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Understanding The Relationship Between Perceived Levels Of Stress, Mindfulness, And Meditation Practices

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UNDERSTANDING THE RELATIONSHIP BETWEEN PERCEIVED LEVELS OF STRESS, MINDFULNESS, AND MEDITATION PRACTICES

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ABSTRACT

Mindfulness meditation has become increasing popular in the Western world the last few decades. Although the research in the area of mindfulness is just beginning, many studies report positive benefits to individuals who learn this type of meditation. This study compares the perceived stress levels of college students who report common characteristics of individuals who practice mindfulness meditation against college students who do not report those common characteristics of mindfulness. The student's level of mindfulness was measured using the Five Facet Mindfulness Questionnaire while the Measurement of Stressful Life Events was used to determine the student's perceived stress levels to recent events. Results showed that mindfulness is inversely correlated with current stress levels for recent life events. In addition, meditation experience was also found to be inversely correlated with current stress levels for recent life events. Finally, the results indicated a gender difference with respect to mindfulness but not a gender difference with respect to stress. Specifically, males scored higher than females in mindfulness but males and females reported similar levels of stress. There is still much to learn about mindfulness and stress. This study serves as a small part of the many studies being conducted to better understand these variables and their relationship to one another.

Keywords: Mindfulness, Meditation, Stress, Life Events

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INTRODUCTION

Mindfulness

Nearly 2,500 years ago, the Buddha introduced the practice of mindfulness to his followers. Mindfulness is an English translation of the Pali word, sati, and connotes awareness, attention, and remembering (Siegel, Germer, & Olendzki, 2009). It has been defined numerous ways in the English language making understanding mindfulness difficult. Mindfulness typically is developed through the practice of mindfulness meditation. It is important to note that mindfulness meditation is different from traditional meditation. Siegel et al. (2009) went on to describe the difference between meditation and mindfulness meditation:

> [Mindfulness meditation is] like meditation in general, it involves placing attention deliberately upon an object and sustaining it over time, but unlike one-pointedness and absorption, mindfulness tends to open to a broader range of phenomena rather than restricting the focus to a singular object. Like a floodlight rather than a spotlight, mindfulness illuminates a more fluid phenomenological field of ever-changing experience rather than isolating a particular object for intensive scrutiny. This alternative mode of observation is necessary because mindfulness practice is more about investigating a process than about examining an object. (p. 516)

In other words, the traditional meditator only attempts to focus his or her attention on one object or sensation. Mindful meditators are attempting to learn how to keep their focus on what they are experiencing in the present moment and, at the same time, they

are attempting to investigate the thoughts and sensations that they are experiencing. Although western psychologists do not view mindfulness exactly as the Buddha did, the basic idea behind the technique is still the same and researchers are beginning to believe that mindfulness can have positive effects on the mind and body.

As mindfulness became more popular, researchers wanted to find a good way to define it. Currently, one of the most cited definitions comes from Bishop and his colleagues (2004) who state:

> The first component [of mindfulness] involves the self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment. The second component involves adopting a particular orientation toward one's experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance. (p. 23)

According to this definition, there are two facets to mindfulness. The first facet of mindfulness involves paying attention in the present moment. The other involves examining the experience of the present moment in a curious, open and accepting way. This definition may also help explain why some individuals describe mindfulness as a state of being instead of a technique. This mindset is more than just a minor change in our thinking. It is an entirely different way to perceive the world (Bishop et al., 2004).

Another issue facing researchers was creating an inventory or scale that could measure mindfulness. Some of the more popular measures include the

Mindful Attention Awareness Scale (MAAS), the Freibury Mindfulness Inventory, the Kentucky Inventory of Mindfulness Skills (KIMS), and the Cognitive and Affective Mindfulness Scale (Brown & Ryan, 2003; Carlson & Brown, 2005; Hansen, Lundh, Homman, & Wangby-Lundh, 2009). Several studies have been conducted to test the validity of these scales and most of the results have been fairly positive. For example, Carlson and Brown (2005) reported the MAAS as being an appropriate application for researching the role of mindfulness in the well-being of cancer patients. They had examined the construct and criterion validity of the MAAS in cancer outpatients (n = 122) using matched community members as controls. In a different study, using a sample of almost 600 14- to 18-year-olds, Brown, West, Loverich, and Biegel (2011) suggested that the MAAS-A (the adolescent version of the MAAS) supports the reliability and validity of the MAAS-A in normative and mixed psychiatric adolescent populations. Black, Sussman, Johnson, and Milam (2011) collected data from 24 high schools in Chengdu, China (n = 5,287). They also found the MAAS to be a sound measure of mindfulness among Chinese adolescents.

One interesting finding from Mackillop and Anderson (2007) shows that although the MAAS is a valid measure of mindfulness, an individual's meditation experience did not correlate with their level of mindfulness. Using a large university sample (n = 711) they found no difference in gender or length of time an individual had spent meditating. This may, however, be due to their treatment of meditators in general instead of specifically looking at mindful meditators. Additional research is required to properly determine if this is indeed the case.

Recently, Baer and colleagues (2006) developed the Five Facet Mindfulness Questionnaire (FFMQ) from research they did using other mindfulness scales. To create this measurement, the researchers combined questions from five different mindfulness measurements, including the MAAS, the FMI, and the KIMS. The pooled questions were then given to a large sample of college students and correlated with other measurements of dimensions such as personality, emotional intelligence, and self-compassion. The predicted correlations among various clustered questions were assembled and five general dimensions (facets) were attained: nonreactivity to inner experience, attending to sensations, perceptions, thoughts and feelings, acting with awareness, labeling with words, and nonjudging of experience. Using statistical sorting and reasoning, Baer et al. found that these facets were independent aspects of mindfulness and not just part of one dimension. Due to the extensive research and process used to create this measure, Baer considers it to have good validity.

To evaluate the FFMQ, Baer et al. (2008) used experienced meditators and non-meditating comparison groups. Their findings showed that most mindfulness facets were significantly related to meditation experience and to psychological symptoms and well-being. In addition, Van Dam, Earleywine, and Danoff-Burg (2009) compared a group of meditators (n=58) and a group of college students (n=263) using the FFMQ. They found that experienced meditators had significantly higher levels on the FFMQ than non-meditators and that scores increased with meditation practice. As with the other mindfulness measurements, the FFMQ is still relatively new and needs more research to confirm its validity. However, the

results look promising.

Since Bishop provided his definition and Baer created his measure, there has been a surge of research studies conducted on the effectiveness of mindfulness. In 2002 there was less than 50 research studies on mindfulness published in the English language. In 2006 that number jumped to around 125 and in 2010 there were over 350 published studies of mindfulness that year (Black, 2011). This increase in research has helped further the spread of mindfulness into the clinical field.

Jain et al. (2007) found that mindfulness was useful in dealing with disruptive thoughts, and could potentially explain the lower stress levels in individuals practicing mindfulness. Davidson et al. (2003) showed that mindfulness practice improves the immune system, increases positive affect, and reduces the recovery time from a negative experience because of alterations of activation symmetries in the prefrontal cortex. Kirk, Downar, and Montague (2011) showed that Buddhist meditators who were experienced in mindfulness meditation tended to make more rational decisions than the control group when confronted with unfair offers of money.

In a study conducted by Farb et al. (2007), the researchers used fMRI to study areas of the brain that they believed were involved with our awareness of ourselves over time (narrative focus) and our awareness of ourselves in the present moment (experiential focus). They compared these two areas of the brain using a group of individuals who had just completed an eight week course in mindfulness meditation and a group that had never meditated. In the non-meditators group, they discovered reductions of synapse connections in the medial prefrontal cortex associated with narrative focus and in the

trained participants, experiential focus resulted in more marked reductions of synapse connections in the medial prefrontal cortex. In addition, they found an increased engagement of a right lateralized network, comprising the lateral prefrontal cortex and viscerosomatic areas such as the insula, secondary somatosensory cortex and inferior parietal lobule in the meditators group. The researchers believe that this helps show that there are two neural networks (narrative focus and experiential focus) and mindfulness can be used to change to a different neural network.

In a study that explored the effect mindfulness might have on education, Anglin, Pirson, and Langer (2008) compared males and females in math ability after a group of females were taught to learn mindfully. Mindful learning involves focusing on the present moment and looking for new and interesting ideas. The researchers reported that males performed better than females when mindful learning was not encouraged (absolute instruction), but males and females performed equally well when mindful learning was encouraged (conditional instruction). Thus, they believed that mindful learning moderates gender differences in math performance.

In 2000, Kawakami, White, and Langer wanted to examine the perceptions people have of women in leadership positions. They selected women who frequently gave presentations and broke them up into four groups. The first group of women were told to act feminine and mindful, the second group were instructed to act feminine but not be mindful, the third were told to act masculine and mindful, and the fourth were asked to act masculine and not be mindful. Acting mindful involved staying in the present moment and being more aware of the reactions of audience members, while not being mindful involved focusing on what words to say. After the women would give presentations, their

audience rated them. The results showed that masculinity and femininity did not matter, but mindful versus mindless did. The audience preferred the women practicing mindfulness over the women not practicing mindfulness, thus suggesting that mindfulness could be a characteristic of good leaders (Kawakami et al., 2000).

An interesting study involving Grant, Langer, Falk, and Capodilupo (2004) asked one group of artists to draw a picture and then copy it twice. They asked a second group of artists to draw a picture, copy it once, and then copy it again but make some very small, subtle changes. People preferred the 2nd group's last drawing over the 1st group's last drawing. The researchers suggested that mindfulness might be able to make a difference in the products that we produce.

Burpee and Langer (2005) studied the relationship between mindfulness and marital satisfaction. Participants were given a life satisfaction survey and a mindfulness survey created by Langer. The researchers found a stronger correlation between mindfulness and marital satisfaction than the correlation between marital satisfaction and similarity. Following that study, Barnes, Brown, Krusemark, Campbell, and Rogge (2007) surveyed 89 dating college students. Barnes and his colleagues found that higher levels of mindfulness predicted higher relationship satisfaction and greater capability to respond to relationship stress.

Mindfulness has recently become popular in helping individuals quit drug use and avoid relapsing. Specifically, Westbrook et al. (2011) selected 47 smokers, who were seeking treatment and who had never meditated before. They trained the participants in mindfulness and then asked the participants to view pictures of cigarettes and rate their cravings during periods of being mindful and periods of not being mindful. All of this

occurred while undergoing fMRI. The results showed a significant lower level of craving when the individuals were in a mindful state. The fMRI showed reduced neural activity in the subgenual anterior cingulate cortex which was believed to be related to craving. The fMRI also showed a reduction in functional connectivity between the subgenual anterior cortex, and other regions of the brain during the mindful state. The researchers speculated that mindfulness may decrease the effects of subjective and neural reactivity to smoking cues in smokers.

As a way to help young women cut down on their amount of marijuana use, De Dios et al. (2011) used motivational interviewing and mindfulness meditation. They found that on the days that the participants meditated, they were half as likely to use marijuana. However, the researchers did admit that this may have been due to providing the women with an alternative to their drug use. Once again, additional research is needed to conclude if this is the case.

Because of all these perceived benefits of mindfulness, therapies have begun implementing mindfulness as part of its treatment process and there are even new therapies that are built entirely around the concept of mindfulness. Some of the more popular treatments involving mindfulness include Acceptance and Commitment Therapy (ACT), Dialectical Behavior Therapy (DBT), Mindfulness-Based Cognitive Therapy for Depression, and Mindfulness-Based Relapse Prevention. These therapies all have studies that show encouraging results about their effectiveness, but the studies have some limitations to address (APA, 1995; Britton, Shahar, Szepsenwol, & Jacobs, 2011; Linehan, 1997; Linehan, Armstrong, Suarez, Allmon, & Heard, 1991; SAMHSA, 2011; Woody, Weisz, & McLean,

2005; Segal, Teasdale & Williams, 2002).

Acceptance and Commitment Therapy helps the patient develop psychological flexibility by teaching them mindfulness and acceptance strategies. Mindfulness is used to help the patient perceive themselves as being distinct from their thoughts and feelings. They are aware of themselves observing their own thoughts and feelings. It is sort of an awareness of the disconnection between thoughts and self. ACT is considered an empirically validated treatment by the APA, with the status of "Modest Research Support" in depression and "Strong Research Support" in chronic pain (Woody et al., 2005). ACT is also listed as evidence-based by the Substance Abuse and Mental Health Services Administration of the United States federal government which has examined randomized trials for ACT in the areas of psychosis, work site stress, and obsessive compulsive disorder, including depression outcomes (SAMHSA, 2011).

Dialectical Behavior Therapy is a common treatment for individuals with borderline personality disorder. It has been shown to be moderately effective in treating borderline personality disorder, certain mood disorders, and could be effective in treating chemical dependency (Linehan, 1997). In this therapy, mindfulness is an essential core component. A patient is taught mindfulness, which is then used as a foundation for teaching the rest of the therapy process. After learning the rest of the therapy, the patients mostly use mindfulness to accept and tolerate powerful emotions and try to overcome unhealthy habits. Linehan et al. (1991) did ten randomized control trials of Dialectical Behavior Therapy. Patients receiving the DBT, instead of the control, remained in treatment longer than ones not receiving the DBT. Also, patients receiving DBT were released from inpatient psychiatric hospitalization earlier than the control group.

Mindfulness-Based Cognitive Therapy was created from Kabat-Zinn's Mindfulness-Based Stress Reduction program. It combines Mindfulness and Cognitive Therapy and has been researched and evaluated several times in the last few years. According to its creators, the aim of MBCT is more about freeing a person from becoming drawn into automatic reactions to thoughts, feelings, and events than it is about finding happiness or relaxation (Segal et al., 2002). Britton et al. (2011) selected 52 individuals with partially remitted depression and randomly put them into an 8-week Mindfulness-Based Cognitive Therapy course or a waitlist control group. The researchers tested both groups for stress before, after and during that 8-week period. Mindfulness-Based Cognitive Therapy was associated with lower emotional reactivity to social stress. Also, the participants who did not receive the Mindfulness-Based Cognitive Therapy experienced anticipatory anxiety while the other group did not. The authors listed the limitations as having a small sample size, a lack of objective treatment adherence measures, and non-generalizability.

Mindfulness Therapy is also being used to treat eating disorders. It is possible that by focusing on the experience of eating, a person is able to free themselves from negative thoughts that might cause them to overeat. Also, being more aware of the current experience should help the person better recognize when they start to feel full or when they are eating too fast. One study used 150 binge eaters to compare a mindfulness-based therapy to a standard psychoeducational treatment on healthy eating and depression (Kristeller & Hallett, 1999). Both groups produced declines in bingeing and felt less depressed, but the mindfulness-based therapy group reported feeling more in control of their eating and reported enjoying their food more than the psychoeducational group.

There are several programs that have been developed specifically for mindful eating, including the Center for Mindful Eating at the University of Indiana.

Mindfulness-Based Therapies appear to be effective in the treatment of other psychiatric disorders like obsessive-compulsive disorder (Baxter, Schwartz, & Bergman, 1992) and anxiety (Hayes, 2004). Chiesa and Serretti (2011) did a systematic review and meta-analysis of Mindfulness-Based Cognitive Therapy and found that Mindfulness-Based Cognitive Therapy could be useful for reducing anxiety symptoms in patients with bipolar disorder in remission and in patients with some anxiety disorders. Siegal (2010) found 84 patients diagnosed with Major Depressive Disorder and who had recently achieved remission. He assigned them to one of three groups. The first group was asked to stop taking their antidepressant medication and attend eight weekly sessions of Mindfulness-Based Cognitive Therapy, the second group was continued on their medication, and the third group had their antidepressant medication switched to a placebo. The results showed that the Mindfulness-Based Cognitive Therapy was just as effective as the antidepressant medication at preventing relapse. Both were significantly better than the placebo.

Many therapies owe their origins to John Kabat-Zinn who is considered to be the most influential proponent of mindfulness in the United States. In 1979, Kabat-Zinn founded the Mindfulness-Based Stress Reduction program at the University of Massachusetts. The program uses mindfulness to help alleviate pain and increase the physical and mental well-being for individuals suffering from a variety of diseases and disorders. The program also claims to put an emphasis on researching the effectiveness of this stress reduction program and posts those results on its website (Kabat-Zinn, 2012).

Plenty of outside research has been done evaluating the effectiveness of Kabat-Zinn's Mindfulness-Based program. Hölzel et al. (2007) did a study that used MRI to examine the brain structures of 16 individuals before and after an eight week Mindfulness-Based Stress Reduction program. They found an increase in grey-matter density in the hippocampus, known to be important for learning and memory, and an increase in grey-matter density in structures believed to be associated with self-awareness, compassion, and introspection. They also found a decrease in grey-matter density in the amygdala, an area believed to be related to stress. Although there were several physical changes in the brain, the researchers only measured the participant's change in stress level through self-report (which decreased for all 16 participants), so it is unknown what other brain functions may have changed.

Stress

Stress is a big area of concern for individuals. According to the American Psychological Association's (APA) 2011 Stress in America survey, only 29 percent of American's feel that they are doing an excellent or very good job at managing or reducing their stress. The APA also reported that 22 percent of Americans are experiencing chronic extreme stress and the APA warns that these results are cause for concern (APA, 2012). But in order to properly combat stress, it is important to understand what stress is. This is difficult because like mindfulness, there is no consensus on the meaning of stress.

Stress has been examined both objectively and subjectively and is considered to be a relationship between life events and the way those life events are experienced. Individuals may experience increased stress due to the way they

process events. So in order to help better understand stress, several different stress measurements have been created. Some of the more popular measurements include the Social Adjustment Rating Scale (Holmes & Rahe, 1967), the Life Events and Difficulties Schedule (Brown & Harris, 1978), and the Hassles and Uplifts Scale (DeLongis, Folkman & Lazarus, 1988).

Perhaps the most famous stress measurement, the *Social Readjustment Rating Scale*, was created in 1967 by Thomas Holmes and Richard Rahe. The two researchers surveyed a large sample of participants to determine how stressful different life events were. Their newly created measurement then assigned numerical values to the stressors that most people experience some time in their lives. For example, the death of spouse was highest on the scale and received a score of 100 life change units (LCUs), while moving into a new house was only 20 LCUs. An individual's level of stress was calculated by adding up all of their LCUs from their stress events expressed over a period of time (Homes & Rahe, 1967).

In 1978, Brown and Harris developed the Life Events and Difficulties Schedule (LEDS). This measurement differs significantly from the Social Adjustment Rating Scale. The LEDS involves interviewing the participant in detail about the stressful events. After gathering enough detail, raters who are "blind" to the individual's response are given details from the response and asked to rate the participant's level of stress. The raters use "dictionary ratings" which are ratings based on the likely response of an average person to an event occurring in the context of a particular set of biographical circumstances (Brown & Harris, 1978).

In 1988, DeLongis and colleagues produced the Hassles and Uplifts Scale.

The idea behind their measurement was that big life events do not happen very often. Instead they believed that the small stressful events that happen daily can add up, causing a person to feel stressed. Some examples of daily stress include lack of sleep, loneliness, job dissatisfaction, and problems with children (DeLongis et al., 1988).

If stress is related to the way a person processes events, mindfulness may be an effective coping strategy because it requires people to address the stressors instead of avoiding them. Although it could be that individuals who pay more attention to their stressors might become more stressed because of the increased awareness, it must be noted that the key is mindfulness and not just attention. Besides attention, mindfulness also includes non-judgment. Therefore, individuals mindfully observing events as they occur may be able to evaluate their stressors more accurately. In the last few years there has been research to support this belief.

For example, Dekeyser, Raes, Leijssen, Leysen, & Dewulf (2008) used a Dutch sample to analyze the Kentucky Inventory of Mindfulness and examine its correlations with alexithymia (difficulty understanding and expressing feelings), body satisfaction, interpersonal reactivity, and social assertiveness. They found that four components of mindfulness are negatively related to distress contagions (personal distress when witnessing distress in others), positively related to body satisfaction, and negatively related to social anxiety. In 2004, Baer, Smith, and Allen performed a study to assess the Kentucky Inventory of Mindfulness Skills. Using three samples of undergraduate students and a sample of outpatients with Borderline Personality Disorder, they discovered that mindfulness components are

related to aspects of personality and mental faculties, including emotional intelligence, experiential avoidance, and alexithymia.

Mohan, Sharma, and Bijlani (2011) studied the effects that meditation can have on stressful computer games. They took 32 healthy adults who had never practiced meditation before and taught them to meditate. The participants were then asked to meditate either before or after playing a stressful computer game. A third group, the control group, was asked to wait quietly for an equivalent period of meditation time. The stressful game caused a significant increase in both physiological and psychological markers of stress. In contrast, meditation was associated with a significant decrease in these same markers.

Similarly, Evans, Ferrando, Carr, and Halin (2011) published a study that suggests mindfulness-based stress reduction appeared to be associated with a reduction of distress and an increased awareness of everyday life experiences. In 2007, Lee and colleagues compared the effects of meditation-based stress reduction and an anxiety disorder education program might have on patients with an anxiety disorder. They found that the meditation group showed significant improvement on all anxiety scales compared to the education group.

Although none of these studies suggest that mindfulness is the ultimate answer that psychology is looking for, they do suggest that mindfulness can be a helpful therapeutic tool. Consequently, the purpose of this current study was to examine the relationship between levels of mindfulness and levels of stress among college students. The research question was as follows: to what extent do the variables of mindfulness and

stress correlate in a sample of college students. It was hypothesized that *an individual's level of stress would be negatively correlated with their level of mindfulness*. Thus, as a person is better able to observe their stressful life events in a non-judgmental and nonreactive manner, they will be able to accurately assess and deal with their stressors. On the other hand, people with low levels of mindfulness feel more stress because they incorrectly assess their stressors and/or avoid thinking about their stressful events, leading to more accumulated stress. There have been several studies that support this hypothesis (Chiesa & Serretti, 2009; Joo, Lee, Chung, & Shin, 2010; Kabat-Zinn, Massion, Kristeller, et al., 1992; Miller, Fletcher, & Kabat-Zinn, 1995).

Another hypothesis of this study was that *the meditation experience of an individual would be related to levels of stress. Specifically, increased frequency of meditation would be negatively correlated with stress levels*. The concept of mindfulness originated from the practice of mindfulness meditation and many mindfulness studies entail teaching participants to meditate. Even though it could be assumed that meditation is associated with mindfulness, researchers have still tried to study the effect that meditation has on the brain. Carmody and Baer (2008) conducted a study that involved examining the relationship between the time an individual spends engaging in home practice of formal meditation exercises and their change in mindfulness. The results showed that the more a person spends practicing meditation, the greater the improvement in the five facets described in the Five Facet Mindfulness Questionnaire. Shapiro (1992) found that the more experience a person has with meditation, the higher the person's levels of self-regulation, self-exploration, and self-liberation. Lazar et al. (2005) found the level of cortical thickness was associated with a person's meditation experience.

Finally, it was also hypothesized that *the gender of the participant would have an impact on their perceived levels of stress and their levels of mindfulness*. *Specifically, males would tend to score higher on the mindfulness scale for individuals without meditation experience. However, females who score equally as high on the mindfulness scale would have lower levels of perceived stress in their lives.* Several studies have shown that without mindfulness training, men tend to be more mindful then women, but when both men and women are taught mindfulness, women show a greater improvement than men (Anglin et al., 2008; Baer et al, 2006; Shao & Skarlicki, 2009). For example, Shao and Skarlicki (2009) tested 149 MBA students and showed a greater positive association of mindfulness and individual performance for women than for men. As stated before, Anglin et al. (2008) reported that although males performed better at math than females when mindful learning was not used, when mindful learning was taught to the students, both males and females did equally as well. However, this may be due to males exhibiting higher levels of mindfulness then females before mindfulness meditation is taught (Baer et al., 2006).

METHODS

Participants

Participants included a sample of 100 undergraduate and graduate students attending a small Midwestern university. Of the 100 participants, 34 were male and 66 were female. The ages of the students ranged from 18 to 55, with the average age being 25 (SD = 8.62). Class ranking was almost equally distributed, with 17 freshmen, 17 sophomore, 23 juniors, 24 seniors, and 19 graduate students. Finally, 86% of students in this study reported their ethnicity as Caucasian, 7% reported African-American, 3% reported Hispanic, 2% reported Arabian, 1% reported Asian, and 1% reported more than one ethnicity.

Procedure and Materials

This study was made available through an online survey website. Department chairs were sent an e-mail requesting permission to inform professors and students about this research study. If the department chair gave permission, the professors of summer classes in that department were then emailed and asked to forward a recruitment script and attached consent form to their students about this research study. The recruiting script can be viewed in Appendix A.

After reviewing the recruiting script which was contained in the email forwarded by the professors, participants could download the informed consent form, which was sent as an attachment in the forwarded e-mail. The informed consent form is shown in Appendix B. If a student did not want to participate in the study, a message thanking

them for his or her consideration was also included in the e-mail. If the eligible participant decided to participate in the study, they could click the link located at the bottom of the recruiting script, which would navigate them to the correct website.

After clicking the link to the website, participates were shown the first of three surveys. This first survey started off by asking four basic demographic questions to determine the sex, age, class ranking, and ethnicity of the participants. The first survey also asked three questions about the students' experience with meditation. This was to determine if the participant meditated, how often they meditated, and how long each one of their meditation sessions lasted. Appendix C contains the questions used in this survey.

As soon as they completed the first survey, participants were then directed to the second survey. That survey was the Five Facet Mindfulness Questionnaire that was created in 2006. To develop this questionnaire, Baer and colleagues pooled questions from five different available measures of mindfulness, which included the Mindful Attention Awareness Scale (Brown & Ryan, 2003), the Kentucky Inventory of Mindfulness Skills (Baer et al., 2004), and the Freiburg Mindfulness Inventory (Buchheld, Grossman, & Wallach, 2001). These pooled questions were then given to participants and correlated with other measurements such as personality, self-compassion, and emotional intelligence. The predicted correlations among various clustered questions were assembled and five general dimensions or "facets" of mindfulness were reached. These five facets are (1) observing/noticing/attending to sensations/perceptions/thoughts/feelings; (2) describing/labeling with words; (3) acting

with awareness/(non)automatic pilot/concentration/nondistraction; (4) nonjudging of experience; (5) nonreactivity to inner experience. The average correlation between any two facets is .18, indicating the five facets or skills are distinct (Baer et al., 2006). According to recent research by Bohlmeijer, Klooster, Fledderus, Veehof, and Baer (2011), the Five Facet Mindfulness Questionnaire is a reliable and valid instrument for measuring mindfulness.

The instructions for the Five Facet Mindfulness Questionnaire asked the participants to rate 39 questions using a Likert scale to indicate what is generally true for them. The Likert scale responses ranged from "never or very rarely true" which is considered a score of 1 to "very often or always true" which is a score of 5. Nineteen of the questions are reversed scored and the questions are broken up into the five facets of mindfulness. For example, question 5 is reversed scored and falls under the acting with awareness facet, while question 6 is scored normally and falls under the observing facet. The complete response scale can be found in Appendix D. Examples of some questions include, "When I'm walking, I deliberately notice the sensations of my body moving" and "I can easily put my beliefs, opinions, and expectations into words."

When finished with the Five Facet Mindfulness Questionnaire, participants were given the Measurement of Stressful Life Events. This measurement is a modification of the 1967 Social Readjustment Rating Scale (SRRS) created by Holmes and Rahe. Rahe, Mahan Jr., and Arthur (1970) conducted a study to test the reliability of the Social Readjustment Rating Scale. The researchers gave 2,664 men the SRRS before they boarded 3 different U.S. Navy cruisers. About 90 percent of the men had their health

monitored over a six- to eight month period stay on the ship. The results showed a significant correlation of .12 between the stress scale scores and illness. In 1978, Gerst and colleagues tested the reliability of the SRRS for moderate and long-term stability using 3 sampling periods in a 2 year period of time. Male psychiatric outpatients and non-patients were used and the rank ordering of the amount of readjustment required by life events remained extremely consistent both for the non-patients (r ranged from .89 to .96) and the patients (r ranged from .70 to .91).

The Measurement of Stressful Life Events consisted of 46 stressors that both traditional and non-traditional college students might experience. In order to avoid scores that were influenced by length of time of a stressor, individuals were asked to only record stressors that had occurred between the time periods of 1 to 6 months. Response ranged from "0 or Not Stressed" to "10 or Very Stress" and also contains a response of N/A in case the participant has not experienced the stressor in the allotted period of time. To calculate a person's level of stress, the scores for the reported levels of all the stressors were summed. The higher the participant's score, the more stress the person perceived in his or her life.

This final page displayed the debriefing statement shown in Appendix F. In these short paragraphs, the purpose of the study was revealed, participants were explained that there were no right or wrong answers, and they were advised to seek help from the Kelly Center if they feel any distress. As some professors may wish to offer extra credit for participation in this study, a code was also displayed at the end of the survey and the same code was emailed separately to professors.

RESULTS

Data was collected over a one week period. For the first hypothesis, a Pearson correlation was conducted to examine the relationship between a person's level of mindfulness and their perceived level of stress. Results indicated that the correlation between level of mindfulness and level of stress was statistically significant, $r(98) = -.33$, $p < .01$. The two variables were negatively correlated indicating that as a person's level of mindfulness increased, their level of stress decreased.

The second hypothesis examined the relationship between meditation experience and perceived level of stress. For this analysis, only 19 individuals who reported that they were currently meditating were included. Results of a Pearson correlation showed a moderate negative correlation between the two variables, $r(17) = -.52$, $p < .01$. This indicated that as a person's level of meditation experience increased, their level of stress decreased.

Finally, to test the third hypothesis, t-tests were conducted to determine if there was a gender difference with perceived stress levels and mindfulness levels. For the first t-test, which looked at levels of mindfulness for non-meditating males and females, results showed that males scored significantly higher in mindfulness, $t(72) = 1.82$, $p < .05$. In addition, when levels of mindfulness for both meditators and non-meditators were examined, males still scored higher than females, $t(98) = 2.83$, $p < .01$. The means and standard deviations for this test are located in Table 1. In the second t-test, the results did not show a significant difference between stress levels for males and females, $t(98) = .69$,

$p > .05$ and when examining the males and females who scored in the top 25 percentile for mindfulness, there was also no significant difference, $t(21) = -.52$, $p > .05$. Means and standard deviations for this test are shown in Table 2.

DISCUSSION

The purpose of the current study was to investigate the relationship between levels of mindfulness, meditation experience, and perceived stress levels of college students. Much of the previous research in these areas has focused on teaching individuals to meditate and then measuring to see if their stress level has changed. This study, however, examined the level of mindfulness of a person, without teaching them meditation. It then compared the participants' levels of mindfulness to how stressed the individuals perceived themselves to be. The study also looked at the relationship between a person's meditation experience and his or her perceived level of stress, and the differences between males and females when it comes to mindfulness and stress. The information in this study can be added to the growing number of studies involving these variables.

Overall, three hypotheses were developed for this research study. The first hypothesis stated that a person's level of mindfulness would be inversely correlated with their level of stress. The results of this first hypothesis were statistically significant. Mindfulness and stress levels were shown to be negatively correlated. This indicates that the stress levels of a person decrease as the level of mindfulness increases.

Previous mindfulness and stress studies share both similarities and differences with this study. For example, since both variables are difficult to define, level of stress and level of mindfulness were measured in various different ways. In these studies stress has been measured in the following ways: self-report questionnaires, changes in cerebral spinal fluid levels heart rate, skin resistance responses and forehead muscle tension, and

changes in brain structure (Koolhaaset et al., 2011; Miller et al., 1995) Mindfulness has been measured through self-report measures such as the Five Facet Mindfulness Questionnaire, the Freibury Mindfulness Inventory, the Kentucky Inventory of Mindfulness Skills, and the Cognitive and Affective Mindfulness Scale. Even with the differences in measurement, the results of these previous studies have been fairly consistent that mindfulness and stress are negatively correlated, and therefore support the results of the current study (Kabat-Zinn, 2012; Lee et al., 2007; Miller et al. 1995; Shapiro et al., 2007).

Although it is not entirely clear why mindfulness causes this decrease in stress, Garland and his colleagues (2009) claim they might know the answer. They believe that mindfulness is a metacognitive form of awareness that involves a process of decentering. Through this process, a person is able to view their stressful life events in alternative ways. This allows for individuals to reappraise stressful life events in a more positive way. Whether or not Garland and his colleagues are correct, the hope for many mindfulness researchers is that mindfulness will be utilized to help individuals struggling with high levels of stress.

The second hypothesis of this current study was that the meditation experience of an individual was related to their level of stress. Specifically, frequency of meditation will be negatively correlated with stress levels. This suggests that stress levels decrease for a person as they increase their amount of time meditating. The results for this hypothesis were also significant and previous research supports this hypothesis as well (Buchheld et al., 2001; Farb et al., 2007; Kabat-Zinn et al., 1992; Mohan et al., 2011).

As is the case with mindfulness, it is still unknown how meditating can lower a person's stress level. Some researchers believe that it might have something to do with slowing down brain function. In a study by Cahn and Polich (2006) the researchers found that EEG activity in the brain slows when a person reaches a meditative state. Other researchers have studied the brain the changes in brain structure of meditators and believe this might be causing the lower stress levels (Lazar et al., 2005). Once again, additional research is needed in order to better understand how and why meditation is effective at decreasing stress levels.

It should be noted that although mindfulness is a form of meditation and the two terms are often used interchangeably, this study examined meditation in general. Examples of other types of meditation include deep breathing, yoga, and prayer. The main difference between the various forms of meditation seems to have to do with where the practicer is focusing his or her attention. For example, a person who is practicing mindfulness focuses on the stimuli they are experiencing in the present moment. In contrast, a person practicing breathing meditation reaches a meditative state simply by focusing on his or her own breating. The practicer of yoga focuses on his or her body movements. These other styles of meditation have also been shown to lower stress levels (Alexander, Rainforth, & Gelderloos, 1991; Lazar, 2005; Paul, Elam, & Verhulst, 2007). The fact that there are several kinds of meditation that is effective at lower stress levels is helpful for high stressed individuals and clinicians trying to find the right treatments for their patients.

The third hypothesis consisted of two parts. The first part predicted a difference in mindfulness levels for males and females. Specifically, it stated that males would score

higher than females if neither group had meditation experience. For this part of the hypothesis, the results suggested that non-meditating males tend to exhibit higher levels of mindfulness than non-meditating females. This also proved to be the case when comparing the mindfulness levels of the entire sample. Males scored higher in mindfulness than females.

The results of previous research studying mindfulness levels of males and females are mixed (Baer et al., 2006; MacKillop et al., 2007). Many of the studies say one of two things: non-meditating males had higher levels of mindfulness than non-meditating females or both males and females had equal levels of mindfulness. One possible reason for these inconsistent results may have to do with the difference in defining and measuring mindfulness. Although there is an effort to accurately define mindfulness, there is a still not a consensus among researchers. If there does happen to be a difference in mindfulness levels for males and females, researchers may be able to learn valuable information about differences in the cognitions of males and females. In turn, this may lead to more effective treatments. Anglin and colleague's 2008 study showed that mindful learning can be used to close the gap between scores of males and females in a math class.

For the second part of this hypothesis, the stress levels of the males and females were compared. The hypothesis stated that if both males and females scored high in mindfulness, females would have lower levels of stress than males. No difference was found between the two groups suggesting that males and females had equal levels of perceived stress. This was also the case when the stress levels of the males and females who scored in the 25 percentile for mindfulness were compared. Even when high levels

of mindfulness were factored in, males and females showed no difference in levels of stress. These results are not consistent with previous research which tends to show females having higher levels of stress than males when mindfulness levels are low, and also shows females having lower levels of stress than males when mindfulness is high (Anglin et al., 2008; APA, 2012; Cohen & Janicki-Deverts, 2012).

One possible reason for the data not supporting the hypothesis and previous research may be that Baer's Five Facet Mindfulness Questionnaire does not specify what constitutes a high level of mindfulness. Scores on the questionnaire can range from 39 to 195. For this study, the top 25 individuals with the highest level of mindfulness were selected as having high level of mindfulness; however, this does not mean all 25 selected had high levels of mindfulness.

Limitations of the Study

It is important to note a few limitations found in this study. The first limitation to mention is the diversity of participants. According to the demographic data, there were twice as many female participants than male. In addition, 87 percent reported their ethnicity as Caucasian. There is a possibility that with a greater diversity of participants, the results may have been different.

Another limitation of this study was the questionnaires. The Five Facet Mindfulness Questionnaire (FFMQ) was used in this study because of the well worded questions, the dimensions of mindfulness it defines, and because it has good reliability and validity (Bohlmeijer et al., 2011). Higher scores on the FFMQ indicate higher levels of mindfulness, but this questionnaire does not include information defining cut-off scores for what constitutes high or low levels of

mindfulness. Even though this study chose to assign the 25 individuals who scored the highest on the FFMQ as having high mindfulness, this may not have been the best approach. Some of the top 25 mindfulness scores in this study may not be considered high mindfulness.

The mindfulness and stress questionnaires in this study were both self-report measures. They rely on the participants to honestly and accurately answer the questions. This also requires the participants to properly assess and understand themselves. In addition, the Measurement of Stressful Life Events requires individuals to remember stressful life events that happened in the time frame of a six month period. It may be difficult for a person to recall exactly when certain events happened and if they occurred during that six month time frame.

Finally, this survey can only be used to suggest relationships between mindfulness, meditation, and stress. A true experiment was not conducted and therefore this study cannot conclude whether increasing mindfulness causes a person's stress levels to lower or if a person with lower stress is just more mindful. However, numerous researchers have conducted experiments which do suggest that meditation can lead to higher levels of mindfulness and mindfulness does lead to lower stress levels (Galantino, Baime, Maguire, Szapary, & Farrar, 2005; Kutz, Borysenko, & Benson, 1985).

Practical Implications and Future Research

The increase in meditation and mindfulness research has enabled them to begin to making their way into many different areas of clinical psychology. Jon Kabat-Zinn, Ellen Langer, and other mindfulness researchers have played a major part in bringing attention to the possible benefits that mindfulness can have on individuals. All their hard work has

given researchers and clinicians new ways to study the mind. In 2012, the APA reported that there is reason for concern about the stress levels for Americans. According to this study, most Americans report that they are under moderate to high stress and 40% said their stress level has increased in the last 5 years (APA, 2012). Several studies have already shown the negative impact that stress can have on a person's health (Kemeny, 2007; Koolhaas et al., 2011).

Since each person is unique, understanding the relationship between meditation, mindfulness and stress gives therapists the ability to select treatments that work best for their patients. Kabat-Zinn's Mindfulness-Based Stress Reduction program is just one of many new treatments utilizing mindfulness to combat stress and other mental illnesses. Depending on the patient's beliefs, interests, and physical and mental abilities, other forms of meditation might be a better choice. In order to ensure the successful treatment of stress, it is important that future research focus on identifying how mindfulness and other forms of meditation lower stress levels. Current research appears promising, and it may not be long before researchers discover the answer.

References

Alexander, C., Rainforth, M., & Gelderloos, P. (1991). Transcendental meditation, self-actualization, and psychological health: A conceptual overview and statistical meta-analysis. *Journal of Social Behavior & Personality, 6*(5), 189-248.

American Psychological Association (1995). An update on empiracally validated therapies. Retreived from http://www.apa.org/divisions/div12/est/newrpt.pdf

American Psychological Association (2012). Latest APA survey reveals deepening concerns about connection between chronic disease and stress. Retreived from http://www.apa.org/news/press/releases/2012/01/chronic-disease.aspx

Anglin, L., Pirson, M., & Langer, E. (2008). Mindful learning: A moderator of gender differences in mathematics performance. *Journal of Adult Development*, *15*(3), 132-139. doi: 10.1007/s10804-008-9043-x

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: The Kentucky Inventory of Mindfulness Skills. *Assessment*, *11*(3), 191-206. doi: 10.1177/1073191104268029

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, *13*(1), 27-45.

Baer, R. A., Smith, G. T., Lykins, E., et al. (2008). Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples. *Assessment*, *15*(3), 329-42. doi: 10.1177/1073191107313003

Barnes, S., Brown, K., Krusemark, E., Campbell, W., & Rogge, R. (2007). The role of mindfulness in romantic relationship satisfaction and responses to relationship

stress. *Journal of Marital and Family Therapy*, *33*(4), 482-500.

Baxter, L., Schwartz, J., & Bergman, K. (1992). Caudate glucose metabolic rate changes with both drug and behavior therapy for obsessive-compulsive disorder. *Archives of General Psychiatry 49*, 681-689. doi: 10.1001/archpsyc.1992.01820090009002

Bishop, S., Lau, M., Shapiro, S., Carlson, L., Anderson, N., & Carmody, J. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice*, *11*(3), 230-241. doi: 10.1093/clipsy.bph077

Black, D. (2011). *A brief definition of mindfulness*. Retrieved November 29, 2012, from Mindfulness Research Guide: http://www.mindfulexperience.org

Black, D., Sussman, S., Johnson, C., & Milam, J. (2011). Psychometric assessment of the Mindful Attention Awareness Scale (MAAS) among Chinese adolescents. *Assessment*, *19*(1), 42-52. doi: 10.1177/1073191111415365

Bohlmeijer, E., Klooster, P., Fledderus, M., Veehof, M., & Baer, R. (2011). Psychometric properties of the Five Facet Mindfulness Questionnaire in depressed adults and development of a short form. *Assessment, 18*(3), 308-320. doi: 10.1177/1073191111408231

Britton, W., Shahar, B., Szepsenwol, O., & Jacobs, W. (2011). Mindfulness-based cognitive therapy improves emotional reactivity to social stress: Results from a randomized controlled trial. *Behavior Therapy*, *43*(2), 365-380. doi: 10 .1016/j.beth.2011.08.006

Brown, G., & Harris T. (1978). Social origins of depression: A reply. *Psychological Medicine*, 8, 577–588. doi: 10.1017/S0033291700018791

Brown, K., & Ryan, R. (2003). The benefits of being present: Mindfulness and its role in

psychological well-being. *Journal of Personality and Social Psychology*, *84*(4), 822-848. doi: 10.1037/0022-3514.84.4.822

Brown, D.W., West, A.M., Loverich, T.M., & Biegel, G.M. (2011). Assessing adolescent mindfulness: Validation of an adapted Mindful Attention Awareness Scale in adolescent normative and psychiatric populations. *Psychological Assessment*, *23*, 1023-1033. doi: 10.1037/a0021338

Buchheld, N., Grossman, P., & Walach, H. (2001). Measuring mindfulness and insight meditation (Vipassana) and meditation based psychotherapy: The development of the Freiburg Mindfulness Inventory (FMI). *Journal for Meditation and Meditation Research, 1*, 11-34.

Burpee, L., & Langer, E. (2005). Mindfulness and marital satisfaction. *Journal of Adult Development*, *12*(1), 43-51. doi: 10.1007/s10804-005-1281-6

Cahn, B., & Polich, J. (2006). Meditation states and traits: EEG, ERP, and neuroimaging studies. *Psychological Bullentin, 132*(2), 180-211. doi: 10.1037/0033-2909.132.2.180

Carlson, L., & Brown, K. (2005). Validation of the Mindful Attention Awareness Scale in a cancer population. *Journal of Psychosocial Resources*, *58*(1), 29-33. doi: 10.1016/j.jpsychores.2004.04.366

Carmody, J., & Baer, R. (2008). Relationships between mindfulness practice and levels of mindfulness, medical and psychological symptoms and well-being in a mindfulness-based stress reduction program. *Journal of Behavioral Medicine, 31*(1), 23-33. doi: 10.1007/s10865-007-9130-7

Chiesa, A., & Serretti, A. (2009). Mindfulness-based stress reduction for stress

management in healthy people: A review and meta-analysis. *Journal of Alternative Medicine, 7*(2), 1-7. doi:10.1089/acm.2008.0495

Chiesa, A., & Serretti, A. (2011). Mindfulness-based cognitive therapy for psychiatric disorders: A systematic review and meta-analysis. *Psychiatry Research*, *187*(3), 441-453. doi: 10.1016/j.psychres.2010.08.011

Cohen, S., & Janicki-Deverts, D. (2012). Who's stressed? Distributions of psychological stress in the United States in probability samples from 1983, 2006, and 2009. *Journal of Applied Social Psychology, 42*(6), 1320-1334.

Davidson, R., Kabat-Zinn, J., Schumacher, J., Rosenkranz, M., Muller, D., & Santorelli, S. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine*, *65*(4), 564-570. doi: 10.1097/01.PSY.0000077505.67574.E3

De Dios, M., Herman, D., Britton, W., Hagerty, C., Anderson, B., & Stein, M. (2011). Motivational and mindfulness intervention for young adult female marijuana users. *Journal of Substance Abuse Treatment*, *42*(1), 56-64. doi: 10.1016/j.jsat.2011.08.001

Dekeyser, M., Raes, F., Leijssen, M., Leysen, S., & Dewulf, D. (2008). Mindfulness skills and interpersonal behaviour. *Personality and Individual Differences*, *44*(5), 1235-1245. doi: 10.1016/j.paid.2007.11.018

DeLongis, A., Folkman, S., & Lazarus, R. (1988). The impact of daily stress on health and mood: Psychological social resources as mediators. *Journal of Personality and Social Psychology*, *54*, 486-495. doi: 10.1037/0022-3514.54.3.486

Evans, S., Ferrando, S., Carr, C., & Haglin, D. (2011). Mindfulness-based stress

reduction (MBSR) and distress in a community sample. *Clinical Psychology & Psychotherapy, 18*(6), 553-558. doi: 10.1016/S0306-4530(03)00054-4

Farb, N., Segal, Z., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., & Anderson A. (2007). Attending to the present: Mindfulness meditation reveals distinct neural modes of self-reference. *Social Cognitive and Affective Neuroscience, 2*(4), 313-322. doi: 10.1093/scan/nsm030

Galantino, M., Baime, M., Maguire, M., Szapary, P., & Farrar, J. (2005). Association of psychological and physiological measures of stress in health-care professionals during an 8-week mindfulness meditation program: Mindfulness in practice. *Stress and Health, 21*(4), 255-261. doi: 10.1002/smi.1062

Garland, E., Gaylord, S., & Park, J. (2009). The role of mindfulness in positive reappraisal. *Explore: The Journal of Science and Healing, 5*(1), 37-44. doi: 10.1016/j.explore.2008.10.001

Gerst, M. S., Grant, I., Yager, J., & Sweetwood, H. (1978). The reliability of the social readjustment rating scale: Moderate and long-term stability. *Journal of Psychosomatic Research, 22*(6), 519-523. doi: 10.1016/0022-3999(78)90008-9

Grant, A., Langer, E., Falk, E., & Capodilupo, C. (2004). Mindful creativity: Drawing to draw distinctions. *Creativity Research Journal*, *16*(2), 261-265. doi: 10.1080/10400419.2004.9651457

Hansen, E., Lundh, L., Homman, A., & Wangby-Lundh, M. (2009). Measuring mindfulness: Pilot studies with the swedish versions of the Mindful Attention Awareness Scale and the Kentucky Inventory of Mindfulness Skills. *Cognitive Behaviroal Therapy*, *38*(1), 2-15. doi: 10.1080/16506070802383230

Hayes, S. (2004). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behavior Therapy*, *35*(4), 34-65. doi: 10.1016/S0005-7894(04)80013-3

Holmes, T., & Rahe, R. (1967). Social readjustment rating scale. *Journal of Psychosomatic Research*, *2*, 213-218. doi: 10.1016/0022-3999(67)90010-4

Hölzel, B., Ott, U., Gard, T., Hempel, H., Weygandt, M., Morgen, K., & Vaitl, D. (2007). Investigation of mindfulness meditation practitioners with voxel-based morphometry. *Social Cognitive and Affective Neuroscience*, *3*(1), 55-61. doi: 10.1093/scan/nsm038

Jain, S., Shapiro, S., Swanick, S., Roesch, S., Millis, P., Bell, I., & Schwartz, G. (2007). A randomized controlled trial of mindfulness meditation versus relaxation training: Effects on distress, positive states of mind, rumination, and distraction. *Society of Behavioral Medicine*, *33*(1), 11-21. doi: 10.1207/s15324796abm3301_2

Joo, H., Lee, S., Chung, Y., & Shin, I. (2010). Effects of mindfulness based stress reduction program on depression, anxiety, and stress in patients with aneurysmal subarachnoid hemorrhage. *Journal of Korean Neurosurgical Society, 47*(5), 345-351. doi: 10.3340/jkns.2010.47.5.345

Kabat-Zinn, J., Massion, A., Kristeller, J. et al. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *The American Journal of Psychiatry, 149*(7), 936-943.

Kabat-Zinn, J. (2012). Major research findings at the Center for Mindfulness. Retreived from http://www.umassmed.edu/Content.aspx?id=42426

Kawakami, C., White, J., & Langer, E. (2000). Mindful and masculine: Freeing women

leaders from the constraints of gender roles. *Journal of Social Issues*, *56*(1), 49-63. doi: 10.1111/0022-4537.00151

Kirk, U., Downar, J., & Montague, P. (2011). Interoception drives increased rational decision-making in meditators playing the ultimatum game. *Fronters Neuroscience*, 5(49), 1-11. doi: 10.3389/fnins.2011.00049

Kemeny, M. (2007). Understanding the interaction between psychosocial stress and immune-related diseases: A stepwise progression. *Brain, Behavior, and Immunity, 21*(8), 1009–1018. doi: 10.1016/j.bbi.2007.07.010

Koolhaas, J., Bartolomucci, A., Buwalda, B., de Boer, S., Flugge, G., Korte, S., … Fuchs, E. (2011). Stress revisited: A critical evaluation of the stress concept. *Neuroscience and Biobehavioral Reviews, 35*, 1291–1301. doi: 10.1016/j.neubiorev.2011.02.003

Kristeller, J., & Hallett, C. (1999). An exploratory study of a meditation-based intervention for binge eating disorder. *Journal of Health Psychology*, *4*(3), 357-363. doi: 10.1177/135910539900400305

Kutz, I., Borysenko, J., & Benson, H. (1985). Meditation and psychotherapy: A rationale for the integration of dynamic psychotherapy, the relaxation response, and mindfulness meditation. *The American Journal of Psychiatry,142*(1), 1-8.

Lazar, S. W., Kerr, C. E., Wasserman, J. R., Gray, J. R., Greve, D. N., Treadway, M. T., & Bruce, F. (2005). Meditation experience is associated with increased cortical thickness. *Neuroreport, 16*(17), 1893-1897. doi: 10.1097/01.wnr.0000186598.66243.19

Lee, S. H., Ahn, S. C., Lee, Y. J., Choi, T. K., Yook, K. H., & Suh, S. Y. (2007). Effectiveness of a meditation-based stress management program as an adjunct to pharmacotherapy in patients with anxiety disorder. *Journal of Psychosomatic Research, 62*(2), 189-195. doi: 10.1016/j.jpsychores.2006.09.009

Linehan, M. (1997). Dialectical behavior therapy (DBT) for borderline personality disorder. *The Journal of the California Alliance for the Mentally Ill, 8*(1), 50.

Linehan, M., Armstrong, H., Suarez, A., Allmon, D., & Heard, H. (1991). Cognitive-behavioral treatment of chronically parasuicidal borderline patients. *Archives of General Psychiatry*, *48*, 1060-1064. doi:10.1001/archpsyc.1991.01810360024003

MacKillop, J., & Anderson, E. J. (2007). Further psychometric validation of the Mindful Attention Awareness Scale (MAAS). *Journal of Psychopathology and Behavioral Assessment*, *29*(4), 289-293. doi: 10.1007/s10862-007-9045-1

Miller, J., Fletcher, K., & Kabat-Zinn, J. (1995). Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *General Hospital Psychiatry, 17*(3), 192-200. doi: 10.1007/s10862-007-9045-1

Mohan, A., Sharma, R., & Bijlani, R. (2011). Effect of meditation on stress-induced changes in cognitive functions. *The Journal of Alternative and Complementary Medicine, 17*(3), 207-212.

Paul, G., Elam, B., & Verhulst, S. (2007). A longitudinal study of students' perceeptions of using deep breathing meditation to reduce testing stresses. *Teaching and Learning in Medicine: An International Journal, 19*(3), 287-292. doi: 10.1089/acm.2010.0142

Rahe, R. H., Mahan, J. L., & Arthur, R. J. (1970). Prediction of near-future health change from subjects' preceding life changes. *Journal of Psychosomatic Research, 14*(4), 401-406. doi: 10.1016/0022-3999(70)90008-5

Substance Abuse and Mental Health Services Administration (2011). SAMHSA's national registry of evidence-based programs and practices. Retrieved from http://nrepp.samhsa.gov/ViewIntervention.aspx?id=191

Segal, Z., Teasdale, J., & Williams, M. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse.* New York: Guilford Press.

Shao, R., & Skarlicki, D. (2009). The role of mindfulness in predicting individual performance. *Candian Journal of Behavioural Science, 41*(4), 195-201. doi: 10.1037/a0015166

Shapiro, D. (1992). A preliminary study of long-term meditator: Goals, effects, religious orientation, cognitions. *Journal of transpersonal Psychocology, 24,* 23-39.

Siegel, D. (2010). Mindfulness training and neural integration: Differentiation of distinct streams of awareness and the cultivation of well-being. *Oxford Journals*, *2*(4), 259-263. doi: 10.1093/scan/nsm034

Siegel, R. D., Germer, C. K., & Olendzki, A. (2009). *Mindfulness: What is it? Where did it come from?* (F. Didonna, Ed.) New York: Springer Science and Business Media.

Van Dam, N., Earleywine, M., & Danoff-Burg, S. (2009). Differential item function across mediators and non-meditators on the Five Facet Mindfulness Questionnaire. *Personality and Individual Differences*, *47(1)*, 516-521. doi: 10.1016/j.paid.2009.05.005

Westbrook, C., Creswell, J., Tabibnia, G., Julson, E., Kober, H., & Tindle, H. (2011).

Mindful attention reduces neural and self-reported cue-induced craving in smokers. *Social Cognitive and Affective Neuroscience,* 6(7), 11-15. doi: 10.1093/scan/nsr076

Woody, S., Weisz, J., & McLean, C. (2005). Empirically supported treatments: 10 years later. *The Clinical Psychologist, 58*(4), 5-11.

TABLES

Table 1

Means and Standard Deviations for Levels of Mindfulness

Gender	***M***	***SD***
Males	136.06	23.14
Females	122.92	21.43

Table 2

Means and Standard Deviations for Levels of Stress

Scenario	***M***	***SD***
Males	67.65	59.92
Females	61.11	35.16

APPENDIX A

Recruitment Email

Recruiting script sent via email to undergraduate students taking summer classes at FHSU:

Hello, my name is Michael Gallagher and I am a graduate student at Fort Hays State University currently working to obtain my Master's Degree in Clinical Psychology. I am conducting thesis research on the relationship between an individual's level of mindfulness and his or her level of stress. Participation in this research is entirely voluntary. If you do not wish to participate, I thank you for your consideration and you may disregard this e-mail. If you should wish to participate, please click the ***attachment labeled Informed Consent*** and read through the form carefully. If you consent, please click the link located at the bottom of this e-mail. Upon clicking the link, you will be sent to a web-based survey involving questionnaires that are intended to assess your level of mindfulness and your level of stress. After the survey is complete, a code word will be displayed on the screen. If your instructor is allowing you course credit or extra credit, you can email him or her the code word to verify that you completed the survey. All information gathered will be kept confidential and will be destroyed following data collection. The survey will take approximately 30 minutes to complete.

If you have any questions regarding this research, or if you would like to participate in this study, please contact me at m_gallagher@mail.fhsu.edu or simply reply to this email.

Thank you for your time,
Michael Gallagher
Graduate Student
Fort Hays State University

APPENDIX B

Informed Consent

CONSENT TO PARTICIPATE IN RESEARCH

Department of Psychology, Fort Hays State University

Mindfulness and Stress

Name of Researcher: Michael Gallagher
Contact Information: m_gallagher@scatcat.fhsu.edu
Name of Faculty Supervisor & Contact Information, if student research:
Dr. Bonds-Raacke, 785-628-4403, jmbondsraacke@fhsu.edu

You are being asked to participate in a research study. It is your choice whether or not to participate. Your decision on whether or not to participate will have no effect on benefits, services, academic standing, job status, or anything else to which you are otherwise entitled.

What is the purpose of this study?

Mindfulness is a form of meditation that has been suggested to help individuals deal with stress. This study examines the relationship between a person's level of mindfulness and his or her level of stress.

What does this study involve?

This online study includes reading an informed consent, completing a short demographic data form, answering a questionnaire on mindfulness, answering a questionnaire on stress, and then reading a debriefing statement. The informed consent and debriefing statements will be available to print out if you desire. After completion of the study, a certificate will be available to print out to show completion of participation in a research project.

None of the procedures or questionnaires used in this study are experimental in nature. The only experimental aspect of this study is the gathering of information for analysis. This study and its data is maintained at an online site called Survey Monkey. This is a very secure site, using various advanced encryption and other security techniques. You can read about the site's security procedures at their website (http://www.surveymonkey.com/mp/policy/security/).

If you decide to participate in this research study, you will be asked to indicate your understanding and acceptance of this consent form after you have read and understand what will happen to you. The length of time of your participation in this study will be about 30 minutes. Approximately 100 participants will be in this study.

Are there any benefits from participating in this study?

There will be no benefits to you should you decide to participate in this study. Your participation may provide a small contribution to the field of psychology in terms of how mindfulness affects levels of stress.

Will you be paid or receive anything to participate in this study?

No, you will not receive any monetary compensation for doing this study. However, you will receive research credit or extra credit if your class instructor allows it. You will not receive any compensation if the results of this research are used towards the development of a commercially available product.

What are the risks involved with being enrolled in this study?

It is unlikely that participation in this project will result in harm to participants. Sometimes talking about these subjects can cause people to become upset. You do not have to talk about any subjects you do not want to talk about, and you may stop participating at any time. If you feel distressed or become upset by participating, please contact the *Kelly Center, 785-628-4401.*

How will your privacy be protected?

Efforts will be made to protect the identities of the participants and the confidentiality of the research data used in this study. At no point will you be asked to provide your name, and only summary results of data collected will be reported. Data will be saved only until the study ends and will be destroyed at that time. Access to all data will be limited to the researcher and faculty advisor.
The information collected for this study will be used only for the purposes of conducting this study. What we find from this study may be presented at meetings or published in papers but your name will not ever be used in these presentations or papers.

Other important items you should know:

• **Withdrawal from the study:** You may choose to stop your participation in this study at any time. Your decision to stop your participation will have no effect on your receiving class credit.

• **Funding:** There is no outside funding for this research project.

Whom should you call with questions about this study?

If you have questions, concerns, or suggestions about human research at FHSU or specific questions about this particular study, you may call the Office of Scholarship and Sponsored Projects at FHSU (785) 628-4349 during normal business hours. You may also contact Dr. Janett Naylor, Chair of the Psychology Department Ethics Committee, 785-628-5857, jmnaylor@fhsu.edu.

CONSENT

I have read the above information about ***Mindfulness and Stress***. By clicking on the link sent in this e-mail, I agree to participate in this study. I have been given the opportunity to print a copy of this signed consent document for my own records. I understand that I can change my mind and withdraw my consent at any time. By clicking on the link located in this e-mail I understand that I am not giving up any legal rights. I am 18 years or older.

APPENDIX C

Demographic Form

1. Are you male or female?

Male
Female

2. What is your age?

3. Please select your class ranking.

Freshman
Sophomore
Junior
Senior
Graduate

4. Please select your ethnicity.

White or Caucasian
Black or African-American
American Indian or Alaskan Native
Asian
Native Hawaiian or other Pacific Islander
From multiple races
Other (please specify)

5. Do you currently meditate? If you are not currently meditating, please skip questions 8 and 7.

Yes
No, but I used to meditate
No, I have never meditated before

6. If you do meditate, how long have you been meditating?

Not Long 1 2 3 4 5 An extended period of time
I am new to meditating I am experienced at meditating

7. If you do meditate, how long do you meditate in one sitting?

Short periods of time 1 2 3 4 5 Extended periods of time

APPENDIX D

Five Facet Mindfulness Questionnaire

Five Facet Mindfulness Questionnaire

Instructions:

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.
_____ 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.

Reference:

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27-45.

APPENDIX E

Measurement of Stressful Life Events

Directions: The following is a list of life events that many people may experience at some time in their life. If you have experienced any of these events between the time period of 1 to 6 months ago, please indicate how stressed you currently feel about that event. Place a check mark under N/A if the event has happened in the last 30 days or more than 6 months ago.

	Not Stressed 0	1	2	3	4	5	6	7	8	9	Very Stressed 10	N/A
Major physical illness or injury												
Recent surgical operation												
Unhealthy (overweight, not sleeping, etc.)												
Started a new relationship												
Separated from a loved one												
Marriage												
Trouble starting a romantic relationship												
Divorce												
Conflict in romantic relationship												
Death of spouse or significant other												
Became pregnant (spouse became pregnant)												
Birth of a child												
Child starting school/daycare												
Conflict with family member or relative												
Serious illness of family member or relative												
Death of a family member or relative												
Conflict with a friend(s)												
Trouble making friends												
Problems with pet(s)												
Death of a friend												
Death of pet(s)												
Started new job												
Received promotion												
Quit or was terminated from a job												
Conflict with co-worker(s)												
New boss												
Started College												
Started Graduate Program												
Failing a class												
Conflict with professor(s)												
Conflict with classmates												
High course load (exams, homework, projects)												
Switched majors												
Financial aid probation or suspension												
Low finances												
High credit card debt												
Filed bankruptcy												
Being sued or suing someone												
Arrested												
Spent time in jail												
Conflict with landlord												
Bought or sold a house												
Moved												
Messy living spaces												
Conflicts with roommates												
Conflicts with neighbors												

APPENDIX F

Debriefing Statement

Debriefing Statement

Thank you very much for your participation in this research on mindfulness and stress. The purpose of this study is to determine whether a person who exhibits high characteristics of mindfulness has lower levels of stress than a person with lower characteristics of mindfulness. It also will determine if gender, age, or meditation experience affect the results. Current research has found that mindfulness meditation does lower a person's level of stress. Your participation was important in helping researchers understand more about the relationship of mindfulness and stress, particularly in a college setting.

Final results will be available by August 1st, 2012. You may contact me at m_gallagher@mail.fhsu.edu to receive a summary of the results. This study did not contain right or wrong answers. If you are feeling personal discomfort as a result of doing this study for any reason, please contact your local mental health provider or a professional at the Kelly Center on campus (1-785-628-4401). Virtual students can also call toll-free at 1-800-628-FHSU (3478) and ask for the Kelly Center.

Thank you very much for your participation in this study. Below you will find the code to give to your professor if they are offering extra credit.