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An examination of the reliability and factor structure of the mindfulness process questionnaire (MPQ)



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Abstract This study examined the factor structure and reliability of the seven item and eight item mindfulness process questionnaire (MPQ). The MPQ differs from other psychological measures of mindfulness in that it quantifies the process of being mindful, rather than mindfulness as a state. Cronbach's alphas were examined across and within to determine the overall reliability of the MPQ. An exploratory factor analysis (EFA) was utilized to assess the factor structure of the seven item and eight item MPQ. The results indicated that two items lowered the overall reliability; item seven and item two from the eight item MPQ, and item two from the seven item MPQ. The EFA suggested a two factor structure with the seven item MPQ and a three factor structure for the eight item MPQ.

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Análisis de la fiabilidad y la estructura del factor del cuestionario del proceso de mindfulness (MPQ)

Resumen Este estudio analizó la estructura del factor y la fiabilidad del cuestionario del proceso de *mindfulness* (Mindfulness Process Questionnaire [MPQ]) de 7 y de 8 ítems. El MPQ se diferencia de otras medidas psicológicas del *mindfulness* en que cuantifica el *mindfulness* como un proceso de ser consciente, en lugar de hacerlo como si se tratara de un estado. Los alfa de Cronbach se analizaron transversalmente y por dentro para establecer la fiabilidad general del MPQ. Se utilizó el análisis factorial exploratorio (EFA) para evaluar la estructura del factor de los 7 y de los 8 ítems del MPQ. Los resultados indicaron que 2 elementos reducían la fiabilidad general: el ítem 7 y el ítem 2 de los 8 ítems del MPQ, y el ítem 2 de los 7 ítems del MPQ. El EFA sugirió una estructura de 2 factores en el MPQ de 7 ítems y una estructura de 3 factores en el MPQ de 8 ítems.

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Introduction

The mindfulness process questionnaire (MPQ) is one of the few mindfulness measures that focuses on the process of being mindful, rather than the outcome of being mindful (Erisman & Roemer, 2011). The process of being mindful, as well as trait mindfulness, has been associated with a number of positive outcomes; such as, reducing physical and psychological distress; improving quality of life and overall well-being; facilitating presence in the current moment; and helping to sustain positive emotions. With such findings, mindfulness has become an essential component to integrate within intervention strategies for a myriad of symptoms and diagnoses. Therefore, there is a need for a mindfulness measure that not only measures the process of being mindful but also one that exhibits sound psychometric properties.

The mindfulness process questionnaire (MPQ; Erisman & Roemer, 2011) has made little appearance in psychological literature. This could possibly be due to the fact that the MPQ is relatively new. It could also be due to the lack of existing research examining the psychometric properties of the MPQ. The MPQ is unique in that it is one of few measures that attempts to quantify the process of mindfulness, which is more closely related to the original concept of mindfulness as opposed to quantifying the traits of mindfulness, like many other mindfulness measures do (Carlson & Brown, 2005; Davis, Lau, Mark, & Cairns, 2009; Gill & Hodgkinson, 2007). Examining the reliability and factor structure of the mindfulness process questionnaire would add to the literature and may lead to providing evidence that this process measure could be used to assess the benefits of intervention strategies since it has been designed to focus on process, which is more aligned with the Eastern view of mindfulness (Erisman & Roemer, 2011). Without proper assessment of the psychometric properties of the MPQ professionals would be wary to utilize this measure with clients or even for basic research purposes. Additionally, as the number of mindfulness-based interventions increases it is vital that professionals not only use a measure that examines the process of being mindful, but also one that does so accurately and consistently.

Mindfulness

Mindfulness, or more specifically the process of being mindful, originates from Buddhist philosophy (Lindahl, 2015). The process of mindfulness comprises of being mindful in the present moment with clear comprehension and directed toward discernment of the wholesome and unwholesome aspects of the current moment. Mindfulness has been adapted conceptually within a myriad of intervention techniques for varying psychological symptoms and diagnoses (Lindahl, 2015). The adapted conceptualization of mindfulness focuses on being present in the current moment while maintaining nonjudgment throughout the process (Erisman & Roemer, 2011). Due to Western psychology's incorporation of mindfulness, there have been a number of individuals that have raised concern in adapting this Eastern conceptualization into a Western field (Lindahl, 2015). Some argue that incorporating the conceptualization of mindfulness without

the ethical framework that coincides is culturally and ethically inappropriate; while others argue that mindfulness and mindfulness meditation are secular from the religious or philosophical roots of Buddhism (Lindahl, 2015). Of those concerned, they stress the importance of our understanding and correct implementation of mindfulness into our field, as well as underpin the cultural sensitivity of whether or not it is acceptable to utilize Eastern understandings for Westernized conditions (Turnbull & Dawson, 2006). Researchers are concerned that without proper social and cultural consideration, implementation of mindfulness could result in inadvertent consequences resulting from the revision of an Eastern concept to a Western one. Others urge professionals to undergo ethical training that presents the Buddhist foundation that coincides with the conceptualization of mindfulness, before utilizing mindfulness-based interventions (MBIs; Baer, 2015). Erisman and Roemer (2011) have adapted their conceptualization of mindfulness to incorporate the process of being mindful with the emphasis of being present in the moment and reflecting on the thoughts that coincide in a nonjudgmental manner, which is more closely related to the original Buddhist conception of mindfulness compared to other mindfulness measures (Baer et al., 2008; Davis et al., 2009; MacKillop & Anderson, 2007). Mindfulness, and the process of being mindful, exhibits its pertinence through diminishing physical and psychological anguish, as well as amplifying quality of life and overall wellness (Erisman & Roemer, 2011). Therefore, continuing to utilize reliable and valid mindfulness measures within psychological research is essential.

Trait and process measures of mindfulness

The MPQ quantifies the process of being mindful, which closely relates to the original Buddhist concept of mindfulness (Erisman & Roemer, 2011). Other mindfulness measures within the literature operationally define mindfulness as a state, a single moment in time, or as a trait facilitated by meditation, rather than as a process (Davidson & Kaszniak, 2015). Examining mindfulness measures with samples consisting of individuals who practice meditation and those who do not has provided insight into the process of being mindful, with evidence that meditation experience facilitates the necessary skills needed to be mindful. Buddhist philosophy also perpetuates that long-term meditation fosters the necessary skills to be mindful (Baer et al., 2008). Therefore, one aim of mindfulness research has been the comparison of those with meditation experience and novice individuals based on different mindfulness measures (Davidson & Kaszniak, 2015).

With the increase of mindfulness research in recent years, a systematic review was conducted to evaluate the psychometric properties of self-reported mindfulness measures, specifically looking at reliability, validity, and responsiveness (Park, Spong, & Gross, 2013). The Mindful Attention and Awareness Scale (MAAS) is a unidimensional mindfulness measure conceptually adapted from the self-regulation theory (Brown & Ryan, 2003). Studies utilizing the MAAS found adequate internal consistency estimates with reported Cronbach's alphas ranging from .78 to .92

(Park et al., 2013). In addition, MAAS scores have been found to be positively correlated with measures of openness, internal state awareness, positive affect, and well-being. Additionally, MAAS scores have been found to have a negative relationship with neuroticism, anxiety, stress, and rumination, suggesting good construct validity. When the MAAS was examined in relation to the Freiburg Mindfulness Inventory (FMI), the Cognitive and Affective Mindfulness Scale-Revised (CAMS-R), the Southampton Mindfulness Questionnaire (SMQ), Mindfulness/Mindlessness Scale (MMS), and the Kentucky Inventory of Mindfulness Skills (KIMS) the correlations were found to be weak to moderate with coefficients ranging from .14 to .51. Congruent with the previous study described, the review showed no significant difference in MAAS scores between non-meditators and beginner meditators; however, meditators scored higher on the MAAS than non-meditators. In regards to the MAAS and performance-based tests, the review found conflicting reported results.

MacKillop and Anderson (2007) examined the psychometric properties of the MAAS, specifically they examined the factor structure of the measure. Based on past research suggesting that self-regulation fluctuates by gender, these researchers also examined gender differences in MAAS scores. Further, the researchers predicted that individuals with meditation experience would score higher on the MAAS. A confirmatory factor analysis (CFA) suggested that the unidimensional factor structure fit the data, as evinced by a root mean square residual value (RMR) of .08; the comparative fit index (CFI) value of .91; and a root mean square error of approximation (RMSEA) value of .07. The researchers also reported that all factor loadings met the commonly accepted criterion value of .3, as indicated by Tabachnick and Fidell (2001) which indicated a unidimensional factor structure (MacKillop & Anderson, 2007). In regard to gender differences, the results did not point to differences in MAAS scores between women and men. Finally, 10% of the sample consisted of those having experience with meditation. The magnitude of that experience ranged from one year or less to ten years, with the most frequent response being one year or less. However, the researchers failed to find a significant relationship between those with meditation experience and those without. Additionally, there was not a stronger relationship found between experienced meditators and scores on the MAAS. This could have been due to the small percentage of individuals having any meditation experience thus reducing power, as well as over half (65%) of those who did meditate reporting a year or less of experience.

The Five Facet Mindfulness Questionnaire (FFMQ) is comprised of subscales to assess five factors to quantify mindfulness: observing, describing, acting with awareness, nonjudging of inner experience, and nonreactivity to inner experiences (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). In their review, Park et al. (2013) found that the five facets and overarching concept of mindfulness varied by one's meditation experience, as well as, symptoms differing by facet. Cronbach's alphas reported for the five facets ranged from .67 to .93, suggesting adequate internal consistency. In addition, the FFMQ has been shown to be positively correlated with openness, emotional intelligence, self-compassion, and wellbeing; while being negatively

correlated with neuroticism, depression, anxiety, dysfunctional emotional awareness, and detachment, suggesting good construct validity. Further, FFMQ scores have been shown to be higher for meditators, specifically, the correlation (i.e., r) between meditation experience and the total FFMQ score was .52. In regard to the observing facet, there have been differences found between the meditator and non-meditator samples from previous studies, however, when matched on age there was little evidence for differential item functioning (DIF) between meditators and non-meditators. In addition, when subsamples of high and low worry groups were compared, scores on both the observing and describing factors were not found to significantly differ.

Evidence from a hierarchical confirmatory factor analysis indicated that the observing facet was not a vital component of mindfulness (Baer et al., 2008). However, when reassessed with a sample of meditators and non-meditators, this factor was found to be a component to mindfulness (Park et al., 2013). Baer et al. (2008) examined the internal consistency with a sample of regular meditators and non-meditators, as well as the factor structure for their sample of regular meditators. Further they investigated the relationship between psychological well-being, the FFMQ, and the possible mediation of this relationship via regular meditation. They reported finding relatively good internal consistency estimates, with alpha coefficients ranging between .72 and .92. The factor structure of the FFMQ with regular meditators showed that all five facets were related yet discrete constructs. A hierarchical model was utilized to examine whether the five facets were vital components of mindfulness as a concept with a sample of regular meditators which provided evidence of the five factors being indicators of mindfulness. The results of a one-way analysis of variance indicated that there was a significant difference between the meditators and non-meditators on all five factors. That is, planned contrasts indicated that meditators scored higher on the five factors compared to the non-meditators. A second planned contrast examined meditators and non-meditators that were demographically similar showing that meditators scored higher on four of the five factors, with acting with awareness being non-significant. However, acting with awareness was significantly correlated with age and education, possibly suggesting that education facilitates acting with awareness. Almost all of the five mindfulness factors were found to be negatively associated with symptoms; however, with the observing factor this only held true when examining the subsample of meditators. The correlations between psychological well-being and the factors of mindfulness showed a positive association, except for the observing factor, which again was only so within the meditators sample. Within the meditators group, high scores of observing were strongly associated with good adjustment; whereas, in non-meditators, this relationship was not found. With these findings, there are a few limitations to keep in mind. First, these research samples mainly included White individuals. Moreover, their meditation group were long term meditators, with less than 8% having meditated for less than a year. Finally, the meditator sample had a high percentage of mental health workers, and therefore, a high percentage of college educated individuals.

The Toronto Mindfulness Scale (TMS) was adapted to measure the state of value sustained when attention is focused in an open, non-judgmental orientation to the specific experience (Park et al., 2013). TMS evaluates the quality of the persons' state using Curiosity and Decentering as the two subscales, with these being positively related to adsorption, awareness of surroundings, reflective self-awareness, and mindedness. Curiosity was found to be correlated with awareness of internal states and self-consciousness, with r values of .41 and .31 respectively. While Decentering was correlated with openness and cognitive failures, with r values of .23 and $-.16$ respectively. When the two subscales were correlated with other mindfulness measures (e.g., MAAS, FFMQ, etc.) the Decentering had stronger correlations (r 's ranged from .20 to .74) when compared to Curiosity (r 's ranged from .10 to .54). Scores on both subscales were higher for meditators compared to non-meditators, with those with meditation experience scoring higher on Decentering subscale. Differences in Decentering were also associated with fluctuations in symptoms and stress. The Experience Questionnaire (EQ) was adapted to measure Decentering specifically. Decentering was conceptualized as an individuals' capability to view thoughts as being distinct from oneself, and not an objective rumination of reality. The structure of Decentering was found to be unidimensional, or consisting of one factor. The internal consistency estimates (i.e., Cronbach's alpha) ranged from .83 to .90. Additionally, The EQ was found to have positive correlations with cognitive appraisal ($r = .25$). It was also found to be negatively associated with experiential avoidance, brooding rumination, emotional suppression, depression, and symptoms of anxiety (r 's ranging from .31 to .49), suggesting good construct validity. Finally, it was found that those with depression reported lower scores of Decentering compared to a control of healthy individuals.

The Mindfulness/Mindlessness scale (MMS) was adapted to evaluate mindfulness in regards to a cognitive-information processing framework utilizing active awareness of and engagement in the environment. The MMS is viewed as being distinct from other mindfulness measures in that it has a very clear Westernized adaptation, specific to the cognitive-information processing component. This measure has four subscales including, Novelty Seeking Engagement, Novelty Producing, and Flexibility; however, this four factor structure has no evidence of support, while a refined two factor structure explained approximately 34% of variance in scores. The internal consistency estimates reported for a single scale ranged from .81 to .86. However, when the individual MMS subscales were assessed the Cronbach's alphas ranged from .45 to .77.

The Philadelphia Mindfulness Scale (PHLMS) conceptualizes and defines mindfulness similarly to other prominent mindfulness measures such as the FFMQ and the MAAS. Specifically, that mindfulness is being greatly aware of oneself in relation to their internal cognitions and their external circumstances in an accepting and non-judgmental manner. The PHLMS assesses two factors with one subscale pertaining to Awareness and the other Acceptance. Where Awareness is defined as a behavioral component of the propensity to be continuously present in the current moment. The second subscale of Acceptance is defined as accepting the experienced moment, or the thoughts and feelings that present

themselves, in a non-judgmental manner with the exclusion of interpretation, explanation, or evasion. In a prior systematic review, a correlation between these two scales was not found, and the use of the total score from the PHLMS was not endorsed. However, a confirmatory factor analysis did support a two factor structure. Reliability estimates for the total scale (i.e., Cronbach's alpha) ranged from .75 to .86. While internal consistency estimate for the Awareness subscale was .75 and the estimate for the Acceptance subscale was .91, indicating good internal consistency. In addition, the Awareness and Acceptance subscales were found to be strongly correlated with KIMS-Observe ($r = .83$) and KIMS-Accept without Judgement subscales ($r = .79$). Although a weak relationship was found when the Awareness subscale was correlated with the MAAS ($r = .21$) within a university sample, the relationship was found to be moderate within a sample of psychiatric outpatients ($r = .40$). The correlation between the Acceptance subscale and the MAAS was also weak ($r = .32$) with a university sample. The evaluation also found that a sample of students scored higher on the PHLMS than a psychiatric outpatient sample. Students also scored higher on the Acceptance subscale than with a sample of inpatients diagnosed with an eating disorder. Awareness subscale scores were not found to be significantly different between the student sample and the sample of inpatients with an eating disorder (Park et al., 2013).

The mindfulness process questionnaire (MPQ) was proposed to be a unique measure of mindfulness in that it incorporates the process of being mindful, rather than the outcome of being mindful (Erisman & Roemer, 2011). Specifically, the MPQ is a self-report tool with seven items, one that is reverse scored, using a 5-point Likert scale. It is purported to measure an individual's habit or attempt at mindfulness utilizing the skills for compassionate awareness, in a non-judgmental manner of the current moment, when attention is directed elsewhere. The MPQ and the MAAS have been shown to be moderately correlated ($r = .39$) indicating that these two measures are assessing similar, but perhaps distinct constructs. A similar relationship was found between the MPQ and the FFMQ ($r = .49$). Erisman and Roemer (2011) originally developed the MPQ to include 8 items, however upon evaluation of this tool they deemed that one of the two reverse scored items had poor item-total correlations and thus removed it from the subsequent version of the MPQ. It should be noted that the internal consistency estimate for the 8-item MPQ was .69, whereas the Cronbach's alpha with the item removed increased to .71, which might be considered a trivial amount.

Erisman and Roemer (2011) further examined the MPQ to determine if the measure could account for unique variance that the MAAS and FFMQ could not account for, in relation to symptoms, emotional processes, and well-being. The MPQ was compared against the FFMQ and MAAS to see if quantifying the process of being mindful (MPQ) would outperform state or outcome based mindfulness measures (MAAS & FFMQ). Their sample consisted of four hundred and ten university students. The internal consistency was also examined between different ethnic groups within the sample, of which 16.3% selected Asian, 1% selected Alaskan Native/American Indian, 17.6% selected Black, 6.6% selected Latino/nonwhite, 48% selected White, 5.1% selected Multiracial, 7.1% selected Other, and 6.6%

did not respond out of the four hundred and ten participants. Researchers reported alpha levels for Asian ($\alpha = .70$) and Latino (White and non-White; $\alpha = .70$) to be similar, with lower alpha levels among those who identified as Black ($\alpha = .67$). The MPQ was found to significantly account for unique variance when predicting anxious arousal (DASS-anxiety) when compared to the MAAS, but this same result was not found when the MPQ was compared to the FFMQ. The MPQ was also found to be a significant predictor of distress about emotions and difficulty regulating them, as well as a predictor of well-being beyond what the MAAS and the FFMQ accounted for. Although still significant, the MPQ was found to have a smaller effect as a predictor of psychological symptoms, such as depression, anxiety, and stress. It is important to recognize that the direction of any potential causal relationships is unknown. That is, it is not clear if the process of being mindful reduces psychological symptoms, emotional reactivity, and increases well-being, or is it that reduced psychological symptoms, emotional reactivity, and increased well-being promotes the process of being mindful.

Researchers have examined the MPQ within a sample of participants enrolled in a treatment outcome study for General Anxiety Disorder (GAD). The participants were randomly assigned to either the Applied Relation group or the Acceptance-Based Behavioral Therapy (ABBT) group where they underwent sixteen individual sessions and completed a questionnaire packet at pre and post treatment. Those within the ABBT group were of particular importance given that mindfulness is a component of ABBT. Researchers looked at whether increases in the process of mindfulness through therapy would be significantly associated to benefits in outcomes for participants with GAD in the ABBT group. The results indicated that scores on the MPQ changed from pre to post treatment, with higher scores reflected post treatment. Additionally, these changes in scores were found to be significantly associated with change in depression, stress, emotional regulation, quality of life and happiness. Such findings indicate that the MPQ may be a valuable tool to use as a clinical instrument; however, there are limitations to consider.

Researchers did not assess how this unique conceptualization of mindfulness (the process of) compared to other state like mindfulness measures effects changes in psychological symptoms. It is also possible that the participants reacted in a socially desirable manner in reporting decreased symptoms after treatment. Overall, it is important to recognize that all data of the MPQ utilized self-report, which could pose problems if the conceptualization of the process of being mindful, along with the necessary skills to do so, are not adequately understood by the participants. With the concept of mindfulness originating from an Eastern perspective, misunderstandings are likely to occur with Westernized participants, of which most participants in both studies identified as White. With most scholars unable to come to a consensus of what the concept of mindfulness entails, it is difficult to ensure that participants are understanding the content of these measures correctly. Additionally, the MPQ was not found to be a significant predictor of anxiety arousal from the DASS-anxiety scale, of which the FFMQ performed beyond the MPQ in this regard. The age range of the participants from both studies greatly varied (study 1, 18–65 years old; study 2,

20–65 years old; [Erisman & Roemer, 2011](#)). It has not been examined how mindfulness and age relate nor the magnitude of this relation ([Davidson & Kaszniak, 2015](#)). It is unknown if the age of participants had any effect on the process of being mindful, their symptomology, or how they would rate such components. The MPQ has also been criticized for lacking decentering components that some researchers view as being essential to some mindfulness-based interventions (MBIs; [Lacaille, Sadikaj, Nishioka, Flanders, & Knauper, 2015](#)).

While there are some promising features of the mindfulness process questionnaire (MPQ), additional research investigating the psychometric properties and factor structure still need to be conducted. The MPQ has demonstrated initial evidence of its utility within clinical psychology, however further validation is important to further understanding the true impact being mindful can have for the individual. Although, the MPQ utilizes a definition closer to the Buddhist concept, in that mindfulness is a process, the MPQ's cultural validity has been questioned ([Christopher, Woodrich, & Tierman, 2014](#)). Examining MPQ scores for those who engage in mindfulness during their daily activities who were previously guided in mindfulness training should also be assessed to understand the various degrees of mindfulness dependent upon necessary mindfulness skills.

The goal of the current thesis was twofold. First, one aim was to further examine the internal consistency of the MPQ, and more specifically the reliability of both a 7-item version, with one reverse scored item, and an 8-item version containing both of the originally proposed reverse scored items. This focus would allow for additional examination of the original author's decision to remove an item for .02 increase in the reliability coefficient. A second aim was to provide information reading the factor structure of the MPQ. No research to date has examined whether the measure is unidimensional or whether there may be sub facets to the process of being mindful, as operationally defined by the MPQ. Examining the reliability and factor structure of the mindfulness process questionnaire would add to the scant literature and may also lead to the increased use of this tool in intervention research.

Method

The data utilized for this study were archival in nature collected in the course of four different research studies utilizing the mindfulness process questionnaire (MPQ). Three samples, as described below, consisted of graduate students, and one was community-based.

Participants

In three of the research studies subjects were graduate students attending masters or doctoral programs in clinical psychology enrolled in either statistics, research methods, and/or mindfulness courses. The subjects from the community-based sample were participants in an eight-week mindfulness based stress reduction (MBSR) course. All participants resided in the Pacific Northwest and the demographic characteristics across all four samples were as follows. The majority of participants were female (61%) and

identified as Caucasian (75%) while the ages ranged from 21 to 59, with the average being 27.72 ($SD = 6.42$).

Sample size, power and precision

Random, or unexplained, variance within research is inversely related to the sample size, such that when the sample size is smaller, there is a greater amount of random, unexplained variance within that study (Marsh, Balla, & McDonald, 1988). Further, larger samples are related to an increase in statistical power and subsequently a decrease in the likelihood of committing a Type II Error. Each of the four research studies were longitudinal in nature where one study provided data from two different time points, two studies provided data from three time points, and one study provided data from four time points. Within each study the sample sizes at each time point varied due to missing data and/or attrition. Further, it should be noted that two samples ($N = 130$) provided data on the 8-item MPQ, and two ($N = 73$) provided data on only the 7-item MPQ.

Thus, the sample sizes reported below for the internal consistency analyses varied considerably depending on the time points being compared and whether the 7-item MPQ was being examined or the 8-item MPQ. With regard to internal consistency estimates, the smallest sample size was 81 when evaluating the 8-item MPQ at time four, while the largest sample size was 203 when evaluating the 7-item MPQ at time one. Similarly, sample sizes for exploratory factor analyses (EFAs) of the MPQ's structure also varied based on data that were available at each time point and which version (i.e., 7-item or 8-item) was being assessed. Sample sizes for the EFAs conducted at each time point were deemed adequate for both assessment of the 7-item ($N_{time\ 1} = 203$) and 8-item MPQ ($N_{time\ 1} = 130$), per rules of thumb based on a ratio of 10:1 for responses to questions (Yong & Pearce, 2013).

Measures and procedures

As was described in the introduction and literature above the focus of this research was the mindfulness process questionnaire (MPQ) developed by Erisman and Roemer (2011). During the iterative process of developing the MPQ over the course of two studies the original authors dropped one reverse-scored item thus creating a final version consisting of seven items. A key goal of this project was to evaluate the reliability and structure of both versions of this measure to determine if one was more psychometrically sound than the other. As such the archival data examined contained subject responses on either one or both versions of the MPQ.

Results

Data collected from multiple samples at multiple time points, as described above were analyzed with the Statistical Package for the Social Sciences (SPSS, version 24). Appropriate item transformations (e.g., reverse coding) were performed. To examine the psychometric properties of the MPQ (7-item and 8-item versions) multiple analyses were conducted utilizing data from the different time points and individual and combined samples. Reliability analyses were

conducted to assess the internal consistency of the MPQ. In addition, exploratory factor analyses were conducted to examine the structure of both the 7-item and 8-item MPQ.

Internal consistency analyses

Internal consistency estimates (i.e., Cronbach's alphas) along with other item statistics (e.g., corrected item-total correlations, alpha if item deleted, etc.) were assessed for both the 7-item and 8-item versions of the MPQ and are addressed below. Based on criteria established by Nunnally and Bernstein (1994) internal consistency estimates that were .70 or higher were deemed adequate. Further, corrected item-total correlation estimates that were lower than .40 were deemed problematic, as established by Gliem and Gliem (2003).

Internal consistency estimates based on both versions of the MPQ across and within samples, and at each applicable time point are provided in Table 1. Overall, it appeared that the 7-item MPQ had slightly higher Cronbach's alpha at baseline when compared to the 8-item MPQ, even though both estimates would be considered in the acceptable range for basic research purposes. However, when looking at the combined samples at other time points studied the different version's estimates seemed more similar with values ranging from .77 to .85. When examining items separately for the 7-item MPQ, item two, which was the only reverse scored item, impacted the overall reliability of the scale. That is, if this item were removed the reliability coefficient would increase. Similarly, for the 8-item MPQ item two and item seven, both reverse scored items, impacted the overall reliability of the scale, in which the removal of both items would result in an increase to the reliability estimate.

7-item MPQ internal consistency. The 7-item MPQ reliability estimates across time points ranged from .78 to .85, and were considered adequate. Corrected item-total correlations, squared multiple correlations, variance if item deleted, and alpha if item deleted were also assessed. Item two on the measure stood out as problematic, and as mentioned above, happens to be the only item that is reversed scored on this version. The second item is, "I don't consciously try to be accepting of whatever thoughts and feelings I have." Examining the data across the four time points and across samples, the scale variance if item was deleted indicated that the variance would be greater if item two was removed with values ranging from 13.88 to 20.01. Similarly, the corrected item-total correlation for item two, ranging from .18 to .32 across samples and time points indicates small correlations with MPQ 7-item total scores. Further, the squared multiple correlations also indicated that item two could be problematic with values ranging from .07 to .26. Lastly, examining the Cronbach's alpha if item two were deleted indicated that alpha would increase to values ranging from .87 to .80.

When the reliability estimates were computed for each sample separately they were generally adequate, with three occurrences of alphas falling below the .70 cut off, indicating poor internal consistency. Two of these values were based on data from one student sample and from the community-based sample at the third and fourth time points, respectively.

Table 1 Seven and eight item MPQ reliability estimates (i.e., Cronbach's alpha).

Sample	Items	Time 1 α (N)	Time 2 α (N)	Time 3 α (N)	Time 4 α (N)
<i>Total sample</i>	7	.82 (203)	.78 (171)	.79 (100)	.85 (90)
Student sample 1	7	.75 (91)	.71 (72)	.81 (62)	.84 (81)
Student sample 2	7	.77 (39)	.83 (28)	.67 (21)	na
Student sample 3	7	.82 (18)	.82 (16)	.80 (17)	.67 (9)
Community sample	7	.85 (55)	.81 (55)	na	na
<i>Total sample</i>	8	.74 (130)	.77 (98)	.78 (82)	.82 (81)
Student sample 1	8	.75 (91)	.72 (70)	.81 (61)	.82 (81)
Student sample 2	8	.72 (39)	.84 (28)	.67 (21)	na

Note. na = data not collected in the archival study.

Time one 7-item MPQ internal consistency. When the first student sample was examined at time one the coefficient alpha was .75, demonstrating satisfactory internal consistency. When examining the individual items, omitting item two would increase the scale variance when compared to other items. Additionally, a low corrected item-total correlation ($r = .13$) and squared multiple correlation ($r^2 = .08$) were found for item two. Finally, the Cronbach's alpha if item two were deleted would have increased to .79.

Cronbach's alpha was .77 for the MPQ collected from the second student sample at time one. While examining the items separately, item two again stood out as potentially problematic as demonstrated by a larger value for the scale variance if the item were deleted ($s^2 = 15.06$), and a lower corrected item-total correlation and squared multiple correlation, with values of .25 and .27, respectively. However, the Cronbach's alpha if this item were deleted did not increase, as it did in the first student sample.

When the third student sample at time one was analyzed the Cronbach's alpha was .82, indicating good internal consistency. The first MPQ item (i.e., "When I feel myself getting caught up in my feelings, I am able to bring my mind back to what's happening right now.") did have a corrected item-total correlation that was lower than the .40 standard, however if this item were removed the internal consistency estimate for the scale would remain at .82.

Finally, when time one data was analyzed for the community-based sample a Cronbach's alpha of .85 was found. Examining the items separately indicated that item two again was problematic, as evinced by a larger value for the scale variance if the item were to be deleted ($s^2 = 24.61$), as well as a smaller corrected item-total correlation and squared multiple correlation, with a value of .03 and .03 respectively. Further, the reliability estimate would increase to .90 if this item were removed from the scale.

Time two 7-item MPQ internal consistency. When the first student sample was examined at time two the coefficient alpha was .71, indicating satisfactory internal consistency. When examining the individual items item two had the lowest corrected item-total correlation and squared multiple correlation, with values of .25 and .18 respectively. However, omitting item two would only increase the Cronbach's alpha to .72.

Cronbach's alpha was .83 for the MPQ collected from the second student sample at time two. When examining the individual items separately, item two again stood out. The

scale variance if item two were deleted was 18.89. Item two's corrected item-total correlation and squared multiple correlation was .14 and .24, respectively. The Cronbach's alpha if item two were deleted was .87.

When the third student sample at time two was analyzed the Cronbach's alpha was .82, indicating good internal consistency. The third MPQ item's (i.e., "I try to be open to whatever happens, as it's happening, instead of having my mind wander to other things.") scale variance if item three were deleted was 12.65, with a corrected item-total correlation at .23. The Cronbach's alpha if item three were deleted was .86. Scale variance if item four were deleted was 12.07, with the corrected item-total correlation and squared multiple correlation of .47 and .43, respectively. However, removal of item four did not increase the alpha coefficient.

Finally, when time two data were analyzed for the community-based sample a Cronbach's alpha of .81 was found. The scale variance if the item two were deleted was 13.10. The corrected item-total correlation and the squared multiple correlation for item two was .15 and .33, respectively. The Cronbach's alpha if item two were deleted was .87.

Time Three 7-item MPQ internal consistency. When the first student sample was examined at time three the coefficient alpha was .81. The scale variance if item two were deleted was 15.05. The corrected item-total correlation and squared multiple correlation for item two was .40 and .23, respectively. However, if item two were omitted, the Cronbach's alpha would not change. The scale variance if item five were deleted was 15.34. Finally, the scale variance if item one were deleted was 15.28. However, if item one or item five were deleted the overall reliability of the scale would decrease.

When the second student sample at time three was analyzed the Cronbach's alpha was .67, which is slightly below what is considered adequate for basic research purposes per [Nunnally and Bernstein \(1994\)](#). Item two had the highest scale variance if the item were deleted at 14.06. Item two's corrected item-total correlation and squared multiple correlation was $-.30$ and .12, respectively. If item two were deleted the Cronbach's alpha would be .75.

For the third student sample at time three when analyzed the Cronbach's alpha was .80. When examining the items separately, the first item appeared problematic. The scale variance if item one were deleted was 12.36. The

corrected item-total correlation and squared multiple correlation were .11 and .19, respectively. The Cronbach's alpha if item one were deleted would increase the alpha to .83.

Time four 7-item MPQ internal consistency. At the fourth time point for the first student sample, the Cronbach's alpha was .84, indicating good internal consistency. The second item had the highest scale variance if the item were deleted at 19.97. Item two's corrected item-total correlation and squared multiple correlation were .29 and .26, respectively. The Cronbach's alpha if item two were deleted was found to slightly increase the overall reliability of the scale to .86.

Cronbach's alpha was .67 for the third student sample at time four, indicating below adequate reliability. While examining the items separately, item one had the highest scale variance if the item were deleted ($s^2 = 7.75$). Item two's scale variance if the item were deleted was 6.25. The corrected item-total correlation and squared multiple correlation for item one were $-.40$ and $.95$, respectively. Whereas, item two's corrected item-total correlation was zero and the squared multiple correlation was $.08$. The Cronbach's alpha if item one were deleted was $.79$, whereas the Cronbach's alpha if item two were deleted was $.76$.

8-item MPQ internal consistency. Data from the original 8-item MPQ were collected in two student samples at multiple time points. The 8-item MPQ reliability estimates across time points ranged from $.74$ to $.82$ and were considered adequate; however, it is worth noting the 7-item MPQ reliability estimates were found to be marginally better. The item that the 7-item MPQ lacks is reversed-scored and states "I don't intentionally try to be aware of the present moment." Across samples, the 8-item MPQ at time one had a Cronbach's alpha at $.74$. The highest scale variance if item two was deleted was 17.24. However, item seven's scale variance if the item were deleted was 17.02. Item two had a low corrected item-total correlation and squared multiple correlation at $.18$ and $.09$, respectively. Item seven's corrected item-total correlation was $.18$, and the squared multiple correlation was $.06$. The Cronbach's alpha if item two were deleted was $.75$, and the Cronbach's alpha if item seven were deleted $.76$.

At time two across samples the 8-item MPQ's Cronbach's alpha was $.77$. Three items had higher scale variances if their item were deleted compared to the other items. Item two's scale variance if the item were deleted was 17.45. Item one's scale variance if the item were deleted was 16.86, followed by item seven's scale variance if item were deleted at 16.79. However, item one and seven if removed, did not improve the overall reliability of the scale. Item seven's corrected item-total correlation was $.36$, with a squared multiple correlation at $.23$. Item two's corrected item-total correlation was $.29$, and a squared multiple correlation at $.22$. Item two if removed, increased the Cronbach's alpha to $.77$.

When the 8-item MPQ at time three was assessed across samples the Cronbach's alpha was $.78$. Item two's corrected item-total correlation was $.35$ and a squared multiple correlation of $.21$. Item seven's corrected item-total correlation was $.31$, and a squared multiple correlation of $.22$. However, removal of neither item two nor item seven would have improved the overall reliability of the scale.

Finally, when the data were analyzed at time four within one sample, the Cronbach's alpha was $.82$. When examining the items separately, item seven's scale variance if the item were deleted was 22.95. Item two's scale variance if the item were deleted was 22.54. Item one's scale variance if the item were deleted at 21.66. Item seven's corrected item-total correlation was $.21$ and the squared multiple correlation was $.20$. Item two's corrected item-total correlation was $.36$, and the squared multiple correlation was $.30$. Removal of item two did not improve the overall reliability of the scale. However, removal of item seven would increase the overall reliability of the scale to $.84$.

Time one 8-item MPQ internal consistency. When the first student sample was examined at time one the coefficient alpha was $.75$. The scale variance if the item two were deleted was 18.05, the highest compared to the other items. The corrected item-total correlation and squared multiple correlation were low for item two at $.14$ and $.08$, respectively. If item two were removed the coefficient alpha would rise to $.77$. Additionally, item seven's scale variance if the item were deleted was 17.06. Item one's scale variance if the item were deleted was 17.30. Item seven's corrected item-total correlation was $.14$, and the squared multiple correlation was $.08$. If item seven were removed the coefficient alpha would increase to $.75$.

Cronbach's alpha was $.72$ for the MPQ collected from the second student sample at time one. The scale variance if item seven were deleted was the largest at 17.36. The corrected item-total and squared multiple correlation values were low at $.01$ and $.31$, respectively. Additionally, removal of item seven increased the overall reliability of the scale to $.77$. Item two's corrected item-total correlation and squared multiple correlation were $.29$ and $.40$, respectively. Although, removal of item two did not increase overall reliability of the scale.

Time two 8-item MPQ internal consistency. The second time point for the first student sample obtained a Cronbach's alpha of $.72$. While examining the item separately, numerous items had high scale variance if they were deleted. Item one's scale variance if the item were deleted was 15.79. Item two's scale variance if the item were deleted was 15.15. Item six's scale variance if the item were deleted was 15.85. Further, item seven's scale variance if the item were deleted was 15.18. Additionally, Item two's corrected item-total correlation was $.35$, and a squared multiple correlation at $.29$. Item six's corrected item-total correlation was $.25$, and a squared multiple correlation at $.30$. The corrected item-total correlation was $.30$ for item seven, and a squared multiple correlation at $.24$. Item six was the only item to increase the overall reliability of the scale to $.73$ if it were removed.

Cronbach's alpha was $.84$ for the MPQ collected from the second student sample and time two, signifying good internal consistency. Examining the item separately, item two stood out. Item two's scale variance if item were removed was the largest at 23.04. Item's two corrected item-total correlation was $.16$, and a squared multiple correlation at $.25$. Additionally, item two was the only item that if removed would increase the overall reliability of the scale to $.87$.

Time three 8-item MPQ internal consistency. Cronbach's alpha was $.81$ for the MPQ collected from the first student sample at time three. Item seven's scale variance if

the item were deleted was largest at 19.39. Item seven's corrected item-total correlation was .34, and a squared multiple correlation at .24. Item two's squared multiple correlation was .33. Additionally, if item seven were removed it would marginally increase the overall reliability of the scale to .82.

When the second student sample at time three was analyzed the Cronbach's alpha was .67, which is slightly below acceptable internal consistency. While examining the items separately, item two and seven stood out. Item two's scale variance if the item were removed was largest at 16.03, with item seven's scale variance if the item were deleted at 14.89. Item two's corrected item-total correlation and square multiple correlation were the lowest at .02 and .21, respectively. If item two were removed, the overall reliability of the scale would rise to .73, indicating adequate reliability. Item seven's corrected item-total correlation was .23, and a squared multiple correlation at .37. However, removal of item seven did not increase the overall reliability of the scale.

Time four 8-item MPQ internal consistency. Cronbach's alpha was .82 for the first student sample at time four, indicating good internal consistency. Examining the items separately item seven stood out. Item seven's scale variance if the item were deleted was the largest at 22.95. Item two's scale variance if the item were deleted was 22.54. Item seven's corrected item-total correlation and squared multiple correlation were lowest at .21 and .20, respectively. If item seven were removed the overall reliability would increase to .84. Item two's corrected item-total correlation was .36, and a squared multiple correlation at .30. However, removal of item two did not increase the overall reliability of the scale.

Exploratory factor analyses (EFA)

7-item version of the MPQ. First the suitability of the data for the factor analysis was assessed. Data from the 7-item MPQ at the first time point, across samples passed the Bartlett's test of sphericity, $p < .001$. Also, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .81, indicating the data (i.e., correlation matrix) was suitable for factor analysis. Additionally, the determinant was found to be greater than zero, with a value of .06, indicating that the correlation matrix was suitable for the factor analysis. However, when the anti-image covariance matrix was examined, seven of the twenty-one off-diagonal elements values were greater than $\pm .10$, (or 33.3%), which exceeds the 25% criterion indicating the correlation matrix may not be suitable for factor analysis. An EFA using the maximum likelihood extraction method and an oblimin rotation was performed. The communalities ranged from .08 to .87. The highest of these values was from item eight with a communality of .87, followed by item six with a communality of .67, and item five with a communality of .62. Item three and four had communalities of .46 and .50. Item two had the lowest communality, which was .08. Item two's communality did not meet the .4 standard, which may indicate that this item is not similar to the other items. Based on the eigenvalue greater than one rule a two-factor solution was indicated, with 65.96% of the original variance accounted for by the

first factor. Upon examination of the scree plot a one factor solution was indicated. Based on the pattern matrix, and using criterion of .32 for loadings, factor one would include item one, item three, item four, and item five (see Table 2). Further factor two would include item six, item eight, and possibly item two, which is on the cusp of the cut off value (.31). However, this value may be too far below the cut off, and could be argued it did not load onto either factor. Factor one could be interpreted as presence with one's cognitions and emotions. Whereas factor two could be interpreted as self-talk, if item two is excluded.

8-item version of the MPQ. The suitability of the data for the factor analysis was assessed. Data from the 8-item MPQ at the first time point, across samples passed the Bartlett's test of sphericity, $p < .001$. Also, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was .74, indicating the data were suitable for factor analysis. The determinant was found to be greater than zero, with a value of .13, indicating the correlation matrix was suitable for the factor analysis. However, when the anti-image covariance matrix was examined, eight of the twenty-eight off-diagonal values were greater than $\pm .10$, (28.6%), which exceeded the 25% criterion indicating the correlation matrix may not be suitable for factor analysis. An EFA using the maximum likelihood extraction method and an oblimin rotation was performed. The communalities ranged from .07 to .93. Item eight received the highest communality value at .93. Item three followed with a communality value of .60. Item one and six had low communality values of .57 and .57, respectively. Item four and five had low communality values of .41 and .43, correspondingly. Finally, item two and seven had the lowest extraction communality values at .10 and .07. With item two and item seven not meeting the .4 cut off, this may indicate that these two items may not be similar to the other items. Based on the eigenvalue greater than one rule a three-factor solution was indicated, with 65.8% of the original variance accounted for by the first factor. Upon examination of the scree plot, a one factor solution was indicated. Based on the pattern matrix, and using the cut off of .32 for the pattern matrix, factor one would include item one and item five (see Table 3). Further factor two would include item six and item eight. Finally, factor three would include item three and item four. The items that did not load on a factor were item two and item seven. Factor one could be interpreted as presence with one's cognitions and emotions. Factor two could be interpreted as self-talk. Factor three could be interpreted as tolerance or acceptance.

Discussion

The items from both the 7-item and 8-item MPQ's were examined, specifically in an effort to evaluate the measure's internal consistency. Then exploratory factor analyses were performed with both versions of the MPQ. Overall, both the versions of the MPQ possess acceptable reliability. This study's reliability analyses supported [Erisman and Roemer's \(2011\)](#) removal of item seven, as the 7-item MPQ did have slightly higher reliability estimates. When items were analyzed separately for the 8-item MPQ, the two reverse scored items did not seem to be strongly related to the measure's other items. Analyses often indicated that removal of item

Table 2 7-Item version MPQ factor loadings.

Items	Factor	
	1	2
1. When I feel myself getting caught up in my thoughts or feelings, I am able to bring my mind back to what's happening right now.	.01	.75
2. I don't consciously try to be accepting of whatever thoughts and feelings I have. (R)	.29	-.05
3. I try to be open to whatever happens, as it's happening, instead of having my mind wander to other things.	-.01	.66
4. I intentionally try to be accepting of my thoughts and feelings as they occur.	.21	.56
5. When I notice that I'm not engaged in the present moment I can gently bring myself back.	-.06	.83
6. If I notice that I'm being hard on myself for the thoughts and feelings I'm experiencing, I try to be kind to myself instead.	.69	.19
8. If I notice that I'm being critical of my thoughts or feelings, I try to be more accepting of them instead.	.84	.19

Note. Numerical values that are bolded indicate adequacy for loading onto a factor.

Table 3 8-Item version MPQ factor loadings.

Items	Factor		
	1	2	3
1. When I feel myself getting caught up in my thoughts or feelings, I am able to bring my mind back to what's happening right now.	1.04	-.02	-.08
2. I don't consciously try to be accepting of whatever thoughts and feelings I have. (R)	-.04	.29	-.03
3. I try to be open to whatever happens, as it's happening, instead of having my mind wander to other things.	.18	-.09	.73
4. I intentionally try to be accepting of my thoughts and feelings as they occur.	.06	.28	.46
5. When I notice that I'm not engaged in the present moment I can gently bring myself back.	.39	.13	.22
6. If I notice that I'm being hard on myself for the thoughts and feelings I'm experiencing, I try to be kind to myself instead.	.11	.69	.04
7. I don't intentionally try to be aware of the present moment. (R)	-.04	-.003	.28
8. If I notice that I'm being critical of my thoughts or feelings, I try to be more accepting of them instead.	.09	.91	.10

Note. Numerical values that are bolded indicate adequacy for loading onto a factor.

two and seven resulted in an increase in the overall reliability of the scale. The 7-item MPQ analyses also frequently indicated the removal of item two would increase the overall reliability of the measure.

The exploratory factor analyses for both versions of the MPQ suggest the measure is multifaceted. The exploratory factor analysis for the 8-item MPQ indicated a three factor solution, whereas the exploratory factor analysis of the 7-item MPQ indicated a two factor solution. Although, examination of the scree plot for both versions indicated a unidimensional construct. The 8-item MPQ factor loadings resulted in item two and item seven not loading on any of the three factors. Although, the factor loading for item five was slightly less than the suggested cut-off as well. The 7-item MPQ factor loadings indicated that item two was not associated with either emerging factor.

In conclusion, the internal consistency analyses indicated that the MPQ is a reliable instrument. The analyses suggested that removal of item two would increase the reliability of the scale, and further support [Erisman and Roemer's \(2011\)](#) removal of item seven. The EFA of the 7-item MPQ indicated a two factor structure, although the scree plot

suggested a unidimensional measure. The EFA of the 8-item MPQ suggested a three factor structure, with the scree plot again indicating a unidimensional structure. The EFA's of both versions resulted in item two and item seven (for the eight item MPQ) not loading onto any suggested factor, indicating that these two reverse coded items may not be similar to the other items within the measurement tool.

References

- Baer, R. (2015). *Ethics, values, virtues, and character strengths in mindfulness-based interventions: A psychological science perspective*. *Mindfulness*, 6(4), 956–969.
- Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment*, 13(1), 27–45. <http://dx.doi.org/10.1177/1073191105283504>
- Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., et al. (2008). *Construct validity of the five facet mindfulness questionnaire in meditating and nonmeditating samples*. *Assessment*, 15(3), 329–342.
- Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: Mindfulness and its role in psychological well-being.

- Journal of Personality and Social Psychology*, 84(4), 822–848. <http://dx.doi.org/10.1037/0022-3514.84.4.822>
- Carlson, L. E., & Brown, K. W. (2005). Validation of the Mindful Attention Awareness Scale in a cancer population. *Journal of Psychosomatic Research*, 58(1), 29–33.
- Christopher, M. S., Woodrich, L. E., & Tiernan, K. A. (2014). Using cognitive interviews to assess the cultural validity of state and trait measures of mindfulness among Zen Buddhists. *Mindfulness*, 5(2), 145–160. <http://dx.doi.org/10.1007/s12671-012-0160-z>
- Davidson, R. J., & Kaszniak, A. W. (2015). Conceptual and methodological issues in research on mindfulness and meditation. *American Psychologist*, 70(7), 581–592. <http://dx.doi.org/10.1037/a0039512>
- Davis, K. M., Lau, M. A., & Cairns, D. R. (2009). Development and preliminary validation of a trait version of the Toronto Mindfulness Scale. *Journal of Cognitive Psychotherapy*, 23(3), 185–197.
- Erismann, M. S., & Roemer, L. (2011). A preliminary investigation of the process of mindfulness. *Mindfulness*, 3(1), 30–43.
- Gill, C. M., & Hodgkinson, G. P. (2007). Development and validation of the five-factor model questionnaire (FFMQ): An adjectival-based personality inventory for use in occupational settings. *Personnel Psychology*, 60(3), 731–766.
- Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. In *Midwest research-to-practice conference in adult, continuing, and community education*.
- Lacaille, J., Sadikaj, G., Nishioka, M., Flanders, J., & Knäuper, B. (2015). Measuring mindful responding in daily life: Validation of the Daily Mindful Responding Scale (DMRS). *Mindfulness*, 6(6), 1422–1436.
- Lindahl, J. R. (2015). Why right mindfulness might not be right for mindfulness. *Mindfulness*, 6(1), 57–62. <http://dx.doi.org/10.1007/s12671-014-0380-5>
- MacKillop, J., & Anderson, E. J. (2007). Further psychometric validation of the mindful attention awareness scale (MAAS). *Journal of Psychopathology and Behavioral Assessment*, 29(4), 289–293.
- Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin*, 103(3), 391.
- Nunnally, J. C., & Bernstein, I. H. (1994). *Psychological theory*. New York, NY: MacGraw-Hill.
- Park, T., Reilly-Spong, M., & Gross, C. R. (2013). Mindfulness: A systematic review of instruments to measure an emergent patient-reported outcome (PRO). *Quality of Life Research*, 22(10), 2639–2659.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*.
- Turnbull, L., & Dawson, G. (2006). Is mindfulness the new opiate of the masses? Critical reflections from a Buddhist perspective. *Psychotherapy in Australia*, 12(4), 60–64.
- Yong, A. G., & Pearce, S. (2013). A beginner's guide to factor analysis: Focusing on exploratory factor analysis. *Tutorials in Quantitative Methods for Psychology*, 9(2), 79–94.