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Development and Psychometric Properties of the Self-Efficacy for Mindfulness Meditation Practice (SEMMP) Scale

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Abstract

Purpose: This study aimed to develop a self-efficacy measure for mindfulness meditation practice (Self-Efficacy for Mindfulness Meditation Practice scale, SEMMP).

Methods: The scale was developed through a process of expert consensus, cognitive interviewing, and evaluation among 199 mindfulness meditation practitioners who completed an online survey.

Results: The 9-item SEMMP was unidimensional with three sub-constructs of Attention, Compassion, and Emotion. The omega hierarchical coefficient for the total scale was 0.78, and test-retest reliability was ICC=0.85 (95% CI: 0.80, 0.89).

Conclusion: This study provides preliminary evidence that SEMMP is a reliable and valid measure of self-efficacy for mindfulness meditation practice.

Introduction

In the United States, 8% of adults report using meditation for health purposes. While there are various meditation types, mindfulness meditation has become one of the most popular types. Mindfulness meditation practice emphasizes non-judgmental awareness focused in the moment, and consists of sitting while paying attention to sensations and patterns related to the breath, body, and mind (Kabat-Zinn and Hanh (2009)). This definition can be operationalized as two major components: self-regulation of attention and the quality of that attention (Bishop, 2004). Self-regulation of attention is a commonly accepted component of

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Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the Vanderbilt University Medical Center Institutional Review Board and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent: Informed consent was obtained from all individual participants in the study and the consenting process was approved by the Vanderbilt University Institutional Review Board.

mindfulness meditation practice (Bishop 2004; Holzel 2011). This focused attention increases the recognition of mental events (e.g., thoughts, feelings, physical sensations) in the present moment (Bishop 2004). The non-judgmental quality of attention is a shift in appraisal of mental events without an intention to change experience (Bishop 2004). Thus, mindfulness meditation is also a practice of reappraisal of mental events perspective and resulting emotion regulation (e.g., self-kindness(Holzel, 2011; Neff (2010))

Mindfulness meditation has been studied to examine potential effects on mental and physical health among health and medical samples. (Chiesa and Serretti (2009), Hilton et al. (2017), Loucks et al. (2015)). A meta-analysis reported moderate effects of mindfulness meditation programs compared to an active control on anxiety and depression, (), though low evidence for effects on mental health-related quality of life. Goyal et al. (2014). Among individuals with chronic pain, another meta-analysis reported low quality evidence of mindfulness meditation producing small decreases in pain and increases in physical health-related quality of life, and moderate quality evidence for increases in mental health-related quality of life from mindfulness meditation (Hilton et al. (2017).

There are different formats for teaching mindfulness meditation, including formal training as a standard course over weeks (e.g., Mindfulness-based Stress Reduction; MBSR), intensive retreats (e.g., silent meditation retreats), books, online, and mobile phone applications. Home practice adherence to mindfulness meditation interventions varies widely; though higher adherence correlates with improved outcomes in research studies (Waelde et al. (2017), Carmody and Baer (2008)).

Self-efficacy is the perceived competence (Bandura (1997)) or confidence for performing goal-directed behaviors (Wallston 1989). The intention to initiate and maintain a behavior is predicted by self-efficacy. An individual who perceives a high competence for a health behavior is more likely to succeed in maintaining the behavior over time (Schwarzer and Luszczynska (2007). Self-efficacy measures may focus on a specific health behavior or be applied broadly to health behaviors across conditions (Dzewaltowski et al. (1990); Schwarzer and Jerusalem (2010); Smith et al. (1995)). Specific self-efficacy measures for physical exercise, nutrition, alcohol consumption, and smoking cessation have demonstrated the relationship between higher self-efficacy and improved health behaviors respectively including initiation and adherence (Anderson et al. (2000); Annis, HM. (1984); Dijkstra and De Vries (2000); (Schwarzer and Renner (2000)).

Many instruments have been developed to measure mindfulness state and traits (Baer et al. (2008), Sauer et al. (2013). However, development of a self-efficacy measure specifically related to the practice of mindfulness meditation may improve our ability to understand variability in adoption of that type of meditation. One instrument, “Mindfulness-based Self Efficacy Scale (MSES)” assesses skills or implementation as a result of mindfulness practice.^a Rather than focusing on the results of mindfulness practice, our primary focus was to assess the ability to perform mindfulness meditation.

^a.The Mindfulness Self-Efficacy Scale has not appeared in a peer-reviewed publication but was created by investigators at MiCBT in New Zealand. http://www.mindfulness.net.au/_blog/MiCBT_Research/post/A_psychometric_analysis_of_MSES/

Our objective in this study was to develop and initially validate a measure of self-efficacy for the practice of mindfulness meditation (Self-Efficacy for Mindfulness Meditation Practice; SEMMP). We designed the SEMMP to inform research on adoption of mindfulness meditation practice as a health behavior. We proposed the following hypotheses based on current literature, our experience studying and teaching mindfulness, and behavioral theory:

H1: As evidence for concurrent validity, SEMMP scores would correlate positively with a measure of health self-efficacy.

H2: As evidence for convergent validity, SEMMP scores would correlate positively with health-related quality-of-life and the different facets of mindfulness experience.

H3: As evidence for the new scale's discriminant validity, SEMMP scores would be uncorrelated with gender and indicators of socioeconomic status (i.e., education and income), and have weak correlations with social desirability bias.

H4: As evidence for the new scale's known-groups construct validity, participants who had practiced for longer, participated in a silent retreat, reported more frequent practice, were older or mindfulness instructors would have higher SEMMP scores.

Method

Procedure for item pool generation and development of the SEMMP

We followed a systematic method recommended for scale development (DeVellis (2016), Worthington and Whittaker (2006)), and procedures we used to develop the Yoga Self-Efficacy Scale (Birdee et al. (2016). First we developed an initial item pool through an expert group consensus process followed by a series of cognitive interviews. This method was adopted to generate item content consistent with the language used in mindfulness meditation classes. We then administered the survey online to mindfulness meditation practitioners to examine its psychometric properties.

The initial item pool was developed through a process of expert consensus and cognitive interviews to insure content validity. The expert panel consisted of mindfulness-based meditation instructors (n=2), psychologists that use mindfulness meditation in clinical practice (n=3), and mind-body researchers (n=2). As a group, the panel was asked to construct items that measure an individual's perceived competence to perform mindfulness meditation. Our intention was to produce items that were not situation specific, and to focus on an individual's confidence of to perform each behavior. The group process was conducted as a brainstorming session to capture broad dimensions potentially covered by the targeted construct of mindfulness meditation practice. The panel initially produced 58 mindfulness self-efficacy items. The pool was then critically reviewed by the panel, and items were removed if redundant or situational, reducing the list to 28 self-efficacy items.

We then conducted cognitive interviews with 10 mindfulness practitioners individually. The purpose of cognitive interviews is to understand the cognitive process respondents use to understand questions on a survey (Collins, D (2003)). Information derived from cognitive interviews allows for revision of questions to reduce potential response errors. Selected

mindfulness practitioners for interviews were independent from the expert panel. Practitioners varied in regards to years of meditation experience and four of the 10 were mindfulness teachers. Jointly, two researchers conducted the cognitive interviews with one asking questions and the other taking notes. The objectives of the interviews were to evaluate comprehension, information used to respond to the items, the decision process, and the perceived difficulty of answering each SEMMP item (Willis (1999)). First, we performed interviews with five mindfulness practitioners. After completing these five interviews, the expert panel reviewed responses and revised the item list. Then, we performed interviews with five other mindfulness practitioners with the revised item list. The expert panel reviewed these responses and made additional revisions to the item list. Revisions included modification or deletion of items based on face validity regarding measurement of mindfulness self-efficacy, parsimony, and/or clarity of item construct.

The final item pool consisted of 14 items with a Flesch-Kincaid Readability Grade-level of 6.8. The SEMMP items were to be rated by respondents using a 9-point response scale that went from *never (1)*, *rarely (3)*, *sometimes (5)*, *usually (7)*, *always (9)*. The SEMMP items were rated using a 9-point response scale that went from *never (1)*, *rarely (3)*, *sometimes (5)*, *usually (7)*, *always (9)*. The even numbered response options (2, 4, 6, 8) did not have verbal anchors. We chose a 9-point scale since this functioned well for the Yoga Self-Efficacy Scale (Birdee (2016)). (See Table 2 for item list).

Evaluation of the SEMMP

After item development, we examined the psychometric properties of the scale by testing the items in a larger sample of individuals with varying levels of mindfulness meditation experience.

Participants

We only recruited participants who practiced mindfulness meditation since the instrument was designed for individuals who had been exposed to mindfulness teaching. Participants were asked if they were enrolled in or had completed a mindfulness meditation course, such as MBSR. The study was advertised through academic health institutions and community programs that offered mindfulness education to clients or patients. Vanderbilt University Institutional Review Board approved this study.

Enrollment—We sent emails to potential participants describing the research study and a link to an online survey. In the email, we did not describe the specific purpose of the study (to assess self-efficacy), only stating that we were developing a new instrument for mindfulness research. Participants were asked to opt into the study only if they had some experience practicing mindfulness meditation. The survey website presented an online consent document to potential participants. Emails were sent to lists of mindfulness meditation teachers in middle Tennessee in the greater Nashville area, maintained lists of individuals who completed mindfulness training at the Osher Center for Integrative Medicine at Vanderbilt University Medical Center, and mindfulness meditation teachers identified through the nationally represented Academic Consortium for Complementary and Integrative Health. Mindfulness teachers were encouraged to forward the email invitation to

colleagues or students of mindfulness practice. All study participants provided online consent. No compensation was provided to study participants.

Data Collection—Participants completed the online survey through a research management tool-Research Electronic Data Capture (REDCap). REDCap allows for secure online administration of research surveys and data collection (Harris et al. (2009)). Surveys included the 14 SEMMP items, and assessments of sociodemographic variables, health self-efficacy, health-related quality of life, social desirability bias, mindfulness practice characteristics, and mindfulness state. For ordinal response scales, respondents selected radio buttons on the online survey which took about 15 minutes to complete. To assess test-retest reliability, two weeks later we emailed participants who completed the initial surveys and asked them to complete the SEMMP items again.

Measures

Health Self-Efficacy—The 8-item Perceived Health Competence Scale was used to assess health self-efficacy. Health self-efficacy measures an individual's confidence in managing his or her own health status (Smith et al. (1995), Wallston (1989),). This scale is internal consistent (Cronbach's alpha range: 0.82 – 0.90) with high construct validity in both healthy and chronic disease populations. In our study the PHCS instrument had a Cronbach's alpha of 0.86.

Health-related Quality of Life—Patient Reported Outcomes Measurement Information System (PROMIS) Global Health Scale, with both a physical and mental health component, was administered to assess health-related quality of life (Hays et al. (2009)). This 10-item instrument is internally consistent with high construct validity, responsiveness, precision, and reliability in the general population ((Bryan et al., 2014), Cella et al. (2010)). We utilized the two PROMIS 4-item subscales of Global Physical Health and Global Mental Health. In our study, Global Physical Health and Global Mental Health had Cronbach alphas of 0.71 and 0.85, respectively.

Social Desirability Bias—We assessed social desirability bias with the 5-item Social Desirable Response Set Measure. This instrument has been shown to be valid and reliable (Hays et al. (1989)). Items were responded to and scored using a 5-point ordinal scale ranging from *definitely true* (1) to *definitely false* (5). Two scale items ("I am always courteous even to people who are disagreeable" and "No matter who I'm talking to, I'm always a good listener") were reverse-scored due to the fact that indicating "*definitely true*" could be interpreted as responding in a socially desirable manner. High scores signified high social desirability bias. In our study, this instrument had a Cronbach's alpha of 0.77.

Mindfulness Practice Characteristics—We asked how long participants had been practicing mindfulness meditation (*less than 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, more than 10 years*); on average how many times they practiced mindfulness meditation during the week (*less than once, 1, 2, 3, 4, 5, 6, 7, more than 7 times a week*); and how long they practiced (on a continuous scale from 0–100 or more minutes). Due to the distribution in the 'years of practice' and 'weekly practice' variables, they were collapsed into the following categories:

6 years and 7 years; and 2, 3–4, 5–6, and 7 times a week, respectively. We also asked whether they had completed a Mindfulness-Based Stress Reduction Program (*Yes, No*); if they had participated in a silent meditation retreat (*Yes, No*); if they practiced other mind-body techniques (*none, yoga, t'ai chi, qi gong, transcendental meditation, progressive relaxation, guided imagery, spiritual meditation, mantra meditation, relaxation response, clinically standardized meditation, and/or other*), and if so, which one they practiced most frequently; where they most often practice mindfulness meditation (*at home, work, spiritual or religious place, meditation studio/school, gym or fitness center, or other*); how they practiced (*community group class, private one-on-one class, following an audio recording, following a DVD, following an online video, following a practice someone taught me, following a practice I learned from a book, following a practice I made for myself, or other*); and if they were a mindfulness meditation instructor (*Yes, No*).

Mindfulness Facets—The 39-item Five Facet Mindfulness Questionnaire (FFMQ) is based on five different mindfulness questionnaires that were combined through a factor analysis study (Baer et al. (2008)). This instrument captures five facets of mindfulness experience during the respondent's day-to-day activities: observing; describing; acting with awareness; non-judging of inner experience; and non-reactivity to inner experience. In the current study, the Cronbach's alphas for the five mindfulness facets were 0.78, 0.83, 0.88, 0.86, and 0.88, respectively.

Sociodemographics—We collected self-reported data regarding age, gender, race, ethnicity, education, and income.

Analyses

We performed analyses with IBM SPSS Statistics Version 22 with the Amos add-on (Armonk, New York), Omega (Watkins, 2013), and an empirical Kaiser Criterion app (Braeken and Van Assen (2016)). We conducted a confirmatory factor analysis using structural equation modeling in Amos to test the *a priori* determined one-factor structure of the SEMMP. A significant Bollen-Stine bootstrap (a modified method of the χ^2 statistic for a non-normal sample) indicated if a model was not a good fit, although this statistic is highly sensitive to sample size. Thus, other indicators of model fit considered were the RMSEA with a target value of < 0.08 and CFI with a target value of > 0.95 (Cella et al. (2010), (Kenny DA (2015)). Due to the non-normality of the distribution of item responses, we checked standardized bootstrapped-corrected estimates to determine significance of paths in the model. The initially hypothesized model was not a good fit, thus we also conducted an exploratory factor analysis using SPSS (principal component analysis with a varimax rotation) to determine scale dimensionality and plausible factor structure. We also conducted an empirical Kaiser Criterion analysis to inform the number of factors selected. A confirmatory factor analysis using Amos was applied again to assess the selected factor structure, which was based on both the exploratory factor analysis results and scientific judgment informed by face validity of item content.

To estimate internal consistency reliability for the SEMMP we computed Cronbach's alpha and the omega hierarchical coefficient recommended for bifactor models (Reise

(2012)). Using paired t-tests and mean item score changes over 2 weeks between test administrations, we evaluated stability correlations and changes in mean scale scores to further evaluate the reliability of the SEMMP (treating SEMMP item scores as continuous variables). Known-groups, concurrent, convergent, and discriminant validity were assessed using independent groups t-tests and Spearman's correlations (chosen due to the skewed nature of the total SEMMP scale) (Braeken and Van Assen (2016)).

Results

We administered the survey online to 199 mindfulness practitioners, of whom 154 completed the SEMMP items again after 2 weeks. Table 1 describes the participants' characteristics. The mean age was 50.5 years ($SD = 13.8$) and participants were primarily White (95%), female (74%), and highly educated (67% having advanced degrees). A majority of the participants (76%) had been practicing for three years or less, and 26% identified as a mindfulness meditation instructor. Fifty-seven percent of participants participated in a MBSR program and 64% attended a silent meditation retreat.

Scale dimensionality

The initial confirmatory factor analysis of a one-factor model with 14-items was not a good fit to the data (Chi-square (78) = 398.961, Bollen-Stine bootstrap $p = 0.002$; RMSEA = 0.149, 90% Confidence Interval (0.135, 0.164); CFI = 0.807). The scree plot generated from a subsequent exploratory factor analysis demonstrated either one clear factor or three possible factors, all with eigenvalues greater than 1. An empirical Kaiser Criterion analysis also recommended retaining three factors. The three factors that emerged are displayed in Table 2 and were named attention (item #'s 1, 2, 3, 4), self-kindness (item #'s 5, 7, 14), and emotion (item #'s 11, 12, 13). We decided to drop the items that did not cleanly load onto a single factor (item #'s 6, 8, 9, 10). Subsequently, we also dropped item # 1 ("I am able to be mindful of my breath") because all of the other items on the attention factor were more cognitively focused.

Our objective with item reduction was to develop a parsimonious model, while recognizing that there were subgroups of items that were capturing sub-aspects of the larger mindfulness construct. Thus, we conducted a confirmatory bi-factor analysis that allowed these nine items to all load onto one primary latent mindfulness self-efficacy factor and each item to load on one, and only one, of the sub-aspects: attention, self-kindness, or emotion (Figure 1). This model (Table 3) marginally fit the data (Bollen-Stine bootstrap $p = 0.004$; RMSEA = 0.106, 90% Confidence Interval (0.076, 0.136); CFI = 0.957). All loadings on the primary factor (labeled SEMMP in Figure 1) were > 0.30 and the majority of loadings on the sub-factors are > 0.30 . This suggested that (1) the overall scale was sufficiently unidimensional to compute a total score for measuring the construct of SEMMP, and (2) the three sub-aspects emerged in the presence of the primary construct (Lai et al. (2006), McDonald (2013)). In addition, we conducted a confirmatory factor analysis specifying three *a priori* factors to further verify that the bi-factor model was the best fit (Table 3).

Internal consistency and test-retest reliability

The initial set of 14-items had a Cronbach's alpha of 0.93, suggesting there was an excessive redundancy among the items. After confirmatory factor analyses were complete, nine items, as marked in Table 2, were kept in the instrument. The resulting nine-item total scale had a Cronbach's alpha of 0.89 and an omega hierarchical value of 0.78. In addition, we ran an intra-class correlation between the SEMMP at baseline and SEMMP at two weeks using single-measurement, absolute agreement, and 2-way mixed effects modeling; ICC = 0.85 with the 95% confidence interval ranges between 0.80 and 0.89 indicating an acceptable level of test-retest reliability.

Construct validity

Table 4 shows the correlations between the SEMMP and the other measures used to assess its construct validity. For concurrent validity (H1), SEMMP scores had a positive, significant correlation with health self-efficacy. For convergent validity (H2), SEMMP scores had a positive, significant correlation with both physical and mental health-related quality of life and each of the five facets of mindfulness. SEMMP also had a positive, significant correlation with social desirability bias, in contrast to our hypothesis for discriminant validity (H3). However, as shown in Table 5, mean SEMMP scores did not differ by sociodemographics, years of practice, or participation in MBSR training, though significant differences were observed by practice frequency and instructor status (H4).

Discussion

This study provides preliminary evidence that SEMMP may be a reliable and valid instrument to measure self-efficacy of mindfulness meditation practice. Additional research is necessary to confirm results, particularly on a different sample. We used a bifactor model approach to identify sufficient unidimensionality (Lai et al., 2006). That is, we were interested in demonstrating that the primary construct was well-defined rather than to focus on the sub-constructs. Results of the bifactor analyses suggest that the SEMMP can be viewed as a unidimensional measure with three sub-aspects: attention, self-kindness, and emotion. SEMMP demonstrated internal consistency and stability in measurement over two weeks. Concurrent validity and convergent validity were demonstrated supporting H1 and H2 respectively. SEMMP scores did not differ significantly by gender and other socioeconomic factors, SEMMP, but were significantly correlated with social desirability bias. This provides partial support for H3.

In addition, results showed some support for known-groups construct validity (H4). Self-reported years of meditation practice and more frequency practice were significantly positively associated with higher SEMMP scores. Meditation instructors also had significantly higher SEMMP scores than those who were not instructors. SEMMP scores did not significantly differ by completion of formal MBSR training attendance or participation in a silent meditation retreat, contrary to our expectations for H4. These results suggest that duration of practice, practice frequency and instructor status may be important influences to consider in regards to mindfulness self-efficacy. Our finding that years of practice is associated with higher SEMMP scores complements other studies suggesting years of

meditation practice correlate with self-reported changes and neurobiological correlates of mindfulness (Baer et al. (2008), Lazar et al. (2005)). Frequency of mindfulness meditation practice has also been associated with higher levels of mindfulness among clinical populations (Bowen and Kurz (2012), Rosenzweig et al. (2010), Snippe et al. (2015)). Furthermore, higher SEMMP scores among mindfulness teachers compared to non-teachers may relate to higher meditation or perceived competence from being a teacher.

We labeled the three sub-aspects of SEMMP--attention, self-kindness, and emotion--as informed by a conceptual model for the proposed mechanisms of mindfulness meditation. These mechanisms through which mindfulness works include: 1) attention regulation; 2) body awareness; 3) emotional regulation (reappraisal and exposure); and 4) change in perspective on the self (Holzel et al. (2011)). The foundational component of mindfulness meditation is attention regulation (Holzel et al. (2011); SEMMP Attention sub-construct). Enhanced body awareness did not emerge as a unique SEMMP sub-factor, although is referenced in item 13. Maintaining attention on experiences that are usually automatic (e.g., thoughts, body sensations, emotions) without judgment creates an opportunity for exposure to emotions (SEMMP Emotions sub-construct) and with a shift in appraisal (e.g., SEMMP Self-Kindness sub-construct). These components are conceptually highly interrelated (Holzel et al. (2011)) and our analyses only support an unidimensional structure of SEMMP, supporting our recommended use of the total scale at this time. Future research needs to examine SEMMP sub-aspect measures in regards to their separate validity, reliability, and potentially expand items that may further assess the body awareness and self-referential processing components.

Our study to develop the SEMMP has limitations. Because the design was cross-sectional, we are unable to identify causal relationships. This limits our ability to understand how self-efficacy may affect adherence to practice and health outcomes. Meditation practice behaviors are self-reported and may be limited to related cognitively available aspects of experience, knowledge of the construct, and demand characteristics. Our study sample consisted mostly of white, educated women, so results may not extend to other demographics including men, minorities, or those of lower socioeconomic status. Participants were recruited through email and surveys administered online. This may have biased our sample by excluding participants with limited access to the Internet. Emails were sent to lists of mindfulness meditation practitioners from local mindfulness practitioners and through distribution lists for members of the Academic Consortium for Complementary and Integrative Health. We did not collect respondents' addresses; therefore we do not know whether our sample is nationally representative.

SEMMP scores were positively associated with social desirability bias. In our development of the Yoga Self-Efficacy Scale (Birdee et al. (2016)) we also found a positive correlation between the YSES scale scores and social desirability bias using the same social desirability measure that was administered in the current study. As shown in Table 4, *all* of the psychological scales administered in this study were positively correlated with social desirability, but controlling for social desirability response bias did not adversely affect the validity coefficients perhaps because being "high" on all of the constructs we measured is, in fact, considered to be desirable in our society. We also asked participants to report if they

had attended a “silent retreat.” Standardized MBSR training often includes one day of “silent practice,” and some respondents may have considered this as a silent retreat. This study needs to be repeated with a broader range of mindfulness experience including novices, as our sample population consisted predominantly of experienced practitioners.

Conclusion

Initial analyses support that the SEMMP may be a reliable and valid instrument with which to measure self-efficacy of mindfulness meditation practice, although additional studies are necessary to confirm these initial results. If the psychometric properties of the SEMMP are confirmed, future prospective research may examine how the SEMMP correlates with mindfulness, quality of life, and other health outcomes in response to mindfulness interventions. The SEMMP may provide researchers with a measure that further advances mindfulness meditation research and ultimately optimize the efficacy of mindfulness meditation interventions for improving quality of life and other health outcomes.

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Figure 1 .

Confirmatory bifactor analysis of the Self-Efficacy for Mindfulness Meditation Practice scale

Note: All paths shown except those from Items 12 ($p=0.318$) and 13 ($p=0.53$) to Emotions are statistically significant ($p < .05$). Error terms not shown to improve clarity.

Table 1.

Sample Characteristics (N=199)

Characteristic	
Age - years (mean, S.D.) n=195	
50.5 (13.8)	
Gender (n, %)	
Female	147(74%)
Race (n, %)	
White	189 (95%)
Ethnicity (n, %)	
Hispanic/Latino	8 (4%)
Highest Level of Education (n, %)	
Some college/school	20 (10%)
Bachelor's degree	45 (23%)
Advanced degree	134 (67%)
Annual Income- US Dollars (n, %)	
<24,999	21 (10%)
25,000–49,999	29 (15%)
50,000–99,999	60 (30%)
100,000 or more	65 (33%)
Declined to answer	24 (12%)
Primarily living in United States (n, %)	163 (82%)
How long you have been practicing mindfulness meditation-years (n, %)	
<3 years	77 (38%)
4–6 years	38 (19%)
7–9 years	17 (8%)
10 + years	53 (26%)
Average number of times you practice mindfulness meditation per week (n, %)	
<1x	7 (4%)
1x	13 (7%)
2x	29 (16%)
3x	20 (11%)
4x	30 (16%)
5x	17 (9%)
6x	21 (11%)
7x	15 (8%)
>7x	34 (18%)
Average length of each practice – minutes (mean, S.D.) N=185	26.4, 13.4
Participated in a Mindfulness-Based Stress Reduction Program (n, %)	116 (57%)
Attended silent meditation retreat (n, %)	129 (64%)
Mindfulness meditation instructor (n, %)	49 (26%)

Table 2.

Rotated Matrix after Principal Components Analysis

“During my practice of mindfulness meditation...”	Attention	Self-Kindness	Emotions
1. I am able to be mindful of my breath	.782		
*2. I am able to notice thoughts as they arise	.823		
*3. When I set the intention, I am able to be in open awareness of my thoughts	.739		
*4. I am able to notice when my mind wanders	.764		
*5. I am able to be compassionate with myself when my mind wanders		.809	
6. I am able to notice a thought arise without following it	.579	.518	
*7. I am able to be aware of my thoughts without judgement		.820	
8. I am able to refocus my attention to the present moment when my mind wanders	.500	.514	
9. I am able to observe my impulses arise and choose how to respond	.432	.443	.550
10. I am able to hold physical pain or discomfort with compassion		.568	.540
*11. I am able to notice emotions as they arise	.404		.773
*12. I am able to observe my emotions without responding immediately		.400	.689
*13. I am able to relate physical sensations in my body to my emotions			.821
*14. I am able to maintain compassion towards myself		.813	

* Included in final 9-item scale

Note. Rotation method used was Varimax with Kaiser normalization. A principal axis factoring analyses with Oblimin rotation resulted in the same factors.

Table 3.

Goodness of Fit for the 9-item Self-Efficacy for Mindfulness Meditation Practice scale

	One Factor Model	Three Factor Model^a	Three Factor Model Correlated^b	Bifactor Model^c
Chi-square value (df)	267.767 (28) [*]	250.054 (28) [*]	70.059 (25) [*]	61.220 (20) [*]
RMSEA	0.215	0.207	0.099	0.106
CFI	0.748	0.767	0.953	0.957

^a All latent factors in the 3 factor model are not correlated.^b All latent factors in the 3 factor model are correlated.^c The bifactor model consist of one primary factor and three domain-specific sub-factors^{*} Reported with Bollen-Stine bootstrap significance levels (p<0.01)

Notes: A significant Bollen-Stine bootstrap indicated if a model was not a good fit. Other indicators of model fit considered were the RMSEA with a target value of < 0.08 and CFI with a target value of > 0.95.

Table 4.

SEMMP Correlations and Partial Correlations while controlling for Social Desirability

	PROMIS					FFMQ			Social Desirability
	PHCS	GPH	GMH	Observing	Describing	Non-reactivity	Acting with awareness	Non-judging	
Zero-order correlation ^a	0.41 **	0.27 **	0.58 **	0.42 **	0.47 **	0.72 **	0.48 **	0.54 **	0.42 **
MSES	0.22 **	0.15 *	0.38 **	0.29 **	0.29 **	0.51 **	0.43 **	0.48 **	-----
Social Desirability									
Partial correlation ^b									
MSES	0.36 **	0.23 **	0.50 **	0.34 **	0.40 **	0.65 **	0.37 **	0.42 **	-----

Abbreviations: FFMQ, Five-Facet Mindfulness Questionnaire GPH, Global Physical Health, GMH, Global Mental Health, SEMMP, Self-Efficacy of Mindfulness Practice scale, PROMIS, Patient-Reported Outcomes Measurement Information System, Perceived Health Competence Survey, PHCS

*
p < 0.05

**
p < 0.01

^a. Spearman's rho

^b. Controlling for Social Desirability

Table 5.

SEMMP by Practice Characteristics (score range 0–72)

	N	Mean	SD	Statistical Test
Age	199	58.75	9.67	$\rho = -0.035, p = 0.641$
Gender				
Male	47	61.66	11.26	t-test
Female	136	59.79	9.67	$t(181) = 1.096, p = 0.274$
Education				
Some college/school	18	57.28	7.21	ANOVA
Bachelor's degree	39	63.03	8.99	$F(2, 180) = 2.389, p = 0.095$
Advanced degree	126	59.84	10.64	
Income				
<24,999	20	61.25	12.68	ANOVA
25,000–49,999	25	61.88	11.38	$F(4, 178) = 0.494, p = 0.740$
50,000–99,999	57	60.68	8.94	
100,000 or more	58	58.89	10.36	
Declined to answer	23	60.09	8.57	
Years of practice				
<3 years	77	59.36	9.72	ANOVA
4–6 years	38	57.45	9.58	$F(4, 178) = 1.711, p = 0.149$
7–9 years	17	63.24	12.85	
10+ years	53	62.36	9.44	
Practice frequency (per week)				
<1x	7	54.00	10.30	ANOVA
1x	13	59.62	8.56	$F(8, 177) = 4.209, p < 0.05$
2x	29	57.69	9.80	
3x	20	62.55	8.86	
4x	30	55.60	10.59	
5x	17	63.24	8.44	
6x	21	61.14	8.69	
7x	15	57.73	8.15	
>7x	34	66.88	9.70	
Instructor status				
Instructor	49	67.12	8.64	t-Test
Not an instructor	137	58.07	9.42	$t(184) = -6.146, p < 0.05$
MBSR participation				
Yes	116	60.22	9.53	t-Test
No	70	60.83	10.86	$t(184) = 0.385, p = 0.701$
SMR participation				
Yes	129	61.43	9.59	t-Test
No	57	58.23	10.7	$t(184) = -1.943, p = 0.055$

Abbreviations: ANOVA, analysis of variance, MBSR, Mindfulness-Based Stress Reduction, SD, standard deviation, SEMMP, Self-Efficacy of Mindfulness Practice scale, SMR, silent meditation retreat,