

Mindfulness Practice and Its Relationship to the Five-Facet Mindfulness Questionnaire

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Abstract Central to Mindfulness-Based Intervention (MBI) protocols are formal and informal mindfulness practice, both within and between weekly sessions. It is presumed that mindfulness practices foster increases in mindfulness, which in turn affect treatment outcomes. The current study assessed whether frequency and duration of between-session mindfulness practice predicted mindfulness as measured by the Five Facet Mindfulness Questionnaire (FFMQ) in a clinical sample of adults following Mindfulness-Based Relapse Prevention ($N=103$). In the original trial, significantly greater changes in primary substance abuse outcomes were observed in the MBRP group. In the current study, it was hypothesized that type (formal versus informal), frequency (days/week), and duration (minutes) of practice would predict post-course FFMQ scores. However, no significant relationships were found between practice and either the total or subscale FFMQ scores. Results from the current study suggest that either mindfulness is not affected by mindfulness practices or that the FFMQ may need adaptation for specific clinical samples. Results suggest more objective indices of meditation practice, such as frequency and duration of practice, may be indicated in assessing how mindfulness practice relates to changes in mindfulness and to clinical outcomes, particularly in samples in which mindfulness measures have not been validated. Further investigation is needed to determine best methods of assessment to identify mechanisms of MBIs in different clinical populations.

Keywords Meditation practice · Measurement · Mindfulness · Formal practice · Informal practice

Introduction

The cultivation of mindfulness through formal meditation practices has found new contexts and formats in Western medicine and behavioral sciences, primarily in the form of Mindfulness-Based Interventions (MBIs). Incorporation of contemporary concepts and approaches to mindfulness in these settings are increasingly popular, and while typically secularized, are largely rooted in ancient Buddhist practices in cultivating awareness and attention. Often practiced through formal meditation, training in mindfulness centers on intentionally observing one's present moment experience with the qualities of openness, nonjudgment, and kindness (Gunaratana 2011). MBIs have shown efficacy for a variety of clinical issues, including chronic pain (Veehof et al. 2016), depression (Segal et al. 2010), substance use (Bowen et al. 2014; Witkiewitz et al. 2014), couples counseling (Carson et al. 2004), and Posttraumatic Stress Disorder (Polusny et al. 2015).

To evaluate mechanisms by which these programs affect outcomes, studies commonly employ self-report assessments of mindfulness. However, definition and measurement of mindfulness has proven to be less than straightforward and has fostered many rich discussions and studies. One of the most common assessments of mindfulness used in recent clinical literatures is the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2008). Similar to other self-report measures of mindfulness, the FFMQ has undergone criticism, as it does not always appear to validly assess the construct of mindfulness (Hill and Labbe 2014). Some studies show increases in FFMQ scores following a mindfulness-based intervention

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(e.g., Witkiewitz et al. 2013; Bravo et al. 2015; Mermelstein and Garske 2015), and reviews have shown that increases in FFMQ scores correlate with facets of psychological health and positive clinical outcomes (Bränström et al. 2010; Keng et al. 2011). Results from other studies, however, fail to show a relationship between FFMQ scores and primary outcomes (e.g., Falkenström 2010).

In the current study, investigators were interested in exploring the relationship of the FFMQ to mindfulness practice in a clinical population. Specifically, the investigators were interested in whether or not engagement in formal and informal mindfulness practice between sessions over the period of the 8-week course would predict the postcourse FFMQ total score, and/or scores on individual FFMQ subscales, an emerging area of exploration in the MBI literatures (Re et al. 2013; Soler et al. 2014). Data were drawn from research conducted by Bowen et al. (2014), assessing outcomes following an outpatient aftercare program, Mindfulness-Based Relapse Prevention (MBRP), in a sample of adult participants with substance use disorders ($N = 286$). Measures included frequency and duration of at-home formal and informal mindfulness practice, as well as the FFMQ.

Method

Participants

Analyses were conducted using a subsample of adults in a community-based substance abuse treatment program who were randomized into 8 weeks of MBRP ($N = 103$), versus standard cognitive behavioral relapse prevention or treatment-as-usual control. The mean age of the current sample participants was 39.1 years ($SD = 10.9$), with a range between 20 and 60 years old. Over half of the sample identified as White (55.3 %), following African American (25.2 %), Hispanic or Latino (8.7 %), Mixed (5.8 %), Native American (5.8 %), and Asian (1 %). No individuals identified as Native Hawaiian/Pacific Islander or Other. Although the primary substance of choice was alcohol (Bowen et al. 2014), only 15.5 % reported using alcohol only, while 78.6 % reported polysubstance use. The Severity of Dependence Scale (Gossop et al. 1995) assessed the degree of psychological dependence experienced by users of different types of substances. A mean score of 9.52 ($SD = 4.23$) out of 15 in the current sample indicated an average severity of dependence well above standard cutoffs (e.g., Bruno et al. 2009). (See Table 1 for full participant characteristics.)

Measures

The FFMQ (Baer et al. 2006) is a 39-item, 5-point Likert-type scale, where 1 = “Never or rarely true”, 2 = “Rarely true”,

Table 1 Full participant characteristics

Demographics of sample ($N = 103$)	M (SD)
Mean age (SD)	39.1 (10.9)
Male sex (%)	76 (73.8)
Race/ethnicity (%)	
Non-Hispanic White	57 (55.3)
African American	26 (25.2)
Hispanic	9 (8.7)
Mixed	6 (5.8)
Native American	6 (5.8)
Asian	1 (1.0)
Other/not specified	0
Unemployed (%)	67 (65.0)
Educational level (%)	
Did not complete high school	7 (6.8)
High school graduate/GED	52 (50.5)
Some college	23 (22.3)
College degree	21 (20.4)
Mean (SD) formal practice indices at post-course	
Frequency measured by days per week	4.79 (2.83)
Duration measured in minutes	17.8 (20.9)
Mean (SD) informal practice at post-course	
Frequency measured by days per week	4.43 (3.48)

3 = “Sometimes true”, 4 = “Often true”, and 5 = “Very often or always true”. The FFMQ comprises five subscales. The “Observing” subscale measures the extent to which an individual can notice or attend to internal and external stimuli, and contains items such as “*I notice the smells and aromas of things*”. The “Describing” subscale measures the extent to which an individual can label internal experiences with words and contains items such as “*I am good at finding words to describe my feelings*”. The “Acting with awareness” subscale captures the extent to which an individual can attend to activities in the present moment versus acting automatically without paying attention. This subscale contains items such as “*I find myself doing things without paying attention*”. The “Non-judging” subscale captures the extent to which an individual evaluates their inner experience and contains items such as “*I criticize myself for having irrational or inappropriate emotions*”. Finally, the “Non-reactivity” subscale measures the extent to which an individual can allow thoughts and feelings to arise and pass without becoming attached to them. This subscale contains items such as “*I perceive my feelings and emotions without having to react to them*”.

In the current sample, the scale demonstrated excellent reliability ($\alpha = .81$).

Type of mindfulness practice was assessed at post-course as part of the computer-administered self-report assessment battery. Participants were asked to retrospectively report the

average between-session frequency (number of times per week) and duration (number of minutes of formal practice) for each of the several practices taught in MBRP over the past 7 days (Bowen et al. 2014). “Formal” practice included practices in which participants placed focused attention on internal or external stimuli for a predetermined amount of time (e.g., body scan, breath meditation). “Informal” practices included intentionally attending to experience while performing daily activities (e.g., washing dishes) (Kabat-Zinn 1991) or while in high-risk or triggering situations.

Data Analyses

Multiple linear regression analyses were conducted in SPSS version 23 to assess whether mindfulness practice over the course of the 8-week intervention predicted FFMQ scores at post-course. Specifically, separate regression analyses were conducted to determine whether postcourse FFMQ subscale and total scores were predicted by (1) number of days of informal practice, (2) number of days of formal practice, and (3) number of minutes of informal practice. Baseline FFMQ scores and age were covaried in all analyses.

Results

Contrary to hypotheses, after accounting for age and baseline FFMQ scores, neither the frequency of informal nor formal meditation practice was predictive of neither postcourse individual subscales nor total FFMQ score. Similarly, total duration of formal meditation practice did not significantly predict postcourse FFMQ subscales or total scores (see Table 2).

Discussion

In the current study, we hypothesized that type (formal versus informal), frequency, and duration of mindfulness practice would be related to the total FFMQ score and subscales. However, no significant relationships were found between FFMQ scores and duration or frequency of mindfulness practice. Nonetheless, in the original trial from which these data were drawn, significantly greater changes in primary substance abuse outcomes were observed in the MBRP condition versus both the standard relapse prevention and treatment-as-usual control conditions (Bowen et al. 2014); however, significant changes in FFMQ were not reported.

Recent studies do suggest an association between mindfulness practice and clinical outcomes (e.g., Grow et al. 2014; Elwafi et al. 2013), yet the relationship of FFMQ scores to both practice and outcomes is inconsistent. In a study by Falkenström (2010), for example, FFMQ scores could not differentiate between participants who attended a mindfulness

meditation retreat versus a control group, yet there was a noticeable increase in well-being for the meditation condition.

Studies assessing the relationship between mindfulness practice and FFMQ also yield mixed results. A recent trial (Morgan et al. 2011) found limited relationships between practice frequency and FFMQ subscale scores in a sample of 27 people. In contrast, another study found that frequency of mindfulness practice associated with an MBI *was* related to differences in scores on the FFMQ (Woods and Proeve 2014).

In related research, Soler et al. (2014) found that frequency and lifetime mindfulness practice were significantly related to higher FFMQ scores, but practice session length and type of mindfulness practice were not. In this same study, a new measure labeled the MINDSENS index was created, based on FFMQ subscales. The new measure was more sensitive to differences in daily meditators vs. non-meditators, showing the strongest responses to concrete indices of practice and discriminating between daily meditators and non-meditators in 82.3 % of cases. Future research might use facets of the MINDSENS index in conjunction with frequency, duration, type, and lifetime indices of mindfulness practice to support clinical outcomes related to mindfulness practice.

There are several explanations for results from the current study, as well as the others discussed here. Mindfulness may not reliably increase with duration or frequency of practice. Alternatively, it may be that current self-report methods of measuring both mindfulness and mindfulness practice are not accurately capturing these constructs. As with any self-report measure, reliability can be an issue; results from the current study may be an artifact of measuring formal and informal mindfulness meditation practice using a retrospective self-report method (Grossman and Van Dam 2011). Additionally, there may be reliability issues with the FFMQ. The measure was designed based on concepts and measurement considerations from Dialectical Behavior Therapy literature and has incorporated items from other scales, i.e., the Mindful Attention Awareness Scale (MAAS; Brown and Ryan 2003) in to the facet “Acting with Awareness” (Grossman 2008; Grossman and Van Dam 2011). It was not originally designed to capture changes in mindfulness practice, yet the measure is often used to examine mindfulness in clinical studies. Additionally, the FFMQ has shown differential item functioning between clinical versus nonclinical samples (Bowen and Enkema 2014), frequency and duration of practice (Soler et al. 2014) and years of meditation experience (Grossman and Van Dam 2011). It has also shown to load better onto a bifactor structure than the original five facets (Aguado, et al. 2016).

Another possible issue is validity of the subscales. The FFMQ subscale “Observe” has shown inconsistencies with external validity in other studies, including the 2008 validation study (Baer et al. 2008; de Bruin et al. 2012; Williams et al. 2014). Grossman and Van Dam (2011) suggest that the

Table 2 Regression coefficients

Variables		B	SE (B)	β	<i>t</i>	Sig. (<i>p</i>)
Informal practice (frequency)	Observe	.006	.005	.108	1.303	.197
	Describe	.006	.004	.108	1.444	.153
	Act with awareness	−.003	.004	−.066	−.734	.466
	Non-judgment	−.003	.005	−.047	−.475	.636
	Non-reactivity	.006	.004	.146	1.497	.139
	Total	.003	.003	.092	1.038	.303
Formal practice (frequency)	Observe	.006	.028	.021	.218	.828
	Describe	−.008	.022	−.031	−.386	.701
	Act with awareness	.013	.023	.056	.559	.578
	Non-judgment	−.039	.027	−.147	−1.436	.156
	Non-reactivity	.004	.024	.017	.158	.875
	Total	−.006	.015	−.037	−.388	.699
Formal practice (duration)	Observe	.002	.003	.039	.437	.663
	Describe	.002	.003	.044	.568	.572
	Act with awareness	.002	.003	.072	.781	.437
	Non-judgment	.002	.004	.045	.447	.656
	Non-reactivity	.002	.003	.079	.765	.447
	Total	.002	.002	.087	.947	.347

statistical methods used in this validation trial may not have accounted for potential differential item functioning in the “Observe” and “Describe” subscales.

The clinical nature of the sample also may have an effect on FFMQ validity. For example, Bowen and Enkema (2014) found evidence to suggest that the relationship between mindfulness and outcome variables can differ between clinical and non-clinical populations. Additionally, interaction effects have been found between subscales in substance use populations, such that “Observing” was negatively associated with “Non-reactivity” at higher levels of substance use, but positively correlated with “Non-reactivity” at lower levels of substance use (Eisenlohr-Moul et al. 2012).

Although there is ample evidence for the psychometrics of the FFMQ (Baer et al. 2006; 2008), the generalizability of its clinical utility is undetermined. Acknowledged as a limitation, the 2008 validation process of the FFMQ was conducted on a highly educated, predominantly white sample of meditators, composed of 63 % mental health professionals (Baer et al. 2008). Yet, the current literature shows that the FFMQ is most often used to measure changes in clinical samples of MBI participants who do not match the validated sample of healthy individuals (Crane et al. 2014; Hawley et al. 2013; Hughes et al. 2013; Ma and Teasdale 2004; Witkiewitz et al. 2013). Fewer studies have examined the validity of the FFMQ with a clinical sample (Curtiss and Klemanski 2014; Bowen and Enkema 2014).

Recent evidence has further suggested that changes in mindfulness as measured by the FFMQ are not uniquely tied to mindfulness instruction in an MBI. For example, Goldberg

et al. (2015) found that FFMQ mindfulness scores increased comparatively for participants in both a Mindfulness-Based Stress Reduction (MBSR) course and a Health Enhancement Program. The Health Enhancement Program (HEP) did not include any mindfulness instruction, yet participant FFMQ scores increased and maintained over time concurrently with the MBSR participant scores. This evidence, in combination with the homogeneity of the FFMQ validation sample, may suggest that the construct of mindfulness is most properly evaluated with the FFMQ in a healthy sample of highly educated individuals. Thus, the accuracy of this measure changes in a sample of individuals with more heterogenic demographics and the addition of clinical presentations.

Although the FFMQ has been validated in several languages (Cebolla et al. 2012; Heeren et al. 2011; Hou et al. 2014), there are few validation studies of the FFMQ in clinical samples. A literature search on Google Scholar, PsychInfo, and the Oregon Health and Science University database using the key words “Five Facet Mindfulness Questionnaire” and “validation” and “clinical sample*” yielded one validation study on Dutch patients with fibromyalgia (Veehof et al. 2011), and one on patients with depressive symptoms (Bohlmeijer et al. 2011). One other study that mapped FFMQ subscales onto depressive and anxious symptoms and found that “Acting with awareness”, “Non-judging”, and “Non-reacting” facets were correlated with depressive symptoms (Desrosiers et al. 2013). All clinical validation samples that were found concluded that the “Observe” facet was unrelated to symptoms. Further validating the FFMQ for an addiction population would be valuable, as addiction samples

may differ from other clinical samples due to factors such as comorbid psychological and physiological diagnoses and common involvement with the legal system, making further training and modifications of assessments necessary when working with this population (SAMHSA, 2004).

These considerations are distinctly important for those developing and assessing mindfulness-based interventions, in which an increase in mindfulness is assumed to be the primary mechanism of change. While earlier studies showed significant relationships between self-report mindfulness measures such as the FFMQ and primary psychosocial outcome variables in nonclinical samples (e.g., Leigh et al. 2005), as the field progresses and these relationships undergo more nuanced analysis and assessed in increasingly diverse clinical populations, the picture may not be so clear. Given the reliability of the FFMQ in the samples on which it was validated, it has been shown that this measure may capture the construct of mindfulness in certain demographics. In some clinical samples however, the FFMQ subscales show inconsistent factor structure (Veehof et al. 2011; Williams et al. 2014) and may be due to individual differences in interpreting the meaning of the items. This suggests that the FFMQ may not be generalizable to all samples and that more research needs to be done on the validity and utility of the FFMQ for specific clinical samples.

Future Research

The current literature contains few studies examining the amount of mindfulness meditation practice (duration and frequency) as it relates to clinical outcomes (Crane et al. 2014). Additionally, the original construct validation study for the FFMQ did not evaluate formal meditation practice in duration and frequency as it relates to total FFMQ score (Baer et al. 2008). Given that there is still a debate in the literature about how to measure mindfulness (Grossman 2011; Brown et al. 2011), and even how to define it (Bishop et al. 2004), future research may consider behavioral measures of mindfulness practice such as duration and frequency and determine how it directly relates to outcomes.

It may also be useful to distinguish which aspects of interventions contribute to certain outcomes. In addition to mindfulness practice, many MBIs include psycho-education to target maladaptive behavior. To gain a better understanding of mechanisms underlying changes in outcomes, parsing out changes due to mindfulness practice vs. psycho-education or other aspects of interventions may be necessary. Moreover, analyses of the relationships between meditation practice and clinical outcomes will further illuminate specific mechanisms within an intervention such as MBRP. Finally, it may be necessary to create a version of the FFMQ for clinical participants and validate this version for use in MBI clinical trials moving forward.

This is one of the first studies conducted on a clinical population that assesses the relationship between mindfulness practice and FFMQ scores. The results from this study suggest that the FFMQ may need further validation in clinical samples of MBI participants. Further exploration of the relationship, or lack thereof, between mindfulness practice and measures of mindfulness is needed.

Compliance with Ethical Standards

Funding This study was funded by the National Institute on Drug Abuse (# RO1 DA025764-01A1).

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The authors declare that they have no conflict of interest.

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