ANXIETY, ATTENTION, AND MINDFULNESS FOLLOWING FOCUSED ATTENTION AND OPEN-MONITORING MINDFULNESS MEDITATION

By Matthew D. Hanson

Research on the effects of mindfulness meditation has been growing exponentially over the past three decades. The purpose of this present study is to explore whether different types of mindfulness meditative techniques differentially affect anxiety, attention, and mindfulness. Specifically, a meditative technique that aims to focus attention on one object, and one that aims to increase attentional flexibility, may affect anxiety, attention, and mindfulness in distinct ways. Participants were randomly assigned to one of three conditions: 1) focused-attention mindfulness meditation, 2) open-monitoring mindfulness meditation, or 3) control condition in which they learned about sensations and perceptions. Anxiety, attention, and mindfulness were measured prior to and after each mindfulness practice or listening control task. The data did not support the beneficial effects of mindfulness meditation on state anxiety or state mindfulness previously found in the literature. Additionally, there was no evidence for differential effects of focused attention compared to open-monitoring mindfulness meditation on anxiety, attention, or mindfulness skills. Limitations to the current study are considered.

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by

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Introduction

Mindfulness is a broad term that refers to a focus on some aspect of the present moment. According to Kabat-Zinn (1994), it is defined as nonjudgmentally paying attention in a particular way, on purpose, in the present moment. This is in direct contrast to the day-to-day thought processes that people normally engage in, which involve unintentionally and judgmentally contrasting others' attitudes, behaviors, and perceptions with one's own (Shoots-Reinhard, Rucker, Petty, & Shakarchi, 2014). Didonna (2009) purports that mindfulness may influence an individual's attitudes and behaviors by promoting *acceptance of experience*, a *compassionate attitude*, and the *ability to observe oneself without judgment*. Mehrmann and Karmacharya (2013) conceptualize mindfulness as the bringing of one's complete attention to the present experience by nonjudgmentally observing the ongoing stream of perceivable internal and external stimuli as they arise.

Meditation, another broad term, refers to practices that quiet the mind by promoting awareness of the present moment. Srivastava (1997) defines meditation as a state of 'mental silence' characterized by the elimination of unnecessary thought, effortless attention on the present moment, and alert awareness. According to Mehrmann and Karmacharya (2013), the term *meditation* comprises a variety of mental-training practices. These practices vary between culture and traditions and range from techniques that promote health to exercises that develop a heightened sense of well-being (Merhmann & Karmacharya, 2013). Meditation is also meant to influence an individual's

attitudes and behaviors, but, rather than altering how events are interpreted, it promotes detachment from subjective interpretations of events and promotes objective awareness of sensory and thought experiences (Didonna, 2009). For instance, rather than simply reacting to a situation and becoming angry, a heightened and detached awareness allows one to readily and objectively observe angry thoughts and feelings (Reb & Atkins, 2015).

Together, *mindfulness meditation* is a specific type of meditation that involves intentionally and nonjudgmentally focusing on some aspect of the present moment, while quieting the mind, by promoting the person's awareness of the experience without judging it. Zylowska et al. (2008) describe mindfulness meditation as a technique that emphasizes an observant, nonreactive, and nonjudgmental stance toward one's thoughts, emotions, and body states, which ultimately fosters cognitive flexibility and more accurate reappraisal of experiences (Merhmann & Karmacharya, 2013). For decades now, mindfulness meditation has been incorporated into evidence-based treatments of psychological disorders (Chiesa, Calati, & Serretti, 2011). These treatments include Mindfulness Based Stress Reduction (MBSR) (Kabat-Zinn, 1990), Dialectical Behavior Therapy (DBT) (Linehan, 1993), and Mindfulness Based Cognitive Therapy (MBCT) (Segal, Williams, & Teasdale, 2002). Additionally, a meta-analysis conducted by Eberth and Sedlmeier (2012) revealed that mindfulness meditation has been shown to increase both state and trait mindfulness.

It is important to note that mindfulness meditation differs from simple mind wandering in one important aspect: the time frame that the practitioner is thinking in. Mind wandering is defined as contemplating events that are either from the past, might

happen in the future, or will never happen at all (Killingsworth & Gilbert, 2010), and often occurs spontaneously and without intention (Seli, Cheyne, Xu, Purdon, & Smilek, 2015). In contrast, practitioners of mindfulness meditation focus only on the present moment and consciously and deliberately acknowledge stimuli and sensations.

Variations of Mindfulness Meditation

More recently, researchers have suggested that mindfulness meditation can be partitioned into two subtypes termed *focused attention* (FAMM) and *open-monitoring* (OMMM) (Ainsworth, Eddershaw, Meron, Baldwin, & Garner, 2013). FAMM is a practice where one maintains a sustained selective attention toward a volitionally chosen object while monitoring one's thoughts for intrusive attentional distractors. The example Ainsworth et al. (2013) provided is as follows:

> Find a place where the sensations of your breath are particularly clear right now…at the tip of the nose, the back of the throat, the chest, or the abdomen… Make a decision to stay with this place for the duration of this exercise rather than moving your awareness from one place to another… Turn your awareness toward this place…allowing your awareness to settle on this point…allowing the mind to become comfortable here… Maintain this focus, and if the mind wanders, lightly and firmly return the mind to this place… Really examining the sensation of the breath, and making the focus of attention as fine and as exact as possible – really pinpoint this one point where the breath is observed. (p. 1228)

The goal of the practitioner of FAMM is to focus on one object and notice, without judgment, the nuances and changes in the object, event, and experience. Eventually, the practitioner's attention wanders to various thoughts or stimuli. When that happens, the practitioner calmly refocuses his or her attention back to the chosen object while making sure not to judge the experience or the self. For instance, if someone were to attend to the breath or breathing, and the sound of the wind outside drew his or her attention, the person would refocus attention back to the breath while accepting that his or her attention wandered.

In contrast to FAMM, Ainsworth et al. (2013) define OMMM as a practice involving no deliberate de-selection or selection of stimuli, but active monitoring and acceptance of internal and external sensations, as they arise, to promote a receptive field of non-judgmental awareness. The example that Ainsworth et al. (2013) provided is as follows:

> Allow a sense of awareness of the breath and physical sensations in the body generally to gradually expand… Allowing your focus to include the sounds that you're hearing, whatever the eyes see, and perhaps any smells to come within your field of awareness… Sitting here, with all of this, perhaps allowing your emotional tone, how you are feeling right now, to become part of this field of awareness – whatever sense of comfort or discomfort, and emotions you feel right now, allowing that to become part of your field of awareness right now, noticing any changes that may occur. (p. 1228)

The goal of OMMM is to allow the mind to notice the ever-changing flow of experiences. The practitioner's attention is fluid and receptive, acknowledging each new thought or sensation as they arise. As each new sensation or thought arises in turn, the practitioner simply acknowledges and accepts them. There is no forced selecting or deselecting of attention by the practitioner. For instance, if someone were to attend to his or her breath, and the sound of the wind outside drew his or her attention, the person would be okay with this while remaining on the wind until the temperature drew his or her attention. This might be best understood as a willingness and openness to notice and nonjudgmentally accept external and internal experiences while recognizing that those experiences are dynamic and ever changing.

Attention Networks

Attention is a broad term that is best defined as a set of sub-processes that collectively govern our ability to observe the innumerable stimuli in our environment (Didonna, 2009). Rothbart and Posner (2015) elucidate attention into, what they call, three attention networks. The first is *alerting* attention, which they define as reaching and maintaining sensitivity to new stimuli. This can be conceptualized as how readily someone is able to observe something new in his or her environment. For instance, someone who is scanning a crowd of people for a friend will show elevated alerting attention compared to someone who is reading a book. The second is *orienting* attention, which they define as the selection of information from the environment. This can be conceptualized as how easily someone shifts to a stimulus in his or her environment. For

instance, if someone in a crowd of people is trying to get the attention of a friend by waving their hands, how fast their friend is able to notice them reflects their level or orienting attention. These two attention networks are indicative of attentional shifting, as this requires 1) the disengagement of attention from one object, 2) sensitivity to detect a second object, and 3) selection of the second object (Posner, Walker, Friedrich, & Rafal, 1984). The third is *executive* attention, which they define as monitoring and resolving conflict among thoughts, feelings, and behaviors. This can be conceptualized as someone's ability to manipulate stored information in his or her mind. For instance, while scanning a crowd of people for a friend, someone's ability to 1) listen for their friend's voice and look for their face while ignoring irrelevant information, and 2) remember which parts of the crowd they have already scanned, reflects their level of executive attention. This attention network is indicative of sustaining attention, as this requires the ability to direct and focus cognitive activity on specific stimuli, while ignoring distractions (DeGangi & Porges, 1990).

Anxiety

According to Wadlinger and Isaacowitz (2011), there is a link between attentional dysfunction and negative emotional well-being, which contributes to the therapeutic effects of mindfulness meditation. While anxiety is defined by the context in which it is applied, Bockstaele and Verschuere (2014) define it broadly as a general, enduring, and vague feeling of unease and stress. Anxiety falls on a continuum that ranges from normal fear reactions, which help people avoid danger, to overwhelming, maladaptive avoidance

of people, places, and things (Didonna, 2009). Attentional processes substantially influence maladaptive anxiety, which is the hallmark symptom of anxiety disorders; specifically, attentional bias towards threatening information may generate, maintain, and exacerbate anxiety (Bockstaele & Verschuere, 2014). Wadlinger and Isaacowitz (2011) explored this relationship by reviewing studies that used attentional training techniques. They concluded that attention training is an effective way to modify emotional experiences.

Ainsworth et al. (2015) found more support for a link between mindfulness meditation and anxiety. Participants were randomly assigned to practice FAMM, OMMM, or a relaxation technique. Next, a 7.5% carbon dioxide air mixture was inhaled to induce anxiety. Ainsworth et al. found that participants in both mindfulness meditation conditions felt reduced subjective anxiety, but the effect was considerably stronger after OMMM. They concluded that mindfulness meditation, in general, alleviates anxiety, and that OMMM is particularly effective due to the constant nonjudgmental acceptance of whatever is present in the field of awareness.

Mindfulness Meditation in Theory

One theory behind why mindfulness meditation has such an influential relationship with well-being is grounded in neuroplasticity (Baldini, Parker, Nelson, & Siegel, 2014), which states that repeated experiences, activities, and thoughts are capable of altering the structure of the brain (Adolphs, 2010; Davidson & McEwen, 2012). Davidson and Begley (2012) theorized that new experiences are constantly restructuring

the neuronal circuitry in the brain, subsequently influencing emotions, cognitions, and even behavior. Essentially, meditation trains individuals to regulate their emotions and cognitions through practice, making practitioners 'neuroarchitects' (Baldini et al., 2014). Much like training to become an athlete, by practicing the ability to control one's attention, self-awareness, and self-monitoring, an individual's skill, or "muscle" (neuronal pathways), can be enhanced (Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007; Manna et al., 2010; Van Vugt & Slagter, 2014).

Based on the neuroplasticity paradigm, evidence should suggest that mindfulness meditation practices that promote different mental processes would differentially influence various components of emotion and cognition. One such study by Manna et al. (2010) examined brain activity while highly experienced Buddhist monks and lay novices practiced mindfulness meditation. They found that during OMMM the Buddhist monks' brain activity resembled their resting brain activity, while during FAMM their brain activity deviated sharply in areas that correlate with sustaining attention. In contrast, the lay novices' brain activity during OMMM deviated from their resting brain activity, while during FAMM their brain activity did not correlate with sustaining attention. Manna et al. concluded that both FAMM and OMMM act as mental practice in distinct ways.

Additionally, Van Vugt and Slagter (2014) found support for the effect that OMMM has on attention by examining the attentional blink deficit. The attentional blink deficit is a lapse in attention that closely follows the onset of a stimulus. The theory behind variation in the attentional blink deficit asserts that a decreased deficit, or superior

performance, means that less attentional resources are required to attend to a stimulus. Van Vugt and Slagter hypothesized that more experienced meditators would require less attentional resources after OMMM, and therefore show a reduced attentional blink deficit when compared to FAMM. After running the meditators through a series of FAMM and OMMM blocks, they found that OMMM led to a reduced attentional blink deficit in the more experienced meditators when compared to FAMM. Van Vugt and Slagter concluded that experience in OMMM, with a focus on shifting attention, leads to a reduction in attentional resources required to attend to a stimulus.

Brefczynski-Lewis, Lutz, Schaefer, Levinson, and Davidson (2007) found support for the effect that FAMM has on attention by utilizing functional magnetic resonance imaging (fMRI). To examine the influence of FAMM as a function of experience, they recruited novice meditators (NM), expert meditators with considerable experience (MHEH), and expert meditators with moderate experience (LHEM). Brefczynski-Lewis et al. found that FAMM activated areas of the brain associated with sustained attention, and that this activation increased as a function of hours of meditative expertise, but only from NM to LHEM participants. Interestingly, they found that this function was actually an inverted U-shape, with activation decreasing between the LHEM and MHEM participants. They concluded that FAMM initially leads to an increase in sustained attention due to changes in strategy and technique, which require more cognitive resources. However, sustained attention eventually requires less cognitive resources as the skill is learned due to neuronal plasticity altering the structure of the brain.

Hypotheses

Based on the aforementioned evidence, mindfulness in general should positively influence state anxiety and state mindfulness. Additionally, FAMM should lead to a greater ability to sustain attention, while OMMM should lead to a greater ability to shift attention. Therefore, the present study posed the following hypotheses (see Figure 1):

1) *State Anxiety* will be lower following both mindfulness conditions compared to the control condition.
2) *State mindfulness* will be higher following both mindfulness conditions compared to the control condition.
3) *Alerting* and *orienting attention* will be highest following the OMMM condition, moderate following the FAMM condition, and lowest following the control condition.
4) *Executive attention* will be highest following the FAMM condition, moderate following the OMMM condition, and lowest following the control condition.

Method

Participants

Undergraduate students ($N = 103$) from a midsized Midwestern university participated in the study for research credits. They were run in groups of up to four. Groups were randomly assigned to one of three conditions: FAMM, OMMM, or an active control condition in which participants learned about sensation and perception. Additionally, data were gathered at two points in time, prior to (T1) and after (T2) a 70-minute meditation or control session. Therefore, this was a 3 x 2 mixed-measures design, with mindfulness meditation condition as between-subjects and time as within-subjects.

Materials

Participants were provided with two informed consent forms (Appendix A), a description of the study, and a laptop. They were instructed to read the purpose of the study, which was to examine the effects of different experiential practices on psychological processes (Appendix B). They then opened their laptops and completed the Beck Anxiety Inventory (BAI) (Appendix C), the Five Facet Mindfulness Questionnaire (FFMQ) (Appendix D), the Positive and Negative Affect Scale (PANAS) (Appendix E), and the Attention Network Task (ANT) (outlined in Appendix F). All measures were programmed using E-Prime (Schneider, Eschman, & Zuccolotto, 2002) and counterbalanced at both T1 and T2.

The participants then read instructions pertaining to their randomly assigned condition (Appendix G [OM]; Appendix H [FA]; Appendix I [Control]). Finally, they listened to an audio recording specific to their condition. A researcher that was not present while the participants completed their questionnaires at T1 or T2 sat with them while they listened to their recording to ensure that everyone felt comfortable and safe, and to ensure that there were no auditory glitches. The participants then completed the same four measures again (T2), a demographics form with a manipulation check (Appendix J), and read a short debriefing that provided more in-depth information regarding the purpose of the study (Appendix K). All three recordings were completed using the same male researcher and all were similar in length, pitch, and tone.

This mindfulness meditation design mirrors that used by Ainsworth et al. (2015), Manna et al. (2010), Raghavendra and Telles (2012), and van Vugt and Slagter (2014), where participants either came into the lab once to practice mindfulness meditation, or they returned a week later, once the effect was washed out, to utilize a within subjects design. Additionally, the length of the time practicing mindfulness meditation in the proposed study mirrors, or exceeds, that used by Ainsworth et al. (2013, 2015), Raghavendra and Telles (2012), and van Vugt and Slagter (2014).

Focused attention meditation. The recorded script was identical to that which Ainsworth et al. (2013) used in their study on FAMM and OMMM. An example of the focused attention mindfulness meditation is as follows:

> You will find that from time to time your mind will wander off into thoughts, fantasies, anticipations, or memories. When you notice that your attention is no

longer with your breathing, without judging yourself, bring your attention back to your breathing, fully conscious of the duration of each breath from moment to moment. Every time you find your mind wandering off the breath, gently bring it back to the present, back to the moment-to-moment observing of the flow of your breathing.

Open-monitoring meditation. The recorded script was similar to the one that Ainsworth et al. (2013) used in their study on FAMM and OMMM; however, aspects of FAMM were replaced with aspects of OMMM used by Kabat-Zinn, J. (2013). An example of the open-monitoring mindfulness meditation is as follows:

You will find that as time passes, your mind will wander into thoughts, fantasies, anticipations, or memories. When you notice that your attention has wandered on to something new, acknowledge it without judging yourself, while riding the waves of your consciousness, fully aware of the moment to moment. Every time you find your mind wandering, gently remain in the present, to the moment-to-moment observing of the flow of your consciousness.

Active control condition. The recorded script contained information about sensation and perception, and directed the participants to focus on the factual content.

Anxiety. The Beck Anxiety Inventory (BAI; Beck & Steer, 1990) is a 21-item questionnaire that asks participants to indicate the extent to which a number of symptoms of anxiety have bothered them in the past week on a scale from 0 (*not at all*) to 3 (*severely*) ($\alpha_{T1} = .92$; $\alpha_{T2} = .93$). To provide a measure of state anxiety, the BAI was

revised in the current study to ask the participants to indicate the extent to which they were *just* bothered by the various symptoms of anxiety.

Mindfulness. The Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) is a 39-item questionnaire that asks participants to rate each statement by how true it is for them from 1 (*never or very rarely true*) to 5 (*very often or always true*) and can be divided into five subscales: observing, describing, acting with awareness, non-judging of inner experience, and non-reactivity to inner experience ($\alpha_{T1Observing}$ = .71; $\alpha_{T2Observing}$ = .81; $\alpha_{T1Describing}$ = .83; $\alpha_{T2Describing}$ = .86; $\alpha_{T1ActingWithAwareness}$ = .79; $\alpha_{T2ActingWithAwareness}$ = .89; $\alpha_{T1NonjudgingInnerExperiences}$ = .86; $\alpha_{T2NonjudgingInnerExpeiences}$ = .91; $\alpha_{T1NonreactivityInnerExperiences}$ = .63; $\alpha_{T2NonreactivityInnerExperiences}$ = .76; $\alpha_{T1OverallMindfulness}$ = .82; $\alpha_{T2OverallMindfulness}$ = .86). To provide a measure of state mindfulness, the FFMQ was also revised in the current study to ask participants to indicate how true each statement is in regards to what they *just* experienced.

Positive and Negative Affect. The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) includes 20 items that ask participants to indicate the extent that they are currently feeling various emotions from 1 (*very slightly or not at all*) to 5 (*extremely*) ($\alpha_{T1PositiveAffect}$ = .90; $\alpha_{T2PositiveAffect}$ = .88; $\alpha_{T1NegativeAffect}$ = .74; $\alpha_{T2NegativeAffect}$ = .76). The 20 items include 10 that are positive and 10 that are negative, resulting in a *positive affect* and *negative affect* subscale, respectively. In the current study, an additional item (*Bored)* was also included to assess the participants' level of boredom throughout the study.

Attention. The Attention Network Task (ANT; Fan, McCandliss, Sommer, Raz, & Posner, 2002) was developed specifically to examine the differences between *alerting*, *orienting*, and *executive attention*. The ANT is a 30-minute computerized task where participants are presented with a fixation point in the middle of the screen (see Figure 2). After a brief pause, either 1) one cue appears above or below the fixation point (spatial), 2) cues appear both above and below the fixation point (double), 3) a cue will appear over the fixation point (central), or 4) no cue appears (none). Next, a target arrow that is pointing either left or right appears, and is either 1) surrounded by two arrows on each side that are pointing in the same direction (congruent), 2) surrounded by two arrows on each side that are pointing in the opposite direction (incongruent), or 3) stands alone (neutral). Finally, the participants press a button indicating which direction the target arrow is pointing.

Consistent with previous research using the ANT (Ainsworth et al., 2013), *Alerting attention* is measured by changes in reaction time depending on whether a cue is present (double cue) or not (no cue). *Orienting attention* is measured by changes in reaction time depending on whether cues clue the participant in to where the target arrow will appear (spatial cue) or not (center cue). *Executive attention* is measured by changes in reaction time depending on whether the target arrow is surrounded by arrows that point in the same direction (congruent) or the opposite direction (incongruent). Additionally, only the reaction times from responses where the participants accurately chose the direction of the target arrow were used to compute the network scores of the ANT (Ainsworth et al., 2013). Pearson correlations coefficients between T1 and T2, as a

measure of test-retest reliability, ranged from small to moderate ($r_{alerting}$ = .26; $r_{orienting}$ = .43; $r_{executive}$ = .39). Macleod et al. (2010) noted that the moderate reliabilities are potentially a result of the subtraction used when calculating scores, with difference scores typically leading to underestimated levels of reliability.

Manipulation Check. The manipulation check involved asking each participant to rate the extent that they followed the condition instructions from 1 (*Never*) to 5 (*Always*). There were three manipulation check questions; the first referred to general mindfulness and the last two corresponded to the two mindfulness meditation conditions. The first questions asked participants '*While taking part in your experiential practice session, to what extent did you remain in the present moment?'* The second question asked *'While taking part in your experiential practice session, to what extent did you focus on one sensation, and try to stay focused on that one sensation, the entire time?'* The third question asked *'While taking part in your experiential practice session, to what extent did you shift between sensations, and allow the sensations to pass, the entire time?'* If the manipulation was successful, participants in the FAMM condition should rate higher on the second question, while participants in the OMMM condition should rate higher on the third question. Finally, the participants in both of the mindfulness meditation conditions should rate higher than the control condition on the first question.

Procedure

Process. Upon arrival, participants were directed to read and sign the consent form if they wanted to participate in the study. The researcher collected the signed

informed consent forms and then handed out the study description. Once the participants were done reading the description, they completed the BAI, FFMQ, PANAS, and ANT on laptops.

When all of the participants were finished completing the questionnaires on the laptops, the second researcher moved them to a midsize room with meditation mats and a CD player. The second researcher handed out the condition instructions for the participants to read. When they were all finished, the researcher pressed play on the CD player and they began listening to the FAMM, OMMM, or control material. The second researcher was required to ensure that the researcher administering the dependent measures remained blind to the condition. After 10 minutes, the audio instructed them to take a 2-minute break on their mats. Once the two minutes were up, another 10-minute session began automatically. All together, the participants took part in six 10-minute sessions with five 2-minute breaks between the sessions, for a total of 60 minutes of mindfulness and 10 minutes of break. Once the final 10-minute session was completed, the second researcher brought all of the participants back to the original classroom with the first researcher. Finally, they completed the BAI, FFMQ, PANAS, and ANT once more. As soon as they were all done, they completed the demographics form with the manipulation check. Finally, they read the debriefing, which gave them more in-depth information regarding the study. All together, the sessions lasted between three-and-a-half and four hours.

Results

Of the 103 participants recruited, four were removed from analyses due to missing all data at either T1 or T2. Of the 99 remaining participants, 64 identified as female (64.6%), 90 were Caucasian (90.9%), and their ages ranged from 18 to 43 (M = 19.39, SD = 2.77). The FAMM condition consisted of 35 participants, the OMMM condition consisted of 33 participants, and the control condition consisted of 31 participants (see Table 1).

Manipulation Check

To compute the manipulation check scores, the mean of the ratings from each of the three manipulation checks were calculated. A univariate analysis of variance (ANOVA) was conducted with condition as the fixed factor and the *present-moment manipulation check* as the dependent variable. The results suggest that there were no significant differences in the participants' ratings between the three conditions, $F(2, 96) = .18$, $p = .839$, $\eta_p^2 = .004$. Another univariate ANOVA was conducted with condition as the fixed factor and the *FAMM manipulation check* as the dependent variable. The results suggest that there were no significant differences in the participants' ratings between the three conditions, $F(2, 96) = 2.23$, $p = .112$, $\eta_p^2 = .045$. However, follow-up contrasts revealed that participants in the FAMM condition scored significantly higher on the *FAMM manipulation check* (M = 3.20, SD = .93) than participants in the OMMM condition (M = 2.73, SD = .84), $t(96) = 2.11$, $p = .038$. Finally, a univariate ANOVA was

conducted with condition as the fixed factor and the *OMMM manipulation check* as the dependent variable. The results suggest that there was no significant difference in the participants' ratings between the three conditions, $F(2, 96) = .43$, $p = .653$, $\eta_p^2 = .009$. See Table 2.1 for means and standard deviations and Table 3 for results.

Beck Anxiety Inventory

A univariate mixed-measures ANOVA was conducted with condition as the between-subjects factor, time as the within-subjects variable, and *anxiety* as the dependent variable. There was not a significant interaction between condition and time, Wilks' Lambda = .99, $F(2, 96) = .28$, $p = .759$, $\eta_p^2 = .006$. However, there was a main effect of time, Wilks' Lambda = .92, $F(1, 96) = 8.64$, $p = .004$, $\eta_p^2 = .083$, with *anxiety* in all three conditions significantly higher at T1 ($M = 1.49$, $SD = .48$) than T2 ($M = 1.39$, $SD = .47$). The main effect comparing the conditions was not significant, $F(2, 96) = 1.49$, $p = .230$, $\eta_p^2 = .030$, indicating that *anxiety* did not significantly differ between the FAMM condition ($M = 1.33$, $SE = .08$), the OMMM condition ($M = 1.50$, $SE = .08$), and the control condition ($M = 1.50$, $SE = .08$). See Table 2.1 for means and standard deviations and Table 4 for results.

Five Facet Mindfulness Questionnaire

A univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *observing* as the dependent variable. There was not a main effect of time, Wilks' Lambda = .98, $F(1, 96) = 1.81$, $p = .181$, η_p^2

= .019, indicating that *observing* in all three conditions did not significantly differ between T1 (*M* = 3.14, *SD* = .56) and T2 (*M* = 3.08, *SD* = .62). However, there was a significant interaction between condition and time, Wilks' Lambda = .91, *F*(2, 96) = 4.96, *p* = .009, η_p^2 = .094, indicating that the effect of time on *observing* depended on what condition the participants were in. Pairwise comparisons revealed that *observing* for participants in the FAMM condition significantly decreased from T1 (*M* = 3.14, *SD* = .56) to T2 (*M* = 2.96, *SD* = .59), *t*(34) = 2.83, *p* = .008. However, *observing* for participants in the OMMM condition did not significantly change from T1 (*M* = 3.22, *SD* = .55) to T2 (*M* = 3.14, *SD* = .56), *t*(32) = 1.39, *p* = .173. Additionally, *observing* for participants in the control condition did not significantly change from T1 (*M* = 3.04, *SD* = .58) to T2 (*M* = 3.15, *SD* = .71), *t*(30) = -1.41, *p* = .168. The main effect comparing the conditions was not significant, *F*(2, 96) = .46, *p* = .634, η_p^2 = .009, indicating that *observing* did not significantly differ between the FAMM condition (*M* = 3.04, *SE* = .10), the OMMM condition (*M* = 3.18, *SE* = .10), and the control condition (*M* = 3.09, *SE* = .10).

A univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *describing* as the dependent variable. There was not a main effect of time, Wilks' Lambda = .98, *F*(1, 96) = 1.75, *p* = .189, η_p^2 = .018, indicating that *describing* in all three conditions did not significantly differ between T1 (*M* = 3.31, *SD* = .60) and T2 (*M* = 3.26, *SD* = .66). Additionally, there was not a significant interaction between condition and time, Wilks' Lambda = .98, *F*(2, 96) = 1.01, *p* = .368, η_p^2 = .021. Finally, the main effect comparing the conditions was not

significant, $F(2, 96) = 1.12$, $p = .331$, $\eta_p^2 = .023$, indicating that *describing* did not significantly differ between the FAMM condition ($M = 3.40$, $SE = .10$), the OMMM condition ($M = 3.18$, $SE = .11$), and the control condition ($M = 3.26$, $SE = .11$).

A univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *acting with awareness* as the dependent variable. There was not a significant interaction between condition and time, Wilks' Lambda = 1.00, $F(2, 96) = .14$, $p = .867$, $\eta_p^2 = .003$. However, there was a main effect of time, Wilks' Lambda = .88, $F(1, 96) = 13.44$, $p < .001$, $\eta_p^2 = .123$, with *acting with awareness* in all three conditions significantly higher at T1 ($M = 3.22$, $SD = .57$) than T2 ($M = 3.05$, $SD = .71$). Finally, the main effect comparing the conditions was not significant, $F(2, 96) = 1.10$, $p = .337$, $\eta_p^2 = .022$, indicating that *acting with awareness* did not significantly differ between the FAMM condition ($M = 3.24$, $SE = .10$), the OMMM condition ($M = 3.02$, $SE = .10$), and the control condition ($M = 3.14$, $SE = .11$).

A univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *nonjudging of inner experience* as the dependent variable. There was not a significant interaction between condition and time, Wilks' Lambda = 1.00, $F(2, 96) = .05$, $p = .953$, $\eta_p^2 = .001$. However, there was a main effect of time, Wilks' Lambda = .92, $F(1, 96) = 8.60$, $p = .004$, $\eta_p^2 = .082$, with *nonjudging of inner experience* in all three conditions significantly lower at T1 ($M = 3.32$, $SD = .69$) than T2 ($M = 3.44$, $SD = .75$). Finally, the main effect comparing the conditions was not significant, $F(2, 96) = 2.20$, $p = .116$, $\eta_p^2 = .044$, indicating that *nonjudging of inner experience* did not significantly differ between the FAMM condition

(*M* = 3.45, *SE* = .12), the OMMM condition (*M* = 3.18, *SE* = .12), and the control condition (*M* = 3.52, *SE* = .12).

A univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *nonreactivity to inner experience* as the dependent variable. There was not a significant interaction between condition and time, Wilks' Lambda = .99, $F(2, 96) = .46$, $p = .636$, $\eta_p^2 = .009$. However, there was a main effect of time, Wilks' Lambda = .93, $F(1, 96) = 6.80$, $p = .011$, $\eta_p^2 = .066$, with *nonreactivity to inner experience* in all three conditions significantly higher at T1 (*M* = 2.95, *SD* = .48) than T2 (*M* = 2.84, *SD* = .52). Finally, the main effect comparing the conditions was not significant, $F(2, 96) = .45$, $p = .642$, $\eta_p^2 = .009$, indicating that *nonreactivity to inner experience* did not significantly differ between the FAMM condition (*M* = 2.94, *SE* = .08), the OMMM condition (*M* = 2.89, *SE* = .08), and the control condition (*M* = 2.84, *SE* = .08).

Finally, a univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *overall mindfulness* as the dependent variable. There was a main effect of time, Wilks' Lambda = .91, $F(1, 96) = 9.19$, $p = .003$, $\eta_p^2 = .087$, with *overall mindfulness* in all three conditions significantly higher at T1 (*M* = 3.19, *SD* = .33) than T2 (*M* = 3.13, *SD* = .36). There was also a significant interaction between condition and time, Wilks' Lambda = .94, $F(2, 96) = 3.13$, $p = .048$, $\eta_p^2 = .061$, indicating that the effect of time on *overall mindfulness* depended on what condition the participants were in. Pairwise comparisons revealed that *overall mindfulness* for participants in the FAMM condition significantly decreased from T1 (*M*

= 3.27, *SD* = .27) to T2 (*M* = 3.16, *SD* = .33), *t*(34) = 3.05, *p* = .004. Additionally, *overall mindfulness* for participants in the OMMM condition significantly decreased from T1 (*M* = 3.12, *SD* = .34) to T2 (*M* = 3.06, *SD* = .35), *t*(32) = 2.44, *p* = .020. However, *overall mindfulness* for participants in the control condition did not significantly change from T1 (*M* = 3.17, *SD* = .38) to T2 (*M* = 3.17, *SD* = .39), *t*(30) = -.13, *p* = .900. Finally, the main effect comparing the conditions was not significant, *F*(2, 96) = 1.21, *p* = .303, η_p^2 = .025, indicating that *overall mindfulness* did not significantly differ between the FAMM condition (*M* = 3.22, *SE* = .06), the OMMM condition (*M* = 3.09, *SE* = .06), and the control condition (*M* = 3.17, *SE* = .06). See Table 2.2 for means and standard deviations and Table 5 for results.

Attention Network Task

A univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *alerting attention* as the dependent variable. There was not a main effect of time, Wilks' Lambda = 1.00, *F*(1, 96) = .19, *p* = .663, η_p^2 = .002, indicating that *altering attention* in all three conditions did not significantly differ between T1 (*M* = 43.77, *SD* = 33.95) and T2 (*M* = 45.45, *SD* = 32.36). However, there was a trending interaction between condition and time, Wilks' Lambda = .94, *F*(2, 96) = 3.05, *p* = .052, η_p^2 = .060, indicating that the effect of time on *alerting attention* depended on what condition the participants were in. Pairwise comparisons revealed that *alerting attention* for participants in the FAMM condition did not significantly change from T1 (*M* = 48.57, *SD* = 31.57) to T2 (*M* = 42.20, *SD* = 33.39),

t(34) = 1.18, *p* = .247. Additionally, *alerting attention* for participants in the control condition did not significantly change from T1 (*M* = 48.73, *SD* = 34.06) to T2 (*M* = 44.84, *SD* = 35.69), *t*(30) = .51, *p* = .612. However, *alerting attention* for participants in the OMMM condition trended toward an increased from T1 (*M* = 34.01, *SD* = 35.14) to T2 (*M* = 49.49, *SD* = 28.28), *t*(32) = -2.03, *p* = .051. Finally, the main effect comparing the conditions was not significant, *F*(2, 96) = .31, *p* = .733, η_p^2 = .006, indicating that *alerting attention* did not significantly differ between the FAMM condition (*M* = 45.38, *SE* = 4.48), the OMMM condition (*M* = 41.75, *SE* = 4.62), and the control condition (*M* = 46.79, *SE* = 4.76).

A univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *orienting attention* as the dependent variable. There was not a main effect of time, Wilks' Lambda = .98, *F*(1, 96) = 1.60, *p* = .210, η_p^2 = .016, indicating that *orienting attention* in all three conditions did not significantly differ between T1 (*M* = 49.25, *SD* = 30.73) and T2 (*M* = 45.20, *SD* = 34.22). Additionally, there was not a significant interaction between condition and time, Wilks' Lambda = .95, *F*(2, 96) = 2.32, *p* = .104, η_p^2 = .046. Finally, the main effect comparing the conditions was not significant, *F*(2, 96) = .13, *p* = .878, η_p^2 = .003, indicating that *orienting attention* did not significantly differ between the FAMM condition (*M* = 46.41, *SE* = 4.69), the OMMM condition (*M* = 46.11, *SE* = 4.83), and the control condition (*M* = 49.33, *SE* = 4.98).

Finally, a univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *executive attention* as the

dependent variable. There was not a main effect of time, Wilks' Lambda = 1.00, $F(1, 96) = .11$, $p = .740$, $\eta_p^2 = .001$, indicating that *executive attention* in all three conditions did not significantly differ between T1 ($M = 104.77$, $SD = 77.84$) and T2 ($M = 107.08$, $SD = 48.19$). Additionally, there was not a significant interaction between condition and time, Wilks' Lambda = .99, $F(2, 96) = .60$, $p = .549$, $\eta_p^2 = .012$. Finally, the main effect comparing the conditions was not significant, $F(2, 96) = .91$, $p = .407$, $\eta_p^2 = .019$, indicating that *executive attention* did not significantly differ between the FAMM condition ($M = 106.60$, $SE = 9.00$), the OMMM condition ($M = 114.22$, $SE = 9.26$), and the control condition ($M = 96.34$, $SE = 9.55$). See Table 2.3 for means and standard deviations and Table 6 for results.

Positive and Negative Affect Scale

A univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *positive affect* as the dependent variable. There was not a significant interaction between condition and time, Wilks' Lambda = 1.00, $F(2, 96) = .14$, $p = .869$, $\eta_p^2 = .003$. However, there was a main effect of time, Wilks' Lambda = .62, $F(1, 96) = 58.85$, $p < .001$, $\eta_p^2 = .380$, with *positive affect* in all three conditions significantly higher at T1 ($M = 2.20$, $SD = .78$) than T2 ($M = 1.74$, $SD = .66$). Finally, the main effect comparing the conditions was not significant, $F(2, 96) = .15$, $p = .863$, $\eta_p^2 = .003$, indicating that *positive affect* did not significantly differ between the FAMM condition ($M = 1.95$, $SE = .11$), the OMMM condition ($M = 1.95$, $SE = .12$), and the control condition ($M = 2.03$, $SE = .12$).

A univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *negative affect* as the dependent variable. There was not a significant interaction between condition and time, Wilks' Lambda = 1.00, $F(2, 96) = .03$, $p = .969$, $\eta_p^2 = .001$. However, there was a main effect of time, Wilks' Lambda = .93, $F(1, 96) = 7.07$, $p = .009$, $\eta_p^2 = .069$, with *negative affect* in all three conditions significantly higher at T1 ($M = 1.52$, $SD = .48$) than T2 ($M = 1.42$, $SD = .44$). Finally, the main effect comparing the conditions was trending, $F(2, 96) = 2.69$, $p = .073$, $\eta_p^2 = .053$. Contrasts revealed that *negative affect* in the FAMM condition ($M = 1.35$, $SD = .39$) was significantly lower than in the OMMM condition ($M = 1.59$, $SE = .46$), $t(96) = 2.31$, $p = .023$. However, there was no difference in *negative affect* between the FAMM condition and the control condition ($M = 1.48$, $SD = .38$), $t(96) = 1.22$, $p = .22$, or the OMMM condition and the control condition, $t(96) = 1.04$, $p = .302$.

Finally, a univariate mixed-measures ANOVA was conducted with condition as the fixed factor, time as the within-subjects variable, and *boredom* as the dependent variable. There was not a significant interaction between condition and time, Wilks' Lambda = .99, $F(2, 96) = .75$, $p = .475$, $\eta_p^2 = .015$. However, there was a main effect of time, Wilks' Lambda = .95, $F(1, 96) = 5.60$, $p = .020$, $\eta_p^2 = .055$, with *boredom* in all three conditions significantly lower at T1 ($M = 2.90$, $SD = 1.31$) than T2 ($M = 3.29$, $SD = 1.39$). Finally, the main effect comparing the conditions was not significant, $F(2, 96) = .15$, $p = .860$, $\eta_p^2 = .003$, indicating that *boredom* did not significantly differ between the FAMM condition ($M = 3.17$, $SE = .18$), the OMMM condition ($M = 3.08$, $SE = .18$), and

the control condition (M = 3.03, SE = .19). See Table 2.3 for means and standard deviations and Table 7 for results.

Discussion

According to the neuroplasticity paradigm, repeated experiences, activities, and thoughts are capable of altering the structure of the brain, and new experiences are constantly restructuring the neuronal circuitry in the brain, subsequently influencing emotions and cognitions (Adolphs, 2010; Davidson & McEwen, 2012; Davidson & Begley, 2012). If FAMM and OMMM constitute different activities that emphasize different processes, one would expect the structure of the brain to alter in distinct way, influencing emotions and cognitions in distinct ways. However, the current study did not find evidence of this. In fact, there was no evidence that mindfulness meditation in general was able to influence emotions or cognitions.

One possible reason for this lack of an effect may simply be that there is no difference between FAMM and OMMM, and that the effects of mindfulness meditation are overstated in the literature. The goal of the present study was to conduct an extremely controlled experiment to examine the differential effects of FAMM and OMM compared to a control condition. In that sense, this experiment appears to be successful. Potential confounds were addressed by controlling for 1) researcher expectancy effects through the use of prerecorded CDs to administer the manipulations and blind researchers to collect dependent measure data, 2) participant expectancy effects by using an undergraduate sample and a reaction-time dependent measure of attention, and 3) attrition by hosting the entire manipulation in one session. However, this level of control may have come at a cost.

Another possible reason for this lack of an effect may stem from the manipulation of the conditions, or lack thereof. Evidence from the manipulation checks suggests that the manipulation in the current study was not effective, and that the participants did not actually engage in different psychological experiences. The first question (*While taking part in your experiential practice session, to what extent did you remain in the present moment?*) was meant to gauge whether the participants successfully remained mindful in the two mindfulness conditions compared to the control condition. Unfortunately, there were no significant differences between the conditions, indicating that that all three conditions remained in the present moment to the same degree. Additionally, the second two questions (*While taking part in your experiential practice session, to what extent did you focus on one sensation, and try to stay focused on that one sensation, the entire time?*; *While taking part in your experiential practice session, to what extent did you shift between sensations, and allow the sensations to pass, the entire time?*) were meant to gauge whether the FAMM and OMMM manipulation was successful, respectively. Again, this did not appear to be the case, as there were no significant differences between the three conditions on any of the questions. However, the FAMM manipulation did appear to have the predicted effect when comparing the participants in the FAMM condition to the OMMM condition. The nature of this effect may be due to the often-reported ease of practicing focused attention mindfulness meditation relative to open-monitoring mindfulness meditation. Yet, if the manipulation was truly effective, one would expect to see a difference between the control condition as well.

One possible reason that the manipulation check was largely unsuccessful is that, in an attempt to control for confounding variables, the sessions were presented using prerecorded CDs. While CDs may be effective for motivated individuals, in-person mindfulness training is the norm for studies researching the effects of meditation (Glück & Maercker, 2011; Messer, Horan, Turner, & Weber, 2015). In the current study, the meditation was delivered passively, with the participants simply asked to listen after reading instructions. Previous studies that have been successful in manipulating mindfulness with a CD have used active forms of mindfulness, such as mindful eating (Hong, Lishner, & Han, 2014; Hong, Lishner, Han, & Huss, 2011). Research has not been done examining the difference between in-person mindfulness meditation training and prerecorded, passive mindfulness meditation training.

Another possible reason that the manipulation was not effective is because the audio recordings used in the mindfulness conditions repeated the same 10-minute exercise six times, and each 10-minute exercise was separated by only two minutes. In order to trigger neuroplasticity, repeated experiences, activities, and thoughts are required to alter the structure of the brain. However, repetition over such a short period of time has been shown to facilitate boredom, especially when the task is monotonous, while introducing a longer or uneven time lag may mitigate boredom (Tsai, 2016). Additionally, previous research on mindfulness training with multiple sessions has typically spread them out over at least one week (Ainsworth et al., 2013; Bögels, Hoogstad, van Dun, de Schutter, & Restifo, 2008; Fernos, Furhoff, & Wändel, 2008; Jha,

Krompinger, & Baime, 2007). Research has not been done examining the effects of a mindfulness intervention under different timeframes.

Finally, another possible reason that the manipulation was not effective is because the entire timeslot lasted almost four hours. In order to ensure that the data that were collected were a result of the manipulated session, participants completed all of the dependent measures immediately before and immediately after they participated in their respective condition. However, the dependent measures themselves took 45 minutes to complete. Previous research on mindfulness that used the ANT had participants complete T1 and T2 during separate sessions (Ainsworth et al., 2013) or utilized a cross-sectional design where some participants completed the ANT at T1 and the rest completed it at T2 (Elliot, Wallace, & Giesbrecht, 2014).

This evidence suggests that time should be the largest factor in the current study, and that there should not be very many differences as a result of the different conditions. Results from the PANAS support this post-hoc hypothesis. While *negative affect* decreased between T1 and T2, *positive affect* did as well. In previous research, mindfulness training has positively correlated with *positive affect* and negatively correlated with *negative affect* (Bajaj & Pande, 2016). However, in the current study, there was not an interaction between the levels of *positive* and *negative affect* between time and condition, meaning that the changes in *positive* and *negative affect* did not depend on whether the participants were in the FAMM, OMMM, or control condition. However, *negative affect* was lower in the FAMM condition, but only compared to the

OMMM condition, and this difference was trending. Finally, the participants were significantly more *bored* at T2 than T1.

Additionally, results from the BAI and FFMQ follow the same pattern: time was the largest factor and there were not many significant differences between the conditions. Participants reported significantly more *state anxiety* at T1 than T2. *Acting with awareness*, *nonreactivity to inner experiences*, and *overall mindfulness* also decreased from T1 to T2, although *nonjudging of inner experiences* increased between T1 and T2. Finally, participants in the FAMM and OMMM conditions both reported lower *overall mindfulness* compared to the control. Assuming that the manipulation was not effective, as the manipulation checks would suggest, these results appear to be due to the general passing of time within the experiment, although there was not a condition where the participants did absolutely nothing, so this conclusion is conjectural. However, the lower reported *overall mindfulness* in the FAMM and OMMM conditions compared to the control condition might shed light on an important distinction between the mindfulness audio and the control audio. As mentioned, the mindfulness audio repeated the same 10-minute exercise six times. In the control condition, the participants listened to sensation and perception information from a textbook; there was no repeating of information. Therefore, the negative effects of repeating the same stimuli were only present in the mindfulness conditions. However, one would expect to see this same pattern in *positive* and *negative affect* and *boredom* as well, yet it did not emerge.

The only result that somewhat reflect any of the predicted hypotheses stemmed from the Attention Network Task. While there were no differences found between the

conditions or time for *orienting* or *executive attention*, participants in the OMMM condition did see an increase in performance for *alerting attention* compared to the FAMM and control conditions. This finding was trending, however, and likely inexplicable since the manipulation was not effective.

Due to the significant elevation in boredom between T1 and T2, the same analyses were conducted while controlling for boredom. The same pattern of results emerged, suggesting that, although boredom did significantly increase with time, it may not have played a crucial role in dampening the effects of the manipulation. Additionally, mindfulness was examined for participants who scored higher than the median for boredom and anxiety, respectively, incase floor effects for each contributed to the general lack of an effect of mindfulness meditation on mindfulness. Again, the same pattern was found, indicating that, even when individuals rated their boredom and anxiety as relatively high, mindfulness meditation did not lead to higher level of mindfulness.

In conclusion, several limitations of the current study may have lead to a general lack of effectiveness in manipulating the FAMM, OMMM, and control condition. First, the use of audio CDs instead of an in-person mindfulness meditation training and control session may have caused the participants to become bored, as audio clips are frequently used to induce boredom (Markey, Chin, Vanepps, & Loewenstein, 2014). Second, the voice of the individual used to make the CDs was not pilot-tested beforehand to make sure that it was not experienced as overly negative or positive. While the same voice was used in each condition, if the voice came across as unduly positive or negative, it may have been too distracting and subsequently thwarted any attempt at a manipulation.

Third, the repetition of the sessions and length of the entire timeslot may have lead to a habituation to the message and subsequent boredom (Campbell & Keller, 2003). The sessions included built in 2-minute breaks every ten minutes, but previous research has used breaks that extend into the following day and scheduled only one session each day (Ainsworth et al., 2013; Bögels, Hoogstad, van Dun, de Schutter, & Restifo, 2008; Fernos, Furhoff, & Wändel, 2008; Jha, Krompinger, & Baime, 2007). Finally, in an attempt to reduce fatigue and decrease the length of the timeslots, the ANT was cut in half. This may have contributed to the reduced test-retest reliability between T1 and T2, compared to previous research, ultimately leading to higher variance than what is typical and a decreased ability to detect an effect if one is present.

Further research on the difference between FAMM and OMMM should focus on the aforementioned limitations. First, whether or not an in-person practitioner results in a more motivated sample than using just audio should be ascertained. Second, shorter sessions spread out over multiple days may reduce any feelings of boredom or decreased positive affect. To study this, the same intervention should be manipulated by 1) spreading it out over a period of time and 2) condensing it into one sitting. Finally, further research using the ANT should use the entire 30-minute task as it was intended. If time and fatigue are issues, it may be more beneficial to only conduct the task once upon completion of the intervention. Alternatively, the ANT may be administered before and after sessions that extend for multiple days, increasing the time between when the participants' are required to complete it and decreasing fatigue.

APPENDIX A

Informed Consent Form

Informed Consent Form

The Department of Psychology supports the practice of protecting human participants in research. The following information is provided so that you can decide whether you wish to participate in this research experience. Your participation is solicited but is strictly voluntary and you are free to withdraw at any point without penalty. If you are willing to participate, please sign this consent form. Your consent form will be separated from all other study materials.

The researchers are interested in the effect of different experiential practices on psychological processes. The study will run for 3 hours, which will include six 10-minute audio sessions with five 2-minute breaks. You will complete various questionnaires at the beginning and end of today's session. Some of the questions may be personal and cause you some discomfort. Please keep in mind that all of your information will be strictly confidential. You will also be required to silence your cellphone and will not be able to use it while you participate in this study. If you feel that you will be unable to follow this protocol, please let the researcher know immediately.

If you agree to participate, you will be free to withdraw at any time and still receive at least partial credit for your participation. If you decide not to participate at any time, or for any reason, please let the researcher know and she or he will excuse you. You do not need to tell the researcher your reasons for choosing not to participate. If you decide to withdraw from this research experience, no data provided by you will be entered into the data set or used.

Although participating may not be highly beneficial to you, we believe that the information you provided will be useful in furthering our understanding of how different learning styles may influence students' behaviors.

Once the study is completed, we would be glad to give the results to you. Do not hesitate to ask any questions about the study before, during, or after the research is complete. If you would like additional information concerning this study before or after it is complete, please feel free to contact us by phone, mail, or email:

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If you have any complaints about your treatment as a participant in this study, please contact:

Dr. Anca Miron, Chair, Institutional Review Board for
Protection of Human Participants
c/o Grants Office
UW Oshkosh
(920) 424-1415

Although the chairperson may ask for your name, all complaints are kept in confidence.
Consent Statement: I have received an explanation of the study and agree to participate. I understand that my participation in this study is strictly voluntary, and that I may withdraw at any time. By signing this, I confirm that I am either 18 years old and can give consent or if I am under 18 years old, I am enrolled in a psychology course at the University of Wisconsin Oshkosh.

PRINTED NAME SIGNATURE
DATE

This research project has been approved by the University of Wisconsin Oshkosh IRB (Protocol # 972712) for the Protection of Human Participants for a one-year period, valid until 5/20/16.

APPENDIX B

Study Description

Study Description

The purpose of this study is to examine the effect of different experiential practices on various psychological processes. First, you will complete four questionnaires. Second, you will read instructions that will explain what you will be doing today. Once you are done reading the instructions, you will complete six 10-minute experiential practices. In between each experiential practice, you will receive a 2-minute break. The researcher will play a CD and participate in the experiential practice with you. Once the six 10-minute sessions are done, you will complete the same three questionnaires again, and then the study will be concluded.

APPENDIX C

Beck Anxiety Inventory

Directions: Below is a list of common symptoms of anxiety. Please read through each list item. Indicate ***how much you were just bothered*** by each symptom listed on the left, marking an X in the degree of disturbance corresponding to a column of cells on the right.

Symptoms		How much were you bothered?			
		Nothing 0	Weak 1	Moderate 2	Strong 3
		It did not bother me at all.	It bothered a little.	It bothered me a lot but I could stand it.	I almost could not stand it.
1	Numbness or tingling				
2	Hot sensation				
3	Wobbly				
4	Incapable of relaxing				
5	Fear of the worst happening				
6	Dizziness or lightheadedness				
7	Heart pounding or racing				
8	Restless				
9	Terrified				
10	Nervous				
11	Feeling of suffocation				
12	Hands trembling				
13	Trembling				
14	Fear of losing control				
15	Difficulty breathing				
16	Fear of dying				
17	Frightened				
18	Indigestion or discomfort in the abdomen				
19	Fainting				
20	Red Face				
21	Sweating (not due to heat)				
Score:					

To score: Average the scores from each item _____.

APPENDIX D

Five Facet Mindfulness Questionnaire

Directions: We are interested in ***what you just experienced***. Below is a list of things that people sometimes experience. Please read each statement, and rate each of the statements with the number that best describes your own opinion of what is true for you, right now.

	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.	1	2	3	4	5
2) I'm good at finding words to describe my feelings.	1	2	3	4	5
3) I criticize myself for having irrational or inappropriate emotions.	1	2	3	4	5
4) I perceive my feelings and emotions without having to react to them.	1	2	3	4	5
5) When I do things, my mind wanders off and I'm easily distracted.	1	2	3	4	5
6) When I take a shower or bath, I stay alert to the sensations of water on my body.	1	2	3	4	5
7) I can easily put my beliefs, opinions, and expectations into words.	1	2	3	4	5
8) I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.	1	2	3	4	5
9) I watch my feelings without getting lost in them.	1	2	3	4	5
10) I tell myself I shouldn't be feeling the way I'm feeling.	1	2	3	4	5
11) I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.	1	2	3	4	5
12) It's hard for me to find the words to describe what I'm thinking.	1	2	3	4	5
13) I am easily distracted.	1	2	3	4	5
14) I believe some of my thoughts are abnormal or bad and I shouldn't think that way.	1	2	3	4	5
15) I pay attention to sensations, such as the wind in my hair or sun on my face.	1	2	3	4	5

16) I have trouble thinking of the right words to express how I feel about things.	1	2	3	4	5
17) I make judgments about whether my thoughts are good or bad.	1	2	3	4	5
18) I find it difficult to stay focused on what's happening in the present.	1	2	3	4	5
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.	1	2	3	4	5
20) I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.	1	2	3	4	5
21) In difficult situations, I can pause without immediately reacting.	1	2	3	4	5
22) When ever I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.	1	2	3	4	5
23) It seems I am "running on automatic" without much awareness of what I'm doing.	1	2	3	4	5
24) When I have distressing thoughts or images, I feel calm soon after.	1	2	3	4	5
25) I tell myself that I shouldn't be thinking the way I'm thinking.	1	2	3	4	5
26) I notice the smells and aromas of things.	1	2	3	4	5
27) Even when I'm feeling terribly upset, I can find a way to put it into words.	1	2	3	4	5
28) I rush through activities without being really attentive to them.	1	2	3	4	5
29) When I have distressing thoughts or images, I am able just to notice them without reacting.	1	2	3	4	5
30) I think some of my emotions are bad or inappropriate and I shouldn't feel them.	1	2	3	4	5
31) I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.	1	2	3	4	5
32) My natural tendency is to put my experiences into words.	1	2	3	4	5

33) When I have distressing thoughts or images, I just notice them and let them go.	1	2	3	4	5
34) I do jobs or tasks automatically without being aware of what I'm doing.	1	2	3	4	5
35) When I have distressing thoughts or images, I judge myself as good or bad depending what the thought or image is about.	1	2	3	4	5
36) I pay attention to how my emotions affect my thoughts and behavior.	1	2	3	4	5
37) I can usually describe how I feel at the moment in considerable detail.	1	2	3	4	5
38) I find myself doing things without paying attention.	1	2	3	4	5
39) I disapprove of myself when I have irrational ideas.	1	2	3	4	5

Scoring: (Note: R = reverse-scored item)

Subscale Directions	**Your Score TOTAL**	**Your score item Avg.**
Observing: Sum items 1 + 6 + 11 + 15 + 20 + 26 + 31 + 36		
Describing: Sum items 2 + 7 + 12R + 16R + 22R + 27 + 32 + 37.		
Acting with Awareness: Sum items 5R + 8R + 13R + 18R + 23R + 28R + 34R + 38R.		
Nonjudging of inner experience: Sum items 3R + 10R + 14R + 17R + 25R + 30R + 35R + 39R.		
Nonreactivity to inner experience: Sum items 4 + 9 + 19 + 21 + 24 + 29 + 33.		
TOTAL FFMQ (add subscale scores)		

NOTE: Some researchers divide the total in each category by the number of items in that category to get an average category score. The Total FFMQ can be divided by 39 to get an average item score.

APPENDIX E

Positive and Negative Affect Scale

Directions: This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent ***you feel this way right now***.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1. Interested	1	2	3	4	5
2. Bored	1	2	3	4	5
3. Distressed	1	2	3	4	5
4. Excited	1	2	3	4	5
5. Upset	1	2	3	4	5
6. Strong	1	2	3	4	5
7. Guilty	1	2	3	4	5
8. Scared	1	2	3	4	5
9. Uninterested	1	2	3	4	5
10. Hostile	1	2	3	4	5
11. Enthusiastic	1	2	3	4	5
12. Proud	1	2	3	4	5
13. Irritable	1	2	3	4	5
14. Alert	1	2	3	4	5
15. Tired	1	2	3	4	5
16. Ashamed	1	2	3	4	5
17. Inspired	1	2	3	4	5
18. Nervous	1	2	3	4	5
19. Determined	1	2	3	4	5
20. Attentive	1	2	3	4	5
21. Indifferent	1	2	3	4	5
22. Jittery	1	2	3	4	5
23. Active	1	2	3	4	5
24. Afraid	1	2	3	4	5

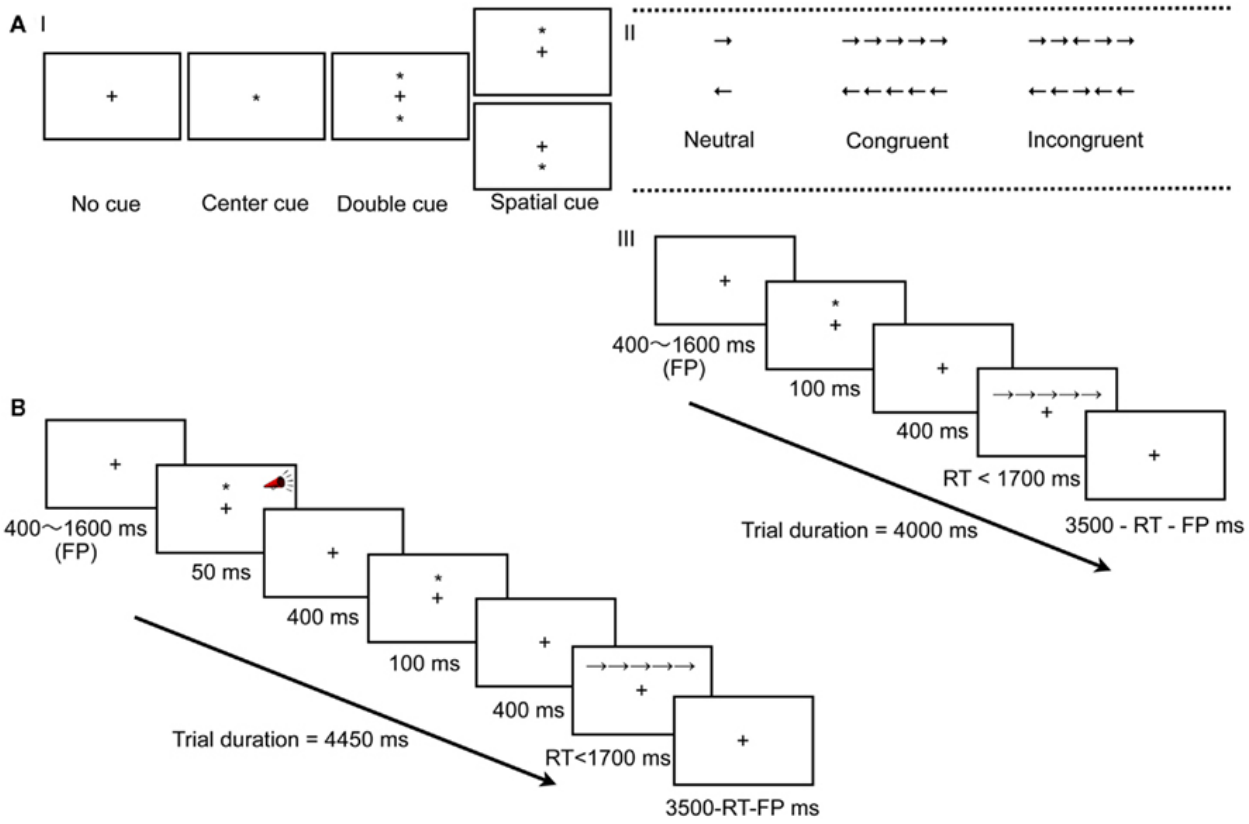
Scoring Instructions:
Boredom Score: Average the scores on items 2, 9, 15, and 21. Scores can range from 4 to 20, with higher scores representing higher levels of boredom.

Positive Affect Score: Average the scores on items 1, 4, 6, 11, 12, 14, 17, 19, 20, and 23. Scores can range from 10 to 50, with higher scores representing higher levels of positive affect.

Negative Affect Score: Average the scores on items 3, 5, 7, 8, 10, 13, 16, 18, 22, and 24. Scores can range from 10 to 50, with higher scores representing higher levels of negative affect.

APPENDIX F

Attention Network Task


A I
No cue
Center cue
Double cue
Spatial cue
II
Neutral
Congruent
Incongruent
III
400～1600 ms
(FP)
100 ms
400 ms
RT < 1700 ms
3500 - RT - FP ms
Trial duration = 4000 ms
B
400～1600 ms
(FP)
50 ms
400 ms
100 ms
400 ms
RT<1700 ms
3500-RT-FP ms
Trial duration = 4450 ms

APPENDIX G

Open-Monitoring Instructions

Experiential Practice Instructions (Open-Monitoring)

Your experiential practice session involves being open to your moment-to-moment sensations. For the length of the session, your most important goal is to remain relaxed, nonjudgmental, and open. As you relax, your attention will likely shift to new sensations. When you find that your attention has shifted, simply observe the ebb and flow of your sensations. When your attention shifts on to a new sensation, no matter where it goes or how many times it shifts, understand that this is okay, and simply open yourself to any new sensations.

APPENDIX H

Focused Attention Instructions

Experiential Practices Instructions (Focused Attention)

Your experiential practice session involves maintaining a moment-to-moment focus on your breath. For the length of the session, your most important goal is to remain relaxed, nonjudgmental, and focused on your breath. As you relax, your mind will likely wander away from your breath. When you find that your mind has wandered, simply return your focus back to your breath. When your mind wanders, no matter where it goes or how many times it wanders, understand that this is okay, and simply bring your focus back to your breath.

APPENDIX I

Control Session Instructions

Experiential Practice Instructions (Control Session)

Your experiential practice session involves listening to information about sensations and perceptions. For the length of your session, your most important goal is to carefully listen to the information presented and follow along the entire time. As you listen, do your best to learn as much as you can about sensations and perceptions. If you find that the information being presented is not relevant to you, keep listening until it is. The information presented is important. It is okay if you do not understand the information. Do your best.

APPENDIX J

Demographics and Manipulation Check

Directions: We are interested in your experience ***during your experiential practice session***. Please read each statement and rate each of the statements by circling the number that best describes your own experience. At the end you will also be asked to indicate your sex, age, and ethnicity.

1) While taking part in your experiential practice session, to what extent did you remain in the present moment?

1	2	3	4	5
Never	Rarely	Occasionally	Mostly	Always

2) While taking part in your experiential practice session, to what extent did you focus on one sensation, and try to stay focused on that one sensation, the entire time?

1	2	3	4	5
Never	Rarely	Occasionally	Mostly	Always

3) While taking part in your experiential practice session, to what extent did you shift between sensations, and allow the sensations to pass, the entire time?

1	2	3	4	5
Never	Rarely	Occasionally	Mostly	Always

4) What is your sex?

_____Female
_____Male
_____Other

5) What is your age? _____

6) What is your ethnicity?

_____Caucasian
_____African American
_____Hispanic/Latino
_____Asian
_____Native American
_____Indian/Pakistani
_____Other

APPENDIX K

Debriefing Information

Debriefing Information

Thank you for participating in this study. The purpose of this form is to provide you with more in-depth information about the study. While the actual purpose of the study is to examine the effects of an experiential practice on psychological processes, the specific experiential practice we are interested in is mindfulness meditation, and the psychological processes we are interested in are anxiety, attention, and mindfulness.

To examine this issue, we randomly assign 1/3rd of the participants to take part in a mindfulness meditation where the point is to focus on the sensation of their breath. Another 1/3rd of the participants are assigned to take part in a mindfulness meditation session where the point is to remain flexible to ever sensation that arises. The final 1/3rd of the participants are randomly assigned to take part in an active control condition where the point is to simply learn about sensation and perception. All participants complete measures of anxiety, attention, and mindfulness before and after the experiential practice session.

If you have any questions or concerns about this study, then please feel free to speak with either of the research assistants. They will be more than happy to talk with you about any questions or concerns that you may have.

Again, thank you very much for your participation. We value the time and energy you spent in this study and it is our hope that the data you have provided will help us to better understand human psychology.

APPENDIX L

Tables and Figures

1)

State Anxiety	Condition		
	FA	OM	Control
	Lower	Lower	Higher

2)

State Mindfulness	Condition		
	FA	OM	Control
	Higher	Higher	Lower

3)

Shifting Attention: Alerting and Orienting	Condition		
	FA	OM	Control
	Moderate	Highest	Lowest

4)

Sustaining Attention: Executive Control	Condition		
	FA	OM	Control
	Highest	Moderate	Lowest

Figure 1. Prediction tables reflecting hypotheses one through four.

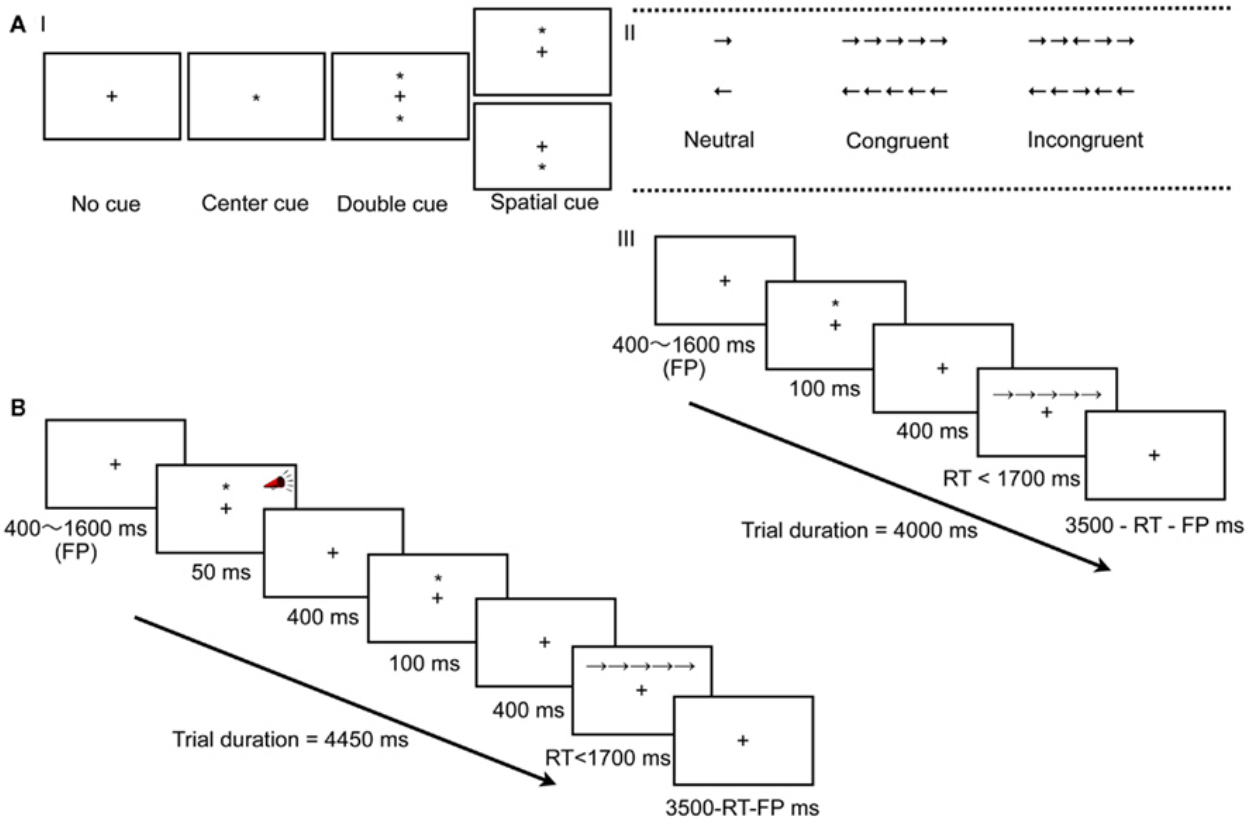


Figure 2. An outline of the Attention Network Task (ANT), including A1) the cue conditions, A2) the target conditions, and B) the order of presentation (Ishigami & Klein, 2011).

Table 1

Demographic Information (N = 99)

	FAMM	OMMM	Control
N	35	33	31
Gender			
Female	18	25	21
Male	15	8	10
Ethnicity			
Caucasian	31	30	29
African American	1	0	1
Hispanic/Latino	2	1	0
Asian	1	1	0
Native American	0	1	0
Indian/Pakistani	0	0	1
Age			
Mean	19.11	19.85	19.23
Minimum	18	18	18
Maximum	26	43	23

Note. Gender, ethnicity, and age of the sample by condition.

Table 2.1

Descriptive Statistics (N = 99)

Present Moment Manipulation Check		
Condition	*M*	*SD*
FAMM	3.23	0.91
OMMM	3.15	0.94
Control	3.10	0.87
FAMM Manipulation Check		
Condition	*M*	*SD*
FAMM	3.20_{a}	0.93
OMMM	2.73_{b}	0.84
Control	2.94	1.00
OMMM Moment Manipulation Check		
Condition	*M*	*SD*
FAMM	3.06	0.94
OMMM	3.09	0.98
Control	2.90	0.60

Anxiety	Time 1		Time 2	
Condition	*M*	*SD*	*M*	*SD*
FAMM	1.37	0.38	1.30	0.42
OMMM	1.55	0.53	1.44	0.51
Control	1.55	0.52	1.45	0.48
Total	1.49_{a}	0.48	1.39_{b}	0.47

Note. Higher means reflect greater anxiety and a more successful manipulation, respectively. Different subscripts within dependent variables indicate significant differences at $p < .05$ (two-tailed).

Table 2.2

Descriptive Statistics Continued (N = 99)

Observing	Time 1		Time 2	
Condition	*M*	*SD*	*M*	*SD*
FAMM	3.14_{a}	0.56	2.96_{b}	0.59
OMMM	3.22	0.55	3.14	0.56
Control	3.04	0.58	3.15	0.71
Total	3.14	0.56	3.08	0.62
Describing	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
FAMM	3.45	0.55	3.35	0.59
OMMM	3.22	0.61	3.15	0.65
Control	3.25	0.64	3.27	0.74
Total	3.31	0.60	3.26	0.66
Acting with Awareness	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
FAMM	3.33	0.52	3.14	0.72
OMMM	3.12	0.56	2.92	0.71
Control	3.21	0.63	3.07	0.70
Total	3.22_{a}	0.57	3.05_{b}	0.71
Nonjudging Inner Experience	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
FAMM	3.40	0.60	3.50	0.70
OMMM	3.13	0.75	3.23	0.79
Control	3.46	0.70	3.58	0.73
Total	3.32_{a}	0.69	3.44_{b}	0.75
Nonreactivity Inner Experience	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
FAMM	3.02	0.48	2.86	0.49
OMMM	2.92	0.41	2.85	0.46
Control	2.88	0.55	2.79	0.62
Total	2.95_{a}	0.48	2.84_{b}	0.52
Overall Mindfulness	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
FAMM	3.27_{aa}	0.26	3.16_{bb}	0.33
OMMM	3.12_{aaa}	0.34	3.06_{bbb}	0.36
Control	3.17	0.38	3.17	0.39
Total	3.19_{a}	0.33	3.13_{b}	0.36

Note. Higher means reflect superior mindfulness. Different subscripts within dependent variables indicate significant differences at $p < .05$ (two-tailed).

Table 2.3

Descriptive Statistics Continued (N = 99)

Alerting Attention	Time 1		Time 2	
Condition	*M*	*SD*	*M*	*SD*
FAMM	48.57	31.57	42.20	33.39
OMMM	$34.01_{a\dagger}$	35.14	$49.49_{b\dagger}$	28.28
Control	48.73	34.06	44.84	35.69
Total	43.77	33.95	45.45	32.36
Orienting Attention	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
FAMM	46.47	27.56	46.35	27.08
OMMM	45.11	25.28	47.12	30.06
Control	56.80	38.15	41.85	44.88
Total	49.25	30.73	45.20	34.22
Executive Attention	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
FAMM	104.85	89.42	108.34	55.51
OMMM	118.30	54.02	110.14	47.78
Control	90.27	84.85	102.40	40.31
Total	104.77	77.84	107.08	48.19
Positive Affect	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
FAMM	2.19	0.78	1.71	0.74
OMMM	2.19	0.76	1.71	0.60
Control	2.23	0.82	1.82	0.64
Total	2.20_{a}	0.78	1.74_{b}	0.66
Negative Affect	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
$FAMM_{aa}$	1.40	0.42	1.31	0.40
$OMMM_{bb}$	1.63	0.56	1.54	0.50
Control	1.54	0.42	1.42	0.39
Total	1.52_{a}	0.48	1.42_{b}	0.44
Boredom	**Time 1**		**Time 2**	
Condition	*M*	*SD*	*M*	*SD*
FAMM	3.11	1.30	3.23	1.35
OMMM	2.82	1.29	3.33	1.53
Control	2.74	1.34	3.32	1.30
Total	2.90_{a}	1.31	3.29_{b}	1.39

Note. Higher means reflect less efficient attention network and greater affect, respectively. Different subscripts within dependent variables indicate significant differences at $p < .05$; † = trending (two-tailed).

Table 3

Manipulation Checks (N = 99)

Present Moment	*df*	*F*	*p*	η_p^2
Source				
Condition	2	0.18	.839	.004
Error	96			
Focused Attention				
Source				
Condition	2	2.24	.112	.045
Error	96			
Open-Monitoring				
Source				
Condition	2	0.43	.653	.009
Error	96			

Note. Analysis of variance with manipulation check ratings as dependent variable and condition as independent variable. *$p < .05$; (two-tailed).

Table 4

Beck Anxiety Inventory (N = 99)

Anxiety	*df*	*F*	*p*	η_p^2
Source				
Time	1	8.64	.004**	.083
Condition	2	1.49	.230	.030
Condition x Time	2	0.28	.759	.006
Error	96			

Note. Analysis of variance with BAI ratings as dependent variable and condition as independent variable. *$p < .05$; **$p < .01$; (two-tailed).

Table 5

Five Facet Mindfulness Questionnaire (N = 99)

Observing	*df*	*F*	*p*	η_p^2
Source				
Time	1	1.81	.181	.019
Condition	2	0.46	.634	.009
Condition x Time	2	4.96	.009**	.094
Error	96			
Describing				
Source				
Time	1	1.75	.189	.018
Condition	2	1.12	.331	.023
Condition x Time	2	1.01	.368	.021
Error	96			
Acting with Awareness				
Source				
Time	1	13.44	.001**	.123
Condition	2	1.10	.337	.022
Condition x Time	2	0.14	.867	.003
Error	96			
Nonjudging Inner Experience				
Source				
Time	1	8.60	.004**	.082
Condition	2	2.20	.116	.044
Condition x Time	2	0.05	.953	.001
Error	96			
Nonreactivity Inner Experience				
Source				
Time	1	6.80	.011*	.066
Condition	2	0.45	.642	.009
Condition x Time	2	0.46	.636	.009
Error	96			
Overall Mindfulness				
Source				
Time	1	9.19	.003**	.087
Condition	2	1.21	.303	.025
Condition x Time	2	3.13	.048*	.061
Error	96			

Note. Analysis of variance with FFMQ ratings as dependent variable and condition as independent variable. *$p < .05$; ** $p < .01$; (two-tailed).

Table 6

Attention Network Task (N = 99)

Alerting Attention	*df*	*F*	*p*	η_p^2
Source				
Time	1	0.19	.663	.002
Condition	2	0.31	.733	.006
Condition x Time	2	3.05	.052†	.060
Error	96			
Orienting Attention				
Source				
Time	1	1.60	.210	.016
Condition	2	0.13	.878	.003
Condition x Time	2	2.32	.104	.046
Error	96			
Executive Attention				
Source				
Time	1	0.11	.740	.001
Condition	2	0.91	.407	.019
Condition x Time	2	0.60	.549	.012
Error	96			

Note. Analysis of variance with ANT scores as dependent variable and condition as independent variable. *$p < .05$; † = trending; (two-tailed).

Table 7

Positive and Negative Affect Scale (N = 99)

Positive Affect	*df*	*F*	*p*	η_p^2
Source				
Time	1	58.85	.001**	.380
Condition	2	0.15	.863	.003
Condition x Time	2	0.14	.869	.003
Error	96			
Negative Affect				
Source				
Time	1	7.07	.009**	.069
Condition	2	2.69	.073†	.053
Condition x Time	2	0.03	.969	.001
Error	96			
Boredom				
Source				
Time	1	5.60	.020*	.055
Condition	2	0.15	.860	.003
Condition x Time	2	0.75	.475	.015
Error	96			

Note. Analysis of variance with PANAS ratings as dependent variable and condition as independent variable. *$p < .05$; ** $p < .01$; † = trending; (two-tailed).

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