

Validating the Mindfulness Skill Scale

By

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## ABSTRACT

The purpose of this study was to replicate and extend the work of Stremic (2020), who created the Mindfulness Skill Scale (MSS). Stremic (2020) argued that mindfulness should be best measured as a skill that can be learned, rather than a personality trait or a psychological state. We recruited 150 working professionals from Prolific who were asked to complete the MSS, a series of other mindfulness measures that measured state, trait, and skill mindfulness, along with other mindfulness related outcomes (happiness, perceived stress, and anxiety). Participants in the intervention group were asked to engage in a mindful meditation, while participants in the control group were asked to watch a video about stress management techniques. Analyses examined correlations between mindfulness measures and outcome variables. We also examined whether the MSS demonstrated a stronger relationship to the outcomes compared to other mindfulness measures. In addition, we conducted Fisher's  $r$ -to- $z$  transformation to compare mindfulness measures to the outcome variables. Results showed that the mindfulness training did not work, therefore it is unclear if the MSS is accurately measuring mindfulness skill. Additionally, the mindfulness skill did not change over time and did not differ between conditions. Despite the mindfulness intervention not having an impact on mindfulness skill, the MSS was found to be significantly correlated with happiness, anxiety, and perceived stress. Overall, partial validity for the MSS was found. Future research is needed to further validate the MSS to be accurate and useful for organizational use.

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## Literature Review

### Introduction

In 2020, our world changed forever when the COVID-19 crisis hit. Ever since then, mental health problems have continued to escalate (American Psychological Association, 2021). Several recent reports published by the American Psychological Association paint a bleak picture that organizations and employees in America are facing an epidemic of stress. Approximately 71% of people feel stressed out at work, and 87% of people believe that actions from their employer would benefit their mental health (American Psychological Association, 2021). Further, each year the Society of Industrial Organizational Psychologists (SIOP) creates a list of ten top work trends for the year. In 2023, four out of ten topics (e.g., reshaping work to address employees' mental health, psychological safety in the workplace, leadership development and coaching, integrating work, life, and family) related to the mental health crisis and how organizations can help their employees (Stark, 2023). While ideal solutions are to eliminate or reduce the job demands that cause people to experience stress (Wang et al., 2023), this is not always possible. One solution is to equip people with the skills to successfully cope with stress (Bartlett et al., 2019; Carmody & Baer, 2008). Relatively recent research has shown that people can effectively cope with work stress using mindfulness. Indeed, mindfulness has been shown time and time again to decrease perceived stress levels (Carmody & Baer, 2008; Jensen et al., 2012; Rich et al., 2021; Schulte-Frankenfeld & Trautwein, 2022), anxiety (Gál et al., 2021, Farb et al., 2010), and depression (Bostock et al., 2019; Farb et al., 2010).

The purpose of this study is to replicate and extend the work of Stremic (2020), who created the Mindfulness Skill Scale (MSS). Stremic (2020) argued that mindfulness should be best measured as a skill that can be learned, rather than a personality trait or a psychological state. Based on this, she developed the MSS to measure mindfulness skill. The MSS is a 22-item mindfulness questionnaire whereby participants are asked to rate each item based on their perceived skill level. In the 2020 study, 281 working professionals from Amazon's Mechanical Turk were asked to complete the MSS. They were additionally asked to complete other mindfulness measures including: the Mindfulness Attention Awareness Scale (MAAS) and the Five Facet Mindfulness Questionnaire (FFMQ), to measure trait mindfulness, the Toronto Mindfulness Scale (TMS) to measure state mindfulness, and the Kentucky Inventory of Mindfulness Skills (KIMS) as the other mindfulness skill measure. Participants were also asked to complete the Perceived Stress Scale, to measure perceived stress, the Oxford Happiness Questionnaire (OHQ) to measure happiness, and the Mini-Marker Questionnaire (MMQ) to measure the big five personality traits, openness and neuroticism in particular. Stremic (2020) found that the MSS demonstrated a strong relationship to the outcomes, such as stress. Overall, the study resulted in the final version of the MSS demonstrating a sound measure of mindfulness but did not demonstrate significantly stronger relationships with the outcomes than the other mindfulness measures, the KIMS and the FFMQ.

The current study plans to continue this research and attempts to provide further validation of the Mindfulness Skill Scale. Future research and future development of the MSS mentioned in the Stremic (2020) study included that mindfulness should explicitly measure mindfulness skill, mindful behavior, and other relevant behavioral outcomes.



Additionally, she stated that future replications should incorporate a mindfulness meditation session before measuring state mindfulness and to utilize a different sample to make the results more generalizable. The present study will compare the MSS to measures of state and trait mindfulness as well as happiness, perceived stress, and anxiety. Additionally, this study will address a few limitations of the previous study and compare brief training that focuses on mindfulness meditation or stress management techniques. This study will also use a different sample. After validation, the MSS would work best in research involving mindfulness trainings in organizations.

### **Defining Mindfulness**

Currently, much of the literature defines and operationalizes mindfulness as a state (Brown et al., 2007) or trait (Michel et al., 2021). Researchers adopting the trait perspective argue that some people are born with natural tendencies to be mindful (Kiken et al., 2015). However, this perspective contradicts the teaching of mindfulness through classes and training as traits are relatively stable and fixed over shorter durations. Other researchers define mindfulness as a state, whereby mindfulness is viewed as a condition (Brown & Ryan, 2003). These conditions are usually temporary, but the purpose of training is to develop continuous intentional mindfulness (Kabat-Zinn, 2015).

Bishop et al. (2004) proposed an operational definition for mindfulness and argued that mindfulness is like a “skill that can be developed with practice” (p. 234). It concluded by calling for the development of a new instrument that was sensitive to change and had incremental validity. The Kentucky Inventory of Mindfulness Skills is one of the only mindfulness instruments that measures mindfulness as a skill, and it has demonstrated good internal consistency and test-retest reliability. However, there were

limitations in the content coverage of the KIMS, including construct validity and temporal reliability (Baer et al., 2004). Baer et al. (2020) further suggested that mindfulness scales should continue to be developed to increase consensus on how mindfulness is defined and operationalized. Therefore, the present study aims to extend Stremic's (2020) study and further develop and validate the MSS. One limitation of her study was that mindfulness skill was only measured at one point in time, so change in mindfulness could not have been observed. Thus, this study will also utilize four time points and a brief mindfulness training intervention to examine changes in mindfulness to obtain further validity evidence for the MSS.

### **Mindfulness Definitions**

The topic of mindfulness suffers from a definition and operationalization problem in much of the training and occupational health literature (Davidson, 2010). Mindfulness has not been as clearly conceptualized and measured as it should be in organizations. Specifically, mindfulness has been defined in several ways, including as a trait (Feldman et al., 2007), state (Brown & Ryan, 2003), and skill (Baer et al., 2004). Different conceptualizations of mindfulness have led to multiple instruments for measuring mindfulness. One popular measure of trait mindfulness is the Cognitive and Affective Mindfulness Scale (Feldman et al., 2007). This scale covers the broad conceptualization of mindfulness that is not specific to a certain type of meditation training. This scale does have acceptable internal consistency and evidence of some convergent and discriminant validity. However, Feldman et al. (2007) suggests that research must further examine test-retest reliability. Additionally, an issue with measuring trait mindfulness is that it suggests that only some individuals are capable of being mindful, while everyone else

must spend much longer practicing. Researchers should be aware of this definitional constraint when considering mindfulness scale options.

Previous research has also operationalized mindfulness as a state. Kabat-Zinn, the creator of Mindfulness-Based Stress Reduction, defines mindfulness as “moment-to-moment, non-judgmental awareness, cultivated by paying attention in a specific way, that is, in the present moment, and as non-reactively, as non-judgmentally, and as openheartedly as possible” (2015, p.14). This definition suggests that mindfulness can vary from moment to moment within individuals (Bishop et al., 2004; Dane, 2011). Most of the current literature measures and operationalizes mindfulness as a state, and many researchers use the Mindfulness Attention Awareness Scale (MAAS) to measure state mindfulness (Brown & Ryan, 2003; Chambers et al., 2008; Fredrickson et al., 2008). However, many of these studies may be using this scale incorrectly by using it to measure state or skill mindfulness. For example, Fredrickson et al. (2008) used a randomly assigned waitlist control group to see the difference between workers who practiced loving-kindness meditation and those who did not. It was found that over time, there was an increase in daily experiences of positive emotions which led to increased life satisfaction and decreased depressive symptoms. The loving-kindness meditation was taught by a stress-management specialist with extended practice and teaching of this meditation. In this context, mindfulness should be operationalized as a skill of continued mindfulness that is being learned, rather than the spontaneous induction of a state of mindfulness.

Another example of researchers using mindfulness scales incorrectly was when Chambers et al. (2008) evaluated the impact of a ten-day intensive mindfulness

meditation training on cognitive and affective function. The results showed that there were significant improvements in depressive symptoms, sustained attention, and working memory among novice meditators. This indicates the participants were getting better at being mindful (i.e., a skill), so if the researcher is attempting to measure increases in mindfulness competence, a scale that operationalizes mindfulness as a skill should have been used. Bishop et al. (2004) stated that one “is not trying to produce a particular state such as relaxation or to change what he or she is feeling in any way” (p. 223). This suggests mindfulness does not result in a state, like some research claims (Brown & Ryan, 2003). Further, while Brown & Ryan (2003) stated that the MAAS measures mindfulness as a state, many researchers use it to measure trait mindfulness (Hülshager et al., 2013). Researchers operationalizing mindfulness as a state should be aware of and acknowledge these limitations when studying mindfulness. I argue the moment-to-moment mindfulness experience is the result of one’s level of mindfulness skill, which is discussed below.

Bishop et al. (2004) proposed an operational definition for mindfulness, and in this context, “mindfulness can be considered a metacognitive skill”(p. 223). It was further defined as “an orientation to experience that is adopted and cultivated in mindfulness meditation practices” (p. 223). Based on this conceptualization of mindfulness, it should be considered a skill that can be learned rather than a state that is induced or a trait that is relatively stable and immalleable. Baer et al. (2004) created the Kentucky Inventory of Mindfulness Skills (KIMS) to measure mindfulness as a skill. Subsequently, more recent studies have started to use the KIMS to measure mindfulness (Baas et al., 2020). In 2023, while researching how to improve mindfulness skills in trainee child psychotherapists,

Kalmer et al. (2023) used the KIMS to measure changes in mindfulness after a six-week mindfulness workshop-based mindfulness intervention. Results showed the intervention produced quantitative, long-term changes in mindfulness in participants. Perhaps, mindfulness is rather a skill that is developed over time, and this is how research should measure and operationalize it.

Each of these conceptualizations has qualitatively different implications, especially for the practice of mindfulness. When defined as a trait, variation in mindfulness between individuals is due to inherent dispositional properties. When measuring mindfulness, clinical psychologists may view trait mindfulness as something that can change with deliberate and lengthy effort (Anicha et al., 2012). The trait conceptualization implies that a person's natural mindfulness tendencies are relatively fixed and cannot be easily developed. When defined as a state, variation in mindfulness is due to each individual's state of being at any given moment (Davidson, 2010). When measuring mindfulness, business researchers may view state mindfulness as something that can enhance employee outcomes in the workplace (Glomb et al., 2011). However, operationalizing mindfulness as a state implies that one can only be mindful if they are in a mindful state, rather than continuous mindfulness. When defined as a skill, trainers may view mindfulness as a skill that can be learned and developed over time (Bishop et al., 2004). Perhaps then, the most practically useful approach and the approach that seems to match much of the literature evaluating mindfulness interventions is to define mindfulness as a skill. This is the key argument made by Stremic (2020) that led to the development of the MSS.

It is important to note that mindfulness does exist as a state, a trait, and a skill. In the clinical setting, measuring mindfulness as a state or trait is appropriate. However, because organizations typically use mindfulness interventions to combat stress and other work outcomes, mindfulness would best be measured as a skill in this setting.

Mindfulness interventions in organizations are often used as a way to improve the coping “skills” of employees and these interventions are commonly presented in training format. Additionally, this may help provide support for the implementation of mindfulness interventions since leaders can view mindfulness as a skill their employees can develop and benefit from.

### **Mindfulness Interventions in Organizations**

As previously mentioned, the American workforce is experiencing overwhelming levels of stress (American Psychological Association, 2021). More and more organizations need solutions for retaining employees and offering them mental health assistance (Stark, 2023). One solution is employing mindfulness practices, such as mindfulness meditation. While many mindfulness interventions exist, the most used intervention is the MBSR (Carmody & Baer, 2008; Grossman et al., 2004; Ito et al., 2022). Common among all these interventions is the notion that mindfulness behaviors are being trained. Kabat-Zinn (2011), the founder of Mindfulness-Based Stress Reduction (MBSR), argued one can be trained into stability and calm the mind. This line of thought matches the idea of skill development.

Butler (1978) defines skill as “the ability to carry out a purposeful activity with facility; the proficient application of knowledge and process to a task” (p. 7). Learning was defined as “the attainment of a new capability; the ability to do something that one

could not do before; demonstrated by a new behavior encompassing new knowledge, skills, values and attitudes” (p. 7). With these 2 definitions in mind, I argue that mindfulness is a skill, rather than a trait or state. Further, the skill approach suggests people can have varying degrees of proficiency at being mindful. Thus, people can learn and develop the skill of mindfulness through training and (individual) practice.

Consistent mindfulness meditation practice has been shown to increase mindfulness and significantly reduce psychological distress and perceived stress (Carmody & Baer, 2008).

Organizations can choose from several kinds of mindfulness interventions to help their employees. Mindfulness-Based Stress Reduction (MBSR) interventions are an 8-session group program where participants complete measures of mindfulness, well-being, perceived stress, and symptoms pre- and post-MBSR. The foundation and methodology of this intervention have already been described in detail elsewhere (Kabat-Zinn, 2011). MBSRs have been increasingly popular in organizations (Carmody & Baer, 2008; Ito et al., 2022). The purpose of MBSRs is to focus on the cultivation of mindfulness through instructed sessions of formal meditation practices, such as sitting meditation, mindful yoga, and body scans, as well as group interaction. Participants are asked to practice 45 minutes of mindfulness outside of the weekly two-and-a-half-hour sessions (Kabat-Zinn, 2011). In 2019, a meta-analysis reviewing the effects of workplace mindfulness training referred to the MSBR as the gold standard for mindfulness training (Bartlett et al.). More mindfulness-based programs (MBP) quickly followed MSBR’s success (Bartlett et al., 2019). Then in 2020, another meta-analysis reviewing mindfulness-based programs in the workplace found that MBPs reduce stress, mental distress, and burnout, while improving mindfulness, compassion, well-being, and job satisfaction (Vonderlin et al.). Overall,

MBSR and MBPs can help reduce stress in employees while improving mental health and well-being (Bartlett et al., 2019).

Many researchers have found that mindfulness interventions show decreases in depression and anxiety scores (Farb et al., 2010) and stress (Chen et al., 2022). It has also been shown to have a positive impact on work meaningfulness, emotion regulation, and work engagement (Chen et al., 2022). In 2014, Creswell & Lindsay sought to discover the underlying pathways linking mindfulness to health outcomes. They found that mindfulness is hypothesized to alter stress processing in the brain. This then alters peripheral stress-response cascades and any risk for stress-related disease. It alters two stress processing pathways in the brain: mindfulness increases the use of prefrontal regulatory regions that may reduce activity in stress processing regions and mindfulness might also have direct effects on controlling the reactivity of stress processing regions. Additionally, they found that mindfulness interventions increase the use of prefrontal regulatory regions. Mindfulness has also been found to reduce the reactivity of central stress processing regions and alters the function and structure of the amygdala, the region responsible for the flight-or-fight response.

Another option for mindfulness interventions organizations can implement is to encourage employees to use mindfulness/meditation applications. Mindfulness-based smartphone apps are now widely available and easy to use. These apps are also less time-consuming, more cost-effective, and potentially more engaging (Economides et al., 2018). Those using these apps have access to daily guided meditation sessions. Many benefits have been found from using these apps, including improvements in mindfulness skill, depressive and stress symptoms (Tan et al., 2022), well-being, distress, job strain,



and more (Bostock et al., 2019). Gal et al. (2021) conducted a meta-analysis to review the efficacy of mindfulness meditation apps to enhance well-being and mental health-related outcomes. Significant effect sizes were found at post-test for perceived stress, depression, anxiety, and psychological well-being. One popular mindfulness application is Headspace. Use of Headspace has been shown to increase mindfulness and well-being while also reducing stress (Economides et al., 2018; Rich et al., 2021). Headspace has over 70 million downloads and is partnered with over 4,000 businesses to offer the app free of charge to employees (*Headspace for Organizations*, 2023). Headspace has grown so expeditiously, it is now available on the widely adopted streaming platform, Netflix.

The use of mindfulness applications can yield significant positive outcomes. Champion et al. (2018) discovered that using a mindfulness app for only 10 days led to reported higher satisfaction with life, decreases in perceived stress, and increased resilience, and these benefits continued to grow after 30 days of use. Rich et al. (2021) found that just offering an app without any additional employer input can result in improved perceived stress. Bostock et al. (2019) also used a mindfulness app in their study and found participants who received the most benefits also had the most meditation sessions logged. Gál et al. (2021) conducted a meta-analysis of 34 randomized trials that evaluated the effectiveness of app-delivered mindfulness training, and the results support the benefits of mindfulness apps. Small and medium effect sizes were found, compared to control groups, for perceived stress, life satisfaction, burnout, depression and anxiety symptoms, psychological well-being, and more. Having easy access to mindfulness practice seems to be incredibly beneficial.

Interestingly, mindfulness can also impact how people interact with each other in the workplace. Hawkes & Neale (2020) found that when employees can pay attention to the present moment without judgment, they have greater emotional and cognitive resources for responding with consideration to co-workers. Additionally, they found awareness without judgment led to viewing coworker relationships as reciprocal, cooperative, and supportive. In a similar study, Yela Aránega et al. (2020) evaluated a mindfulness and emotional management intervention and found that the workers' social well-being and relationships with coworkers improved after the intervention. Mindfulness has also been shown to reduce conflict avoidance and increase collaboration (Kay & Skarlicki, 2020). Indeed, several studies encourage the use of mindfulness interventions for team management, improving coworker relationships (Yela Aránega et al., 2020), team building (Hawkes & Neale, 2020), and collaboration (Kay & Skarlicki, 2020). Mindfulness has also been shown to improve workplace social support (Bostock et al., 2019), and predict the quality of creative ideation in workers (Baas et al., 2020).

### **Previous and Present Study**

Stremic (2020) conducted a study to examine and compare existing mindfulness scales (MAAS, TMS, FFMQ, KIMS) with a new mindfulness skill scale (MSS). She also attempted to inject clarity around the definition and operationalization of mindfulness by arguing that mindfulness (as it is commonly used in research) is best operationalized as a skill rather than a state or trait. The Mindfulness Skill Scale (MSS) showed excellent reliability and convergent validity. However, the study found the newly developed Mindfulness Skill Scale was outperformed in stress, neuroticism, and openness by the KIMS and FFMQ. In an initial display of validity evidence, the MSS showed similar

results to the MAAS in its correlations with neuroticism, openness, stress, and happiness. In relation to happiness, the MSS did outperform both the MAAS and TMS.

However, there were a few limitations in this study that I will be addressing in the current study. In Stremic's study, the sample used was from Amazon's MTurk which is problematic because it provides threats to internal validity, statistical conclusion validity, and construct validity (Cheung et al., 2017). Additionally, it has been shown to be problematic when scale development and validation efforts are based on data with substantial amounts of inattentive or careless responses (Meade & Craig, 2012). A second limitation of Stremic's study was that there was no use of an intervention to observe skill change, and this is necessary when developing a measure of skill. To address these limitations in the current study, mindfulness data will be collected at four time periods. Specifically, two mindfulness meditation sessions will be administered to observe changes in mindfulness which could have been acquired during training. A pre-and post-test will address the limitation of explicitly measuring perceived mindfulness skill. This will also be used to examine whether the Mindfulness Skill Scale is superior to other mindfulness measures. A third limitation of the Stremic (2020) study involved errors in the measurement process. In the current study, these errors will be resolved. Specifically, the MSS and the KIMS should be the only measures to show any change in mindfulness skill. If the other measures do show change, this would suggest they are not measuring trait or state mindfulness. Lastly, the MAAS was used to measure trait mindfulness in the previous study. After reviewing the original literature of the MAAS, it stated that the MAAS should be used to measure state mindfulness, not trait mindfulness. Therefore, in the current study it will be used to measure state mindfulness in this study. Overall, this

research should help provide additional validity evidence of the MSS. The different outcomes I will be using are state, trait, and skill mindfulness, happiness, anxiety, and perceived stress. This leads to the following hypotheses:

*Hypothesis 1a:* The mindfulness skill scale will be positively correlated with happiness following a mindfulness intervention.

*Hypothesis 1b:* The mindfulness skill scale will be inversely related to perceived stress following a mindfulness intervention.

*Hypothesis 1c:* The mindfulness skill scale will be inversely related to anxiety following a mindfulness intervention.

*Hypothesis 2:* The mindfulness skill scale will be significantly and positively correlated with the Kentucky Inventory Mindfulness Scale (KIMS).

*Hypothesis 3a:* The relationship between the mindfulness skill scale and happiness will be significantly stronger than the relationship between existing measures of mindfulness and happiness following a mindfulness intervention.

*Hypothesis 3b:* The relationship between the mindfulness skill scale and stress will be significantly stronger than the relationship between existing measures of mindfulness and perceived stress following a mindfulness intervention.

*Hypothesis 3c:* The relationship between the mindfulness skill scale and anxiety will be significantly stronger than the relationship between existing measures of mindfulness and anxiety following a mindfulness intervention.

*Hypothesis 4a:* Mindfulness skill will interact with time and have a significant effect on happiness after controlling for state and trait mindfulness. Such that as over time as mindfulness skill increases, happiness increases.

*Hypothesis 4b:* Mindfulness skill will interact with time and have a significant effect on perceived stress after controlling for state and trait mindfulness. Such that as over time as mindfulness skill increases, stress decreases.

*Hypothesis 4c:* Mindfulness skill will interact with time and have a significant effect on anxiety after controlling for state and trait mindfulness. Such that as over time as mindfulness skill increases, anxiety decrease.

## **Methods**

### **Participants**

An *a priori* power analysis was conducted using the software G\*Power to obtain an adequate sample size for this study. Results showed an estimated number of 46 participants per group to detect a medium effect. Additionally, Hinkin (1995) suggests that a generous sample for scale development would be a participant-to-item ratio of 4:1, which would be a sample of 79 in this case. To ensure enough usable data was collected, a minimum target sample size of 150 participants from Prolific was used. Prolific is an online research platform that provides the recruitment and management of participants for online research (Prolific, n.d.). Participants were then rewarded with \$10 for completing Time 1 and another \$10 for completing Time 2. Only participants 18 and older were eligible to participate.

Note, that in the initial recruitment post on Prolific, the incorrect link for Part 1 was posted by mistake. An earlier version of the study asked participants to enter their MTSU email before beginning the study because the initial recruitment plan was to recruit participants from the MTSU psychology undergraduate research pool. However, the recruitment plan changed to recruit from Prolific, a sample of greater convenience.

Once the study was published on Prolific, participants began to message me asking what this meant. I quickly sent the correct link to everyone who signed up for the study. Some people used a fake email to enter the survey. All participants who completed the study using the incorrect link were compensated in accordance with Prolific policy and the IRB approved compensation plan. However, the data for these participants were removed from the analysis. Additionally, all data gathered from participants who completed the study using the incorrect link were removed and excluded from any analyses. Throughout the process of contacting participants regarding this issue, I was in contact with Prolific explaining the error. Due to the error of inserting the wrong link to the Part 1 survey on Prolific, 10 participants who completed both the incorrect and correct link were removed from the study to avoid any chance of bias. A request to complete Part 2 of the study was sent to all participants who completed the correct Part 1 study.

Participants were required to pass three out of four randomly placed attention check questions in each survey to be included in the study. Five participants who missed more than one attention check were removed from the original sample of 163 participants in the Time 1 survey. 1 participant was removed from the Time 2 survey due to failing more than one attention check. These attention checks were used to ensure data quality. Additional quality check questions were asked before participants were shown the intervention videos. Any participant who indicated they were not alone, were not in a distraction free environment, or did not have access to video or sound was removed from the study. 11 participants were removed due to this. 29 participants did not participate in the Time 2 survey; therefore, they were excluded. At the end of the study, participants were asked whether they clicked through the survey and if there was any reason why

their data should *not* be used. One participant selected the response that said, “I just skimmed through the questions,” therefore they were removed from the study.

The final sample ( $N = 105$ ) consisted of 81.9% white, non-Hispanic and 50.9% male participants. Ages of participants ranged from 20 to 72 years ( $M = 42$ ,  $SD = 13.5$ ). 88.6% of participants reside in the United Kingdom and approximately, 4.76% were African American, 1.9% were Hispanic, 6.67% were Asian, and 3.81% were of another ethnicity. 24 participants (22.86%) had meditation experience. Of those participants, the average years of experience was 4.2 and a standard deviation of 4.4 years. Years of experience ranged from 1 to 20 years. 16 participants (15.24%) practice yoga and 76 participants (72.38%) exercise weekly. 82.9% of participants were employed and industries ranged from educational services to wholesale trade. 53 participants were randomly placed by Qualtrics into the control group. 50 participants were randomly placed into the experimental group.

## **Materials and Metrics**

### ***Mindfulness Skill***

#### **Mindfulness Skill Scale (MSS).**

To measure mindfulness as a skill, Stremic’s (2020) MSS was used. This scale was developed by MTSU I-O Psychology master’s student Mattie Stremic. Items were developed to reflect one’s evaluation of their mindfulness skills, such as acting with awareness. The MSS has 22 items with a 5-point Likert scale ranging from 1 (*not at all skilled*) to 5 (*extremely skilled*). The scale was comprised of two subscales: present-moment awareness and attention. The present-moment awareness subscale had a total of

13 items, while the attention subscale had nine items. An example item from the present-moment awareness subscale was, “Being aware of my current emotions,” and an example from the attention subscale is “Accepting my negative thoughts.” The present-moment awareness subscale showed high reliability  $\alpha = .90$ . Excellent reliability of  $\alpha = .93$  was found for the attention subscale. Overall, the MSS demonstrated insufficient convergent validity. This scale was normed on working adults in the United States. There were a few revisions made to the scale for the current study. In the instructions, instead of asking participants how skilled they thought they were, participants were asked how easy the following items were to them. Therefore, anchors were changed to 1 (*very easy*) to 5 (*very difficult*). The internal consistency reliability for the overall scale in the current study was  $\alpha = .95$ .

#### **Kentucky Inventory of Mindfulness Scale (KIMS).**

To measure mindfulness as a skill, Baer et al.’s (2004) KIMS was used. This scale included 77 items with a 4-point Likert scale ranging from 1 (*poor*) to 4 (*excellent*). High scores represent being more skilled in mindfulness. Example items were, “I pay attention to whether my muscles are tense or relaxed,” and “I’m good at finding the words to describe my feelings.” Test-retest reliability was assessed, and it was found that test-retest correlations for four out of five facets were greater than  $\alpha = .60$ . However, a paired samples t-test indicated no significant change in scores from Time 1 to Time 2. This scale was normed on three samples of both undergraduate students as well as outpatients with borderline personality disorder in the United States. The internal consistency reliability in the current study was  $\alpha = .98$ .

#### ***State Mindfulness***



### **Mindfulness Attention Awareness Scale (MAAS)**

To measure mindfulness as a state, Brown and Ryan's (2003) MAAS was used. This scale included 15 items with a 6-point Likert scale ranging from 1 (*always*) to 6 (*almost never*). A low score represented higher levels of state mindfulness. However, to be consistent with the anchor ordering of the other scales, I inverted the presentation of the scale anchors. Some example items were, "I could be experiencing some emotion and not be conscious of it until sometime later," and "I find myself preoccupied with the future or the past." Test-retest reliability was assessed and an intraclass correlation of  $\alpha = .81$  was found. This scale was normed on undergraduates, working adults, and cancer patients. The internal consistency reliability in the current study was  $\alpha = .94$ .

### ***Trait Mindfulness***

#### **Cognitive and Affective Mindfulness Scale-Revised (CAMS-R).**

To measure trait mindfulness, Feldman et al.'s (2007) CAMS-R was used. This scale included 12 items with a 5-point Likert scale ranging from 1 (*rarely/not at all*) to 4 (*almost always*). Higher scores represented more cognitive flexibility and problem analysis. Sample items are, "I am preoccupied by the future" and "I am easily distracted". Previous research has demonstrated a good internal consistency reliability of  $\alpha = .76$ . This scale was normed with undergraduate students in the United States. The internal consistency reliability in the current study was  $\alpha = .96$ .

### ***Perceived Stress***

#### **Perceived Stress Scale (PSS).**

To measure stress, Cohen et al.'s (1983) PSS was used. This scale included 14 items with a 4-point Likert scale ranging from 0 (*never*) to 4 (*very often*). High scores

represented higher perceived stress levels. An example item was, “In the last month, how often have you been upset because of something that happened unexpectedly?” Cohen et al. used three different samples and found reliabilities of .84, .85, and .86 in each sample. This scale was normed on undergraduate students and participants in a community smoking cessation program in the United States. The internal consistency reliability in the current study was  $\alpha = .96$ .

#### **Perceived Occupational Stress Scale (POSS).**

To measure occupational stress, Marcatto et al.’s (2022) POSS was used. This scale included four items with a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Higher scores indicate higher perceived work stress. An example item was, “Thinking about work makes me feel tense.” A high test-retest reliability of  $\alpha = .86$  was found. This scale was normed on Italian workers. The internal consistency reliability in the current study was  $\alpha = .98$ .

#### ***Anxiety***

##### **State-Trait Anxiety Inventory (STAI).**

To measure anxiety, a shortened version of Spielberger’s STAI (2020) was used. This scale included 10 items with a 4-point Likert scale ranging from 1 (*not at all*) and 4 (*very much so*). Higher scores indicated one is more prone to experience anxiety and be vulnerable to anxiety disorders. Example items were, “I feel upset” and “I worry too much over something that doesn’t really matter.” This scale was normed on Hungarian participants. An excellent reliability of  $\alpha = .86$  was found. The internal consistency reliability in the current study was  $\alpha = .95$ .

## ***Happiness***

### **Oxford Happiness Questionnaire (OHQ).**

To measure happiness, Hills & Argyle's (2002) OHQ was used. This scale included 29 items with a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Higher scores indicated greater happiness. Example items were, "I feel that life is very rewarding" and "I feel fully mentally alert." A high scale reliability of  $\alpha = .91$  was found. This scale was normed on undergraduate students in the United Kingdom. The internal consistency reliability in the current study was  $\alpha = .98$ .

### **Training Materials**

Participants were randomly assigned to an intervention group or an active control group. Participants in the intervention group engaged in an active skills training for both Part 1 and Part 2. Participants in the active control group watched a video about general stress management techniques.

Videos for the intervention group were chosen to simulate the meditation aspect of the MBSR, which is a typical mindfulness program for an organization to use. I also wanted to test whether mindfulness skill could change over the course of a week with just two meditation videos. Videos for the active control group were chosen to simulate alternate mindfulness techniques an organization might implement. Additionally, all videos were approximately 20 minutes to keep the length of Part 1 and Part 2 one hour each.

### **Intervention Group Materials**

In Part 1, participants in the intervention group were asked to engage in a 20-minute Jon-Kabat Zinn meditation on YouTube titled, "Journey to Inner Peace 20-Minute

Guided Meditation Jon Kabat Zinn PhD” (Jon Kabat Zinn, 2023). The meditation script used in the video aimed to guide participants through a journey of inner peace and relaxation. Jon Kabat-Zinn's soothing voice encouraged participants to focus on their breath and bodily sensations while letting go of any tensions or worries. The script emphasized the importance of being present in the moment and cultivating a sense of mindfulness. Throughout the meditation, participants were prompted to pay attention to the sensations of their breathing, the sounds surrounding them, and the sensations in different parts of their body. They were encouraged to observe their thoughts and emotions without judgment, allowing them to come and go like passing clouds in the sky. The meditation session concluded with gentle guidance for participants to gradually return their awareness to the present moment, feeling refreshed, grounded, and centered.

In Part 2, participants in the intervention group were asked to engage in a similar 20-minute Jon-Kabat Zinn meditation on YouTube titled, “20 Minute Guided Meditation Jon Kabat Zinn PhD” (Jon Kabat Zinn, 2023). The meditation script was similar to the video in Part 1. Jon Kabat-Zinn's calming voice encouraged participants to focus on their breath and bodily sensations while releasing any tensions or concerns. The script underscored the significance of being present in the moment and fostering mindfulness. Throughout the meditation, participants were guided to pay close attention to the sensations of their breathing, the ambient sounds, and the sensations in various parts of their body. They were prompted to observe their thoughts and emotions without judgment, allowing them to arise and dissipate like passing clouds in the sky. The meditation session concluded with gentle instructions for participants to gradually

reorient their awareness to the present moment, feeling rejuvenated, grounded, and centered.

### **Control Group Materials**

In Part 1, participants in the control group were prompted to watch a 19-minute YouTube video titled “Introduction to Stress Management” (Helms, 2013a). This video aimed to educate viewers about various stress management techniques and coping strategies. It addressed the concept of stress, its potential impact on physical and mental health, and practical ways to mitigate its effects. Throughout the video, there was a discussion about mindfulness, relaxation techniques, time management, and effective communication as essential components of stress management. Participants were encouraged to practice self-care, set boundaries, and seek social support when dealing with stressors. The video concluded with a summary of key takeaways and actionable steps that viewers could implement in their daily lives to better manage stress and promote overall well-being.

In Part 2, participants in the control group were prompted to watch a 19-minute YouTube video titled “Stress Management and Wellness Plan” (Helms, 2013b). This video aimed to empower viewers with practical strategies for managing stress and enhancing overall well-being. The video covered various aspects of stress management, including identifying stressors, developing coping skills, and creating a wellness plan tailored to individual needs. Additionally, viewers were guided through exercises to assess their current stress levels, identify sources of stress, and explore effective coping strategies. The presenter emphasized the importance of self-care, healthy lifestyle choices, and building resilience to better manage stress in daily life. Further, the video

provided tools and resources for developing a personalized wellness plan, including setting realistic goals, prioritizing self-care activities, and seeking support from friends, family, or mental health professionals when needed. The video concluded with a summary of key takeaways and actionable steps that viewers could implement to proactively manage stress and promote overall wellness in their lives.

### **Demographics**

Participants were asked to respond to several demographic questions. Demographic questions asked participants about their gender, race, occupation, industry, employment status, hours at work, age, location (US or UK). Participants were additionally asked if they had meditation experience (“*Do you practice mindful meditation?*”). If the participant selected yes, they were asked, “*How many years of experience with mindfulness meditation do you have?*” followed by “*How many hours per week do you practice mindfulness meditation?*” Participants were then asked if they exercise (“*Do you exercise?*”) If the participant selected yes, they were asked, “*How many hours do you exercise each week?*”. Participants were also asked if they practice yoga (“*Do you practice yoga?*”). If the participant selected yes, they were asked, “*How many hours a week do you practice yoga?*” Finally, the debriefing questions asked participants about the *quality* of their data. Participants were asked if they randomly selected items or paid attention.

### **Procedures**

The current study was a two-part study, Part 1 and 2. The opportunity to participate in this study was through Prolific. The survey began with an informed consent page that introduced the purpose and parameters of the study. After consenting,

participants were asked one screening question that filtered out anyone below the age of 18. No one was filtered out due to this. To increase the chance of high-quality data, only included participants who had submitted 100 or more previous Prolific submissions. This was done manually before publishing the study. The survey encompassed various scales: the Mindfulness Skill Scale (MSS), the Kentucky Inventory of Mindfulness Skills (KIMS), the Mindfulness Attention Awareness Scale (MAAS), the Cognitive and Affective Mindfulness Scale (Revised) (CAMS-R), the Perceived Stress Scale (PSS), the Perceived Occupational Stress Scale (POSS), the State-Trait Anxiety Inventory (STAIT-5, STAIS-5), and the Oxford Happiness Questionnaire (OHQ), quality check questions before the video, a video on stress management, demographic questions, and debriefing questions. The order of survey measures mirrored previous descriptions.

**Part 1.** Participants were randomly placed, by Qualtrics, into a control or intervention group for both Part 1 and Part 2. Participants placed in the control group in Part 1 were asked to respond to all the scales mentioned previously (Time 1), answer quality check questions, and watch a 19-minute YouTube video titled “Introduction to Stress Management.” The intervention group in Time 1 engaged in a 20-minute Jon-Kabat Zinn meditation on YouTube titled, “Journey to Inner Peace 20-Minute Guided Meditation Jon Kabat Zinn PhD.” Immediately following the video, participants completed the list of scales mentioned previously (Time 2).

**Part 2.** The procedures for Part 2 were the same as Part 1 with a couple of minor differences. First, at Part 2, participants were asked to enter their Prolific ID. This ensured that they were assigned to the same experimental condition as time one. Participants were then asked to respond to the same set of scales mentioned previously

(Time 3). Next, the videos at time two were thematically the same. However, because participants had already watched the videos from time one, different were selected. Participants in the control group watched a 19-minute YouTube video titled “Stress Management and Wellness Plan.” Participants in the intervention group engaged in a 20-minute Jon-Kabat Zinn meditation on YouTube titled, “20 Minute Guided Meditation Jon Kabat Zinn PhD.” Immediately following the video, participants completed the list of scales mentioned previously (Time 4). Demographic and debriefing questions concluded the Part 2 survey.

## Results

### Manipulation Check

Analyses were conducted to test whether the mindfulness intervention worked as intended. Main effects of time and condition, along with the interaction between time and condition were examined. This manipulation check was conducted for both mindfulness skill measures, the MSS and the KIMS. This was done to compare results from a validated mindfulness skill measure to the one I am trying to validate. Specifically, Table 1 presents the findings for the main effect and interaction between time and condition and its effect on the outcome, mindfulness skill as measured by the MSS. After reviewing the analysis, it was shown that there was no main effect of time on mindfulness skill ( $B = .02$ ,  $t(313) = 1.13$ ,  $p = .26$ ). It was also shown that there was no main effect of condition on mindfulness skill ( $B = .13$ ,  $t(161) = .96$ ,  $p = .34$ ). Further, there was not a significant interaction between time and condition on mindfulness skill ( $B = .01$ ,  $t(313) = .60$ ,  $p = .55$ ).



Table 1  
*Interaction between MSS Mindfulness Skill and Condition*

Predictor	<i>B</i>	SE	df	<i>t</i>	<i>p</i>
Intercept	<b>3.10</b>	.09	161	32.77	< .01
Time	.02	.02	313	1.13	.26
Condition	.13	.13	161	.96	.34
Time*Condition	.01	.02	313	.60	.55

Table 2 presents the findings for the main effect and interaction between time and condition and its effect on the outcome, mindfulness skill as measured by the KIMS. Analyses revealed that there was a main effect of time on mindfulness skill ( $B = .02$ ,  $t(313) = 3.08$ ,  $p < .01$ ). However, there was no main effect of condition on mindfulness skill ( $B = -.06$ ,  $t(129) = -.78$ ,  $p = .44$ ). There was also not a significant interaction between time and condition on mindfulness skill ( $B < .01$ ,  $t(313) = .02$ ,  $p = .99$ ).

Table 2  
*Interaction between KIMS Mindfulness Skill and Condition*

Predictor	<i>B</i>	SE	df	<i>t</i>	<i>p</i>
Intercept	<b>3.17</b>	.06	129	52.44	< .01
Time	<b>.02</b>	< .01	313	3.08	< .01
Condition	-.06	.08	129	-.78	.44
Time*Condition	< .01	.01	313	.02	.99

Due to the manipulation not working, it is unclear if the MSS is measuring mindfulness skill. Therefore, results may not be accurately representing mindfulness skill, and should be interpreted accordingly.

### **Tests of Hypotheses**

Recall, hypotheses 1 and 2 were concerned with the mindfulness skill scale being positively correlated with happiness and the KIMS and negatively correlated with perceived stress and anxiety following a mindfulness intervention. To test hypothesis 1

and 2, correlations between the MSS and the respective variables for each hypothesis were analyzed. Due to wanting to observe correlations following a mindfulness intervention, correlations were examined for participants in the experimental group at Time 2 and Time 4. Table 3 presents the intercorrelations among the study variables at Time 2. Table 4 presents the intercorrelations among the study variables at Time 4. After reviewing the correlation coefficients, the MSS was positively and significantly correlated with happiness following the first ( $r = .35$ , 95% CI [.08, .57],  $p < .05$ ) and second mindfulness intervention ( $r = .56$ , 95% CI [.34, .73],  $p < .01$ ). The MSS was found to be significantly and negatively correlated with perceived stress ( $r = -.39$ , 95% CI [-.60, -.13],  $p < .01$ ) following the first mindfulness intervention and the second mindfulness intervention ( $r = -.57$ , 95% CI [-.66, -.23],  $p < .01$ ). Hypothesis 1a and 1b were partially supported since the manipulation did not work.

Table 3

*Intercorrelations of target variables at Time 2 (n= 51)*

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. MSS	3.39	.63						
2. KIMS	3.16	.42	<b>.71</b>					
3. MAAS	3.04	.86	<b>-.51</b>	<b>-.65</b>				
4. CAMS-R	2.57	.49	<b>.68</b>	<b>.81</b>	<b>-.73</b>			
5. OHQ	3.60	.83	<b>.35</b>	<b>.37</b>	<b>-.28</b>	<b>.41</b>		
6. PSS	2.89	.75	<b>-.39</b>	<b>-.44</b>	<b>.31</b>	<b>-.57</b>	<b>-.78</b>	
7. STAI	1.65	.54	<b>-.46</b>	<b>-.37</b>	<b>.41</b>	<b>-.46</b>	<b>-.65</b>	<b>.72</b>

Note: Bolded numbers indicate significant correlations ( $p < .05$ ).

Lastly, the MSS was found to be significantly and negatively correlated with anxiety ( $r = -.46$ , 95% CI [-.65, -.21],  $p < .01$ ) following the first mindfulness intervention and the second mindfulness intervention ( $r = -.58$ , 95% CI [-.74, -.36],  $p$

< .01). Hypothesis 1c was found to be partially supported due to the manipulation not working.

Table 4

*Means, standard deviations and intercorrelations of target variables at Time 4 (n = 51)*

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. MSS	3.39	.69						
2. KIMS	3.19	.50	<b>-.70</b>					
3. MAAS	2.96	.89	<b>-.55</b>	<b>-.71</b>				
4. CAMS-R	2.57	.49	<b>.73</b>	<b>.80</b>	<b>-.67</b>			
5. OHQ	3.70	.89	<b>.56</b>	<b>.45</b>	<b>-.33</b>	<b>.55</b>		
6. PSS	2.85	.75	<b>-.47</b>	<b>-.30</b>	.25	<b>-.46</b>	<b>.78</b>	
7. STAI	1.56	.54	<b>.56</b>	<b>-.46</b>	<b>.46</b>	<b>-.51</b>	<b>-.58</b>	<b>.74</b>

Note: Bolded numbers indicate significant correlations ( $p < .05$ ).

Hypothesis 2 stated that the mindfulness skill scale would be significantly and positively correlated with KIMS. Analysis revealed that the average MSS ratings across all four time points were significantly and positively correlated with the KIMS ( $r = .74$ , 95% CI [.63, .81],  $p < .01$ ), supporting the hypothesis. Table 5 presents the intercorrelations between the MSS and KIMS. At Time 1, the MSS was significantly and positively correlated with the KIMS ( $r = .67$ , 95% CI [.55, .76],  $p < .01$ ). At Time 2, the MSS was significantly and positively correlated with the KIMS ( $r = .67$ , 95% CI [.54, .76],  $p < .01$ ). At Time 3, the MSS was significantly and positively correlated with the KIMS ( $r = .74$ , 95% CI [.64, .81],  $p < .01$ ). At Time 4, the MSS was significantly and positively correlated with the KIMS ( $r = .65$ , 95% CI [.53, .75],  $p < .01$ ).

Table 5  
*Intercorrelations of MSS and KIMS at all time points (n = 105)*

	1	2	3	4	5	6	7	8	9
1. Average MSS									
2. Time 1 MSS	<b>.92</b>								
3. Time 2 MSS	<b>.93</b>	<b>.82</b>							
4. Time 3 MSS	<b>.94</b>	<b>.84</b>	<b>.79</b>						
5. Time 4 MSS	<b>.94</b>	<b>.77</b>	<b>.85</b>	<b>.89</b>					
6. Average KIMS	<b>.74</b>	<b>.65</b>	<b>.69</b>	<b>.73</b>	<b>.67</b>				
7. Time 1 KIMS	<b>.73</b>	<b>.67</b>	<b>.69</b>	<b>.71</b>	<b>.66</b>	<b>.95</b>			
8. Time 2 KIMS	<b>.68</b>	<b>.59</b>	<b>.67</b>	<b>.67</b>	<b>.63</b>	<b>.96</b>	<b>.92</b>		
9. Time 3 KIMS	<b>.73</b>	<b>.66</b>	<b>.66</b>	<b>.74</b>	<b>.66</b>	<b>.97</b>	<b>.90</b>	<b>.90</b>	
10. Time 4 KIMS	<b>.70</b>	<b>.61</b>	<b>.64</b>	<b>.70</b>	<b>.65</b>	<b>.97</b>	<b>.88</b>	<b>.90</b>	<b>.96</b>

Note: Bolded numbers indicate significant correlations ( $p < .05$ ).

Recall, hypothesis 3 was concerned about the conceptualization of mindfulness as a skill rather than a state or a trait. If mindfulness should be conceptualized as a skill, it should have a stronger relationship with happiness, perceived stress, and anxiety compared to other measures measuring mindfulness following a mindfulness intervention. To test this, Fisher's  $r$  to  $z$  correlation transformations were conducted, and  $z$  tests were performed to determine whether the correlations were significantly different from each other.

The mindfulness skill scale demonstrated a statistically stronger correlation with happiness than the MAAS after the first mindfulness intervention ( $r_{\text{MSS}} = .35$ ,  $r_{\text{MAAS}} = -.28$ ,  $z = 3.12$ ,  $p < .05$ ). The MSS and the CAMS-R had correlations of happiness that were not significantly different from each other ( $r_{\text{CAMS-R}} = .41$ ,  $z = -.31$ ,  $p > .05$ ). The MSS also demonstrated correlations with the KIMS that were not significantly different from each other. ( $r_{\text{KIMS}} = .37$ ,  $z = .01$ ,  $p > .05$ ). After the second mindfulness intervention, Time 4, the MSS demonstrated stronger correlations with happiness than the MAAS ( $r_{\text{MSS}}$

= .56,  $r_{MAAS} = -0.33$ ,  $z = 4.69$ ,  $p < .05$ ). The MSS and the CAMS-R had correlations of happiness that were not significantly different from each other ( $r_{CAMS-R} = .55$ ,  $z = .07$ ,  $p > .05$ ). The MSS also demonstrated correlations with the KIMS that were not significantly different from each other. ( $r_{KIMS} = .45$ ,  $z = .01$ ,  $p > .05$ ). Hypothesis 3a was partially supported due to this finding and due to the manipulation not working.

After the first mindfulness intervention, the MSS demonstrated a significantly stronger correlation with perceived stress than the MAAS ( $r_{MSS} = -0.39$ ,  $r_{MAAS} = .31$ ,  $z = -3.53$ ,  $p < .05$ ). The MSS and the CAMS-R had correlations of perceived stress that were not significantly different from each other ( $r_{CAMS-R} = -.57$ ,  $z = 1.01$ ,  $p > .05$ ). The MSS also demonstrated correlations with the KIMS that were not significantly different from each other. ( $r_{KIMS} = -.44$ ,  $z = .29$ ,  $p > .05$ ). After the second mindfulness intervention, Time 4, the MSS demonstrated stronger correlations with perceived stress than the MAAS ( $r_{MSS} = -.47$ ,  $r_{MAAS} = .25$ ,  $z = -3.69$ ,  $p < .05$ ). The MSS and the CAMS-R had correlations of perceived stress that were not significantly different from each other ( $r_{CAMS-R} = -.46$ ,  $z = -.09$ ,  $p > .05$ ). The MSS also demonstrated correlations with the KIMS that were not significantly different from each other. ( $r_{KIMS} = -.30$ ,  $z = -.99$ ,  $p > .05$ ). Hypothesis 3b was partially supported due to this finding and due to the manipulation not working.

After the first mindfulness intervention, the MSS demonstrated a significantly stronger correlation with anxiety than the MAAS ( $r_{MSS} = -0.46$ ,  $r_{MAAS} = 0.41$ ,  $z = -4.49$ ,  $p < .05$ ). The MSS and the CAMS-R had correlations of perceived stress that were not significantly different from each other ( $r_{CAMS-R} = -.46$ ,  $z = .00$ ,  $p > .05$ ). The MSS also demonstrated correlations with the KIMS that were not significantly different from each

other. ( $r_{KIMS} = -.37$ ,  $z = -.55$ ,  $p > .05$ ). After the second mindfulness intervention, Time 4, the MSS demonstrated stronger correlations with anxiety than the MAAS ( $r_{MSS} = -.58$ ,  $r_{MAAS} = .46$ ,  $z = -5.51$ ,  $p < .05$ ). The MSS and the CAMS-R had correlations of perceived stress that were not significantly different from each other ( $r_{CAMS-R} = -.51$ ,  $z = -.44$ ,  $p > .05$ ). The MSS also demonstrated correlations with the KIMS that were not significantly different from each other. ( $r_{KIMS} = -.46$ ,  $z = -.75$ ,  $p > .05$ ). Hypothesis 3c was partially supported due to this finding and due to the manipulation not working. Table 6 displays the results.

Table 6  
*Fisher's r-to-z transformation*

<i>Dimensions</i>	<i>r of MSS</i>	<i>r of Comparison Scale</i>	<i>n of MSS</i>	<i>n of Comparison Scale</i>	<i>Fisher's z</i>
T2 MSS vs. MAAS (OHQ)	.35	-.28	49	49	<b>3.12</b>
T2 MSS vs. CAMSR (OHQ)	.35	.41	49	49	-.31
T2 MSS vs. KIMS (OHQ)	.35	.37	49	49	-.10
T2 MSS vs. MAAS (PSS)	-.39	.31	49	49	<b>-3.53</b>
T2 MSS vs. CAMSR (PSS)	-.39	-.57	49	49	1.10
T2 MSS vs. KIMS (PSS)	-.39	-.44	49	49	.29
T2 MSS vs. MAAS (STAI)	-.46	.41	49	49	<b>-4.49</b>
T2 MSS vs. CAMSR (STAI)	-.46	-.46	49	49	.00
T2 MSS vs. KIMS (STAI)	-.46	-.37	49	49	-.55
T4 MSS vs. MAAS (OHQ)	.56	-.33	49	49	<b>4.70</b>
T4 MSS vs. CAMSR (OHQ)	.56	.55	49	49	.08
T4 MSS vs. KIMS (OHQ)	.56	.45	49	49	.72
T4 MSS vs. MAAS (PSS)	-.47	.25	49	49	<b>-3.69</b>
T4 MSS vs. CAMSR (PSS)	-.47	-.46	49	49	-.09
T4 MSS vs. KIMS (PSS)	-.47	-.30	49	49	-1.00
T4 MSS vs. MAAS (STAI)	-.58	.46	49	49	<b>-5.51</b>
T4 MSS vs. CAMSR (STAI)	-.58	-.51	49	49	-.44
T4 MSS vs. KIMS (STAI)	-.58	-.46	49	49	-.75

Hypothesis 4 predicted that mindfulness skill would interact with time and have a significant effect on happiness, stress, and anxiety, after controlling for state and trait mindfulness. To test hypothesis 4, a repeated measures linear regression was conducted using the linear mixed-effects modeling package in *R* (Bates et al., 2014). State mindfulness, trait mindfulness, mindfulness skill, condition, and time were entered as fixed effects predicting each respective outcome. The mindfulness skill and state mindfulness were entered as random effects since a change is anticipated over time. Since hypothesis 4a, 4b, and 4c did not make predictions regarding condition, two models were tested for each hypothesis. One model included the three-way interaction between condition, time, and skill, and the other model only included the two-way interaction between time and skill. Mindfulness skill and condition were centered before being entered into each model to reduce the effects of multicollinearity.

For hypothesis 4a, the model that included condition in the interaction ( $AIC = 300.25$ ,  $BIC = 368.94$ ) did not produce a significantly better fitting model than the model with only the time by skill interaction ( $AIC = 295.92$ ,  $BIC = 352.48$ ,  $\chi^2 = 1.67$ ,  $(df) = 3$ ,  $p = .64$ ). Additionally, an examination of the more complex model revealed a non-significant three-way interaction ( $B = -.01$ ,  $t(298) = -.37$ ,  $p = .71$ ). Therefore, the results of the simpler model are reported and interpreted. The results showed a significant interaction between time and mindfulness skill on happiness ( $B = 0.04$ ,  $t(297) = 3.16$ ,  $p < .05$ ), after controlling for state and trait mindfulness. A simple slopes analysis was conducted to probe this interaction. The simple slopes analysis revealed that the positive relationship between happiness and time depended on mindfulness skill, such that the relationship was stronger as mindfulness skill increased (see table 7). This displayed

interaction revealed that over time, while controlling for state and trait mindfulness, participants with higher levels of self-reported mindfulness skill experienced more happiness over time ( $B = 0.20$ ,  $t(298) = 3.59$ ,  $p < .05$ ). Participants with average levels of self-reported mindfulness skill experienced more happiness over time ( $B = 0.17$ ,  $t(298) = 3.66$ ,  $p < .05$ ). Lastly, participants with below average levels of self-reported mindfulness skill also experienced more happiness over time ( $B = 0.14$ ,  $t(299) = 3.77$ ,  $p < .05$ ).

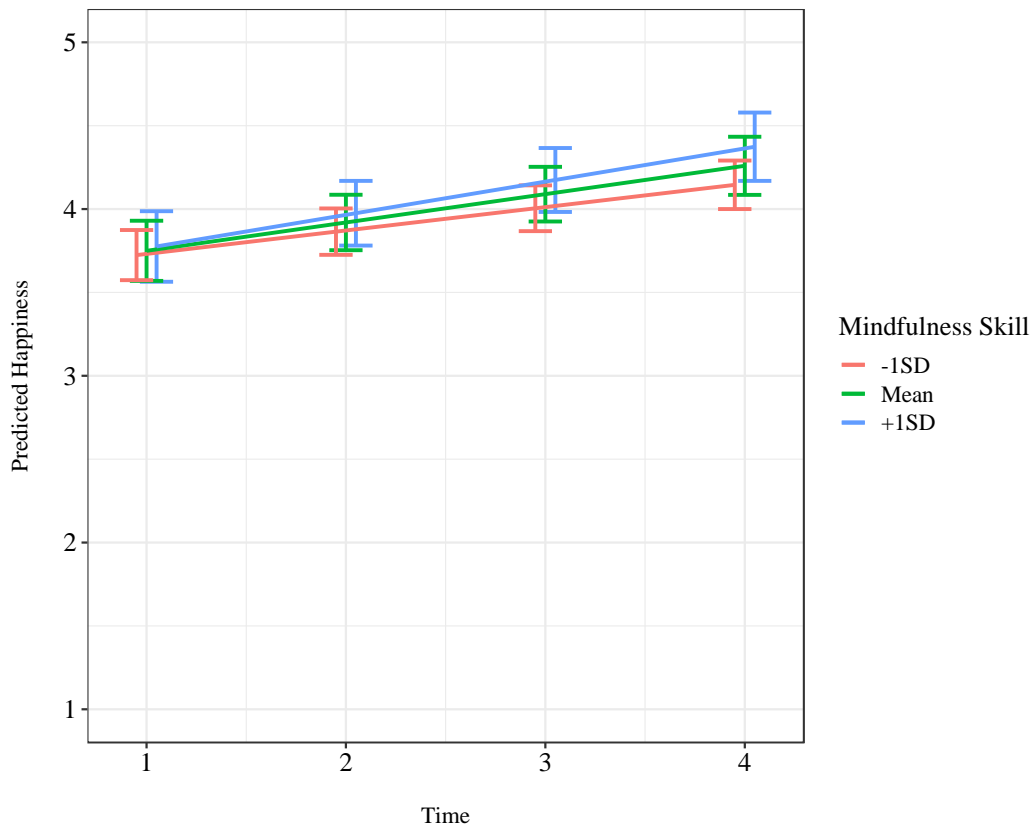
Hypothesis 4a was supported and figure 1 displays this interaction.

Table 7  
*Interaction between Mindfulness and Happiness*

Predictor	<i>B</i>	SE	df	t	<i>p</i>
Intercept	<b>3.02</b>	2.29	1	13.19	< .01
Time	<b>-2.46</b>	9.07	3	-2.71	< .01
Average MSS	<b>-1.48</b>	5.62	1	-2.63	.01
Average MAAS	1.08	3.88	4	2.80	.64
Average CAMS-R	<b>-1.80</b>	6.16	3	-2.92	< .01
Average MSS*Time	<b>-1.81</b>	1.39	2	-0.01	< .01



Figure 1  
*Interaction of Mindfulness Skill and Happiness across Time*



For hypothesis 4b, the model that included condition in the interaction ( $AIC = 231.42$ ,  $BIC = 300.10$ ) did not produce a significantly better fitting model than the model with only the time by skill interaction ( $AIC = 227.59$ ,  $BIC = 284.15$ ,  $\chi^2 = 2.17$ ,  $(df) = 3$ ,  $p = .54$ ). Additionally, an examination of the more complex model revealed a non-significant three-way interaction ( $B = 2.06$ ,  $t(3) = 1.41$ ,  $p = .15$ ). Therefore, the results of the simpler model are reported and interpreted. There was not a significant interaction between time and mindfulness on perceived stress ( $B = -1.81$ ,  $t(3) = -.01$ ,  $p = .99$ ), implying that over time, mindfulness skill does not have an effect on stress. Therefore, hypothesis 4b was not supported. Table 8 presents the findings.

Table 8  
*Interaction between Mindfulness and Perceived Stress*

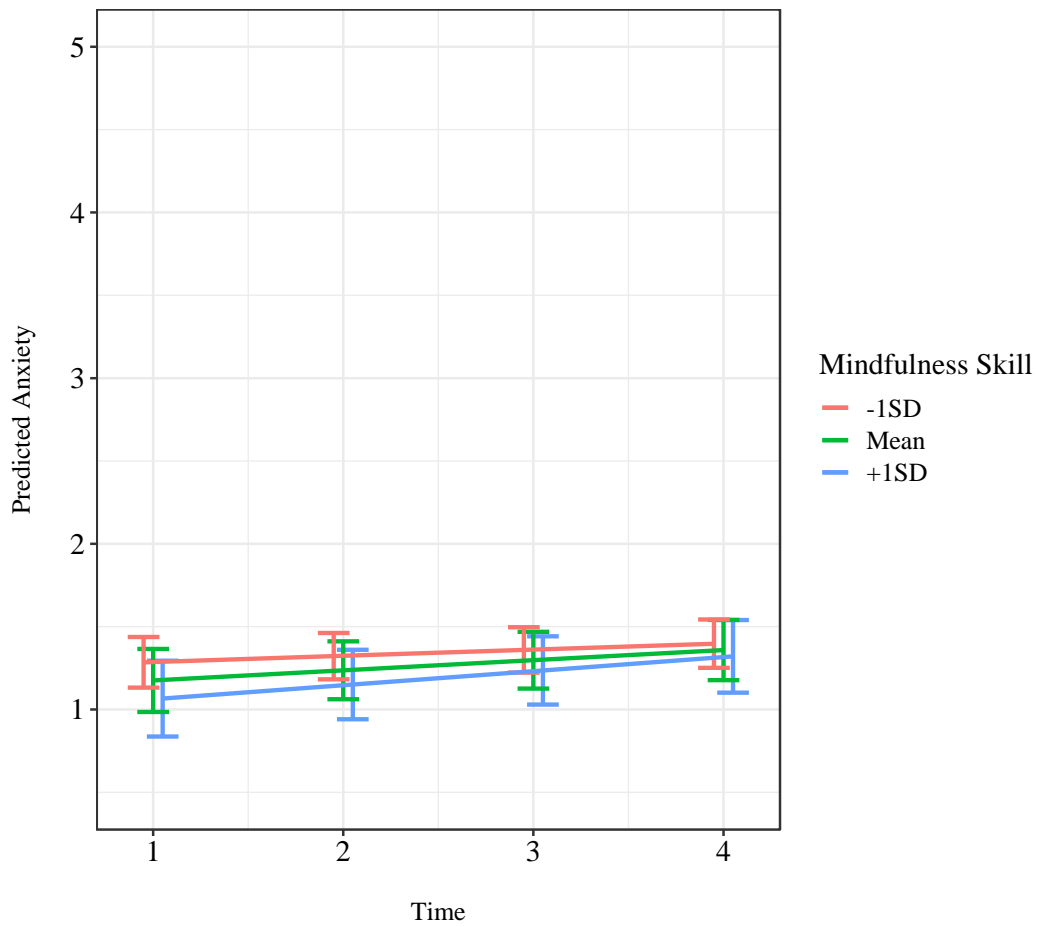
Predictor	<i>B</i>	SE	df	t	<i>p</i>
Intercept	<b>1.90</b>	.23	199	8.09	< .01
Time	<b>-.05</b>	.01	299	1.37	.01
Average MSS	<b>-.19</b>	.07	139	-2.92	.01
Average MAAS	<b>.11</b>	.04	59	2.55	.01
Average CAMS-R	<b>-.18</b>	.06	325	-2.99	< .01
Average MSS*Time	.03	.02	307	2.11	.98

For hypothesis 4c, the model that included condition in the interaction ( $AIC = 234.70$ ,  $BIC = 303.38$ ) did not produce a significantly better fitting model than the model with only the time by skill interaction ( $AIC = 230.41$ ,  $BIC = 286.97$ ,  $\chi^2 = 1.71$ ,  $(df) = 3$ ,  $p = .64$ ). Additionally, an examination of the more complex model revealed a non-significant three-way interaction ( $B = -.01$ ,  $t(308) = -.91$ ,  $p < .05$ ). Therefore, the results of the simpler model are reported and interpreted. There was a significant interaction between time and mindfulness skill on anxiety ( $B = .04$ ,  $t(313) = 2.11$ ,  $p = .02$ ). A simple slopes analysis was conducted to probe this interaction. This interaction revealed that over time, while controlling for state and trait mindfulness, there was little to no change over time. At Time 1 there was a slight difference between participants with low, average, and high mindfulness skill and anxiety. By Time 4, self-reported mindfulness skill and anxiety were similar for all participants. Figure 2 displays this interaction and table 9 displays the results.

Table 9  
*Interaction between Mindfulness and Anxiety*

Predictor	<i>B</i>	SE	df	<i>t</i>	<i>p</i>
Intercept	<b>1.90</b>	.23	217	8.25	< .05
Time	<b>-.05</b>	.01	306	-5.56	< .05
Average MSS	<b>-.19</b>	.07	137	-3.00	< .01
Average MAAS	<b>.11</b>	.04	66	2.65	< .01
Average CAMS-R	<b>-.19</b>	.06	324	-3.12	< .01
Average MSS*Time	<b>.04</b>	.01	313	2.38	.02

Figure 2  
*Interaction of Mindfulness Skill and Anxiety across Time*



Analyses were conducted to compare the groups to happiness, perceived stress, and anxiety levels. When looking at happiness, there was not a significant interaction between condition and time ( $B = .01, t(300) = 1.20, p = .22$ ). There was not a significant interaction between condition and the average level of mindfulness skill, as measured by the MSS ( $B = -.01, t(129) = -.17, p = .86$ ). When looking at perceived stress, there was not a significant interaction between condition and time ( $B = 2.57, t(3) = .03, p = .97$ ). There was not a significant interaction between condition and the average level of mindfulness skill, as measured by the MSS ( $B = -6.70, t(2) = -1.21, p = .23$ ). When looking at anxiety, there was not a significant interaction between condition and time ( $B = .01, t(300) = .55, p = .56$ ). There was not a significant interaction between condition and the average level of mindfulness skill, as measured by the MSS ( $B = .07, t(288) = 1.19, p = .23$ ). Therefore, results suggest that there was not a significant difference between using stress management methods and MBSR methods to develop mindfulness. Since the manipulation did not work, there is not sufficient evidence to show that the MSS is measuring mindfulness as a skill.

## Discussion

The purpose of this study was to validate the mindfulness skill scale developed by (Stremic, 2020). This scale was developed to challenge the operationalization of mindfulness as a trait or state in the organizational psychology literature and practice and proposed that mindfulness is best measured as a skill. Previous research also supports the operationalization of mindfulness skill. Kalmar (2023) used the KIMS to measure changes in mindfulness after a six-week workshop-based mindfulness intervention and

results showed the intervention produced quantitative, long-term changes in mindfulness. Overall, this study provided partial validity evidence for the MSS.

Analyses were conducted to identify differences between the intervention and the active control group, and no significant differences were found. This indicates that the mindfulness training used did not work. Since the manipulation did not work, it is unclear if the MSS is accurately measuring mindfulness skill. Therefore, even if hypotheses are supported, it is not guaranteed that mindfulness skill played a role in the outcome.

The results of the present study showed partial support for hypothesis 1. Hypothesis 1a predicted a positive correlation between the mindfulness skill scale and happiness following a mindfulness intervention. Analysis revealed a significant and positive correlation between the Mindfulness Skill Scale (MSS) and levels of happiness after both mindfulness interventions. These results support the positive correlation prediction portion of the hypothesis. Since the manipulation did not work, this hypothesis was partially supported.

Hypothesis 1b posited an inverse relationship between mindfulness skill scale and perceived stress following a mindfulness intervention. The significant and negative correlations observed between the MSS and perceived stress levels after both the first and second mindfulness interventions provide support regarding the stress-buffering effects of just a few sessions mindfulness practices (Creswell & Lindsay, 2014). However, due to the manipulation not working, this hypothesis was partially supported. Consistent with Hypothesis 1c, analyses revealed a significant inverse correlation between the mindfulness skill scale and anxiety following mindfulness interventions. This finding

supports the role of mindfulness in decreasing anxiety levels (Hofmann et al., 2010; Hoge et al., 2013). This hypothesis was partially supported since the manipulation did not work.

Hypothesis 2 stated that the mindfulness skill scale and the KIMS would be positively correlated, and this was strongly supported by the data. The significant and positive correlation coefficients between the MSS and KIMS suggest convergent validity between these two measures of mindfulness skills. Overall, our hypothesis was supported. While this finding should provide support for the MSS to be a valid tool since it is highly correlated with another validated mindfulness skill measure, validity of the MSS cannot be fully supported. As mentioned previously, due to the manipulation not working, it is unclear if the MSS is measuring mindfulness skill or something else. It is important to note that since the MSS converges with the KIMS, the issue this study is facing may lie with the intervention used. Additionally, there is the issue with participants rating their own skill level rather than skill being measured objectively.

Results for hypothesis 3 provide insights into the relative strength of the relationship between different measures of mindfulness, perceived stress, happiness, and anxiety following two mindfulness interventions. Hypothesis 3a proposed that the relationship between the MSS and happiness would be significantly stronger than the relationships between existing mindfulness measures and happiness. Specifically, following both mindfulness interventions, the MSS exhibited stronger positive correlations with happiness compared to the MAAS. If the MSS was accurately measuring mindfulness skill, we could say that this finding indicates that participants self-reported mindfulness skills, rather than mindfulness state, were more strongly associated with their levels of happiness. However, since the manipulation did not work, we cannot

come to that conclusion and this hypothesis cannot be fully supported. Hypothesis 3b proposed that the relationship between the MSS and perceived stress would be significantly stronger than the relationships between existing mindfulness measures and perceived stress following a mindfulness intervention. The MSS demonstrated similar correlations to the CAMS-R, measuring trait mindfulness, and the KIMS, measuring mindfulness skill. The similar correlations between the MSS and the KIMS may provide some support that the MSS is measuring mindfulness skill, but since the manipulation did not work, we cannot come to that conclusion. However, since these two measures did correlate and the manipulation check showed no change in mindfulness for either measure, this suggests that the intervention may be the issue, not the measure. The findings partially supported hypothesis 3.

The analyses investigating Hypothesis 4 examined the interaction between mindfulness skill and time on happiness, anxiety, and stress, while controlling for state and trait mindfulness. A significant interaction between time and mindfulness skill on happiness was observed. While this finding may suggest that participants with higher levels of self-reported mindfulness skill experienced greater increases in happiness over time than those with lower levels of self-reported mindfulness skill, this cannot be fully supported since the manipulation did not work and it is not clear if the MSS is accurately measuring mindfulness skill. It cannot be fully supported that mindfulness skill changes over time.

Hypothesis 4b, which posited that mindfulness skill would interact with time to influence perceived stress after controlling for state and trait mindfulness. There was not a significant interaction between time and the mindfulness skill scale on perceived stress,

indicating that the effects of mindfulness skill on perceived stress did not vary over time. While this finding may suggest that participants level of mindfulness skill is not related to an increase or decrease of stress over time, it cannot be fully supported since the manipulation did not work and it is not clear if the MSS is accurately measuring mindfulness skill. However, because the manipulation did not work for mindfulness, it is not surprising that it did not work for stress. Hypothesis 4b was not supported.

Finally, Hypothesis 4c proposed that mindfulness skill would interact with time to influence anxiety, while controlling for state and trait mindfulness. A significant interaction between time and mindfulness skill on anxiety was observed. However, the simple slopes analysis revealed that participants mindfulness levels may not be related to change in anxiety levels over time. While this finding may suggest that participants level of mindfulness skill is not related to an increase or decrease of anxiety levels over time, it cannot be fully supported since the manipulation did not work and it is not clear if the MSS is accurately measuring mindfulness skill. However, because the manipulation did not work for mindfulness, it is not surprising that it did not work for anxiety. Therefore, hypothesis 4c was partially supported.

Due to not having an effective intervention, it cannot be stated whether or not the MSS is a good measure of mindfulness skill. However, since the MSS and the KIMS, an established measure of mindfulness skill, had significant correlations, there is evidence that the intervention used was the issue, rather than the measure itself. Further, some results suggest that mindfulness, as assessed by the MSS, play an important role in predicting happiness, perceived stress, and anxiety. However, the lack of an effective



intervention used in this study no way negates the research needed on measuring mindfulness skill in organizational settings.

### **Implications**

The implications drawn from these findings suggest that the MSS needs further research and improvement to be a valid measurement tool for mindfulness skill. Based on these findings, it is not recommended to use the MSS to measure mindfulness skill yet. While some validity evidence was provided, this does not validate the scale. Further research is needed because using mindfulness skill measures in organizations can be a valuable resource for organizations. It is important to effectively measure and evaluate the impact of mindfulness interventions to ensure the efficacy and relevance to organizational goals.

### **Study Strengths**

There are a few strengths of the current study. First, this study provided a comprehensive assessment of participants' experiences by using numerous mindfulness measures along with happiness, stress, and anxiety measures. Additionally, the diversity of demographics makes the sample more generalizable to working adults in the US and the UK, contributing to external validity. This study used a random control design that allowed for the comparison of outcomes between stress management techniques and mindful meditation, enhancing the internal validity of the study. However, analyses revealed evidence that this intervention did not work. Furthermore, the use of quality check questions before the video and debriefing questions helped ensure data reliability.

## **Limitations and Future Research**

There were several limitations of this study. First, the chosen manipulation did not work. This could be due to participants completing the study in an uncontrolled environment or there were issues with motivation to complete the study. Additionally, the dose response may not have been strong enough to elicit the desired response. Participants were only asked to engage in two 20-minute meditation (or stress-management) videos. There is no certainty that participants actively engaged in the meditation. Further, more time points for engaging in meditation may be needed in future research. Asking participants to engage in meditation between time points is encouraged as well. Utilizing the full eight-week MBSR intervention would be ideal when attempting to measure mindfulness skill (Carmody & Baer, 2008). The current study's meditation dosage cannot be accurately compared to the MBSR, a common mindfulness intervention in organizations. This highlights the need for and importance of pilot testing materials. This study did not utilize effective intervention pilot testing before using it to validate a scale for which the effectiveness of the intervention depends. Future research should pilot test the intervention prior to implementation to ensure the materials create the desired change in mindfulness, especially if the purpose is to validate a measure designed to test change in skill.

A major limitation of this study was the use of Prolific to recruit participation. Prolific immediately presents threats to the internal validity of the study. Participant attrition was also an issue due to the repeated measures design of the study. Further, even though quality check questions were in place, there was no control over whether participants were attentive to and engaged with the interventions. There was also no

control over the environments used for the interventions. Additionally, the use of self-report measures introduces the issue of common method variance. Furthermore, using only two timepoints may not have captured the full potential of mindfulness practice, since mindfulness requires consistent practice over time to yield significant and lasting effects (Karl et al., 2021). Another limitation to note is that self-reported skill differs from actual skill. Ratings may be inflated due to participants perceiving themselves to be more mindful than they are (Baer et al., 2006).

Future research is necessary to validate the Mindfulness Skill Scale. Scale items may need to be revised to identify what construct is being measured. Future research should address these limitations by incorporating longitudinal follow-up assessments and alternate delivery methods for mindfulness interventions. It would also be beneficial to use only participants who work in organizations to find how mindfulness skill can be helpful for organizations. Future research should test the Mindfulness Skill Scale with a Mindfulness Based Stress Reduction (MBSR) intervention in an organization. This will help contribute to the idea that mindfulness skill should be measured in this setting to see if mindfulness skill increases or decreases over time and how that impacts organizations.

## **Conclusion**

The purpose of this study was to replicate and extend the work of Stremic (2020), who created the Mindfulness Skill Scale (MSS). Stremic (2020) argued that mindfulness should be conceptualized and measured in organizational contexts as a skill that can be learned, and she therefore developed the MSS. The current study provided some validity evidence supporting the use of the MSS to measure mindfulness skill. While the manipulation did not work, there was some validity evidence for the MSS. Once the

MSS is sufficiently validated, organizations can use the measure to see the development and improvement of mindfulness skill over time and the impact that has on organizational outcomes. Organizations are encouraged to incorporate mindfulness whenever possible due to the rise in stress levels at work in America (American Psychological Association, 2021) and the research that shows the relation to decreased stress levels (Creswell & Lindsay, 2014; Economides et al., 2018; Huberty et al., 2019).

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## APPENDIX

## Measures

### **Mindfulness Skill Scale**

Rate how easy the following mindfulness behaviors are to you:

*(1) Very Easy (5) Very Difficult*

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

### Kentucky Inventory of Mindfulness Skills

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

*(1) Never or very rarely true to (5) Very often or always true*

1. I notice changes in my body, such as whether my breathing slows down or speeds up.
2. I'm good at finding the words to describe my feelings.
3. When I do things, my mind wanders off and I'm easily distracted.
4. I criticize myself for having irrational or inappropriate emotions.
5. I pay attention to whether my muscles are tense or relaxed.
6. I can easily put my beliefs, opinions, and expectations into words.
7. When I'm doing something, I'm only focused on what I'm doing, nothing else.
8. I tend to evaluate whether my perceptions are right or wrong.
9. When I'm walking, I deliberately notice the sensations of my body moving.
10. I'm good at thinking of words to express my perceptions, such as how things taste, smell, or sound.
11. I drive on "automatic pilot" without paying attention to what I'm doing.
12. I tell myself that I shouldn't be feeling the way I'm feeling.
13. When I take a shower or bath, I stay alert to the sensations of water on my body.
14. It's hard for me to find the words to describe what I'm thinking.
15. When I'm reading, I focus all my attention on what I'm reading.
16. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
17. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
18. I have trouble thinking of the right words to express how I feel about things.
19. When I do things, I get totally wrapped up in them and don't think about anything else.
20. I make judgments about whether my thoughts are good or bad.
21. I pay attention to sensations, such as the wind in my hair or sun on my face.
22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
23. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
24. I tend to make judgments about how worthwhile or worthless my experiences are.
25. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
26. Even when I'm feeling terribly upset, I can find a way to put it into words.
27. When I'm doing chores, such as cleaning or laundry, I tend to daydream or think of other things.
28. I tell myself that I shouldn't be thinking the way I'm thinking.
29. I notice the smells and aromas of things.
30. I intentionally stay aware of my feelings.
31. I tend to do several things at once rather than focusing on one thing at a time.
32. I think some of my emotions are bad or inappropriate and I shouldn't feel them.
33. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of



light and shadow.

34. My natural tendency is to put my experiences into words.

35. When I'm working on something, part of my mind is occupied with other topics, such as what I'll be doing later, or things I'd rather be doing.

36. I disapprove of myself when I have irrational ideas.

37. I pay attention to how my emotions affect my thoughts and behavior.

38. I get completely absorbed in what I'm doing, so that all my attention is focused on it.

39. I notice when my moods begin to change.

### **Mindfulness Attention Awareness Scale**

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

*(1) Almost always to (6) almost never*

1. I could be experiencing some emotion and not be conscious of it until some time later.
2. I break or spill things because of carelessness, not paying attention, or thinking of something else.
3. I find it difficult to stay focused on what's happening in the present.
4. I tend to walk quickly to get where I'm going without paying attention to what I experience along the way.
5. I tend not to notice feelings of physical tension or discomfort until they really grab my attention.
6. I forget a person's name almost as soon as I've been told it for the first time.
7. It seems I am "running on automatic," without much awareness of what I'm doing.
8. I rush through activities without being really attentive to them.
9. I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there.
10. I do jobs or tasks automatically, without being aware of what I'm doing.
11. I find myself listening to someone with one ear, doing something else at the same time.
12. I drive places on 'automatic pilot' and then wonder why I went there.
13. I find myself preoccupied with the future or the past.
14. I find myself doing things without paying attention.
15. I snack without being aware that I'm eating.

**Cognitive and Affective Mindfulness Scale-Revised**

People have a variety of ways of relating to their thoughts and feelings. For each of the Items below, rate how much each of these ways applies to you.

*(1) Rarely/not at all to (4) Almost always*

1. It is easy for me to concentrate on what I am doing.
2. I am preoccupied by the future.
3. I can tolerate emotional pain.
4. I can accept things I cannot change.
5. I can usually describe how I feel at the moment in considerable detail.
6. I am easily distracted.
7. I am preoccupied by the past.
8. It's easy for me to keep track of my thoughts and feelings.
9. I try to notice my thoughts without judging them.
10. I am able to accept the thoughts and feelings I have.
11. I am able to focus on the present moment.
12. I am able to pay close attention to one thing for a long period of time.

## Perceived Stress Scale

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

*(1) Never to (4) Very often*

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

### **Perceived Occupational Stress Scale**

Items are rated using a 5-point Likert scale, ranging from 1 (= strongly disagree) to 5 (= strongly agree); participants answers are averaged across the four items to compute the POS score. Thus, the possible score range is from 1 (= lowest perceived stress) to 5 (= highest perceived stress). Participants are asked to provide ratings that reflect their work stress in the last 6 months.

*(1) Strongly disagree to (5) Strongly Agree*

1. My work is stressful
2. Thinking about my work makes me feel tense
3. At work I feel under pressure
4. My work has negative effects on my health

## Oxford Happiness Questionnaire

INSTRUCTIONS. Below are a number of statements about happiness. Would you please indicate how much you agree or disagree with each by entering a number alongside it according to the following code:

1=strongly disagree; 2=moderately disagree; 3=slightly disagree; 4=slightly agree; 5=moderately agree; 6=strongly agree.

You will need to read the statements carefully because some are phrased positively and others negatively. Don't take too long over individual questions; there are no 'right' or 'wrong' answers and no trick questions. The first answer that comes into your head is probably the right one for you. If you find some of the questions difficult, please give the answer that is true for you in general or for most of the time.

1. I don't feel particularly pleased with the way I am
2. I am intensely interested in other people
3. I feel that life is very rewarding
4. I have very warm feelings towards almost everyone
5. I rarely wake up feeling rested
6. I am not particularly optimistic about the future
7. I find most things amusing
8. I am always committed and involved
9. Life is good
10. I do not think that the world is a good place
11. I laugh a lot
12. I am well satisfied about everything in my life
13. I don't think I look attractive
14. There is a gap between what I like to do and what I have done
15. I am very Happy
16. I find beauty in some things
17. I always have a cheerful effect on others
18. I can fit in everything I want to
19. I feel that I am not especially in control of my life
20. I feel able to take anything on
21. I feel fully mentally alert
22. I often experience joy and elation
23. I do not find it easy to make decisions
24. I do not have a particular sense of meaning and purpose in my life
25. I feel I have a great deal of energy
26. I usually have a good influence on events
27. I do not have fun with other people
28. I don't feel particularly healthy
29. I do not have particularly happy memories of the past

## IRB Approval Letter



Office of Research Compliance  
2269 Middle Tennessee Blvd.  
Sam H. Ingram Bldg (ING) Room 010A  
Box 124  
Murfreesboro, TN 37132  
[www.mtsu.edu/irb](http://www.mtsu.edu/irb)

Date: December 20, 2023  
PI: Rhea Maladkar  
Department: Middle Tennessee State University, Psychology  
Re: Initial - IRB-FY2024-20  
Mindfulness Skill Scale Validation

The Middle Tennessee State University Institutional Review Board has reviewed and approved by Expedited Review the above referenced research study. The approval is effective starting December 20, 2023.

Decision: Approved

Category: 7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies. (NOTE: Some research in this category may be exempt from the HHS regulations for the protection of human subjects. [45 CFR 46.101\(b\)\(2\)](#) and (b)(3). This listing refers only to research that is not exempt.)

Findings:

Research Notes:

### **The following apply to your approved study:**

1. In accordance with 45 CFR 46.110 and the regulations for Expedited Review (Common Rule), this project does not expire and continuing review is not required by the IRB.
2. Any unanticipated harm to participants or adverse events must be reported to the Office of Compliance.

3. All modifications to the approved study must be submitted for review through Cayuse IRB for approval before their implementation. Adding new researchers constitutes a modification to the protocol. Per MTSU Policy, a researcher is defined as anyone who handles the data or interacts with participants. Everyone meeting this definition for this project must have completed the required CITI training and received IRB approval prior to becoming actively involved in the project.
4. Closure of the study must be submitted within Cayuse when the study ends or when personal identifiers are removed from the data and all codes and keys are destroyed.
5. All research materials must be retained by the PI for at least three (3) years after study completion and then destroyed in a manner that maintains confidentiality and anonymity.
6. All approval letters and study documents are located within Submission Details in Cayuse IRB.

Sincerely,

*The Middle Tennessee State University Institutional Review Board*