fell in accordance with previous research that found that these two facets had the highest correlations with psychological symptoms such as thought suppression, emotion regulation, and experiential avoidance in comparison to the other facets (Cash & Whittingham, 2010; Baer et al., 2006). Interestingly, none of the facets were significant predictors of psychological well-being in this study, which falls in contrast with more current research (Cash & Whittingham, 2010; Zimmaro et al., 2016).

A 2015 study was one of the more recent studies to examine the facets on subscales. This study assessed the relationship between mindfulness and health behaviors among 310 undergraduate students via self-report through hierarchal multiple regression analyses (Bodenlos et al., 2015). Results showed that the observing facet of mindfulness was negatively associated with physical health, while both acting with awareness and nonjudging facets were positively associated with emotional well-being, similar to the results from Cash & Whittingham (Bodenlos et al., 2015). A separate 2015 study investigated the five facets of

mindfulness in relation to psychological symptoms, as measured by depressive symptoms, stress, anxiety symptoms, and alcohol-related problems in an attempt to support a psychological model of the mechanisms of mindfulness (Brown et al.). Acting with awareness was shown to have direct associations with all of the psychological health outcomes, while the describing facets had no direct associations with any of the psychological health outcomes. Similar to the findings in the Bodenlos et al. study, the observe facet was not associated with positive health outcomes, being associated with higher levels of stress (Brown et al., 2015). These studies serve as an example of the existence of variations between facets, and the implications of some aspects of mindfulness versus others.

In a study examining weekly change in self-reported mindfulness and perceived stress over the course of an 8-week MBSR program, significant increases in mindfulness and decreases in perceived stress, as well as significant changes in mindfulness skills preceding significant changes in stress were found. This study also showed that the observing, acting with awareness, and nonreactivity facets of mindfulness as measured by the FFMQ showed significant changes by week 2 of the program, with the largest magnitude of change being for the nonreactivity subscale (Baer, Carmody, & Hunsinger, 2012). Significant changes early in the program may indicate that some aspects of mindfulness are more easily experienced in initial trainings, while others may require further training to cultivate (Baer, Carmody, & Hunsinger, 2012). While these studies provide great preliminary insight to the particulars of the facets of mindfulness, it is important to conduct further research to better understand the mechanisms of these facets and how they relate to varying health-related issues. Though mindfulness is often studied and spoken about as a whole, the aforementioned studies suggest that the individual facets can play distinct roles in physical and psychological functioning. In

exploring the five facets of the mindfulness through the FFMQ—observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experience—and attentional awareness as measured by the MAAS in relation to perceived stress, mindfulness-based interventions could be improved in their specificity of targets based on relevant conditions.

Methods

Participants

Participants were students at the University of Nevada, Reno. A total of 114 participants were recruited through the UNR SONA system as well as classroom announcements. Data were initially collected from 137 questionnaire responses. Since the survey was administered in two different experiments related to attention, 23 individuals participated in both studies, completing both the endogenous and exogenous attention task. The duplicate survey responses were not included in the final data set in order to control for double responses. This yielded a final n of 114 participants (Table 1).

Participants received online SONA credit for their participation and were entered in a lottery drawing to win a \$15 Walmart gift card. Participant ages ranged from 19-44 years old (mean=22.3, SD=4.17). Participant ethnicities were recorded, with the largest group of participants reporting to be White/Caucasian (51.75%). The study sample also included individuals reporting to be of Hispanic (21.93%), Mixed or Other (9.65%), Asian (8.77%), African American (4.39%), Native American (1.75%), and Pacific Islander (1.75%) descent. Ethnicity and gender frequencies can be viewed in Table 1. The population sample consisted of 23.68% males ($n=27$) and 76.32% females ($n=87$).

Measures

The Five Facet Mindfulness Questionnaire (FFMQ) was used to measure dispositional mindfulness. The questionnaire measures dispositional mindfulness across five distinct facets: observing, describing, acting with awareness, non-judging of experience, and nonreactivity to inner experience. The FFMQ has been proven psychometrically sound across studies, with internal consistencies among subscales, construct and predictive validity, and confirmative factor analyses (Baer et al., 2006; 2008; Bruin, 2012). The FFMQ consists of 39 total statements, and asks participants to rate each statement based on a 5-point Likert scale based on their “own opinion and what is generally true for [them]” (Baer et al., 2006) (See Appendix A). Responses range from 1, representing “never or very rarely true”, to 5, representing “very often or always true” (Baer et al., 2006). The observe facet measures one’s tendency to notice internal and external experiences, such as thoughts, feelings, and sensations. An example of an observe statement reads, “When I’m walking, I deliberately notice the sensations of my body moving”. The describe facet measures one’s self-reported ability to ascribe words to noticed experiences. For example, a describe item reads, “I’m good at finding words to describe my feelings”. Nineteen items are reverse scored in the questionnaire. For example, an act with awareness item reads, “When I do things, my mind wanders off and I’m easily distracted”, and is reverse scored. The act with awareness facet measures how often individuals fully attend to their current experiences. The nonjudge facet refers to being able to acknowledge thoughts and feelings without judgment. Nonjudge items are also reversed scored, with statements like “I criticize myself for having irrational or inappropriate emotions”. Lastly, the nonreactivity facet is meant to measure the tendency for an individual to allow thoughts and emotions to come and go, without being swept away by

inner experiences. An example of a nonreactivity item reads, “I perceive my feelings and emotions without having to react to them”. Facet scores are added individually and then added to yield an overall FFMQ, with total FFMQ scores ranging from 39 to 195. Higher scores across the scale indicate a higher level of dispositional mindfulness.

The Mindful Attention Awareness Scale (MAAS) was also used to measure dispositional mindfulness. In this measure, participants were instructed to indicate “how frequently or infrequently [they] currently have each experience” and to “please indicate what really reflects [their] experience rather than what [they] think each experience should be” (Brown & Ryan, 2003) (See Appendix B). Participants then responded to statements such as “I find myself preoccupied with the future or the past” based on a 6-point Likert scale, with 1 representing “almost always”, and 6 representing “almost never”. Possible scores range from 15 to 90. Item measures are added to achieve final scores, with higher scores indicating higher levels of mindfulness.

The Perceived Stress Scale (PSS) consists of 10 items and was used to measure perceived stress. Participants were instructed that the questions would ask them about their “feelings and thoughts during the last month”, and to “indicate [their] response by selecting the correct response option representing how often [they] felt or thought a certain way” (Cohen et al., 1983) (See Appendix C). Responses follow a 5-point Likert scale, with 0 representing “never”, and 4 representing “very often”. Scores across the 10 items are added to yield the total PSS score. Higher scores indicate higher levels of perceived stress, with a possible range of 0 to 40.

Procedure

This study used mindfulness self-report measures FFMQ and MAAS, as well the PSS to test the hypothesis that higher levels of dispositional mindfulness would result in lower levels of perceived stress, and the facet of nonreactivity would be most predictive of lower levels of stress among the investigated facets.

Data were collected in person on a computer through Qualtrics online survey software. The online survey contained questions from the FFMQ, MAAS, PSS, as well as basic demographic questions related to ethnicity, gender, and age. Informed consent was obtained, and then the Qualtrics survey was administered and completed before participants partook in one of the two attention tasks. These measures were part of a larger study that investigated the relationship between dispositional levels of mindfulness, perceived stress levels, and performance on endogenous and exogenous attention tasks.

Each session ran about 60 minutes in total, and participants received extra credit to apply to their class via the SONA system. Participants were also incentivized with a lottery drawing for a \$15 Walmart gift card. The responses to the online questionnaires were exported from Qualtrics and analyzed through R statistical software. Multiple regression analysis was conducted to analyze correlations across individual scores. Individuals had scores for the following categories: overall FFMQ score, individual scores for each facet outlined in the FFMQ (observing, describing, acting with awareness, non-judging of inner experience, and nonreactivity), MAAS score, and PSS score. The data were analyzed to investigate whether higher FFMQ facets and MAAS scores would be correlated with lower PSS scores, and if any of the five facets of the FFMQ or mindful attention (as measured through the MAAS) would be more closely associated with a lower PSS score. Mean scores were also obtained for each measure.

Results

Preliminary Analysis

Several of the FFMQ facets showed non-significant or negative correlations among one another. There was a correlation of -0.19 between nonjudge and observe, -0.03 between nonreactivity and acting with awareness, -0.05 between act with awareness and observing, and -0.07 between nonjudge and nonreactivity. A linear functional form was demonstrated by the fitted normal curve on the histogram and the Q-Q plot (Figure 1 & Figure 2). Moderate inverse correlations were found between the measures of dispositional mindfulness and the PSS (Table 2).

The means and standard deviations for the three self-report measures used in this study are presented in Table 3. The mean scores of the FFMQ facets and FFMQ total are consistent with previous assessments of mindfulness via the FFMQ in student populations, falling within 1 standard deviation of previously reported scores (Bruin et al., 2012). MAAS totals yielded similar results to previous findings, averaging around 58 compared to a previously reported average of around 56 for an undergraduate student population (Brown & Ryan, 2003). Average PSS scores were slightly higher than previously reported averages. Participants averaged a PSS score of 18.59 compared to a previously reported average of 16.78 for individuals under the age of 25 (Cohen et al., 2012).

Multiple Regression Analysis

To check the zero mean residuals, the residuals versus the fitted values plot was observed. The errors appear to have a constant variance, with the residuals scattered randomly around zero. The normality of residuals can also be observed in the QQ-Plot and

the histogram distribution (Figures 1 & 2). FFMQ Nonreact ($p = 0.27$), FFMQ Act Awareness ($p = 0.53$), FFMQ Nonjudge ($p = 0.09$), FFMQ Observe ($p = 0.51$), FFMQ total ($p = 0.32$), MAAS total ($p = 0.15$), and PSS total ($p = 0.09$) met the assumptions of normality according to the Shapiro Wilk Normality Test, with p -values > 0.05 . The FFMQ describe facet did not meet assumptions of normality ($p = 0.02$). Since the data were normally distributed, it can be noted that there is normality in the residuals. The mean of the probability distribution is 0.00084, which indicates that the model meets a linear regression assumption. The probability distribution of error has equal variance, as seen in the residual plots, thus exhibits homoscedasticity. The Tukey test also examined the residual assumption via scatterplots. Since the Tukey test p -value ($p = 0.835$) was more than the cutoff value of $p = 0.05$, the assumption of independence of residuals has been met. Furthermore, the regression met the assumption of linearity relationship as determined from examining the simple scatter plots of the residuals and the fitted values.

Multicollinearity was tested with 4 central criteria. When computing the matrix of Pearson's Bivariate Correlation among all independent variables the correlation coefficients were smaller than 1 (Table 2). The variance correlation factor was less than 10 (FFMQ Nonreact = 1.47, FFMQ Observe = 1.47, FFMQ Act Awareness = 1.19, FFMQ Describe = 1.65, and FFMQ Nonjudge = 1.33), which indicates that multicollinearity is not problematic. The tolerance measures the influence of one independent variable on all other independent variables; the tolerance is calculated with an initial linear regression analysis. The tolerance in this regression analysis was greater than 0.1 (FFMQ Nonreact = 0.68, FFMQ Observe = 0.68, FFMQ Act Awareness = 0.84, FFMQ Describe = 0.61, and FFMQ Nonjudge = 0.75) which indicates that the multicollinearity is not problematic. The

condition index (CI) was calculated using a factor analysis on the independent variables. All variables had a CI less than 30, and no two variances were above 0.9, which indicates multicollinearity is not problematic in the linear regression variables. Suppression effects were not evident as the standardized betas, semi-partial correlations and correlations were approximately similar.

The results of the multiple regression produced an Adjusted R squared of 0.345 $F(5, 103) = 12.9, p < .001$ for the prediction of perceived stress. It was found that the nonreactivity facet did significantly predict perceived stress ($b = -0.531, p < 0.001$). This indicates that an increase in nonreactivity by one unit leads to a decrease in perceived stress by 0.531 units. The observation facet did not significantly predict perceived stress ($b = -0.141, p = 0.98$). The awareness facet did significantly predict perceived stress ($b = -0.398, p < 0.001$). This indicates that an increase in acting with awareness by one unit leads to a significant decrease in perceived stress by 0.398 units. The describe facet of FFMQ did not significantly predict perceived stress ($b = 0.103, p = 0.59$). The nonjudge facet did significantly predict perceived stress ($b = -0.417, p < 0.01$). This indicates that an increase in the nonjudge facet leads to an average decrease in perceived stress by 0.417 units.

Discussion

The present study examined the relationship among the particular facets of dispositional mindfulness and perceived stress among undergraduate university students. In congruence with the hypothesis, the nonreactivity facet of mindfulness, as measured by the

FFMQ, was found to inversely predict perceived stress levels. Individuals with higher scores on the nonreactivity subscale were found to have lower levels of perceived stress. Similar results were found for acting with awareness and non-judging of inner experience, though the strongest prediction for perceived stress levels came from the nonreactivity facet. These results fall in accordance with the proposed hypothesis, suggesting that Kabat-Zinn's "mindfulness-mediated stress response" could play a large role in how more mindful individuals perceive stress versus those who do not have high levels of mindfulness (2013). These findings are consistent with and expand upon current research as well, such as the aforementioned 2013 study that found that both the nonreactivity and nonjudging facets of the FFMQ were inversely correlated with general distress, as well as a 2015 study that found the acting with awareness and nonjudging facets were positively associated with emotional well-being (Desrosiers, Kiemanski, & Nolen-Hoksema, 2013; Bodenlos et al., 2015). These results also support the 2010 study that found the nonjudge facet was a significant predictor of stress symptomology; acting with awareness and nonreactivity were not significant predictors of stress symptomology in this study, though acting with awareness was a significant predictor of depressive symptoms (Cash & Whittingham, 2010). This slight misalignment of results may be due to differing outcome measures, as Cash & Whittingham used the DASS, while this study used the PSS. This highlights potential differences between symptomology and perceived stress in relation to mindfulness, as one's perception of their stress may be more strongly mediated by a mindfulness-based approach than the actual symptomology. Even so, it is of importance to acknowledge these discrepancies as they all contribute to the greater understanding of these facets in relation to their potential uses.

Both the observing and describing facets of the FFMQ did not significantly predict perceived stress. These results pose an interesting supplement to current research, which has found the observing facet to be negatively associated with physical health, while the describing facet to be unrelated to psychological health outcomes (Desrosiers, Kiemanski, & Nolen-Hoksema, 2013; Brown et al., 2015).

These preliminary results indicate that the nonreactivity, nonjudging, and acting with awareness facets of dispositional mindfulness are strongly associated with lower levels of perceived stress. This lends itself to the notion that a better understanding of the multidimensional nature of mindfulness would be beneficial to tailoring different mindfulness-based interventions based on desired outcome. Given that certain facets of mindfulness have shown promise in relation to improved cognitive functioning (Anicha et al., 2012), while the results of this study indicate different facets are related to lower levels of perceived stress, it can be discussed that the efficacy of MBIs could be improved based on specificity of approach. MBIs can target a varying group of outcomes. These outcomes include, but not limited to: attention, cognitive functioning, stress, and eating-related behaviors. Based on the results of this study, it can be supposed that different aspects of mindfulness may serve different levels of utility in relation to the targeted goal.

The results of this particular study illuminate some of the potentials of the particulars of the facets of mindfulness. Given that nonreactivity, act with awareness, and non-judging of inner experience all proved significant in their predictions of lower levels of perceived stress, it may be beneficial to tailor stress-reduction based interventions towards these facets, while putting less emphasis on the facets of observing and describing. Since Kabat-Zinn's "mindfulness-mediated stress response" is aimed at reducing maladaptive arousal, the

nonsignificant results of the observing and describing facets fall in accordance with his proposed response theory—observing and describing to a certain degree may bring about unintended attention to the negative aspects of the stress stimuli when not in the context of the other facets (2013, p. 337). Focusing on nonreactivity, nonjudging, and acting with awareness could instead lessen the perceived effects of the stress stimuli and subsequent responses through means of decentering in a mindful response. It is of great importance to further investigate these facets and the particular roles they play across populations in order to achieve better structure of intervention and in turn improved efficacy.

This study faced several limitations. The study sample lacked ethnic and gender diversity, with a vast majority of participants being young white/Caucasian females. Given that the sample consisted of a relatively homogenous group of university students, generalizability of the results may be problematic. In addition, any use of self-report measures poses concerns regarding participant responses. While the surveys were completed in a relatively controlled environment with minimal distraction, it is possible that some participants may have responded randomly or dishonestly. Since the PSS is a self-report measure, it is worth noting that individuals are reporting the degree to which they perceive stress to exceed their adaptive capacities versus measuring stress through an objective measure. Interestingly, several of the FFMQ facets displayed non-significant or negative correlations among one another (Table 2). This is contrary to the theoretical predictions, as internal consistency would be expected. Thus, these findings suggest potential measurement issues within the FFMQ as a self-report measure.

It is important to note that the accuracy of measuring mindfulness through any self-report measure has also been met with criticism. A publication by Grossman poses several

arguments against the use of self-report measures in the study of mindfulness. One of Grossman's arguments revolves around the operationalization of mindfulness, and how Buddhist tradition argues the construct cannot be easily separated from ideas that are inherently interrelated, thus making accurate assessment difficult (Grossman, 2011). While many of the current mindfulness measures have proven to be psychometrically sound, a lack of true definitional consensus and the subjective nature of mindfulness create doubt in measurement as well (Grossman, 2011). It has also been contended that discrepancies in how more mindful versus less mindful individuals interpret the meaning of items on these self-report measures may exist, and therefore influence their validity (Grossman, 2011). The article even goes so far as to call the use of brief self-report scales to quantify a construct as complex as mindfulness an "oxymoron" (Grossman, 2011, p. 1038). Grossman proposes that in order for future measures to reflect mindfulness more accurately in empirical study, the field of research would greatly benefit from more comprehensive qualitative investigations in order to better understand the "psychological mechanisms and characteristics related to the practice of mindfulness" (Grossman, 2011, p. 1039). With the existence of such criticism, one can deduce that not only is more thorough investigation needed to accurately assess mindfulness in empirical research, but that existing results and data should be met with less definitive credence. This is not to say that existing results lack validity, but that there may be room for investigative improvement before firm assertions can be made.

Criticisms of measures aside, replication is needed in order to better assess the generalizability of these data. Though the results of this study fell in line with existing theory, it is important to note that this interpretation is solely based on this data set and further investigation is needed.

While this study aids in the understanding of the distinct components of mindfulness and their relation to perceived stress, it would be beneficial to conduct further research with more diverse population samples and larger sample sizes. Given that several of the facets were found to significantly predict perceived stress, it could be of interest to explore current mindfulness-based interventions in relation to these distinct facets in order to better understand their mechanisms of change across populations. Though the inherent nature of mindfulness does not lend itself to objective measure, further investigation of the currently supported facets will allow for a clearer interpretation of the role of mindfulness in both everyday life and health-related outcomes. With a better understanding of the seemingly distinct role these facets play, researchers may be able to develop more effective stress reduction interventions based on the specificity of their approach.

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Tables

Table 1
Sample characteristics

	<u>Frequency</u>	<u>Percentage</u>
Gender		
Male	27	23.68%
Female	87	76.32%
Ethnicity		
White/Caucasian	59	51.75%
African American	5	4.39%
Hispanic	25	21.93%
Asian	10	8.77%
Native American	2	1.75%
Pacific Islander	2	1.75%
Mixed/Other	11	9.65%

Table 2
Correlation Matrix

	PSS Total	MAAS Total	FFMQ Nonreact	FFMQ Observe	FFMQ Act Awareness	FFMQ Describe	FFMQ Nonjudge
PSS Total	1.00	-0.47	-0.30	-0.14	-0.40	-0.27	-0.43
MAAS Total	-0.47	1.00	0.22	0.26	0.50	0.30	0.26
FFMQ Nonreact	-0.30	-0.22	1.00	0.45	-0.03	0.48	-0.07
FFMQ Observe	-0.14	0.26	0.45	1.00	-0.05	0.43	-0.19
FFMQ Act Awareness	-0.40	0.50	-0.03	-0.05	1.00	0.20	0.38
FFMQ Describe	-0.27	0.30	0.48	0.43	0.20	1.00	0.23
FFMQ Nonjudge	-0.43	0.26	-0.07	-0.19	0.38	0.23	1.00

Table 3
Means of Self-Report Measures

Self-Report Measure	Mean	Standard Deviation
MAAS Total	58.044	11.44
FFMQ Nonreact	21.5	4.28
FFMQ Observe	26.56	5.72
FFMQ Describe	28.48	5.34
FFMQ Act Awareness	26.26	4.97
FFMQ Nonjudge	27.19	6.55
PSS Total	18.59	7.02
FFMQ Total	130	15.69

Figures

Figure 1
Histogram

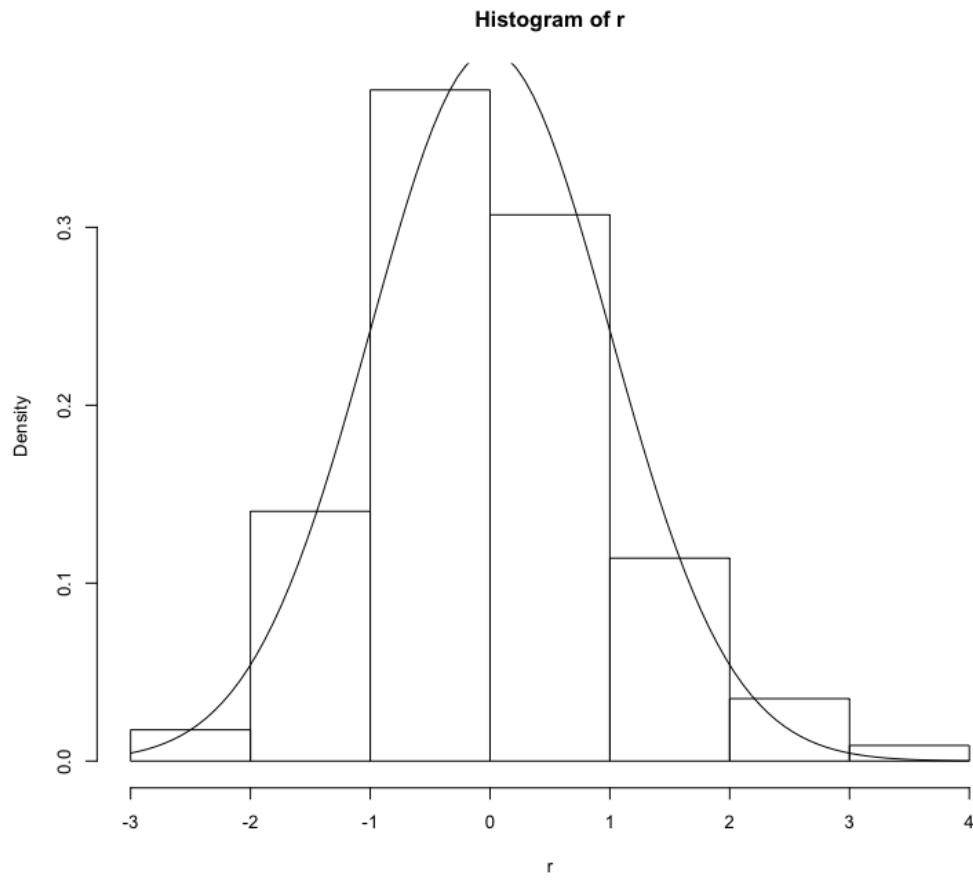
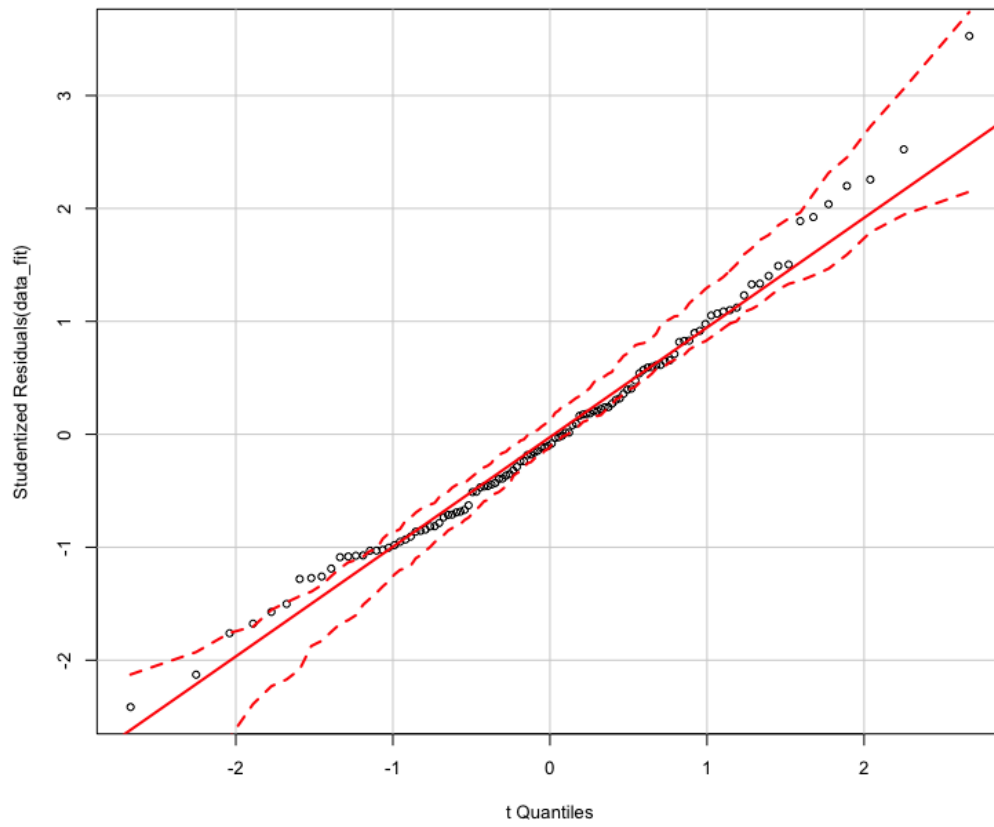


Figure 2
Q-Q Plot



Appendix A: Five Facet Mindfulness Questionnaire (Baer et al., 2006)

Five Facet Mindfulness Questionnaire (FFMQ)

Ruth A. Baer, Ph.D.
University of Kentucky

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

- ____ 1. When I'm walking, I deliberately notice the sensations of my body moving.
- ____ 2. I'm good at finding words to describe my feelings.
- ____ 3. I criticize myself for having irrational or inappropriate emotions.
- ____ 4. I perceive my feelings and emotions without having to react to them.
- ____ 5. When I do things, my mind wanders off and I'm easily distracted.
- ____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.
- ____ 7. I can easily put my beliefs, opinions, and expectations into words.
- ____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
- ____ 9. I watch my feelings without getting lost in them.
- ____ 10. I tell myself I shouldn't be feeling the way I'm feeling.
- ____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
- ____ 12. It's hard for me to find the words to describe what I'm thinking.
- ____ 13. I am easily distracted.
- ____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
- ____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.
- ____ 16. I have trouble thinking of the right words to express how I feel about things
- ____ 17. I make judgments about whether my thoughts are good or bad.
- ____ 18. I find it difficult to stay focused on what's happening in the present.
- ____ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.
- ____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
- ____ 21. In difficult situations, I can pause without immediately reacting.

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

- ____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
- ____ 23. It seems I am "running on automatic" without much awareness of what I'm doing.
- ____ 24. When I have distressing thoughts or images, I feel calm soon after.
- ____ 25. I tell myself that I shouldn't be thinking the way I'm thinking.
- ____ 26. I notice the smells and aromas of things.
- ____ 27. Even when I'm feeling terribly upset, I can find a way to put it into words.
- ____ 28. I rush through activities without being really attentive to them.
- ____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.
- ____ 30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.
- ____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
- ____ 32. My natural tendency is to put my experiences into words.
- ____ 33. When I have distressing thoughts or images, I just notice them and let them go.
- ____ 34. I do jobs or tasks automatically without being aware of what I'm doing.
- ____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
- ____ 36. I pay attention to how my emotions affect my thoughts and behavior.
- ____ 37. I can usually describe how I feel at the moment in considerable detail.
- ____ 38. I find myself doing things without paying attention.
- ____ 39. I disapprove of myself when I have irrational ideas.

FFMQ Scoring instructions

For all items marked "R" the scoring must be reversed. Change 1 to 5, 2 to 4, 4 to 2, and 5 to 1 (3 stays unchanged). Then sum the scores for each subscale.

Observing

1, 6, 11, 15, 20, 26, 31, 36

Describing

2, 7, 12R, 16R, 22R, 27, 32, 37

Acting with awareness

5R, 8R, 13R, 18R, 23R, 28R, 34R, 38R

Nonjudging of inner experience

3R, 10R, 14R, 17R, 25R, 30R, 35R, 39R

Nonreactivity to inner experience

4, 9, 19, 21, 24, 29, 33

Appendix B: Mindful Attention Awareness Scale (Brown & Ryan, 2003)

Day-to-Day Experiences

Instructions: Below is a collection of statements about your everyday experience. Using the 1-6 scale below, please indicate how frequently or infrequently you currently have each experience. Please answer according to what *really reflects* your experience rather than what you think your experience should be. Please treat each item separately from every other item.

	1	2	3	4	5	6
	Almost Always	Very Frequently	Somewhat Frequently	Somewhat Infrequently	Very Infrequently	Almost Never
I could be experiencing some emotion and not be conscious of it until some time later.	1	2	3	4	5	6
I break or spill things because of carelessness, not paying attention, or thinking of something else.	1	2	3	4	5	6
I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5	6
I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.	1	2	3	4	5	6
I tend not to notice feelings of physical tension or discomfort until they really grab my attention.	1	2	3	4	5	6
I forget a person's name almost as soon as I've been told it for the first time.	1	2	3	4	5	6
It seems I am "running on automatic," without much awareness of what I'm doing.	1	2	3	4	5	6
I rush through activities without being really attentive to them.	1	2	3	4	5	6
I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.	1	2	3	4	5	6
I do jobs or tasks automatically, without being aware of what I'm doing.	1	2	3	4	5	6
I find myself listening to someone with one ear, doing something else at the same time.	1	2	3	4	5	6

	1 Almost Always	2 Very Frequently	3 Somewhat Frequently	4 Somewhat Infrequently	5 Very Infrequently	6 Almost Never
I drive places on 'automatic pilot' and then wonder why I went there.	1	2	3	4	5	6
I find myself preoccupied with the future or the past.	1	2	3	4	5	6
I find myself doing things without paying attention.	1	2	3	4	5	6
I snack without being aware that I'm eating.	1	2	3	4	5	6

MAAS Scoring

To score the scale, simply compute a mean of the 15 items. Higher scores reflect higher levels of dispositional mindfulness.

Appendix C: Perceived Stress Scale (Cohen et al., 1983)

Items and Instructions for Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate *how often* you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

For each question choose from the following alternatives:

- 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.^a In the last month, how often have you dealt successfully with irritating life hassles?
 - 5.^a In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?
 - 6.^a In the last month, how often have you felt confident about your ability to handle your personal problems?
 - 7.^a In the last month, how often have you felt that things were going your way?
 8. In the last month, how often have you found that you could not cope with all the things that you had to do?
 - 9.^a In the last month, how often have you been able to control irritations in your life?
 - 10.^a In the last month, how often have you felt that you were on top of things?
-
11. In the last month, how often have you been angered because of things that happened that were outside of your control?
 12. In the last month, how often have you found yourself thinking about things that you have to accomplish?
 - 13.^a In the last month, how often have you been able to control the way you spend your time?
 14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
-

^a Scored in the reverse direction.

Appendix D: Mindfulness-mediated Stress Response (Kabat-Zinn, 2013, p. 337)

