REDEFINING MINDFULNESS

by

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ABSTRACT

This research aimed to challenge the current conceptualization of mindfulness as a personality trait or psychological state. Instead, we propose that mindfulness is better defined *and* measured as a skill. As a result, we evaluated a new mindfulness measure, Mindfulness Skill Scale (MSS). We recruited 281 working professionals from Amazon's Mechanical Turk (MTurk) who were asked to complete the MSS, a series of other mindfulness measures and other mindfulness related correlates and outcomes (openness, neuroticism, stress, and happiness). We examined whether the MSS demonstrated a stronger relationship to the outcomes, such as stress. In addition, we conducted an exploratory factor analysis to identify a potential factor structure. The final version of the MSS demonstrated a sound measure of mindfulness but did not demonstrate significantly stronger relationships with the outcomes than the prominent mindfulness measures (KIMS and FFMQ).

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CHAPTER I: INTRODUCTION

Mindfulness is a buzzword among topics for organizational research, individual growth, and workplace health (Jamieson & Tuckey, 2017; Good et al., 2016; Van Dam et al., 2018), which is not surprising given that mindfulness meditation can improve well-being, reduce stress and other negative symptoms, and improve overall well-being (Jamieson & Tuckey, 2017; Schoormans and Nyklcek, 2011). For example, meditation has been shown to improve well-being over several months in mindfulness-based stress reduction (MSBR) interventions as well as in one-day 15-minute meditation sessions (Bostock, Crosswell, Prather, & Steptoe, 2018). Researchers have examined mindfulness interventions within clinical samples, high stressed populations, and workplaces (Alfonso, Caracuel, Delgado-Pastor, Verdejo-Garcia, 2011; Godfrey, Gallo, & Afari, 2015; Richardson & Rothstein, 2008; Heckenberg, Eddy, Kent, & Wright, 2018). Across the samples and methods used, mindfulness appears to be an effective stress reducer.

The purpose of this study is to challenge the current conceptualization of mindfulness as a trait or state. Currently, there is a lack of consensus regarding how mindfulness should be defined and measured (Bishop et al., 2006); this discrepancy has led to confusion in the field (Davidson, 2010; Hayes & Wilson; 2003). Mindfulness interventions imply and assume participants can become more skilled over time in their efforts to be mindful. Generally, participants take a pre-test and post-test of mindfulness during the study (Grossman, Niemann, Schmidt, Walach, 2004). However, in many of these cases, mindfulness is measured as a trait (e.g., FFMQ or MAAS) rather than a skill. Arguably, by introducing an intervention with a pre-test and post-test, there is an assumption and often explicit goal that mindfulness can be increased, often in a relatively short timeframe. We address the current definitions of mindfulness and argue that mindfulness is best conceptualized as a skill, not as a trait or state. In

our discussion, we will further delineate the definition and measurement discrepancies that currently exist. The second purpose of this paper is to examine a new measure of mindfulness, the mindfulness skill scale (MSS). In this way, we demonstrate that mindfulness is best measured as a skill.

Literature Review

The term mindfulness is rooted in ancient Buddhist tradition (Hanh, 1976). Mindfulness came from the Sanskrit word *Smrti*, and the Pali word *Sati*, which is often translated to remember or keep in mind (Dreyfus, 2011; Tanay & Bernstein, 2013). There are a variety of Buddhist traditions and methodologies for understanding mindfulness even though there are similarities and common themes among them (Dunne, 2015). Taney and Bernstein (2013) describe that the five aspects of mindfulness according to Buddhist teachings are "…(1) awareness, (2) perceptual sensitivity to stimuli, (3) deliberate attention to the present moment, (4) intimacy or closeness to one's subjective experience, and (5) curiosity" (page 1287). Most modern definitions of mindfulness include at least some (if not all) of these key aspects. Germer (2004) argues that awareness, acceptance, and present experience are the three most common dimensions in both Buddhist tradition and in current westernized psychotherapy. Indeed, many of the current definitions of mindfulness include variations of acceptance, nonjudgement, and present awareness.

Since its original conceptualization in Buddhist tradition, mindfulness has been redefined and further conceptualized, though it still is tied to its original meaning. Mindfulness gained popularity in the latter half of the 20th century when Buddhism became popular in America (Keng, Smoski, & Robins, 2011). The rising popularity of Zen Buddhism in the Western world encouraged a greater emphasis of research on meditation and spirituality. One of those

researchers was Kabat-Zinn (1994), who created the mindfulness-based stress reduction (MBSR) intervention that is still commonly used within psychological research today. MBSR programs are designed to reduce stress, anxiety, and pain. Another common mindfulness intervention is the mindfulness-based cognitive therapy (MBCT), which combines a meditative approach with cognitive therapy for chronically depressed populations (Segal, Williams, & Teasdale, 2002). Mindfulness-based Therapies (MBT) have become common in clinical settings (Hofmann et al., 2010). Though it originated in clinical settings, mindfulness interventions have become increasingly popular in nonclinical and work settings (Bride, 2015; Richardson, 2017). Birdie (2015) reviewed previous research and reached the following conclusions regarding mindfulness in the workplace: (a) it makes employees happier, (b) it improves decision making, (c) it increases focus, and (d) it reduces stress. For example, according to Heckenberg et al. (2018), mindfulness interventions have the capacity to reduce physiological markers of stress within the workplace populations.

Mindfulness Definitions & Discrepancies

Mindfulness Definition. Kabat-Zinn defines mindfulness as "…the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (p. 145). Kabat-Zinn (2003) also explains that mindfulness is developed through meditation practice. In his definition, mindfulness is described as an *action verb*. Further, he describes mindfulness as if the participant is actively choosing to engage in the practice. This suggest mindfulness is a skill that can be practiced and developed.

Mindfulness is universally understood as a curious and present-minded awareness. Peters, Baer, Erisman, and Roemer (2011) define mindfulness as "… nonjudgmental and nonreactive observation of present-moment experiences, such as bodily sensations, cognitions, and emotional

states, as well as external stimuli such as sights and sounds" (p. 229). In other words, mindfulness involves intentionality in thought and observation. With every conceptualization of mindfulness, there are almost always two elements included within the definition. The first is nonjudgement, which is sometimes also referred to as a curiosity mindset. This type of perspective removes the need for judgement, opinion, or criticism. Rather, a curiosity mindset approaches each situation and feeling with openness and inquisitiveness (Shapiro, Carlson, Astin, & Freedman, 2006).

The second component is present mindedness. Present mindedness is when an individual chooses to be aware or engaged in the moment (Peters et al., 2001; Sharpiro et al., 2006). Mindfulness involves intentional awareness *and* kind-curiosity to one's experiences. For example, an individual could be presently observing how his or her body feels in a heated yoga class and also be harshly critiquing their lack of flexibility. In this case, the individual is not exhibiting mindfulness because he or she is harshly judging the experience.

Mindfulness as a trait. In the literature, mindfulness is usually operationalized in two different ways: as *trait* mindfulness or *state* mindfulness (Jamieson & Tuckey, 2017). Trait mindfulness is similar to a stable personality-like individual characteristic. This is also referred to as dispositional mindfulness, whereby an individual consistently exhibits mindful behavior. This approach is common in mindfulness measures (Baer et al., 2006; Brown & Ryan, 2003).

According to most trait theories, traits are stable or established characteristics that do not easily change over time (Cohen, Swerdlik, Sturman, 2013; Guilford, 1959; Tett & Guterman, 2000). Generally, traits are *not* something that can be taught and are often defined in terms of "any distinguishable relatively enduring way in which one individual varies from another" (Guilford, 1959, p. 6). Furthermore, people vary in which traits they commonly exhibit.

While traits are enduring, there is research to suggest that traits can and do change (Cohen, Swerdlik, Sturman, 2013). In fact, this is the basic premise of clinical psychology, to slowly and deliberately changes one's dispositions. Allport (1947) describes how fluctuations in the environment can influence and transform traits. However, at the core of their conceptualization, traits are stable and long lasting. For example, support for the Big-5 personality measures indicates people consistently differ in the traits they display (Roberts & Delvecchio, 2000).

Consequently, if mindfulness is conceptualized as a trait, it should *not* be easily trainable, especially within a short timeframe. However, study after study demonstrate that mindfulness interventions are not just effective in reducing stress, but also in increasing one's level of mindfulness (Buchheld, Grossman, & Walach, 2001; Lau et al, 2006). This would suggest that mindfulness can be easily trained, similar to how people learn any other skill. Therefore, from a purely definitional perspective, mindfulness cannot be a trait. If this is indeed the case, then researchers are incorrectly defining and measuring mindfulness.

Mindfulness as a State. On the other hand, mindfulness has also been considered a psychological state, whereby an individual engages mindfully in response to a stimulus. For example, a meditation practitioner could enter a mindfulness state during their meditation practice. The problem with this definition is that if mindfulness operates as a state construct, it should behave in the same way as other states, such as emotions. For example, mindfulness as a state should only be temporarily induced through a meditation session. As soon as the session is over, the mindfulness state would end. This also implies that people cannot improve in the manner evidenced in many mindfulness interventions.

State theory defines a state as a reaction to a stimulus of some kind or "…an experience present during a specific moment in time, such as during certain periods of work activity" (Tuckey, Sonnentag, & Bryan, 2018, p. 34). Unlike personality traits, states are temporary and can quickly change (Cohen, Swerdlik, Sturman, 2013). In Chaplin, John, and Goldberg's (1988) research, they sought to clarify the distinction between trait and states. They defined states as "temporary, brief, and caused by external circumstances" (p. 541). In their research they identified common states, such as infatuation, bewilderment, displeasure, and disinterest. States do not reflect an individual's consistent personality characteristics, but rather a momentary reaction to an environmental stimulus or event. Further, Chaplin, John, and Goldberg (1988) suggest that states should *not* be used to predict future behavior because states are unstable over time and can only be induced by specific situations.

Cohen, Swerdlik, and Sturman (2013) describe states as impermanent and specific to each moment. Additionally, states are reactionary or temporarily induced. Tuckey, Sonnentag, and Bryan (2018) argue that mindfulness should be defined as state instead of a trait. In their study, they used a subset of the mindfulness attention awareness scale (MAAS), which is often used to measure trait mindfulness, but they had their participants fill it out before work, in the middle of the workday, and at the end of the workday. Similarly, Du et al. (2019) measured state mindfulness by asking participants, "Are you currently aware of what you are doing without judgements?" (p 59). Other studies have utilized the Toronto Mindfulness Scale (TMS) to measure state mindfulness (Carmod, Reed, Kristeller, and Merriam, 2008). Some other research has utilized the State Mindfulness Scale (SMS), which uses 21 items to assess mindfulness during a specific task (Tanay & Berstein, 2013). State scales usually ask the participants how they feel today or at this very moment. On the other hand, trait scales usually ask participant

questions about whether they frequently exhibit certain characteristics across a variety of settings.

Bishop et al. (2004) defines mindfulness as "…a mode of awareness that is evoked when attention is regulated" (p. 234). In defining mindfulness this way, mode is used synonymously to a state because it suggests mindfulness is spontaneous or induced. They argue that in order to evoke a mindfulness state, one must practice self-regulation. Consequently, they suggest that any increase in self-regulation skill will result in longer and more advanced states of mindfulness. This conceptualization is somewhat contradictory to their initial argument that mindfulness is a state. If mindfulness is a state, there would not be differing levels of capability. We also would not be teaching people to get better at it, we would teach them to find situations or stimuli that induce mindfulness (e.g., coffee or drugs). Additionally, the spontaneous nature would necessarily prevent its measurement because as soon as we ask people to reflect, we would pull them out of the state.

State scales (SMS, TMS, etc.) use meditation sessions to evoke a mindfulness state for the participants before they take the questionnaire. Meditation is a key part of mindfulness but does not fully capture the construct. Rather, meditation is a means of practicing and further developing mindfulness. People can choose to act with awareness in a variety of stressful or overwhelming situations, such as driving in rush hour. Mindfulness involves intention and effort and can be practiced in stress-inducing situations. Consequently, mindfulness should not be conceptualized as a state. Instead, mindfulness operates more like a skill.

Mindfulness as a Skill. An alternative approach is to consider mindfulness as a *skill* whereby individuals can have different levels of mindfulness capabilities. Indeed, Bishop et al. (2004) argue that mindfulness should be conceptualized as a metacognitive skill because it

requires regulation of attention. Additionally, Kabat-Zinn (2003) states that mindfulness is "…akin to an art form that one develops over time, and it is greatly enhanced through regular disciplined practice, both formally and informally, on a daily basis" (p. 148). If mindfulness truly develops over time through regular discipline, then mindfulness by the very definition of skill should be considered a skill. A skill is a "competency in performing a task" (Noe, 2020). In other words, skills are how good or bad a person is at performing a specific task. Skills can develop over time through practice (Baer & Smith, 2004). Furthermore, practicing mindfulness through meditation can result in higher levels of mindfulness over time.

Baer, Smith, and Allen (2004) created the only scale for mindfulness that measures it as a skill. Every other scale for mindfulness measures it as either a state or trait (Baer et al., 2006; Baer, Smith, Allen, 2004; Bryan & Ryan, 2003; Cardaciotto et al., 2008; Chadwick et al., 2008; Lau et al,, 2006; Taney & Bernstein, 2013; Buchheld, Grossman, & Walach, 2001; Park, Reilly-Spong, & Gross, 2013). The Kentucky Inventory of Mindfulness Skills (KIMS) was designed to measure mindfulness as a skill, but it resembles other trait scales in both instructions and content.

Definition Discrepancies. As previously mentioned, there are three commonly used definitions of mindfulness (Park, Reilly-Spong, & Gross, 2013). These various definitions are used and measured differently and inconsistently throughout current research. In her review of mindfulness and executive function, Gallant (2016) discusses how the inconsistent scientific operationalization of mindfulness prohibits the development of a solid theoretical framework for the construct. This inconsistency threatens current evidence for the construct validity of mindfulness. Jamieson and Tuckey (2016) recommend that researchers clearly define which kind of mindfulness is conceptualized (i.e., *state, trait,* or *skill*) within each study and maintain appropriate terminology that matches that conceptualization throughout the results and

discussion. Though Jamieson and Tukey correctly identify the issue and urge researchers to clarify their interpretation of mindfulness, there is still the issue that researchers are defining mindfulness in different ways without any overwhelming consensus. Bishop et al.'s (2004) efforts to create a consensus on a mindfulness definition were arguably unsuccessful. For example, in their systematic review of mindfulness measures, Park, Reilly-Spong, and Gross (2013) found that definitions were drastically different across studies. More specifically, they stated, "Mindfulness can be a dynamically changing state, a trait that differs between persons, and skill that can be enhanced through training" (p. 2). As a result, this study seeks to challenge the current conceptualization of mindfulness as a personality trait or psychological state. Instead, we are proposing that mindfulness is better exclusively conceptualized and measured as a skill. Further, we argue that defining mindfulness as a trait or as a state is inappropriate given the definition and unnecessarily limits our ability to make scientific progress.

In Lueke and Gibson's (2016) study on mindfulness and implicit bias, they discuss previous research on meditation experience. Interestingly, they explain that experienced meditators tend to more easily enter a mindfulness state than non-experienced meditators "…as if long-term practitioners had mastered a skill that short-term practitioners were still attempting to master" (p. 40). In their study, Lueke and Gibson (2016) also measure mindfulness as a trait and state, but simultaneously refer to it as a *skill*. Bishop et al. (2004) argued that mindfulness is based on self-regulation skill, but the scale that was developed based on their initial research does not measure mindfulness as a skill (Five Facet Mindfulness Questionnaire FFMQ; Baer et al., 2006); their scale measures mindfulness as a trait. These examples highlight and contribute to the confusion and discrepancy in the field.

Current Mindfulness Scales

Currently, there are a variety of scales used to measure mindfulness. Perhaps the most popular is the Mindfulness Attention Awareness Scale (MAAS), which was designed to measure mindfulness as a *trait* (Park, Reilly-Spong, & Gross, 2013; Brown & Ryan, 2003). As of November 10, 2019, the original article publishing this measure has been cited 10,111 times. The measure contains 14 items on a 6-point Likert scale with reversed score items such as, "I could be experiencing some emotion and not be conscious of it until sometime later." Brown and Ryan (2003) found that the MAAS was positively associated with emotional intelligence, clarity of emotional states, openness to experience, and the Mindfulness/Mindlessness Scale (MMS). The MAAS was negatively related to rumination, social anxiety, depression, self-consciousness, hostility, and impulsiveness. They found that the MAAS demonstrated convergent and discriminant validity, as well as incremental validity. In the original study, they found a Cronbach's alpha of .81 and conducted a reliability assessment using test-retest reliability. They also found that the means did not significantly differ between Time 1 and Time 2. Further they found an intraclass correlation coefficient of .81. In 2007, Mackillip and Anderson further evaluated the validity of the MAAS. In their sample, they found a reliability of .89 and a CFA confirmed the 1-factor structure of the scale. Although the MAAS appears to a popular and stable scale, it does not measure mindfulness as a skill. The scale was designed to measure mindfulness as a trait. This is problematic if mindfulness is truly a skill.

The Five Facet Mindfulness Questionnaire (FFMQ) was developed by Baer et al. (2008) and consists of 39 items derived from previous mindfulness scales. As of November 10, 2019, the original article has only been cited 1,918 times. This is significantly less than the MAAS.

The FFMQ was developed out of a variety of mindfulness scales and is based on a five-factor structure of mindfulness characterized by non-reactivity, observing, acting with awareness, describing, and non-judging. Baer at al. (2006) found that the FFMQ was positively associated with openness to experience, emotional intelligence, and self-compassion. Additionally, the FFMQ was inversely related to dissociation, neuroticism, poor emotional regulation, and experimental avoidance. Interestingly, Park, Reilly-Spong, & Gross (2013) suggest that combining mindfulness dimensions can lead to inaccurate interpretations of participants' level of mindfulness. A participant may appear highly mindful, but actually possess a "toxic combination" of the traits. For example, participants could score high on the acting with awareness dimension, but low on the non-judging dimension. Despite scoring high on all other dimensions (*non-reactivity, observing, acting with awareness, & describing*), the participant could be very judgmental. Acceptance and nonjudgment are key aspects of mindfulness and should be weighted accordingly. This concern could also apply to the KIMS, if an overall score is calculated.

The State Mindfulness Scale (SMS) is one of the few scales that measures and defines mindfulness as a psychological state. The only other two are the State-MAAS and the Toronto mindfulness Scale (TMS). The SMS's original paper has only 178 citations as of November 10, 2019. The SMS consists of 21 items and is a 5-point Likert scale type ranging from 1 (*not at all*) to 5 (*very well*). For this scale, participants describe their experience immediately after an activity, such as a mindfulness meditation session. Taney and Bernstein (2013) found good reliability across their original samples (α = .94, α = .92, α = .97, and α = .95). In addition, they found support for the convergent and discriminant validity. Garland, Hanley, Farb, and Froeliger (2015) found that the SMS significantly predicted cognitive reappraisal.

The State-MAAS scale was developed along with the MAAS (Brown &, 2003). It consists of five items derived from the MAAS with slight adjustments to the phrasing. The scale is on a 7-point scale ranging from 0 (*not at all*) to 6 (*very much*). Brown and Ryan (2003) found that the state-MAAS significantly predicted autonomy, pleasant affect, and was inversely related to unpleasant affect. However, Park, Reilly-Spong, & Gross (2013) argue that short forms of current mindfulness scales such as the State-MAAS should not be used when the full version lacks sufficient content validity.

The Toronto Mindfulness Scale (TMS) is another *state* mindfulness scale (Lau et al., 2006). The TMS is the most cited state scale, with 1,197 citations as of November 10, 2019. The TMS is a 13-item scale comprised of curiosity and decentering subdimensions. Usually, participants are asked to enter into a meditation practice of some kind, and then respond to questions, such as, "I was curious about my reactions to things," afterward. Lau et al. (2006) found support for the reliability of the scale ($\alpha = .95$) in their original study. The TMS is positively associated with absorption and reflective self-awareness. The decentering portion of the scale was positively related to openness to experience, but the curiosity aspect was not.

Arguably, the three state scales mentioned are measuring participants' reflection of their mindfulness states rather than the actual state. This is the case because the scales are given to participants after the meditation session is over. If mindfulness is a state that is temporarily induced, the state would end after the session is finished. We argue that all three state scales improperly conceptualize mindfulness as a state when it has clear skill characteristics.

Currently, there is only one scale that measures mindfulness as a skill. The Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, Allen, 2004). The KIMS consists of 39-itens and measures four skills; observing ($\alpha = .91$), describing ($\alpha = .84$), acting with awareness (α

= .83), and accepting without judgement (α = .87). In their original study, Baer, Smith, and Allen found good internal consistency for the KIMS, as well as support for convergent and discriminant validity. Their original study has been cited 2,487 times since November 10, 2019. The KIMS is positively associated with openness, emotional intelligence, and absorption. Also, the KIMS is negatively related to neuroticism, alexithymia, and experimental avoidance (Baer, Smith, Allen, 2004; Park, Reilly-Spong, & Gross, 2013).

The KIMS was developed to measure mindfulness a skill. However, the KIMS is missing key components of a skill scale. The scale was designed to measure four different skills, but the scale is structured like most other trait scales. For example, the instructions state, "Write the number in the blank that best describes your own opinion of what is generally true for you" (Baer, Smith, & Allen, 2006). The instructions are almost identical to the FFMQ and are similar to other trait scale instructions (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). Some example questions of the KIMS are "When I do things, my mind wanders off and I'm easily distracted" or "My natural tendency is to put my experiences into words." The questions do not appear to measure specific skills, but rather aspects of mindfulness. Arguably, the KIMS does not adequately measure mindfulness as a *skill*. As a result, a new mindfulness skill measure was created. The mindfulness skill scale (MSS) instructions ask participants to rate how skilled they are at performing mindfulness activities. The purpose is to measure individuals' mindfulness skill level rather than frequency of mindfulness behaviors.

Park, Reilly-Spong, and Gross (2013) psychometrically evaluated a variety of commonly used mindfulness scales (FFMQ, MAAS, KIMS, etc.). Following their evaluation, they concluded that "…none can be strongly recommended based solely on superior psychometric properties." (page 1). Further, they suggest all current measures do not provide sufficient

evidence for content validity. Their systematic review provides evidence that we do not currently have optimal psychometric scales for mindfulness.

Perhaps some of the core issues are due to the current inconsistent and poor conceptualizations of mindfulness. If mindfulness is a skill, we should find that it is a better predictor when it is measured as a skill. Additionally, we should be able to accurately measure increasing levels of mindfulness after interventions. Currently, researchers are using the MAAS or FFMQ to assess whether or not participants' level of mindfulness increase. However, trait mindfulness measures ask participants to assess what is generally true for them rather than how skilled or competent they are. Instead, the MSS specifically asks participants to assess how skilled they are at mindfulness.

Mindfulness is related to a variety of mental, physical, and emotional benefits across a variety of populations and settings (Alfonso, Caracuel, Delgado-Pastor, Verdejo-Garcia, 2011; Godfrey, Gallo, & Afari, 2015; Richardson & Rothstein, 2008; Heckenberg, Eddy, Kent, & Wright, 2018). Based on previous research, mindfulness should be positively associated with openness to experience, overall well-being, conscientiousness, and self-regulated behavior (Brown & Ryan, 2003; Thomas & Waltz, 2007). Also, mindfulness should be inversely related to stress, neocriticism, alexithymia, and avoidance (Baer, Smith, Allen, 2004; Park, Reilly-Spong, & Gross, 2013; Thomas & Waltz, 2007). As previously discussed, most of the current mindfulness scales are related to openness, neuroticism, and stress. Therefore, the mindfulness skill scales relationship to openness, neuroticism, and stress should demonstrate a *stronger* relationship than other scales. Therefore, we hypothesize the following:

Hypothesis 1: The mindfulness skill scale will be positively correlated with happiness, openness, and conscientiousness.

Hypothesis 2: The mindfulness skill scale will be inversely related to perceived stress and neuroticism.

Hypothesis 3: The mindfulness skill scale will be significantly correlated with the Kentucky Inventory Mindfulness scale (KIMS).

Hypothesis 4: The relationships between the mindfulness skill scale and stress and neuroticism will be significantly stronger than the relationship between existing measures of mindfulness and perceived stress and neuroticism.

Hypothesis 5: The relationships between the mindfulness skill scale and well-being, openness, and conscientiousness will be significantly stronger than the existing measures of mindfulness and happiness and openness.

CHAPTER 2: METHOD

Participants

An a priori power analysis was conducted using the software G*Power to determine adequate sample size. The results of the power analysis yielded a recommended sample size of 214 participants to detect an effect size of .95. As a result, useable data was collected from 281 participants from Amazon's Mechanical Turk (MTURK). MTurk uses Human Intelligence Tasks (HITs) that workers complete and received payment for upon completion. The HIT for this study stated, "We are conducting an academic study about the how mindfulness is operationally defined and measured. For this study, you will be asked to complete one 20-25-minute survey and answer a few questions about yourself. At the end of the survey, you will receive a code to paste into the box below to receive credit for taking our survey." Participants were paid $0.75 for approved HITs. All participants who successfully entered a completion code and met the study's requirements were paid for their response. Participants were removed if they were not 18 years or older and if their native language was not English. Four participants were paid and removed from the analyses because they were not a U.S. Citizen.

Participants were required to pass 2 out of 3 randomly placed stringent attention check questions to be included in the study. Four participants who missed more than one attention check were removed from the original sample of 381 participants. These attention check questions were utilized to ensure the quality of the data. Additionally, respondents were asked whether or not they clicked through the survey and if there was any reason why their data should *not* be used. Some participants selected responses such as, "I wasn't really paying attention" or "I just skimmed through the questions." Consequently, 88 participants were removed from the analyses based on the debriefing questions. Based on the length of the survey, participants were

not included unless their survey completion time met a minimum of five minutes. Four respondents were removed from the final analyses due to not meeting the minimum completion time.

Our final sample (N = 281) consisted of 74% white, non-Hispanic and 51% male participants. Participants ages ranged from 19-73 years (M = 37.55, SD = 12.28). Approximately, 16% were African American, 5% were Hispanic, and 17% were of another ethnicity. A total of 114 participants (41%) had meditation experience. Out of those participants, approximately 52% had 1-2 years of meditation experience. Years of meditation experience ranged from 0-50 years (M = 4.79, SD = 0.49). Ninety percent of participants currently held a job, while 10% did not. Industries across the working participants ranged from accountants to writers and approximately 48% of participants held a 4 year agree.

Measures

Mindfulness Skill Scale (MSS). In order to measure mindfulness as a skill and to overcome limitations of previous mindfulness scales, the MSS was developed. This scale was developed by identifying key aspects of mindfulness (present-moment awareness and nonjudgement) based on the current state of mindfulness research. The items were designed to reflect mindfulness skills, such as acting with awareness and intentional acceptance. Once the items were developed, Dr. Mike Hein, Dr. Cameron Gordon, and Dr. Alexander Jackson reviewed and refined the items. The committee decided that the response scale should instruct participants to assess perceived skill level rather than frequency. The items were written as broad statements that reflect dimensions of mindfulness rather than specific behaviors. The final product consisted of 46 items. Participants would respond using a 5-point Likert scale ranging from 1 (*not at all skilled*) to 5 (*extremely skilled*). Participants rated how skilled they are at

mindfulness behaviors, such as, “accepting my negative thoughts” or “observing how I’m feeling.” High scores on the MSS indicate higher levels of skill. The mean is calculated for an overall mindfulness skill score. Because this is a newly developed scale, the internal consistency reliability for the MSS will be discussed in the results section.

The Mindfulness Attention Awareness Scale (MAAS). In order to measure mindfulness as a trait, the Bryan and Ryan’s (2003) MAAS was used. The scale contains 15 items with a 6-point Likert scale ranging from almost 1 (*always*) to 6 (*almost never*). High scores indicate a higher levels of trait mindfulness. The scale includes all reversed statements. Example items include, “I rush through activities without being really attentive to them” and “I find it difficult to stay focused on what’s happening in the present.” Final scores on the MAAS are calculated by computing the mean. The internal consistency reliability was sufficient in our sample ($\alpha = .93$).

Five Facet Mindfulness Questionnaire (FFMQ). The FFMQ **(**Baer et al., 2006) was used as a second measure of trait mindfulness. The FFMQ includes 39 items with a 5-point Likert scale ranging from 1 (*never or very rarely true*) to 5 (*very often or always true*). The FFMQ was developed from several mindfulness scales. The scale is based on a five-factor structure of mindfulness characterized by nonreactivity, observing, acting with awareness, describing, and nonjudging. Some questions from the FFMQ are, “When I’m walking, I deliberately notice the sensations of my body moving” and “I’m good at finding words to describe my feelings.” High score on the FFMQ indicate higher trait levels of mindfulness. Overall scores are calculated by the mean. Subscale scores can also be calculated using the mean of the items that comprise each subscale. Cronbach’s alpha for the overall scale demonstrated lower, albeit acceptable, reliability of .71.

Kentucky Inventory of Mindfulness Scale (KIMS). The KIMS (Baer, Smith, Allen, 2004) was used as a measure of mindfulness skill. The KIMS has a 5-point Likert scale and 39 questions. The KIMS has a 4-factor structure (observing, describing, acting with awareness and accepting without judgement). The scale does not require past experience with meditation (Chiesa, 2013). High scores indicate a higher levels of mindfulness skill. The KIMS contains a variety of questions such as, "I'm good at finding the words to describe my feelings" and "When I do things, my mind wanders off and I'm easily distracted." The scale produces four different scores based on the mean of each skill dimension (observe, describe, act with awareness, accept without judgement). Internal consistency reliability for the KIMS was high at .93.

Toronto Mindfulness scale (TMS). The TMS (Lau et al., 2006) was used to measure state mindfulness. The TMS is a 13-itme scale with a 5-point Likert scale ranging from 0 *(not at all)* to 4 *(very much).* The TMS is designed to measure mindfulness as a *state*. The scale has a 2-factor structure where mindfulness is broken down into curiosity and decentering factors. Participants are asked questions like the following immediately after a meditation, "I experienced myself as separate from my changing thoughts and feelings" and "I was more concerned with being open to my experiences than controlling or changing them." Final scores are computed summing the items in the curiosity and de-centering dimensions. The TMS internal consistency reliability was acceptable with an alpha of .90.

Perceived Stress Scale (PSS). To measure stress, the perceived stress scale was used (Cohen & Williamson, 1983). The PSS consists of 10 items on a 5-point Likert scaling ranging from 0 (*Never*) to 4 (*Very Often*)**.** The first question in the scale asks participants, "In the last month, how often have you been upset because of something that happened unexpectedly." A

final score is computed by summing across the scale items. PSS demonstrated sufficient internal consistency reliability with a Cronbach's alpha of .80.

Mini-Markers Questionnaire. In order to measure the big five personality traits, Saucier's (1994) big five mini-markers scale was used. The questionnaire consists of 40 items. Participants respond to each item using a 9-point Likert scale ranging from 1 (*Extremely Inaccurate*) to 9 (*Extremely Accurate).* The mini markers ask participants to rate how accurately certain adjectives (e.g., bashful or energetic) describe them. Final scores for the big five traits are calculated by summing all items for each trait. All five trait subscales demonstrated adequate internal consistency: extraversion ($\alpha = .74$), agreeableness ($\alpha = .83$), conscientiousness ($\alpha = .81$), openness ($\alpha = .75$) and neuroticism ($\alpha = .81$).

Oxford Happiness Questionnaire (OHQ). The OHQ by Hills and Argyle (2002) was used as a measure of happiness. The OHQ consists of 10 items on a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Items assess overall happiness with items such as, "I don't feel particularly pleased with the way I am" (reverse scored) and "Life is good." To calculate a final score, item responses are averaged. Scores ranging from 1-3 suggest a lower level of happiness, while scores ranging from 4-6 represent a higher level of happiness. The OHQ demonstrated adequate internal consistency reliability with a coefficient alpha of .88.

Procedure

Participants completed a 25-minute survey through MTurk. The survey started with an informed consent page that introduced the purpose and parameters of the study. Once participants signed the informed consent, they were asked two screening questions. The questions eliminated any participate under the age of 18 years old and non-English speakers from continuing the survey. The measures in the survey comprised of the mindfulness skill scale

(MSS), the mindfulness attention awareness scale (MAAS), the five facet mindfulness questionnaire (FFMQ), the Kentucky inventory of mindfulness skills (KIMS), the toronto mindfulness scale (TMS), the perceived stress scale (PSS), the oxford happiness questionnaire (OHQ), the Big 5 mini markers questionnaire, demographic questions, and debriefing questions. The survey measures were ordered in the same manner as previously described.

Historically, state mindfulness scales are distributed following a 15-minute meditation session to capture the participants' mindfulness state following the meditation. This was not feasible for the current study and an alternative method was utilized to induce a state. For the current study, participants were asked to write a mindfulness prompt (appendix A). The prompt defined mindfulness and asked participants to recall an experience in which they were mindful. Immediately after they wrote they completed the prompt; participants were given the Toronto mindfulness scale. This is similar to a mood induction procedure (MIP) that is an alternative to induce a mood or state (Kucera & Haviger, 2012). The MIP was performed for the purpose of following the administration instructions of the scale.

Demographic and debriefing questions were last in the survey. The demographic questions included sex, ethnicity, occupation, industry, native language, age, and education. Participants were also asked if they had experience with meditation (*"Do you have mindfulness meditation experience?"*). If the participant selected yes, they were asked, *"How many years of experience with mindfulness meditation do you have?"* Lastly, the debriefing questions asked participants about the *quality* of their data. This included asking participants if they randomly selected items or paid attention.

CHAPTER 3: RESULTS

Exploratory Factor Analysis of MSS

The factor structure of the MSS was examined using exploratory factor analysis. An exploratory factor analysis was conducted on the MSS to identify a potential factor structure within the scale. To identify underlying latent factors, principal axis factoring extraction method was conducted. Factors were rotated using the Promax method due to expected strong correlations among the factors. The scree plot suggested that one prominent factor accounted for a large portion of the variance and a few additional factors accounted for smaller, albeit incremental, variance. According to the Guttman-Kaiser rule, the eigen values suggested an 8-factor solution demonstrated by eigen values greater than 1 (Costello & Osborne, 2005). However, only 2 factors added significant variance to the overall model. These first two factors explained 47% of the variance in responses. Factor loadings that were below .3 were suppressed in the pattern matrix. The initial threshold was kept low to ensure that no vital items were immediately discarded. For example, item 26 “Letting go of criticism” had what is considered a low factor loading of .339 (Matsunaga, 2010) but was kept as it represented a key aspect of mindfulness.

Items that cross loaded on multiple factors were removed (items 2, 10, 17). Any items with factor loadings below .30 were removed from the scale (items 14, 15, 42). Several items loaded on the additional factors but contained fewer than 4 items per a factor. Further, these additional factors did not explain a meaningful amount of incremental variance in responses. Thus, the items that loaded on these factors were removed from the final results (items 9, 16, 17, 18, 19, 20, 36, 41, 44). See Table 1 for the pattern matrix and factor loadings.

After reviewing the scale items and variance explained by each factor, a 2-factor solution was deemed most appropriate. The remaining 6 factors were not included because the items heavily cross-loaded or there were not a sufficient number of items on each factor to comprise a stand-alone factor. Internal consistency reliabilities were conducted for the two remaining factors. Factor 1 and factor 2 were combined to create the final scale, resulting in 22 total items. Mindfulness scales typically contain subscale dimensions such as, observing, acting with awareness, acceptance, nonjudgment, etc. Similarly, we found evidence for a present-moment awareness dimension (factor 1) and an acceptance dimension (factor 2). The final items that comprised factor 1 included 11, 12, 13, 27, 28, 29, 30, 31, 33, 34, 35, 37, 40. The final items that comprised factor 2 included 1, 3, 4, 5, 23, 22, 24, 25, 26. Combined, these dimensions make up 22 items for the mindfulness skill scale (See Appendix C). Internal consistency for the MSS was exceptionally high with an alpha of .95. The acceptance subscale presented exceptional internal consistency reliability of .93. The present-moment awareness subscale demonstrated high validity as well (alpha = .90).

Test of Hypotheses

In order to test hypotheses 1-3, correlations between the MSS and the respective variables for each hypothesis were examined. Means, standard deviations, and intercorrelations between the study variables are displayed in table 2. Correlations coefficients demonstrated that the mindfulness skill scale (MSS) was significantly correlated with happiness ($r = .62$, $p < .01$), openness ($r = .190$, $p < .01$), and self-esteem ($r = .31$, $p < .01$). Therefore, hypothesis 1 was supported. The MSS also demonstrated a significant negative correlation with perceived stress ($r = -.37$, $p < .01$) and neuroticism ($r = -.29$, $p < .01$). Thus, hypothesis 2 was also supported. The MSS was also significantly correlated with the KIMS ($r = .51$, $p < .01$), providing support

for hypothesis 3. To provide additional evidence of convergent validity for the MSS, the correlations between the MSS and the other mindfulness scales were examined. Specifically, the TMS decentering subscale (r = .56, p < .01) and the TMS curiosity subscale (r = .56, p < .01) were significantly correlated with the mindfulness skill scale. Lower validities were found between the MSS and the FFMQ (r = .30, p < .01) and the MAAS (r = .37, p < .01). Consequently, although the correlations for the FFMQ and MAAS were significant, they did not meet the recommended .40 and are insufficient for convergent validity (Carlson & Herdman, 2012).

Additionally, we conducted intercorrelations of the study's measures. If mindfulness is *better* conceptualized as a skill, it should have a stronger relationship with outcome variables related to mindfulness (e.g., stress). To test hypotheses 4 and 5, we conducted Fishers *r* to *z* correlation transformations and *z* tests were performed to determine whether the correlations were significantly different from each other.

Hypothesis 4 stated that the relationships between mindfulness skill scale and stress and neuroticism would be significantly stronger than the relationship between existing measures of mindfulness and perceived stress and neuroticism. For comparing the correlation predicting stress and neuroticism, see table 3 and table 4 respectively. Hypothesis 4 was *partially* supported, such that the mindfulness skill scale did demonstrate a statistically stronger correlation with stress than the TMS decentering subscale (r_{MSS} = -.37, $r_{TMS\ decentering}$ < .01, z = -4.44, p < .01) and the TMS Curiosity subscale ($r_{TMS\ curiosity}$ = -.06; z = -2.19). Contrary to our hypothesis, the KIMS (r_{KIMS} = -.67; z = 4.55) and the FFMQ (r_{FFMQ} = -.70; z = 5.22) demonstrated significantly stronger correlations with stress than the MSS (r_{MSS} = -.37). The

MAAS (r_{MAAS} = -.43) demonstrated a stronger correlation but was not significantly stronger than the relationship between the MSS and stress (z = .77).

The mindfulness scale demonstrated a significantly weaker relationship with neuroticism (r_{MSS} = -.29) than the KIMS (r_{KIMS} = -.60; z =5.64) and the FFMQ (r_{FFMQ} = -.65; z =6.32). Part of hypothesis 4 was supported in that the MSS demonstrated a significantly higher correlation than the TMS Decentering subscale ($r_{TMS\ decentering}$ = .04; z = -3.31) and the TMS Curiosity subscale ($r_{TMS\ curiosity}$ = -.021; z =-2.7). The MAAS (r_{MAAS} = -.37) demonstrated a higher correlation than the MSS with neuroticism, but it was *not* significantly different. (z =1.1). Therefore, hypothesis 4 was only partially supported.

Hypothesis 5 states that the relationships between the mindfulness skill scale and well-being, and openness will be significantly stronger than the existing measures of mindfulness and happiness and openness. The MSS demonstrated a higher correlation with happiness than the KIMS (r_{KIMS} = .61; z =.07) and the FFMQ (r_{FFMQ} = .512; z =-1.64), but it was not significantly higher (see table 5). Alternatively, the MSS had significantly stronger association with happiness (r_{MSS} = .62) than the TMS De-Centering subscale ($r_{TMS\ decentering}$ = .31; z =.4.3), the TMS Curiosity subscale ($r_{TMS\ curiosity}$ = .39; z =-3.35), and the MAAS (r_{MAAS} = .38; z =-3.41).

For openness, the MSS (r_{MSS} =.19) significantly underperformed in comparison to the KIMS (r_{KIMS} = .49; z = -3.72) and the FFMQ (r_{FFMQ} = .41; z =-2.61) and demonstrated lower correlations than the MAAS (r_{MAAS} = .24; z =-.63). Although the MSS outperformed the TMS De-Centering ($r_{TMS\ decentering}$ = .08; z =1.24) and the TMS Curiosity subscale ($r_{TMS\ curiosity}$ = .15; z = .42) was not significantly higher (see table 6). Consequently, hypothesis 5 was *partially* supported.

CHAPTER 4: DISCUSSION

The purpose of this study was twofold. First, we sought to examine and compare the current measures of mindfulness with a new mindfulness measure, the mindfulness skill scale. Secondly, we challenged the conceptualization of mindfulness as a trait or state and proposed that it is best defined and measured as a skill.

The development and refinement of the mindfulness skill scale produced an adequate scale, with two dominate dimensions, (1) present-moment awareness and (2) acceptance. The scale demonstrated excellent reliability but did not demonstrate sufficient convergent validity.

Contrary to our hypotheses, the MSS was outperformed in almost every mindfulness-related outcome (stress, neuroticism, and openness) by the KIMS and the FFMQ. The MAAS was roughly equivalent to the MSS in its correlations with stress, neuroticism, openness, and happiness. However, the MSS significantly outperformed both of the TMS subscales (de-centering and curiosity) in all four outcomes. The TMS produced significantly weaker correlations in comparison to all the other measures of mindfulness (see table 2). This could be due in part to the way state mindfulness was measured. It is possible that the reflection prompt was not as effective as the typical meditation session.

The only outcome that MSS demonstrated the strongest relationship with was happiness. The KIMS and FFMQ produced slightly weaker correlations and they were not significantly different than that of the MSS. However, the MSS significantly outperformed both the MAAS and the TMS in its relationship with happiness.

The secondary purpose of the study was to challenge current conceptualizations of mindfulness as a trait or a state. Specifically, we argue that mindfulness is best conceptualized and operationalized as a skill. Given that many mindfulness-based interventions are essentially

training initiatives (Crane et al., 2010) and that training programs are designed to focus on knowledge, skill, or attitudes (Blanchard & Thacker, 2010) the evidence that mindfulness-based interventions improve mindfulness of participants provides evidence that mindfulness *should* be defined and measured as a skill. The partial support for hypothesis 4 & 5 fails to demonstrate that the MSS is a superior measure to existing measures of mindfulness and that mindfulness as measured with the MSS is better conceptualized as a skill. While the MSS failed to provide sufficient evidence in favor of this notion, the KIMS provided some support favoring the idea that mindfulness is better conceptualized as a skill.

Implications

The results of this study provide several implications for researchers. First, as we show, the way mindfulness is operationalized *does* indeed impact the magnitude of the relationship one can expect with various outcomes. Therefore, practitioners and researchers alike need to display diligence and care when defining mindfulness and selecting a scale to measure it. The KIMS and FFMQ demonstrated the clearest and most consistent relationship with mindfulness outcomes. On the other hand, TMS showed significantly weaker relationships with mindfulness outcomes and did not strongly correlate with other mindfulness measures. This suggests that the existing skill and trait measures (KIMS & FFMQ) are better self-report measures for mindfulness.

While we did not specifically test this, it appears that the trait and trait-like measures (FFMQ and KIMS, respectively) appear to better correlate with traits than the MSS. It is worth noting here that the KIMS was designed to measure skill, but as previously stated, the instructions and items more closely resemble trait measures. Thus, trait and trait-like measures of mindfulness may better correlate with other personality traits, while skill-based measures may better correlate with skills and behavioral outcomes. For example, a typing skills test would

better correlate with typing speed on the job than would a personality trait, such as conscientiousness. Similarly, using an actual skill test rather than a self-report perceived skill measure as demonstrated by the MSS would most likely produce stronger relationships with mindfulness outcomes.

Limitations & Future Directions

This study is not without its limitations. Though self-report measures are commonly used inside psychological research, they pose some significant limitations. One limitation to using a self-report measure, specifically for mindfulness is that there may be a difference between how mindful people *think* they are versus how mindful they *actually* are. This is a concern when using self-report measures because we are technically measuring *perceived* skill by asking participants to rate their level of skill rather than objectively measuring actual skill level. Also, the idea of mindfulness has become very popular outside of the clinical side of psychology, and it is possible that participants may want to appear more mindful and inflate their own scores (i.e., social desirability bias). As noted in the previous section, skill-based measures may better correlate with skills and behavioral outcomes. However, one limitation of this study is that we did not explicitly measure mindfulness skill, observe mindfulness behavior, or measure behavioral outcomes. Future development of the MSS and future research examining the conceptualization of mindfulness should explicitly measure mindfulness skill, mindful behavior, and other relevant behavioral outcomes.

Another limitation of the study was a mishap in the Qualtrics survey for the oxford happiness questionnaire (OHQ) and the mindfulness attention awareness scale (MAAS). The OHQ is typically measured on a 6-point scale ranging from “strongly disagree” to “strongly agree” but was measured using a 5-point scale ranging from “not at all” to “a great deal” in our

survey. The MAAS is a 15-item scale, but the 15th item was not included in survey or analyses. However, the scale demonstrated high reliability and only one item was missing. Future research should replicate this study with these measures corrected.

Another limitation tied to measurement is the way in which we measured state mindfulness. State mindfulness scales are often administered immediately following a 15-minute meditation session. This is done to ensure that the participates are in a state of mindfulness. We used the Toronto Mindfulness Scale (TMS) as a state measure of mindfulness. Instead of requiring participants to mediate, we asked them to reflect on a time when they were actively being mindful and write a reflection prompt. Although there is research to suggest mood induction procedures are a sufficient alternative (Kucera & Haviger, 2012), it is possible that participants did not adequately reflect on their experience and did not fully enter a state of mindfulness. Additionally, Kuijsters et al (2016) found that induced states quickly return to baseline after a few minutes. This suggests that participants may not have stayed in a mindfulness state during the entirety of the time it took for them to complete the state mindfulness scale (TMS). Future replications of this study should incorporate a mindfulness meditation session before measuring state mindfulness.

A lot of psychological research is conducted on college students due to convenience, which may cause concern for generalizability outside of college students (Grossman, 2008). In response to this limitation within the mindfulness research, our study included working professionals collected on MTurk. However, these methods also pose certain limitations. It is possible that our sample does not generalize outside of working professionals who use MTurk. As a result, future research should attempt to replicate the current study with other samples. Also, there is some debate on the use of MTurk for collecting participants (Paolacci & Chandler,

2014). However, there is strong research evidence that suggests that MTurk is an appropriate collection method (Buhrmester, Kwang, and Gosling, 2011; Kees, Berry, Burton, & Sheehan, 2017). Future research should utilize other samples to ensure that the results of this study generalize to other settings.

While not necessarily a limitation of our study, our results failed to show that the MSS is superior to other mindfulness scales. Therefore, the MSS should be revised and future research should continue to examine whether the MSS can be improved and be shown to be superior to other mindfulness measures. Alternatively, current versions of mindfulness scales may be revised or altered to better measure mindfulness as a skill. This may provide a better understanding of how best to conceptualize and operationalize mindfulness.

Conclusion

Mindfulness appears to be gaining in popularity every day, but the research has not caught up to its cultural significance. More specifically, the current research on mindfulness is lacking consistency in its operationalization of the construct and its measurement. The current mindfulness measures are adequate but lack key psychometric qualities and do not demonstrate significant evidence for content validity (Park, Reilly-Spong, and Gross, 2013). Additionally, the construct of mindfulness is inconsistently conceptualized as a trait, state, or skill in the literature. This has caused confusion and inconsistencies across the research over the last several decades. Jamieson and Tuckey (2016) have urged researchers to clearly and consistently operationalize their interpretation and measurement of the construct. Arguably this is hindering the scientific community from laying a firm foundation for the construct. In this study, we developed a new measure of mindfulness that sought to measure the construct as a skill.

Although the MSS did not demonstrate superiority to other mindfulness scales, mindfulness operationalized as a skill should be further explored and studied. Interestingly, the KIMS, which is another skill scale, has the strongest relationship with variables known to be related to mindfulness. This indirectly supports the argument that mindfulness is *best* measured in terms of skills. Although the MSS did not outperform the KIMS and FFMQ, it does show potential and should be cross validated in future studies.

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APPENDICES

Appendix A

Mindfulness Prompt:

> "Mindfulness consists of two key components: (1) present moment awareness and (2) nonjudgement. Present moment awareness occurs when you intentionally notice the current moment and how you feel in the moment. The curiosity mindset side of mindfulness occurs when you are engaged in the present moment and choose to do so without opinion or judgement. In other words, you choose not to immediately judge yourself or others. This aspect of mindfulness is also referred to as a curiosity mindset.
>
> In summary, mindfulness is the combination of present moment awareness and maintaining a curious mindset.
>
> Recall an experience in which you engaged in mindfulness behaviors. (e.g., noticed your breath during exercise) and how it made you feel.
>
> Describe the experience in a brief paragraph below and provide details regarding the circumstance, how you felt, and how you were demonstrating mindfulness. Once you're finished, click next."

APPENDIX B

Initial Items for the Mindfulness Skill Scale (MSS)

Rate how skilled you are at the following: (*(1) Not at all skilled* to *(5) Extremely Skilled*

1. Accepting my negative thoughts
2. Accepting my negative emotions
3. Accepting my emotions when I feel sad
4. Accepting unpleasant experiences
5. Accepting myself when I'm angry
6. Detecting stray thoughts
7. Detecting when my mind begins to wander
8. Noticing when my emotions/feeling change
9. Noticing the weather changing
10. Observing my surroundings
11. Being aware of my current emotions
12. Centering myself in the present moment
13. Grounding myself in the present moment
14. Staying alert to the sensations I experience
15. Catching myself when I start to operate on "automatic pilot"
16. Noticing noises around me
17. Noticing smells around me
18. Noticing when my muscles are tense or relaxed
19. Noticing how my body feels while I'm exercising
20. Noticing which muscles I am exerting while exercising
21. Not judging my own negative thoughts
22. Allowing thoughts to come and go without assigning judgement to them
23. Letting go of judgement
24. Recognizing that my thoughts are neither "good" or "bad"
25. Understanding that my emotions aren't "good" or "bad"
26. Letting go of criticism
27. Exploring how my emotions impact my day
28. Observing how I'm feeling
29. Observing what I'm experiencing in the moment
30. Observing what my body feels
31. Observing how my body feels
32. Noticing tension in my body when I'm stressed
33. Observing my thoughts
34. Curiously observing my thoughts
35. Curiously observing my feelings
36. Keeping track of my thoughts
37. Keeping track of my feelings
38. Focusing on my breath
39. Focusing on my breath when I'm upset
40. Focusing on the present moment
41. Focusing on what I'm eating
42. Concentrating on what I'm doing
43. Concentrating on my breath
44. Paying attention to what I'm eating
45. Pausing before reacting to a difficult situation
46. Pausing before I react in a negative way

APPENDIX C

Final Mindfulness Skill Scale (MSS)

Rate how skilled you are at the following:
(1) Not at all skilled to *(5) Extremely Skilled*

1. Accepting my negative thoughts
2. Accepting my emotions when I feel sad
3. Accepting unpleasant experiences
4. Accepting myself when I'm angry
5. Being aware of my current emotions
6. Centering myself in the present moment
7. Grounding myself in the present moment
8. Allowing thoughts to come and go without assigning judgement to them
9. Letting go of judgement
10. Recognizing that my thoughts are neither "good" or "bad"
11. Understanding that my emotions aren't "good" or "bad"
12. Letting go of criticism
13. Exploring how my emotions impact my day
14. Observing how I’m feeling
15. Observing what I’m experiencing in the moment
16. Observing what my body feels
17. Observing how my body feels
18. Observing my thoughts
19. Curiously observing my thoughts
20. Curiously observing my feelings
21. Keeping track of my feelings
22. Focusing on the present moment

APPENDIX D: TABLE 1

Table 1
Exploratory Factor Analysis Mindfulness Skill Scale (MSS)

		1	2	3	4	5	6	7	8
Item 33	Observing my thoughts	.942							
Item 29	Observing what I'm experiencing in the moment	.833							
Item 27	Exploring how my emotions impact my day	.747							
Item 11	Being aware of my current emotions	.633							
Item 12	Centering myself in the present moment	.575							
Item 35	Curiously observing my thoughts	.541							
Item 37	Keeping track of my feelings	.538							
Item 28	Observing how I'm feeling	.492							
Item 34	Curiously observing my thoughts	.440							
Item 40	Focusing on the present moment	.434							
Item 13	Grounding myself in the present moment	.423							
Item 30	Observing what my body feels	.383							
Item 31	Observing how my body feels	.378							
Item 1	Accepting my negative thoughts		.795						
Item 2	Accepting my negative emtions		.706		.454				
Item 24	Recognizing that my thoughts are neither "good" or "bad"		.744						
Item 5	Accepting myself when I'm angry		.684						
Item 23	Letting go of judgement		.635						
Item 25	Understanding that my emotions aren't "good" or "bad"		.629						
Item 3	Accepting my emotions when I feel sad		.615						
Item 4	Accepting unpleasant experiences		.612						
Item 22	Allowing thoughts to come and go without assigning judgement to them		.535						
Item 21	Not judging my own negative thoughts		.470	.401	.318				
Item 26	Letting go of criticism		.339						
Item 38	Focusing on my breath			.816					
Item 39	Focusing on my breath when I'm upset			.738					
Item 43	Concentrating on my breath			.673					

Item 46	Pausing before I react in a negative way		.441				
Item 45	Pausing before reacting to a difficult situation		.393				
Item 15	Catching myself when I start to operate in “automatic pilot”						
Item 32	Noticing tension in my body when I’m stressed			.545			
Item 8	Noticing when my emotions/feeling change			.540			
Item 6	Detecting stray thoughts			.526			
Item 7	Detecting when my mind begins to wander			.431			
Item 16	Noticing noises around me				.780		
Item 9	Noticing the weather changing				.456		
Item 17	Noticing smells around me				.325		
Item 44	Paying attention to what I’m eating					.893	
Item 41	Focusing on what I’m eating					.465	
Item 19	Noticing how my body feels while I’m exercising						.558
Item 20	Noticing which muscles I am exerting while exercising						.381
Item 18	Noticing when my muscles are tense or relaxed						.309
Item 10	Observing my surroundings			.310			
Item 36	Keeping track of my thoughts						.484

Extraction Method: Principal Axis Factoring
Rotation Method: Promax with Kaiser Normalization.
Rotation converged in 18 iterations
Items below.3 were supp

APPENDIX E: TABLE 2

Table 2
Correlation Matrix

		M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1	MSS	76.91	15.54	.95											
2	MSS (Awareness)	46.82	9.43	**.948**	.90										
3	MSS (Acceptance)	30.16	7.14	**.906**	**.724**	.93									
4	KIMS	127.9	15.54	**.514**	**.552**	**.373**	.93								
5	FFMQ	99.26	13.49	**.295**	**.356**	**.176**	**.831**	.71							
6	MAAS	4.49	1.06	**.365**	**.391**	**.296**	**.567**	**.454**	.93						
7	TMS (De-Centering)	22.84	5.41	**.556**	**.505**	**.531**	**.171**	**-.098**	.068	.79					
8	TMS (Curiosity)	20.32	5.41	**.556**	**.551**	**.476**	**.241**	-.004	.098	**.767**	.87				
9	Neuroticism	32.13	11.03	**-.285**	**-.269**	**-.252**	**-.595**	**-.646**	**-.373**	.037	**-.021**	.81			
10	Openness	46.52	9.47	**.190**	**.236**	.11	**.486**	**.405**	**.082**	.082	**.154**	**-.219**	.75		
11	Stress	27.96	6.92	**-.373**	**-.360**	**-.332**	**-.665**	**-.697**	**-.430**	0	-.055	.679	**-.306**	.80	
12	Happiness	3.30	.57	**.617**	**.615**	.521	**.613**	**.512**	**.383**	**.312**	**.389**	**-.571**	**.284**	**-.635**	.88

Note: Bolded values are Significant at p<.01. Scale Reliabilities displayed diagonally

APPENDIX F: TABLE 3

Table 3
Fisher's r to z
Outcome variable: Stress

Dimensions	***r of MSS***	***r of Comparison Scale***	***n of MSS***	***n of Comparison scale***	***Fisher's z***
MSS vs. KIMS	-.373	-.665	253	245	**4.545**
MSS vs. KIMS (Acceptance)	-.373	-.585	253	264	**3.143**
MSS vs. KIMS (Awareness)	-.373	-.578	253	266	**3.029**
MSS vs. KIMS (Describing)	-.373	-.559	253	265	**2.709**
MSS vs. KIMS (Observing)	-.373	-.194	253	256	**-2.191**
MSS vs. TMS (De-Centering)	-.373	0	253	267	**-4.441**
MSS vs. TMS (Curiosity)	-.373	-.055	253	267	**-3.817**
MSS vs. FFMQ	-.373	-.697	253	247	**5.218**
MSS vs. FFMQ (Non-Reactivity)	-.373	.046	253	267	**-4.963**
MSS vs. FFMQ (Nonjudging)	-.373	-.498	253	264	1.749
MSS vs. FFMQ (Observing)	-.373	.067	253	267	**-5.201**
MSS vs. FFMQ (Awareness)	-.373	-.556	253	264	**2.657**
MSS vs. FFMQ (Describing)	-.373	-.543	253	262	2.442
MSS vs. MAAS	-.373	-.43	253	263	.768

MSS = Mindfulness Skill Scale, KIMS = Kentucky Inventory of Mindfulness, TMS = Toronto Mindfulness Scale, FFMQ = Five Facet Mindfulness Questionnaire, MAAS = Mindful Attention Awareness Scale
Bolded z values are significant at p<.01

APPENDIX G: TABLE 4

Table 4
Fisher's r to z
Outcome variable: Neuroticism

Dimensions	***r of MSS***	***r of Comparison Scale***	***n of MSS***	***n of Comparison scale***	***Fisher's z***
MSS vs. KIMS	-.285	-.595	252	245	**5.640**
MSS vs. KIMS (Acceptance)	-.285	-.564	252	262	**4.259**
MSS vs. KIMS (Awareness)	-.285	-.576	252	263	**4.147**
MSS vs. KIMS (Describing)	-.285	-.446	252	263	**3.826**
MSS vs. KIMS (Observing)	-.285	-.138	252	254	-1.084
MSS vs. TMS (De-Centering)	-.285	.037	252	265	**-3.321**
MSS vs. TMS (Curiosity)	-.285	-.021	252	265	**-2.698**
MSS vs. FFMQ	-.285	-.646	252	244	**6.315**
MSS vs. FFMQ (Non-Reactivity)	-.285	.138	252	263	**-3.843**
MSS vs. FFMQ (Nonjudging)	-.285	-.489	252	261	**2.865**
MSS vs. FFMQ (Observing)	-.285	.141	252	265	**-4.082**
MSS vs. FFMQ (Awareness)	-.285	-.608	252	262	**3.773**
MSS vs. FFMQ (Describing)	-.285	-.465	252	258	2.363
MSS vs. MAAS	-.285	-.372	252	261	1.099

MSS = Mindfulness Skill Scale, KIMS = Kentucky Inventory of Mindfulness, TMS = Toronto Mindfulness Scale, FFMQ = Five Facet Mindfulness Questionnaire, MAAS = Mindful Attention Awareness Scale
Bolded z values are significant at p<.01

APPENDIX H: TABLE 5

Table 5
Fisher's *r* to *z*
Outcome variable: Oxford Happiness Questionnaire (OHQ)

Dimensions	***r of MSS***	***r of Comparison Scale***	***n of MSS***	***n of Comparison scale***	***Fisher's z***
MSS vs. KIMS	.617	.613	231	252	0.070
MSS vs. KIMS (Acceptance)	.617	.287	231	240	**4.580**
MSS vs. KIMS (Awareness)	.617	.376	231	241	**3.504**
MSS vs. KIMS (Describing)	.617	.508	231	242	1.730
MSS vs. KIMS (Observing)	.617	.472	231	234	2.223
MSS vs. TMS (De-Centering)	.617	.312	231	243	**4.297**
MSS vs. TMS (Curiosity)	.617	.389	231	243	**3.347**
MSS vs. FFMQ	.617	.512	231	224	1.639
MSS vs. FFMQ (Non-Reactivity)	.617	.207	231	241	**5.505**
MSS vs. FFMQ (Nonjudging)	.617	.184	231	242	**5.769**
MSS vs. FFMQ (Observing)	.617	.234	231	244	**5.214**
MSS vs. FFMQ (Awareness)	.617	.287	231	239	**4.575**
MSS vs. FFMQ (Describing)	.617	.542	231	236	1.215
MSS vs. MAAS	.617	.383	231	240	**3.413**

MSS = Mindfulness Skill Scale, KIMS = Kentucky Inventory of Mindfulness, TMS = Toronto Mindfulness Scale, FFMQ = Five Facet Mindfulness Questionnaire, MAAS = Mindful Attention Awareness Scale
Bolded z values are significant at p<.01

APPENDIX I: TABLE 6

Table 6
Fisher's r to z
Outcome variable: Openness

Dimensions	***r of MSS***	***r of Comparison Scale***	***n of MSS***	***n of Comparison scale***	***Fisher's z***
MSS vs. KIMS	.19	.486	248	242	**-3.723**
MSS vs. KIMS (Acceptance)	.19	.246	248	259	-0.658
MSS vs. KIMS (Awareness)	.19	.317	248	262	-1.526
MSS vs. KIMS (Describing)	.19	.328	248	253	-1.649
MSS vs. KIMS (Observing)	.19	.328	248	253	-1.649
MSS vs. TMS (De-Centering)	.19	.082	248	262	1.236
MSS vs. TMS (Curiosity)	.19	.154	248	264	.417
MSS vs. FFMQ	.19	.405	248	242	**-2.61**
MSS vs. FFMQ (Non-Reactivity)	.19	.012	248	261	2.022
MSS vs. FFMQ (Nonjudging)	.19	.167	248	259	.266
MSS vs. FFMQ (Observing)	.19	.165	248	262	.290
MSS vs. FFMQ (Awareness)	.19	.274	248	260	-.995
MSS vs. FFMQ (Describing)	.19	.515	248	256	**-4.208**
MSS vs. MAAS	.19	.244	248	258	-0.634

MSS = Mindfulness Skill Scale, KIMS = Kentucky Inventory of Mindfulness, TMS = Toronto Mindfulness Scale, FFMQ = Five Facet Mindfulness Questionnaire, MAAS = Mindful Attention Awareness Scale
Bolded z values are significant at p<.01

APPENDIX J: IRB APPROVAL

IRB
INSTITUTIONAL REVIEW BOARD
Office of Research Compliance,
010A Sam Ingram Building,
2269 Middle Tennessee Blvd
Murfreesboro, TN 37129

MIDDLE TENNESSEE STATE UNIVERSITY

IRBN007 – EXEMPTION DETERMINATION NOTICE

Wednesday, January 22, 2020

Principal Investigator	**Stacey Madison Stremic** (Student)
Faculty Advisor	Alexander Jackson
Co-Investigators	Michael Hein and Cameron Gordon
Investigator Email(s)	*sms8x@mtmail.mtsu.edu; alexander.jackson@mtsu.edu*
Department	Psychology
Protocol Title	***Redefining mindfulness as a skill***
Protocol ID	**20-1096**

Dear Investigator(s),

The above identified research proposal has been reviewed by the MTSU Institutional Review Board (IRB) through the **EXEMPT** review mechanism under 45 CFR 46.101(b)(2) within the research category *(2) Educational Tests* A summary of the IRB action and other particulars in regard to this protocol application is tabulated as shown below:

IRB Action	**EXEMPT from furhter IRB review*** **	Date	**1/22/20**
Date of Expiration	**1/31/2021**		
Sample Size	700 (SEVEN HUNDRED)		
Participant Pool	**Adults (18 years or older) - Recruited through Amazon MTurk, Psychology SONA**		
Exceptions	1. Online informed consent permitted and data collection via Qualtrics. 2. Approved to use non-standard template for recruitment.		
Mandatory Restrictions	1. Participants must be 18 years or older 2. Informed consent must be obtained from the participants 3. Identifying information must not be collected		
Restrictions	**1. All restrictions for exemption apply.** **2. Mandatory active informed consent.** **3. Participants must be compensated once they consent.**		
Approved IRB Templates	MTSU Template: Online Informed Consent; 2.SONA recruitment; Non-MTSU Templates: Abbreviated recruitment script		
Funding	NONE		
Comments	NONE		

***Although this exemption determination allows above defined protocol from further IRB review, such as continuing review, MTSU IRB will continue to give regulatory oversight to ensure compliance.

Summary of Post-approval Requirements:
The investigator(s) indicated in this notification should read and abide by all applicable post-approval conditions (Visit https://www.mtsu.edu/irb/FAQ/PostApprovalResponsibilities.php for more information)

- PI must close-out this protocol by submitting a final report before **1/31/2021**; if more time is needed to complete the data collection, the PI must request an extension. NO reminders will be sent. **Failure to close-out (or request extension) may result in penalties** including cancellation of the data collected using this protocol or withholding student diploma.
- IRB approval must be obtained for all types of amendments, such as:
  - Addition/removal of subject population and sample size
  - Change in investigators
  - Changes to the research sites – appropriate permission letter(s) from may be needed if the study will be conducted at a non-MTSU location
  - Alternation to funding
- Modifications to procedures must be clearly described in an addendum request form and the proposed changes must not be incorporated without an approval
- The proposed change must be consistent with the approved protocol and comply with exemption requirements
- Research-related injuries to the participants and other events , such as, deviations & misconduct, must be reported within 48 hours of such events to compliance@mtsu.edu

Post-approval Protocol Amendments:
The current MTSU IRB policies allow the investigators to implement minor and significant amendments that would not result in the cancellation of the protocol's eligibility for exemption. ***Only THREE procedural amendment requests will be entertained per year. This amendment restriction does not apply to minor changes such as language usage and addition/removal of research personnel.***

Date	Amendment(s)	IRB Comments
NONE	NONE.	NONE

Post-approval IRB Actions:

Date	IRB Action(s)	IRB Comments
NONE	NONE.	NONE

Mandatory Data Storage Requirement: All research-related records (signed consent forms, investigator training and etc.) must be retained by the PI or the faculty advisor (if the PI is a student) at the secure location mentioned in the protocol application. The data must be stored for at least three (3) years after the study is closed. Subsequently, the data may be destroyed in a manner that maintains confidentiality and anonymity of the research subjects. **The IRB reserves the right to modify/update the approval criteria or change/cancel the terms listed in this notice**. Be advised that IRB also reserves the right to inspect or audit your records if needed.

Sincerely,

Institutional Review Board
Middle Tennessee State University

Quick Links:

- Post-approval Responsibilities: http://www.mtsu.edu/irb/FAQ/PostApprovalResponsibilities.php

Expedited Procedures: http://www.mtsu.edu/irb/FAQ/PostApprovalResponsibilities.php