

KEEP CALM AND CARRY ON: AN EXAMINATION OF OUTCOMES
FOLLOWING A SINGLE-SESSION MINDFULNESS MEDITATION TRAINING

by

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This thesis was prepared under the direction of the candidate's thesis advisor, Dr. Laura Vernon, and has been approved by the members of her supervisory committee. It was submitted to the faculty of The Honors College and was accepted in partial fulfillment of the requirements for the degree of Bachelor of Arts in Liberal Arts and Sciences.

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ABSTRACT

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Mindfulness involves nonjudgmental awareness of the present moment. Previous research has found that higher levels of mindfulness are positively associated with adaptive psychological outcomes and negatively associated with maladaptive outcomes. We examined the effects of a 55-minute mindfulness training session comprised of psychoeducation and meditation. Questionnaires measuring mindfulness, emotion regulation, stress, anxiety, social behavior and emotion, and mood were administered pre and post session and at one week follow-up. Consistent with hypotheses, mindfulness and social behavior and emotion increased from pre-session to one-week follow-up and difficulties in emotion regulation, negative mood, and perceived stress significantly decreased. These findings suggest that some of the beneficial results found with longer, more intensive mindfulness training programs may be achievable with a short single-session intervention.

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Introduction

Mindfulness

Mindfulness refers to the ability to think in the present moment, to be cognizant of one's own thoughts and physical state. It requires "moment-to-moment, non-judgmental awareness cultivated by paying attention in a specific way, that is in the present moment, and is as non-reactively, as non-judgmentally and as open-heartedly as possible" (Kabat-Zinn, 2005, p. 108-109). This focus is a goal of mindfulness meditation, which aims to shift attention to the present through a variety of mental exercises and guided imagery. There has been a significant amount of research on mindfulness in recent years, as evidenced by several meta-analyses examining the benefits of mindfulness, such as decreases in rumination and anxiety (Chiesa & Serretti, 2009; Eberth & Sedlmeier, 2012; Grossman, Niemann, Schmidt, & Walach, 2004).

Although the clinical effectiveness of mindfulness is a relatively new discovery, the concepts of mindfulness have been in existence for centuries. An ancient text of Buddhism, the Dhammapada, puts forth that "those who are mindful do not die; those who are not mindful are as if already dead" (1986, Verse 21). According to Buddhism, a person lives a richer life spiritually if they act according to the principles of mindfulness. Furthermore, an ancient text of Hinduism, the Bhagavad Gita, touches on the concept of mindfulness when proposing that "the mind acts like an enemy for those who don't control it" (Prasad, 2004, 6.05-06); having command over emotions and thoughts is essential in mindfulness meditation. Carl Rogers advocated for mindfulness principles within the realm of psychology; he encouraged a person to be "fully open to his experience, completely without defensiveness" on the journey to becoming more like the

ideal fully functioning person (1961, p. 20). If mindfulness has been theorized to lead to better psychological function, why not try testing its effectiveness in treating clients as an aid in therapy, especially for those with ruminating depressive thoughts or obsessive anxieties about the future?

Mindfulness can be defined in terms of a two-component model (Bishop, et al., 2004). The first component is the self-regulation of attention, which allows for acknowledgment of events in the precise moment. The second component consists of an open attitude towards the experiences in the moment. This attitude should be characterized by curiosity, openness, and acceptance. Being mindful is “often described as a feeling of being fully present and alive in the moment” (Bishop, et al., 2004, p. 232).

Mindfulness can be seen as both a general trait – rooted in personality and as a malleable state – conceivably changeable based on environment, mood, etc. Although most research discusses general mindfulness (Lakey, Campbell, Brown, & Goodie, 2007; Murphy, Mermelstein, Edwards, & Gidycz, 2012; Rasmussen & Pidgeon, 2011; Way, Creswell, Eisenberger, & Lieberman, 2010), Bishop et al. (2004) make the case that mindfulness is a state because its initial and continued evocation is dependent upon attention while having an open orientation to experience. This state quality is evidenced by the existence of the Toronto Mindfulness Scale (TMS) which assesses the “subjective experience of a mindfulness state retrospectively in reference to mindfulness meditation techniques designed to evoke the mindfulness state” (Lau et al., 2006, p. 1447).

Investigating mindfulness from both perspectives will likely allow researchers to obtain a fuller understanding of mindfulness.

Meditation and mindfulness

By definition, meditation is related to mindfulness. Theorists have suggested that it is necessary to be mindful in order to meditate and meditation is an established technique for increasing levels of mindfulness. Meditation's focus and awareness on the present moment allows the individual to achieve a higher state of mindfulness and cultivate non-judgmental acceptance (Moore & Malinowski, 2009).

Walsh and Shapiro (2006) offer the following definition of meditation: "a family of self-regulation practices that focus on the attention and awareness in order to bring mental processes under greater voluntary control and thereby foster general mental well-being and development and/or specific capacities such as calm, clarity, and concentration" (p. 229). The most researched forms of meditation include transcendental meditation, repeating a mantra with the goal of quieting the mind and going above typical internal dialogue, and mindfulness meditation, attending to thoughts, emotions, sensations, and perceptions (without judgment) in the present moment (Astin, Shapiro, Eisenberg & Forsyth, 2003). Other common practices and techniques related to meditation include concentrated breathing, muscle relaxation, guided imagery, visualization, and stretching.

Recently, there has been extremely strong evidence suggesting emotional and psychological benefits of meditation for nonclinical groups. A meta-analysis by Sedlmeier et al. (2012), comprised of 125 empirical studies, reported the strongest effect sizes for meditation in the areas of emotionality and relationship issues. They also reported medium effect sizes in the areas of attention and cognition. Interestingly, Sedlmeier et al. found that findings varied for the different approaches to meditation, such as

transcendental, mindfulness, etc. These results imply significant benefits resulting from several types of meditation based on a large collection of studies.

For example, Goleman and Schwartz (1976) found, compared to a control group, 30 young adults in a meditation condition habituated heart rate and phasic skin conductance more quickly and experienced less subjective anxiety after watching a stressor film. Participants were asked to do transcendental meditation (experimental), relax with their eyes open (control), or relax with their eyes closed (control). Rausch, Gramling, and Auerbach (2006) assigned 387 undergraduate students to meditation (noncultic form of mantra meditation), progressive muscle relaxation (PMR) or a control condition. The researchers found that the meditation and PMR groups decreased more in cognitive, somatic and state anxiety than the control group after responding to a transitory stressor. Meditation effectively demonstrates a positive influence on nonclinical populations, which mindfulness also hopes to accomplish.

Mindfulness meditation and its benefits

Guided sessions of meditation and psychoeducation seem to be useful for increasing mindfulness and thus increasing its associated benefits (Carmody & Baer, 2008; Schoormans & Nyklíček, 2011). Due to possible benefits, mindfulness and meditation have recently become a part of psychological treatment methods. According to a recent study, 65 students in a small liberal arts college who underwent 12 weekly guided mindfulness meditations (total treatment time was approximately 2.5 to 18 hours, depending on condition) reported at least one benefit of meditation, including decreased anxiety/stress, increased calmness/relaxation/peace, and increased attention/awareness (Sears, Kraus, Carlough, & Treat, 2011). There were no differences reported for which

subgroups of the college population reported a greater number of benefits.

According to a cross-sectional study with 613 undergraduate psychology students, general mindfulness has been found to be positively correlated with various dimensions of emotion regulation (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Mindfulness has also been reported to be negatively correlated with a range of anxiety symptoms after participants with social anxiety disorder underwent Mindfulness-Based Stress Reduction (MBSR) for approximately 26 hours involving eight weekly 2.5 hour sessions and a half-day meditation retreat (Goldin, Ramel, & Gross, 2009). A second study has found similar benefits following MBSR three years after initial treatment with 18 individuals with diagnosed anxiety disorders (Miller, Fletcher, & Kabat-Zinn, 1995). Repeated measures analysis showed maintenance of gains initially made following 23.5 hours of MBSR over a span of 8 weeks (Miller et al., 1995).

Mindfulness Based Stress Reduction (MBSR)

One of the most common strategies employed in current studies looking at the effects of mindfulness is MBSR. While many studies slightly modify the stress reduction treatment plan, they all follow similar guidelines originally based on an 8-week program in a study for medical students (Shapiro, Schwartz, & Bonner, 1998), which was based on Kabat-Zinn's (1982) Stress Reduction and Relaxation Program. Participants received training in 'sitting meditation' (attending to awareness of "body sensations, thoughts, emotions while continually returning the focus of attention to the breath"), conducting a 'body scan' (gradually shifting attention in the body in order to observe any sensations), and Hatha Yoga (involving stretches and postures, which was incorporated for enhance awareness and balance) (Shapiro, et al., 1998, p. 586). To complement these practices,

participants were presented with information on the psychological and physiological effects of stress and how to cope with it. Smaller discussion groups allowed for sharing and social support. Total treatment time often involves 2.5 hours each week for 7 weeks totaling 17.5 hours as well as home practice assignments and daily journals. Typically, there is also an all-day retreat approximately midway through treatment.

MBSR's effectiveness was evaluated in a meta-analysis by Grossman and colleagues (2004), who selected 20 studies out of an original field of 64, finding medium effect sizes of approximately 0.5 ($p < .0001$). Thus, MBSR demonstrates its ability to help a broad range of people cope with clinical and nonclinical problems.

Most studies aiming to increase mindfulness and its adaptive properties, especially studies utilizing MBSR, contain approximately 8 to 12 weekly sessions of mindfulness training or meditation. Even mindfulness studies that report "brief" mindfulness training define this as containing five 45-minute sessions over a 4-week period (McMillan, Robertson, Brock, & Chorlton, 2002) and four sessions over a four day period (Zeidan, Johnson, Diamond, David, & Goolkasian, 2010). To our knowledge, no studies to date have examined the efficacy of a single session of mindfulness and meditation training.

Variables influenced by mindfulness training session

Emotion Regulation. Overall, emotion regulation can be defined as how much people report using certain strategies to try to adjust their emotional state. In the proposed study, two distinct facets of emotion regulation are of interest, suppression and reappraisal (Gross, 2001). Suppression refers to pushing thoughts and emotions out of one's mind in order to avoid experiencing or expressing a particular emotion. Reappraisal

is when people change how they think about a situation, object, person, emotion, etc. in order to change its emotional impact. According to John and Gross (2004), individual differences in increased use of reappraisal and decreased use of suppression are more common in healthy emotion regulation profiles of adults. Unfortunately, much of the current literature on emotion regulation and mindfulness only pertains to overall emotion regulation and does not examine different kinds of emotion regulation separately.

The available research suggests that difficulties in emotion regulation may be negatively associated with mindfulness. In one study, 199 British participants (84% female) recruited through university email and opportunity sampling, filled out an online questionnaire battery measuring mindfulness, close relationships and emotion regulation (Goodall, Trejnowska, & Darling, 2012). This correlational study found a relationship between mindfulness and six different aspects of difficulties with emotion regulation: non-acceptance of emotional responses, difficulties engaging in goal directed behavior, impulse control difficulties, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity. The causal relationship between mindfulness and difficulties in emotion regulation is impossible to determine from a correlational study, but Goodall et al. (2012) posit bidirectional influence, suggesting that mindfulness training may lead to less difficulty with emotion regulation and, conversely, people with “adaptive emotion regulation strategies will be higher in naturally occurring mindfulness” (p. 625). Another study also points toward a correlation between mindfulness and emotion regulation (Hill & Updegraff, 2012). Using the Five Facet Mindfulness Questionnaire (FFMQ) and the Difficulties in Emotion Regulation Scale (DERS) with 96 college students, they found that greater self-reported mindfulness was

related to fewer emotion regulation difficulties

Stress and Anxiety. In addition to such correlational evidence of the potentially adaptive nature of mindfulness, there is also emerging experimental evidence, primarily in regard to stress and anxiety. Preliminary research suggests that two months of weekly MBSR increases emotion regulation in 14 participants with social anxiety disorder (Goldin & Gross, 2010). After MBSR, 14 participants showed a decrease in negative emotion experience and amygdala activity as well as improvements in anxiety, depression symptoms, and self-esteem.

Mindfulness research commonly reports reduced stress and anxiety as a result of increased mindfulness (Chiesa & Serretti, 2009; Goldin & Gross, 2010; Goldin, et al., 2009; Grossman, et al., 2004; Miller, et al., 1995; Paulik, Simcocks, Weiss, & Albert, 2010).

In meta-analysis of ten articles studying MBSR for non-clinical ‘healthy’ individuals, Chiesa & Serretti (2009) found reduced levels (equitable to results of meditation program) of stress compared to an inactive control group. MBSR was able to reduce ruminative thinking and trait anxiety, as well as increase empathy and self-compassion. A second meta-analysis by Grossman, Niemann, Schmidt & Walach (2004) found, with 20 studies, that MBSR can help a broad range of individuals to cope with their clinical and nonclinical problems. While this meta-analysis did not necessarily focus on stress and anxiety outcomes, it can be assumed since MBSR was employed, the effect size of 0.5 ($p < .0001$) found is related to reducing stress.

Additional preliminary research with strictly clinical populations has also found support for the efficacy of mindfulness-based treatments. Social anxiety, as measured by

the Anxiety Disorders Interview Schedule, decreased in 16 participants who underwent approximately 26 hours of MBSR (Goldin, Ramel & Gross, 2009). Goldin and Gross (2010) reported significant decreases in symptoms of social anxiety disorder for 14 participants with social anxiety disorder following approximately 26 hours of MBSR. Furthermore, a pilot study of 7 individuals with severe mental disorders found significant reductions in reported stress and anxiety after twelve weekly two hour mindfulness therapy sessions of MBSR (Paulik, et al., 2010). Additionally, after an 8-week group stress reduction intervention based on mindfulness and meditation, 22 participants reported a decrease in anxiety disorder symptoms at post-treatment and 3 month follow-up (Miller, Fletcher, & Kabat-Zinn, 1995). These participants, ranging from 26 to 64 years old (77% female), were all diagnosed pre-treatment with DSM-III-R defined anxiety disorders (average disorder duration = 6.5 years). Furthermore, they found three years after the study that anxiety and fear scores were still significantly improved and the majority of the participants were still using the meditation practices.

Social Behavior and Emotion. It has been reported that having a better social support system, such as high quality relations with best friends, is associated with greater well-being (Birditt, Antonucci, 2007). In a correlational study, Goodall, et al. (2012) found a significant (and possibly bi-directional) relationship between mindfulness and a person's level of attachment, measured by the Experiences in Close Relationships Questionnaire – Revised (ECR-R). The ECR-R measure is comprised of two subscales measuring attachment-related anxiety and attachment-related avoidance. Higher scores indicate higher levels of avoidance and/or anxiety and therefore a more insecure attachment. In an earlier study, Cordon, Brown, and Gibson (2009) found that MBSR

may provide greater stress reduction benefits for insecurely attached individuals. Participants attended eight weekly 2.5 hour classes and a daylong retreat (totaling approximately 30 hours) and participants were asked to spend an additional 45 minutes a day, 6 days a week practicing at home.

Further correlational research shows that mindfulness could indicate more positive relationship satisfaction. Barnes, Brown, Krusemark, Campbell, and Rogge (2007) found in two separate studies that higher trait mindfulness predicted higher relationship satisfaction (as measured by the Dyadic Adjustment Scale and Satisfaction subscale of the Investment Model Scale) and greater abilities to respond constructively to relationship stress. The second study involving a ‘conflict discussion paradigm’, not only confirmed their initial findings but also demonstrated that trait mindfulness predicted lower emotional stress responses and state mindfulness was related to better communication quality. Although both studies used young adult college students, the first study used 82 individuals and the second used 60 heterosexual couples who had been dating for more than 3 months. Confirming Barnes et al.’s work (2007), a further study provided evidence for a connection between mindfulness and greater intimate relationship satisfaction in 33 married couples, duration of marriage averaged 12 years (Wachs & Cordova, 2007).

Although these correlational studies imply a connection between mindfulness and social behavior and emotion, researchers have also found that a mindfulness-based relationship enhancement treatment can favorably impact couples’ levels of relationship satisfaction, relatedness, closeness, etc. in 44 non-distressed heterosexual couples compared to a waitlist control group (Carson, Carson, Gil, & Baucom, 2004). Couples

involved in this study attended 8 weekly 150 minute group sessions and a full day retreat (approximately totaling 30 hours).

Given preliminary findings of the influence of attachment on mindfulness outcomes, it may be reasonable to expect social closeness in friendships to be related to mindfulness.

Positive & Negative Affect State-like affective experience (mood) is an influential factor affected by mindfulness training. In a group of 64 participants with a life-time history of depression and current residual depressive symptoms, mindfulness-based cognitive therapy (MBCT), was associated with significant increases of positive emotions in comparison to a control group (Geschwind, Peeters, Drukker, van Os, & Wichers, 2011). Total treatment time for participants was approximately 20 hours in addition to 30-60 minute daily homework exercises. A study by Jha, Stanley, Kivonage, Wong and Gelfand (2010) found that higher mindfulness training practice time among two military cohorts corresponded with lower levels of negative affect and higher levels of positive affect, as measured by the Positive and Negative Affect Schedule (PANAS). Participants underwent approximately 24 hours of “Mindfulness-Based Mind Fitness Training (MMFT)” (p. 56), created and delivered by a former U.S. Army officer with many years of mindfulness practice and training in MBSR and trauma resilience. The course paralleled many of the features of MBSR but also incorporated training and skills helpful to the military population, such as links between physical and mental fitness, stress, trauma and resilience in the body.

In a population more similar to that of the current study, 514 college students showed higher levels of general mindfulness positively associated with higher levels of

positive emotions and negatively associated with depressive symptoms (Jimenez, Niles, & Park, 2010).

Objective

The objectives of this study are to determine what effect a single 55-minute mindfulness meditation training session has on scores of mindfulness, emotion regulation, stress, anxiety, mood, and perceived social behavior and emotion.

Hypotheses

Mindfulness. We hypothesize that general mindfulness will significantly increase from pre-session to the one week follow-up. In addition, state mindfulness is expected to increase from pre-session to immediately post-session and remain elevated at the one week follow-up.

Emotion Regulation. Comparing scores from pre-session to the one week follow-up, we hypothesize that participants will report increased reappraisal and decreased suppression use. Additionally, we expect to also find a decrease in self-reported difficulty with emotion regulation.

Stress and Anxiety. We predict that stress will be significantly reduced from pre-session to the one week follow-up. Similarly, we hypothesize that state anxiety will significantly decrease from pre-session to immediately post-session and that this decrease will be maintained at the one week follow-up.

Social Behavior and Emotion. We hypothesize that after the meditation session, participants will report significantly improved social behavior and emotions from pre-session to the one week follow-up.

Mood. We hypothesize that negative mood will be significantly decreased and positive mood will be significantly increased from pre-session to immediately post-session.

Methods

Participants

Participants were recruited from the Jupiter campus of Florida Atlantic University, primarily from the Honors College, through responding to class announcements and online advertisements on social networks. There were 103 participants, 32 males (30.8%) and 70 females (67.3%). There were a total of 76 experimental participants (73.1%) and a total of 28 control waitlist participants (26.9%). Participants' ages ranged from 18 to 25 years old (median = 19.7, *SD* = 2.4).

The majority (69.2%) of participants had previously meditated. Of those that reported previous meditation experience, 51.4% reporting having meditated "only a few times in my life". Only 6.9% of participants reported that they meditated daily.

In order to encourage full completion of the study, participants in psychology classes were compensated with extra credit or course points. Other participants were compensated with \$10 gift cards. Of 105 initial participants, one control participant failed to return to the follow-up session and another experimental participant failed to complete the online survey one week after the session and their data were not included in analyses.

Procedure

Pre-treatment questionnaire measures were administered in one of two semi-randomized orders; measures were allocated into two groups of priority (appearing first in packet) and non-priority and then randomly ordered within those groups. The priority

group of questionnaires measured mindfulness, emotion regulation, perceived stress, and anxiety. After completing the measures, participants in the control waitlist condition scheduled a time to return the following week to complete the same measures and go through the mindfulness meditation session. Participants in the experimental condition immediately participated in the 55 minute mindfulness training session comprised of four meditations, three psychoeducation components, and some discussion (described in further detail below). Following the mindfulness training session, all participants completed four post-treatment questionnaires in one of two randomized orders. Lastly, one week following the mindfulness meditation session, participants received an e-mail requesting that they complete eight follow-up questionnaires online using a [surveymonkey.com](https://www.surveymonkey.com) link.

Mindfulness Meditation and Psychoeducation Session

The scripted sessions, averaging 55 minutes in duration (range 43-82 minutes), were delivered by the two undergraduate authors of this study in a converted classroom – large empty space with yoga mats and pillows. Participants first completed a deep breathing and body relaxation meditation. After every meditation, participants were given the opportunity to discuss their meditation experience. The following is a brief outline of the session:

1. Defined mindfulness in great detail using a slideshow
2. Played an audio clip of Deepak Chopra describing mindfulness and gratefulness
3. Discussed previous experiences of mindfulness and opportunity for clarification questions
4. Used an unguided nature meditation of birds chirping and running water
5. Taught, with a slideshow, to recognize symptoms of stress, how to use a mindful approach for combating stress (first observing and contextualizing a situation, describing the emotional response to the stimuli and finally participating and acting within the event) and how to apply that technique in a hypothetical

example

6. Led guided imagery meditation - allowed people to imagine their own version of a 'happy place' after descending white stairs
7. Described mindfulness applications in everyday life and tips for meditation at home

Measures

Participants completed several questionnaires designed to measure mindfulness, social behavior and emotions, emotion regulation, stress and anxiety, mood, demographics, treatment credibility and attitudes and experience regarding meditation.

Mindfulness. The *Five Facet Mindfulness Questionnaire (FFMQ)*; Baer, et al., 2006) is a 39-item questionnaire measuring dispositional mindfulness with items rated on a 5-point Likert scale from “never or very rarely true” to “very often or always true”. The five facets of mindfulness (with alphas from the current study in parentheses) include: observing (.83), describing (.92), acting with awareness (.90), non-judging of inner experience (.94), and non-reactivity to inner experience (.89). Additionally, the Cronbach’s alpha for the FFMQ scale total was .84 in the present study. Sample items include “When I’m walking, I deliberately notice my body moving” and “In difficult situations, I can pause without immediately reacting”.

The *Toronto Mindfulness Scale (TMS)*; Lau, Bishop, Segal, Buis, Anderson, Carlson et al., 2006) is a 13-item questionnaire rated on a 5-point Likert scale from “not at all” to “very much”. This brief mindfulness scale is being used to test state mindfulness immediately before and after the meditation session and at one week follow-up. The pre-session and one week follow-up measures asked participants to rate mindfulness “in the previous week” whereas the post-session measure asked about mindfulness during the session. The TMS has been reported to have a strong alpha of .95 (Lau et al., 2006) and

in the present study, it was reported at .81, .87 and .92 at pre-session, immediately post-session and one week follow-up, respectively. Sample items include “I was curious to see what my mind was up to from moment to moment” and “I experienced myself as separate from my changing thoughts and feelings”.

Emotion Regulation. The *Emotion Regulation Questionnaire (ERQ)* (Gross & John, 2003) is a 10-item questionnaire rated on a 7-point Likert scale from “strongly disagree” to “strongly agree”. This questionnaire measures two main aspects of emotion regulation: reappraisal and suppression. Internal consistency has been reported as .80 for the reappraisal factor and .73 for the suppression factor (Gross & John, 2003). In the current study, alphas of .71 and .83 were found for the reappraisal scale for pre-session and one week follow-up, respectively. Alphas of .73 and .82 were found for the suppression scale for pre-session and one week follow-up, respectively. Sample items include “I control my emotions by changing the way I think about the situation I’m in” (reappraisal) and “I keep my emotions to myself” (suppression).

The *Difficulties in Emotion Regulation Scale (DERS)* (Gratz & Roemer, 2004) is a questionnaire with 36 items rated on a 5-point Likert scale from “almost never” to “almost always”. In the current study, the alphas measured were .94 and .94 for the overall measure at pre-treatment and follow-up, respectively. Sample item includes: “When I’m upset, I feel guilty for feeling that way” and “I know exactly how I feel”.

Stress & Anxiety. The *Perceived Stress Scale (PSS)* (Cohen, Kamarck, & Mermelstein, 1983) is a questionnaire rated on a 5-point Likert scale from “never” to “very often” with 10 items. The instructions for this scale were modified; instead of asking individuals “how often in the last month” they have experienced various forms of

stress, they were asked “how often in the last week” they have experienced them. The alpha coefficients for the PSS have been reported between .84 to .86 (Cohen et al., 1983). The alphas in the current study were .86 and .88 at pre-treatment and immediately following, respectively. Sample items include: “In the last week, how often have you been upset because of something that happened unexpectedly” and “In the last week, how often have you felt nervous and ‘stressed’”.

The *State-Trait Anxiety Inventory (STAI)*; Spielberger, Vagg, Barker, Donham, & Westberry, 1980) is a questionnaire with items rated on a 4-point Likert scale from “almost never” to “almost always”. This scale has two versions: 20 items tapping state anxiety (e.g., “I am tense”) and 20 items tapping trait anxiety (e.g., “I worry too much over something that really doesn’t matter”). For this study, we used the state version. Reported internal consistency coefficients have ranged from .86 to .95 (Spielberger et al., 1980). In this study, we obtained an alpha coefficient of .91 at pre-session, .87 at immediately post-session and .95 at one week follow-up for state version of the STAI.

Social Behavior and Emotion. For the present research, we designed a 5-item *Social Behavior and Emotion Questionnaire (SBEQ)* questionnaire regarding different facets of social behavior and emotions such as number of arguments, interpersonal patience, and social behavior in the previous week. The first two items regarding the number of minor and major arguments were rated on a 4-point Likert scale from “not many” to “many”. The last three questions regarding “patience with others”, “communication effectiveness”, and “level of social feelings or behavior” were rated on a 4-point Likert scale from “very low” to “very high”. Ensuring a reliable measure, we were able to achieve alphas of .63 and .71 measured pre-session and one week

follow-up, respectively.

Mood. The *Positive and Negative Affect Schedule (PANAS)* (Watson, Clark, & Tellegen, 1988) is a questionnaire with 20 items. The items measure both positive affect (the extent to which a person feels enthusiastic, active, and alert) and negative affect (aversive mood states, such as afraid). The items are rated on a 5-point Likert scale from “slightly or not at all” to “extremely”. Participants rated their current mood both before (positive affect, $\alpha = .88$, and negative affect, $\alpha = .90$) and after the meditation session (positive affect, $\alpha = .91$, and negative affect, $\alpha = .76$).

Demographics. This eight-item questionnaire measured age, gender, race, college class standing, sexual orientation, whether the participant lives on campus, and employment status.

Treatment Credibility. To assess participants’ predictions of the effectiveness of the mindfulness meditation session, we used a self-report questionnaire designed for the current research with a total of 6 positively and negatively keyed items rated on a 5-point Likert scale from “strongly disagree” to “strongly agree”. Sample items include “This treatment makes sense” and “The reasons behind doing this type of treatment are unclear”. In the current study, the alpha coefficient for Treatment Credibility was .78.

Attitudes and Experience Regarding Meditation. Before the meditation session, participants completed a measure regarding whether they had meditated before and if so, how frequently and what kind of meditations they had used. Immediately following the mindfulness meditation session, participants were asked six open-ended questions regarding emotions, thoughts, and feelings that may have arisen during the

meditations. Sample items include “What were your initial reactions to each of the meditations?” and “Do you feel as if meditation could be useful to you?”

During the online follow-up, participants were asked questions regarding their frequency of meditation specifically in the past week in order to observe if there was an inclusion of meditation practices into their lives. There were four general questions, two of which had two follow-up questions, and an open-ended response area for follow-up comments. Participants were asked whether they had meditated since the session and, if so, how often. They were asked how many minutes they had spent “meditating or focusing on being more mindful” and if they had applied anything they learned in the session to their everyday lives. Lastly, participants were asked if they believed they would “use meditation or mindfulness skills” in the future, and if so, whether it was because of this study.

Results

Mindfulness

T-tests comparing means were conducted on the scores of the FFMQ and the TMS of the experimental group in order to test for hypothesized increases in mindfulness between pre-session and one-week follow up. The mean scores of the FFMQ, measuring general mindfulness, increased significantly from pre-session ($M = 126.83$, $SD = 17.8$) to one week follow-up ($M = 133.65$, $SD = 18.54$); $t(102) = -5.38$, $p < .001$. The TMS, measuring state-like mindfulness, was assessed at pre-session, immediately post-session and at the one week follow-up. Not surprisingly, mindfulness significantly increased from pre-session ($M = 24.14$, $SD = 8.52$) to immediately post-session ($M = 34.98$, $SD = 8.9$); $t(103) = -11.27$, $p < .001$. TMS scores then significantly *decreased* from

immediately post-session ($M = 34.98, SD = 8.9$) to one week follow-up ($M = 28.91, SD = 10.14$); $t(102) = 7.21, p < .001$. Most interestingly, despite a significant increase during the week between the session and the one week follow-up, there was still a significant increase detected between pre-session ($M = 24.14, SD = 8.52$) and the one week follow-up ($M = 28.91, SD = 10.14$); $t(102) = -4.73, p < .001$.

Table 1
Comparing Scores on Primary Variables at Pre-Treatment and One-Week Follow-Up

	Pre-treatment		Follow-Up		<i>T-value</i>
	<i>N</i> = 103		<i>N</i> = 103		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Adaptive Outcomes					
Dispositional Mindfulness	126.83	17.80	133.65	18.54	-5.38***
State Mindfulness	24.14	8.52	28.91	10.14	-4.73***
Social Behavior & Emotion	21.43	3.45	22.58	2.94	-3.84***
Emotion Regulation – Reappraisal	24.99	4.75	25.65	5.03	-1.57
Maladaptive Outcomes					
Emotion Regulation – Suppression	13.24	4.47	13.76	5.33	0.2
Emotion Regulation Difficulties	80.38	22.74	76.6	21.24	2.62*
Perceived Stress	17.28	7.02	13.52	6.19	6.67***
State Anxiety	37.72	10.26	37.01	12.84	0.63

* $p < .05$ *** $p < .001$

Emotion Regulation

We performed t-tests to examine potential changes between the pre-session and one week follow-up scores on difficulties with emotion regulation and on the specific emotion regulation strategies of reappraisal and suppression. We found a significant decrease in the mean scores for difficulties in emotion regulation from before the session ($M = 80.38, SD = 22.74$) to one week after the session ($M = 76.6, SD = 21.24$); $t(102) =$

2.62, $p < .05$. There was no reported change in use of specific emotion regulation strategies between pre-session and one week follow-up, with similar scores for suppression ($t = .20$, *ns*) and reappraisal ($t = -1.57$, *ns*).

State Anxiety & Perceived Stress

State anxiety, as measured by the STAI-state, was assessed at each of the three time points. Between pre-session ($M = 37.91$, $SD = 10.4$) and immediately post-session ($M = 26.73$, $SD = 6.28$), STAI-state scores significantly decreased, $t(102) = 11.65$, $p < .001$. Scores reported for the STAI-state significantly increased between post-session ($M = 26.71$, $SD = 6.31$) and one week follow-up ($M = 37.01$, $SD = 12.84$), $t(102) = -9.09$, $p < .001$, showing an increase in anxiety. State anxiety was not significantly different between pre-session and one week follow-up scores, $t(102) = 0.63$, $p = .532$.

Perceived stress, on the other hand, was significantly lower from pre-session ($M = 17.28$, $SD = 7.02$) to one week follow-up ($M = 13.52$, $SD = 6.19$), $t(101) = 6.67$, $p < .001$.

Table 2
Comparing Scores on Primary Variables at Pre-Treatment and Immediately Post-Treatment

	Pre-treatment		Post-treatment		<i>T-value</i>
	<i>N</i> = 103		<i>N</i> = 103		
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Adaptive Outcomes					
State Mindfulness	24.14	8.52	34.98	8.9	-11.27***
Positive Mood	34.38	7.93	32.59	8.56	2.00*
Maladaptive Outcomes					
Negative Mood	20.62	8.19	11.00	1.99	12.78***
State Anxiety	37.91	10.4	26.73	6.28	11.65***

* $p < .05$ *** $p < .001$

Social Behavior and Emotion

T-tests were also conducted on the scores of social behavior and emotion, as measured by the SEBQ. Quality of social behaviors and emotions significantly increased from pre-session ($M = 21.43, SD = 3.45$) to one week follow-up ($M = 22.58, SD = 2.94$), $t(102) = -3.84, p < .001$.

Table 3
Comparing Scores on Primary Variable at Immediately Post-Treatment and One Week Follow-Up

	Immediately Post-treatment		One Week Follow-Up		T-value
	M	SD	M	SD	
Adaptive Outcomes					
State Mindfulness	34.98	8.9	28.91	10.14	7.21***
Maladaptive Outcomes					
State Anxiety	26.71	6.31	37.01	12.84	-9.09***

* $p < .05$ *** $p < .000$

Positive Affect

Although we expected positive affect to increase after a relaxing mindfulness meditation session, the positive affect of the participants significantly *decreased* from pre-session ($M = 34.38, SD = 7.93$) to immediately after the session ($M = 32.59, SD = 8.56$), $t(103) = 2.00, p < .05$.

Negative Affect

Similar to positive affect, negative affect scores significantly decreased from pre-session ($M = 20.62, SD = 8.82$) to immediately post-session ($M = 11, SD = 1.99$), $t(103) = 12.78, p < .001$. There was a drastic difference in standard deviation, from 8.82 before

the session to 1.99 after the session. The session not only significantly decreased negative affect overall but also decreased the variance between participants' reports.

Discussion

Mindfulness

As hypothesized, general mindfulness significantly increased from pre-session to the one week follow-up. State mindfulness also increased from pre-session to immediately post-session and remained somewhat elevated at the one week follow-up. While it would be expected that state mindfulness increased immediately following a mindfulness meditation and psychoeducation session, it is remarkable that state mindfulness remained fairly elevated one week later and that general mindfulness was also increased a week after the session. This is the first study to explore psychological changes in college students following a single 55 minute mindfulness meditation session.

There are several factors that could be influencing this notable change. Firstly, participants were recruited from an Honors College, housing many students of above average intelligence and arguably higher stress levels due to the demanding coursework of an Honors curriculum. Our mindfulness meditation session involved deep and abstract cognitive thought, possibly easier processed by individuals more academically inclined. This substantial mindfulness increase in both the TMS and the FFMQ after such a short session is unheard of in previous mindfulness studies. Typically treatment time involves approximately 20 hours over the course of 8 to 12 weeks (Sears, et al., 2011; Shapiro, et al., 1998). One particular study, however, looked at the effects of a "brief" mindfulness meditation training consisting of 20 minutes each day for four days, totaling 80 minutes

(Zeidan, et al., 2010). Similar to our study, 49 undergraduate college participants experienced an experimental mindfulness or control condition. Unlike the current study, however, their control condition consisted of listening to an audiobook. Both conditions effectively improved mood but only the mindfulness meditation session showed significant improvements in visuo-spatial processing, working memory, and executive functioning. While our study did not look at these particular variables, we share the similarity of having found significance after only a brief amount of mindfulness meditation.

Emotion Regulation

As predicted, difficulties in emotion regulation significantly decreased from pre-session to the one week follow-up. This is not surprising, given the available literature on the significant relationship between mindfulness and emotion regulation (Goodall, et al., 2012). Furthermore, mindfulness has found to be positively correlated with greater emotion differentiation and less emotional difficulties, as measured by the DERS (Hill & Updegraff, 2012). In general, higher levels of reappraisal methods of emotion regulation are associated with better psychological functioning, based on current research (Gross, 1998; Gross & Levenson, 1997; & Thoits, 1985). This decrease in difficulties in emotion regulation could be due to participants' higher focused awareness of the emotions that they're experiencing due to an increase in mindfulness skills. It is reasonable to argue that if a person is more cognitively aware and nonjudgmentally accepting of their emotions, they have less difficulty with regulating their emotions. After an increase in mindfulness, participants reported lower frequency of emotions advocated against by mindfulness proponents - feeling ashamed or irritated for being upset. Mindful awareness

applies to being aware of emotions, ultimately helping a person improve controlling them. While emotion regulation, measured by the ERQ, significantly increased as a total score from pre-session to the one week follow-up, this does not necessarily indicate any improved gain. It implies that participants made more use of emotion regulation techniques, but the results did not indicate whether reappraisal or suppression increased or decreased. No significance was found when testing specifically for differences between reappraisal and suppression techniques before and after the session, signifying that the brief mindfulness session was not sufficient in increasing reappraisal methods and decreasing suppression methods, as we had incorrectly hypothesized.

State Anxiety & Perceived Stress

Conflicting with our a priori hypothesis and previous research, state anxiety did not significantly decrease between pre-session and the one week follow-up. This is very surprising considering the large amount of research reporting reduced levels of stress and anxiety after increased mindfulness (Chiesa & Serretti, 2009; Goldin & Gross, 2010; Goldin, et al., 2009; Grossman, et al., 2004; Miller, et al., 1995; Paulik, et al., 2010). Although, state anxiety did significantly decrease from pre-session to immediately post-session ($p < .001$), it then significantly increased from post-session to the one week follow-up ($p < .001$). Thus, the reduction of anxiety was not maintained over the course of a week. These results do make sense considering the state-like nature of the questionnaire and the anxious environment that an Honors College curriculum breeds. Future research may want to include brief booster sessions reinstating core principles of mindfulness and meditation so as to further the effects of the anxiety reduction.

On the other hand, perceived stress *did* significantly decrease from pre-session to the one week follow-up. It is reasonable that the PSS difference in means was significant one week after the session, whereas the STAI-state did not hold significance one week after the session. The STAI-state assesses momentary feelings and emotions in very brief, often three-word, sentences. The PSS, however, utilizes more cognitive processes of the participant by inquiring further and more in-depth. Thorough and detailed questions could be tapping into the intellectual benefits that the mindfulness meditations session provided to Honors College participants.

Social Behavior and Emotion

Consistent with a priori hypotheses, self-reported social behavior and emotion significantly increased from pre-session to the one week follow-up. This extends findings from correlational research suggesting that higher levels of mindfulness are associated with secure level of attachment (Cordon, et al., 2009; Goodall, et al., 2012) and positive relationship satisfaction (Barnes, et al., 2007; Wachs & Cordova, 2007). Consistent with our findings, Carson, et al. (2004) were also able to improve couples' relationship satisfaction after a mindfulness-based relationship enhancement treatment. While the bulk of the pre-existing research focused on intimate romantic relationships, the present study assessed elements of social behavior and emotion in general, for romantic partners or friends, given that many college students are unmarried or single. It is noteworthy that a variable seemingly difficult to influence can show significant change a week after a 55 minute mindfulness session. Knowing that having a higher level of sociality is associated with greater well-being (Birditt & Antonucci, 2007), it is important that it continued to be explored how higher levels of mindfulness are influencing individuals to have higher

levels of social behavior and emotion, as measured by the Social Behavior and Emotion Questionnaire.

Positive Affect (mood)

Conflicting with previous research regarding positive mood or emotions and mindfulness, (Geschwind, et al., 2011; Jha, et al., 2010; Jimenez, et al., 2011), positive mood significantly decreased immediately following the mindfulness meditation session, compared to pre-session. This change is likely due to increased post-session relaxation and correspondingly lower reported activity and enthusiasm. For example, positive affect items include: “excited”, “strong”, “enthusiastic”, “alert”, and “inspired”, all of which might decrease after a calming mindfulness meditation session. For future mood assessment, one might want to incorporate more ‘pleasant’ and ‘deactivation’ varieties of human dimension, such as “contented”, “serene”, “relaxed”, and “calm”, as defined by Russell’s circumplex model of affect (1980). This would allow for researchers to not only assess an individual’s motivation but also allow for a more balanced approach of emotion.

Negative affect (mood)

Consistent with our hypothesis, reports of negative mood significantly decreased from pre-session to immediately post-session. This data adds to the existing evidence that negative mood is associated with lower levels of mindfulness (Jimenez, et al., 2010) and expands upon it by showing that negative mood can decrease after a 55 minute mindfulness meditation session. This data reaffirms that higher levels of mindfulness are associated with adaptive outcomes such as a decreased negative mood.

Strengths, Limitations & Further Research

The most important finding from the present study is the potential for college students to report psychological benefits following a single 55-minute session of mindfulness meditation and psychoeducation. Compared to current research (Shapiro, et al., 1998; Zeidan, et al., 2010), the present study demonstrates the shortest amount of time necessary for increasing mindfulness and adaptive outcomes and decreasing maladaptive outcomes. These findings could have important implications for future research aiming to reduce MBSR treatment times. Shorter time necessary to implement mindfulness meditation techniques could heavily impact insurance and personal therapy costs making it available to a wider range of individuals.

Given the use of Honors College students, the external validity of the present findings is limited and will need to be replicated with other populations. Honors College students could potentially have higher levels of intelligence and stress compared to an average population, ranged from 18 to 25 years old. This pilot study should be replicated with a more diverse population or a clinical population such as those diagnosed with anxiety disorders or depressive symptoms.

Overall, this study found that both general and state mindfulness can be increased after a single 55 minute mindfulness meditation and psychoeducation session. This shortened treatment time period suggests an ease of use; psychological professionals can employ mindfulness meditation training as a component in larger treatment programs. Mindfulness practice is cost effective, relatively simple to introduce and, according to our study, deliverable in a short amount of time. Additionally, the session produced adaptive outcomes associated with mindfulness, such as increased social behavior and emotion and decreased maladaptive outcomes such as difficulties in emotion regulation, perceived

stress, and negative mood. Additionally, there is a lot of potential in the fact that mindfulness meditation training can produce benefits in a healthy and high-functioning group. Helping those in need of a mental health professional is a priority but seeking ways to help healthy individuals reach their full potential must also be pursued. While our study is an important step, especially relating to treatment time, there is still much to be explored in the efficacy of incorporating mindfulness techniques into people's everyday lives or into therapeutic techniques.

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Appendix

Brief Outline of Mindfulness Meditation Session:

1. Introduction & informed consent
2. Fill out pre-measures
3. Meditation 1 – Deep Breathing and Body Relaxation
 - a. Participants participated in a counted, deep-breathing exercise and were guided into a meditation where they release all of the tension in their bodies and relax their muscles
4. Psychoeducation 1 - Part A
 - a. Mindfulness explained in detail using definitions using a slideshow
5. Meditation 2 - Deepak Chopra – Mindfulness
 - a. Participants listened to audio where Deepak Chopra describes mindfulness and gratefulness
6. Psychoeducation 1 - Part B
 - a. Discussion on previous experiences of mindfulness
7. Meditation 3 – Unguided Nature
 - i. Participants listened to an audio clip of birds chirping and running water while meditating
8. Psychoeducation 2 – Combating Stress
 - a. Education about symptoms of stress, tips for approaching stress using observe, describe and participate technique, and discussion using a hypothetical situation
9. Meditation 4 – Guided Imagery
 - a. Participants will be led in a meditation where they imagine all of the facets of their own version of a perfect and relaxing place
10. Psychoeducation 3 – Everyday Mindfulness
 - a. Describe mindfulness applications in everyday life through an exercise and suggested helpful techniques
11. Conclusion
 - o Giving out researcher contact information and answering any questions

Note: After each meditation, there was an open floor for discussion of reactions to the meditation in order to allow for easier transitions between meditations and psychoeducation components.

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