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Self Report Measures of Mindfulness: A Review of the Literature

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Self Report Measures of Mindfulness: A Review of the Literature

Abstract

The aim of this review is to examine mindfulness measures and determine future directions for mindfulness assessment. Mindfulness has become established in clinical psychology as an intervention for many disorders including substance abuse and depression. Seven mindfulness measures were reviewed, including their development and normative sample psychometrics. Current mindfulness measures were found to be generally psychometrically sound and to assess some (albeit differing) aspects of the construct of mindfulness. A new five factor measure created from the amalgamation of several mindfulness measures was also reviewed of this scale appears to be the most inclusive assessment of mindfulness at present.

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SELF REPORT MEASURES OF MINDFULNESS:

A REVIEW OF THE LITERATURE

A THESIS

SUBMITTED TO THE FACULTY

OF

SCHOOL OF PROFESSIONAL PSYCHOLOGY

PACIFIC UNIVERSITY

FOREST GROVE, OREGON

BY

NINFA JOHNSON

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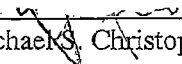
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APPROVED.


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Abstract

The aim of this review is to examine mindfulness measures and determine future directions for mindfulness assessment. Mindfulness has become established in clinical psychology as an intervention for many disorders including substance abuse and depression. Seven mindfulness measures were reviewed, including their development and normative sample psychometrics. Current mindfulness measures were found to be generally psychometrically sound and to assess some (albeit differing) aspects of the construct of mindfulness. A new five factor measure created from the amalgamation of several mindfulness measures was also reviewed and this scale appears to be the most inclusive assessment of mindfulness at present.

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Mindfulness: Construct Explication

Mindfulness has become increasingly prevalent in psychology over the past few decades. The concept of mindfulness originates from Buddhism and involves the practice of meditation to develop the skill of mindfulness, which has been described as an awareness of being aware (Hirst, 2003), as well as “moment-by-moment awareness” (Germer, Siegel & Fulton, 2005, p. 6). In the Buddhist tradition, healing starts with mindfulness meditation and the subsequent increase in awareness of phenomena (Germer, Siegel & Fulton, 2005). The Buddhist definition of mindfulness states that it “requires both attention and concentration to be present in the current moment” (Hirst, 2003, p. 360) and results in a more objective view of the process of experience (Germer, Siegel & Fulton, 2005). The practice of mindfulness also traditionally involves a compassionate attitude toward others as well as one’s self (Kumar, 2002). The current concept and definitions of mindfulness have removed some of the original Buddhist terminology which Kabat-Zinn (2000) states was done to foster more acceptance and understanding of the concepts of mindfulness, such as attention and states of mind like wakefulness without resistance to Buddhist or Eastern terms. Kabat-Zinn’s description of mindfulness closely resembles mindfulness as many in psychology describe it, but also includes references to Buddhist text:

Mindfulness was taught by the Buddha in the *Mahasattipathana Sutta*, which speaks of the four foundations of mindfulness: the contemplation of the body, the contemplation of feelings (pleasant, unpleasant, and neutral sensation), the contemplation of mind states (including thoughts and emotions), and the contemplation of mind objects (suffering, impermanence, emptiness) (p. 233).

Kabat-Zinn (2000) also explains that there are two major types of meditation practice: *samatha* (also called *samadhi*) and *vipassana*. Kabat-Zinn describes *samatha* as the strand of concentration and may involve focusing on the breath or a tone and *vipassana* as the strand of insight and awareness and involves attention to physical sensations, thoughts and feelings. Lastly, in summarizing the extant literature, Bishop et al. (2004) operationally defined mindfulness as two interrelated components. They stated “The first component involves the self-regulation of attention so that it is maintained on immediate experience, thereby allowing for increased recognition of mental events in the present moment. The second component involves adopting a particular orientation toward one’s experiences in the present moment, an orientation that is characterized by curiosity, openness, and acceptance.” (p. 232). The term mindfulness incorporates many concepts such as awareness and meditation and retains original ideas from the Buddhist tradition that it was derived from.

Mindfulness and Psychotherapy

Yoga, focused meditation, qigong and tai chi are all popular types of relaxation practices that are related to mindfulness, but are generally considered to be outside of the mainstream clinical psychology field. However, the incorporation of mindfulness practice and techniques into clinical interventions has gained favor among professional psychology. In a review of the mindfulness literature, Baer (2003) concluded mindfulness-based interventions may be beneficial for a variety of psychological issues and seem to be theoretically similar to other empirically supported interventions, which is an opinion that is held by many other clinicians that apply mindfulness techniques as a

clinical intervention (Brown & Ryan, 2003; Hayes, Follette & Linehan, 2004; Kabat-Zinn, 2000). Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn et al., 1992) and Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002) are two group-based interventions that teach mindfulness meditation skills in combination with other skills. Other treatment interventions that utilize mindfulness practices include Dialectical Behavior Therapy (DBT; Linehan, 1993), Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) and Mindfulness Based Relapse Prevention (MBRP; Marlatt, 2002), all of which will be described below.

MBSR is a manualized treatment that was initially created for the treatment of medical illness and it aims to teach mindfulness meditation with the goal of increasing mindful approaches to stressful situations and emotion regulation (Bishop, 2002). The MBSR program lasts 8 to 10 weeks and is run in groups of up to 30 individuals who meet weekly for lessons and to practice meditation techniques (Baer, 2003). Participants are educated about stress, emotions, coping and mindfulness skills, as well as given meditation homework (Bishop, 2002). An 8 hour intensive mindfulness session is conducted towards the end of the program (Baer, 2003). Participants learn different types of meditation skills like the body scan, sitting meditation, Hatha yoga postures, and mindfulness during everyday activities (Baer, 2003). MBSR has been applied to a variety of problems and is considered a general stress reduction program for both clinical and community populations (Hayes, Follette & Linehan, 2004). There are only a handful of both controlled and uncontrolled studies examining the effectiveness of MBSR (Bishop, 2002). Results have been found to be positive and encouraging with improvements in

symptoms and mood disturbance, but due to methodological limitations, the effectiveness of MBSR has not been definitively established (Baer, 2003).

MBCT is a theory-driven psychological intervention that is focused on relapse prevention for chronic major depression (Hayes, Follette & Linehan, 2004). MBCT is an 8-week group intervention that incorporates aspects of MBSR (Baer, 2003), but is specifically designed for those diagnosed with major depressive disorder who are in remission (Hayes, Follette & Linehan, 2004). In addition to mindfulness skills, MBCT includes cognitive therapy techniques to assist in the development of a decentered view of thoughts, although, unlike CBT, the aim is not to change the content of thoughts (Baer, 2003; Hayes, Follette & Linehan, 2004). Instead participants in the program are taught to become more aware of and to relate differently to their thoughts, feelings, and physical sensations (Hayes, Follette & Linehan, 2004). The 8 week group program meets weekly for 2 hours with enrollment of up to 12 participants (Hayes, Follette & Linehan, 2004). Daily homework exercises are assigned to increase awareness and foster an open attitude toward thoughts and feelings (Hayes, Follette & Linehan, 2004). Relapse prevention is believed to be supported by involving family members, suggested activities that interrupt relapse patterns and increased awareness that permits early detection of relapse-related patterns of negative cognitions (Hayes, Follette & Linehan, 2004). MBCT has been shown to be effective in preventing relapse with individuals who have experienced three or more episodes of depression and was more effective than treatment as usual with this population (Hayes, Follette & Linehan, 2004). MBCT is part of a trend to develop and expand cognitive behavioral treatments with successful and promising results.

DBT is a multi-component behavioral therapy that incorporates dialectical thinking with skills training, including mindfulness skills (Linehan, 1993). DBT was created in the 1970s as a treatment for suicidal individuals and has been found to be an efficacious treatment for patients with borderline personality disorder (BPD) and comorbid diagnoses of substance abuse and dependence, binge eating disorder, and bulimia (Robins, Schmidt & Linehan, 2004). Treatment includes group and individual sessions, as well as phone contact between sessions (Germer, Siegel, & Fulton, 2005). Linehan (1993) includes mindfulness skills in DBT as a means of increasing awareness of the internal experiences of thoughts and feelings as opposed to utilizing formal meditation practices. Patients with BPD are believed to have a biological predisposition to the disorder that is presumed to be activated by an invalidating environment, which leads to dysfunctions in identity, emotion regulation and cognitions (Linehan, 1993). Linehan focuses on teaching individuals with BPD skills for particular deficits to counteract learning that occurred during childhood and increase emotional consistency and a stable sense of self. The mindfulness skills taught include observing non-judgmentally, describing, radical acceptance and participating with one's full attention.

ACT stemmed from behavior analysis and Relational Frame Theory while incorporating mindfulness and acceptance (Hayes & Strosahl, 2004). The goal of ACT is psychological flexibility through acceptance, defusion, self as context, contact with the present moment, values and committed action. Language is viewed as the basis of many psychological disorders, as well as the source of human suffering (Hayes & Strosahl, 2004). Techniques used by ACT therapists include interventions derived from cognitive behavior therapy, experiential therapy and gestalt therapy, as well as mindfulness

techniques although they are often not labeled as such. Mindfulness interventions are used to extinguish the stimulus functions that have been established through relational learning (Hayes, Follette & Linehan, 2004). ACT has been shown to be effective or efficacious for depression, psychosis, substance abuse, chronic pain, eating disorders and other disorders (Hayes, Follette & Linehan, 2004). Additional effectiveness studies with larger sample sizes are needed to establish ACT as an efficacious therapy, but preliminary outcome studies are promising.

MBRP integrates mindfulness practice into relapse prevention treatment for substance abuse and dependence disorders (Marlatt, 2002). More specifically, Marlatt (2002) suggested that mindfulness meditation may be combined with a cognitive behavioral based substance abuse treatment to enhance effectiveness and support relapse prevention (Witkiewitz, Marlatt & Walker, 2005). Traditional relapse prevention focuses on challenging maladaptive thoughts while MBRP attempts to change the relationship with one's thoughts where thoughts and cravings are viewed as temporary mental events that will come and go and clients are taught that acceptance of these thoughts and cravings will reduce suffering (Hayes, Follette & Linehan, 2004). With MBRP thoughts and cravings that had been previously experienced as aversive or unwanted are accepted and allowed to pass without acting upon them (Hayes, Follette & Linehan, 2004). Specific cognitive behavioral strategies are taught such as coping skills and behavioral activation that are combined with mindfulness practice (Hayes, Follette & Linehan, 2004). Benefits of MBRP include relative effectiveness, inexpensiveness and accessibility (Witkiewitz, Marlatt & Walker, 2005). Studies have shown support for the clinical effectiveness of MBRP in an incarcerated and community sample to reduce

alcohol and drug use and improving self-regulation and willingness to change (Hayes, Follette & Linehan, 2004).

The Measurement of Mindfulness

As noted above, the need for valid reliable measures of mindfulness has become apparent to help define the construct of mindfulness and assist with examining the mechanisms of mindfulness interventions and training (Bishop et al., 2004; Brown & Ryan, 2003; Dimidjian & Linehan, 2003). Two primary types of mindfulness measurement have developed in recent years: neuroimaging and self-report. With regard to the former, Cahn and Polich (2006) reviewed studies involving EEG and other neuroimaging techniques, and they observed differences between meditators and control groups, as well as changes within meditators. Similarly, using EEG and self-report, Davidson et al. (2003) found increases in left-sided anterior activation following meditation training, suggesting reductions in anxiety and negative affect and increases in positive affect were related to mindfulness practice. Although useful in determining neurochemical changes related to mindfulness practice, neuroimaging studies have limited utility in assessing trait mindfulness and these methods are costly and time consuming. The development of self-report measures of mindfulness is also a relatively new phenomenon. The first self-report measure assessing contemporary definitions of mindfulness was created in 2001, and although a number of subsequent self-report measures have been developed, additional psychometric support is needed to validate the widespread use of these recently created measures. The currently published self-report measures of mindfulness are described in more detail below.

Freiburg Mindfulness Inventory (FMI)

The FMI was developed by Buchheld, Grossman, and Walach (2001) as a quantitative measure for self-evaluation of mindfulness to be used in research assessing changes in mindfulness pre- and post-mindfulness meditation. The measure was originally written in German, and later revised and translated into English (Walach, Buccheld, Bутtenmuller, Kleinknecht and Schmidt, 2006). Buccheld et al. (2001) borrow largely from a previously derived definition of mindfulness, which describes it as “attentional, unbiased observation of any phenomenon in order to perceive and to experience how it truly is, absent of emotional or intellectual distortion” (Solé-Leris, 1994, p. 26). In the FMI they conceptualize mindfulness as a state, which can be developed and acquired over time. The authors used materials on Buddhism, insight meditation, and subject experts to develop 38 test questions, which were later reduced to 30 with items removed for inadequate correlation to the total scale or excessive item difficulty. Seven of the original 38 items were phrased negatively and items were presented randomly to participants who rated the items on a four-point Likert-type scale ranging from ‘rarely’ to ‘almost always’. Sample items include ‘I see my mistakes and difficulties without judging them’ (Nonjudgmental Acceptance), ‘I watch my feelings without getting lost in them’ (Mindful Presence), ‘I pay attention to what’s behind my actions’ (Insight) and ‘I accept unpleasant experiences’ (Openness to Experiences).

The measure was tested on a normative sample of 115 German-speaking individuals attending a Vipassana retreat, which included a minimum of 8 hours of sitting and walking meditation and silence was maintained throughout the retreat. The time from initial assessment to final assessment varied from 3 to 14 days, depending on the length

of the retreat. At initial pre-retreat evaluation (t1), participants were instructed to rate their experience for the previous two-week period and at post-retreat evaluation (t2), they were asked to rate the past 2 to 7 days when they had been at the retreat. Of the total sample of 115 individuals, 100 questionnaires were filled out completely for t1 and 93 were complete for t2, with 79 participants completing questionnaires for both administrations. The mean age of the sample ($n = 115$) was 43 years with a range of 22 to 61 years of age and the gender composition was 69% female ($n = 79$) and 31% male ($n = 36$). A mean of five years of insight meditation was reported by the sample, with a range of 0 to 22 years. The participants reported practicing an average of 2.7 hours of meditation per week with a range of 0 to 14 hours per week.

Initial psychometric analysis indicated that the FMI is internally consistent and reliable (Cronbach's $\alpha = .93$ at t1) and was able to detect a significant mean change ($z = -6.99, p < .001$) in mindfulness from pre-retreat ($M_{t1} = 77.12; SD_{t1} = 12.45$) to post-retreat ($M_{t2} = 89.4; SD_{t2} = 11.33$). To test the factor structure of the FMI the authors conducted a principal components factor analysis with Varimax rotation. Four factors were recognized that represented 53.9% of the total variance at the first administration: present-moment disidentifying attention, nonjudgemental and nonevaluative attitude toward self and others, openness to negative mind states, and process-oriented insightful understanding. At the second administration, it was discovered that the factor structure was somewhat unstable and the four factors were identified as follows: mindful awareness, accepting attitude toward experience, process-oriented understanding of experience, and present moment focus without becoming lost in thoughts. This change in

factor loading was suggested to be due to “a meta-level shift in conception of the self and the nature of the experience” (Buccheld, Grossman & Walach, 2001, p. 18).

In a follow-up study, Walach et al. (2006) developed and tested a revised version of the FMI. Participants with meditation experience were recruited from Vipassana retreats. There were 85 participants, 29 men and 56 women, with a mean age of 43.6 years ($SD = 9.32$). Meditation practice was reported to average 2 to 3 times per week with mean reported meditation experience of 85 months. A total of 65 individuals filled out the questionnaire after the retreat. Participants were also recruited in public lectures and adult education institutions. Of the 85 subjects, 47 were female and the mean age was 34.4 years ($SD = 12$). Eight participants had meditation experience. A clinical sample of participants were included from a variety of clinical backgrounds ($n = 117$), although demographic data was available for only 66 of these participants. The gender makeup was 52 women and 14 men. The clinical sample included 28 individuals diagnosed with borderline personality disorder from an inpatient program, as well as clients from in- and out-patient facilities of psychotherapy programs and hospitals that included a variety of diagnoses. The clinical sample filled out the SCL-90 and the FMI only.

After removing items with low correlations with the overall scale, Walach et al. (2006) created a short form with 14 items that appeared robust and statistically sound (Cronbach's $\alpha = .79$, $r_{it} = .21$) and was found to correlate with the original version ($r = .95$). In examining validity, the FMI was found to be valid with participants who meditate regularly reporting higher mindfulness scores than participants who meditate less or do not meditate ($p = .013$; Kruskal Wallis). FMI scores were also found to change significantly after meditation retreats. The FMI was also negatively correlated with the

psychological symptoms ($r = -.33, p < .05$), dissociation ($r = -.30, p < .05$), and the following subscales of the DES: absorption ($r = -.31, p < .05$), derealisation ($r = -.31, p < .05$) and conversion ($r = -.26, p < .05$). Positive correlations were discovered between FMI and the SAM subscales private self awareness ($r = .33, p < .05$) and self knowledge ($r = .57, p < .05$). The authors believe the FMI should only be used with experienced mindfulness meditators as the ambiguity of some questions could be misconstrued and result in inaccurate scores.

Mindful Attention Awareness Scale (MAAS)

The MAAS is a theoretically-derived self-report measure that assesses individual differences in the frequency of mindful states over time (Brown & Ryan, 2003). The conceptual basis of the MAAS is rooted in self-regulatory models of psychological functioning and self-awareness. Brown and Ryan stated that everyone has the capability to attend and to be aware and that there are individual differences in willingness to be aware and be in the present moment, which can be affected by many factors, such as habitual or automatic thought or action. Brown and Ryan's conceptualization of mindfulness stems from Langer's (1989) concept of "wakefulness," but is differentiated as an open, undivided observation of internal and external stimuli rather than a particular cognitive approach to external stimuli as with Langer's wakefulness. Langer's conceptualization is an active mental process that involves openness to new perspectives. The authors focused on the presence or absence of attention to and awareness of present-moment phenomenology, thus the name of the measure, mindful attention awareness. Aspects that have been shown to be associated with mindfulness, such as acceptance, trust, and empathy, were included in the original version of the MAAS, but were

determined to be statistically redundant. Brown and Ryan attempted to measure mindfulness as a state of consciousness that varies from individual to individual, as well as within the individual.

The MAAS is a 15-item questionnaire with items scored on a 6-point Likert-type scale from 1 (*almost always*) to 6 (*almost never*). A mean score is calculated and higher scores indicate greater mindfulness. Scale items were created from previous writings on mindfulness. A pool of 184 items was established that both directly and indirectly measure mindfulness. This pool was reduced to 55 items by excluding items that contained attitudinal components, motivational intent, or consequences of mindfulness, as well as items that implied higher levels of consciousness. Items were also rated by nine experienced practitioners of mindfulness on a 5-point Likert-type scale from *very good* to *very poor*. Items that were rated high and consistently across the experts kept and were rated again by eight faculty and graduate students in psychology. The pool of 55 items were used in several pilot studies with undergraduate students and items that had skewed or kurtotic distributions or that did not have a full range of response on a 6-point Likert-type scale were removed. The remaining 24 items were tested to explore the factor structure. A sample of 313 undergraduate students was used. The mean age of the sample was 19.5 with a range of 18 to 23 years of age. Women made up 66% of the sample. Participants reported ethnicity as 73% Caucasian, 15% Asian, 3% African-American, 4% Hispanic, and 5% Other. The exploratory factor analysis showed a strong single-factor solution, with the factor accounting for 95% of the total variance. Items that loaded on the first factor were retained, resulting in a 15-item measure with all items loading above .30, except items 5 and 13 which loaded above .25.

A confirmatory factor analysis (CFA) was performed to further establish the single-factor model using a sample of 327 university students. The mean age was 19.6 with a range of 17 to 28 years of age. Women made up 64 % of the sample and ethnicity was reported as follows: 77% Caucasian, 10% Asian, 5% African-American, 3% Hispanic, 1% Native American, and 5% Other. The authors found that a single-factor model provided an acceptable fit to the data, $\chi^2(90, N = 327) = 189.57$ (goodness-of-fit index [GFI] = .92, comparative fit index [CFI] = .91, index of fit [IFI] = .91, parsimony-adjusted comparative fit index [PCFI] = .78, root-mean-square error of approximation [RMSEA] = .058). All items were significantly correlated to the latent factor and internal consistency was reported as .82. Another CFA was conducted using a non-student national sample, with a mean age of 43.3 and a range of 18 to 77 years of age. The participants completed the MAAS as part of a mail-out survey study. Women made up 66% of the sample and ethnicity was reported as follows: 93% Caucasian, 1% Asian, 1% African-American, 2% Hispanic, and 3% Other. In this sample the single factor model also provided an acceptable fit to the data, $\chi^2(90, N = 239) = 179.14$ (GFI = .91, CFI = .92, IFI = .92, PCFI = .79, RMSEA = .065). Alpha was reported as .87 and all items were correlated with the latent factor.

Test-retest reliability was determined using an independent sample of 60 psychology students (26 men, 34 women; mean age 19 years) over a 4-week period. The intraclass correlation was .81 ($p < .0001$). Scores for the same individual were examined and the authors found that Time 1 and Time 2 scores were not significantly different, $t(59) = .11, ns$. Thus the MAAS was found to be reliable with multiple administrations.

Brown and Ryan (2003) compared the MAAS with other measures to determine convergent, discriminant, and criterion validity. The MAAS was moderately correlated with the Openness to Experience subscales of the NEO Personality Inventory (NEO-PI) and the NEO Five-Factor Inventory (NEO-FFI; Costa & McCrae, 1992) with correlations reported as .18 ($p < .01$) and .19 ($p < .05$), respectively. The Mindfulness/Mindlessness Scale (MMS; Bodner & Langer, 2001) was found to correlate with the MAAS ($r = .31, p < .0001$) and subscales of the Self-Consciousness Scale (SCS; Fenigstein, Scheier & Buss, 1975) including Self-Reflectiveness ($r = -.13, p < .05$), Internal State Awareness ($r = .23, p < .0001$) and Social Anxiety ($r = -.36, p < .0001$). The Rumination-Reflection Questionnaire (RRQ; Trapnell & Campbell, 1999) was examined by subscale and the MAAS was determined to correlate solely with the Rumination subscale ($r = -.39, p < .0001$). Absorption (Tellegen, 1982) was found to be inversely related to the MAAS, although the correlation was small ($r = -.15, p < .05$). The Marlowe-Crowne Social Desirability Inventory (Crowne & Marlowe, 1960) was positively correlated ($r = .24, p < .001$). The MAAS was inversely correlated with the Neuroticism scales from the NEO-PI and NEO-FFI ($r = -.56, p < .0001$). The MAAS was positively correlated with measures of self-esteem with values ranging from .27 to .39 ($p < .0001$). Higher self-actualization was related with increased mindfulness scores with correlations varying from .31 to .43 ($p < .0001$). The MAAS was inversely correlated with self-reported physical symptoms ($r = -.25, p < .0001$) and somatization ($r = -.40, p < .0001$).

Brown and Ryan (2003) gave the MAAS to a sample of 50 Zen meditators to compare with a matched control group of adults. The total sample had a mean age of 41.08, ranging from 22 to 62 years of age with a gender makeup of 21 men and 29

women. A t-test compared the MAAS scores of the Zen meditator group with the control group and found a statistically significant difference, $t(98) = 2.45, p < .05$ (Cohen's $d = .50$). Of the meditator group, 42 individuals were currently practicing at the time of the study and when this "active" group was examined, the distinction between the groups was even more evident, $t(82) = 3.09, p < .005$ ($d = .68$). The authors also found the number of years of meditation practice was correlated with the MAAS ($r = .36, p < .05$).

The MAAS was also examined for its ability to predict well-being in a clinical context (Brown & Ryan, 2003). The 41 participants had been diagnosed with breast or prostate cancer and were post surgery with an average time since diagnosis of 2 years. The mean age of the sample was 55.31 with a range of 37 to 76 years of age. Women represented 78% and 85.4% of the sample was married. The participants were enrolled in an 8 week MBSR program. Using a multiple regression, Brown and Ryan found higher levels of mindfulness were associated with lower levels of mood disturbance ($p < .01$) and stress ($p < .01$) before and after the MBSR program, with the MAAS accounting for 14% of the variance in the pre- to post-MBSR change.

Kentucky Inventory of Mindfulness (KIMS)

The KIMS is based on the conceptualization of mindfulness espoused in Dialectical Behavior Therapy (DBT; Linehan, 1993). By answering the question, "What does one do (or refrain from doing) when being mindful?" (Baer, Smith & Allen, 2004, p. 193), test items were created that were believed to tap into behavioral mindfulness skills. The result was items that fit into 4 categories of Linehan's concept of mindfulness: observing, describing, acting with awareness, and accepting without judgment (Baer et al., 2004). The skill of observing and noticing a variety of body sensations, thoughts, and

emotions, as well as external stimuli is part of DBT, MBCT, and MBSR. Describing as a skill of observing without judgment is encouraged by different applications of mindfulness such as MBCT and DBT. Acting with awareness is a fundamental skill for MBCT and DBT and is often cultivated by completing routine activities with focused attention. The skill of accepting without judgment, also labeled as allowing or being nonjudgmental, is recognized by DBT and MBCT as accepting reality without trying to escape or change it and may involve tolerating unwanted thoughts and feelings.

The initial version of the KIMS consisted of 77 items and the content validity of these items was assessed by five practicing psychologists who were trained in DBT, as well as six doctoral students in clinical psychology who had completed a course on DBT and led DBT skills groups for at least 1 year under supervision. The experts were asked to classify each item into one of the four mindfulness skills categories and rate how well each item fits within the category on a 4 point Likert-type scale from 'poor' to 'excellent', as well as rate the quality of each test item for clarity, bias, and offensiveness. The percentage of raters who identified each item for the category for which it was written ranged from 45% to 100% with a mean of 86%. Mean ratings of item fit ranged from 2.89 to 4.0 with a mean of 3.61. Mean rating of quality ranged from 2.89 to 4.0 with a mean of 3.64. Four items had a mean interrater agreement of less than 60% and two items that had a mean rating below 3.0 and these items were eliminated from the final version.

The remaining items were tested on 205 undergraduate students at the University of Kentucky, aged 18 to 22 years old of which 60% were female and 85% Caucasian. Responses of the participants were used to examine the internal consistency of each of

the four scales (Observe, Describe, Act With Awareness, and Accept Without Judgment). Item-total and inter-item correlations were examined and those with the lowest item-total correlations were eliminated, as well as those with very high inter-item correlations which were considered redundant. Coefficient alpha was recalculated and the process replicated until each scale was reduced to 8 to 12 items with appropriate internal consistency and content coverage. The final version was reduced to 39 items with alpha coefficients for each scale as follows: Observe = .91, Describe = .84, Act With Awareness = .83, and Accept Without Judgment = .87, indicating adequate to good internal consistency for each factor. Each item is rated on a 5 point Likert-type scale from 1 'never or rarely true' to 5 'almost always or always true'. Items include 'Even when I'm feeling terribly upset, I can find a way to put it into words' (Describe), 'I pay attention to how my emotions affect my thoughts and behavior' (Observe), 'I tend to do several things at once rather than focusing on one thing at a time' (Act With Awareness) and 'I tell myself I shouldn't be feeling the way I'm feeling' (Accept Without Judgment).

Exploratory factor analysis was completed with this student sample using principal axis factoring with oblique rotation to allow for correlations among the factors. Nine factors with eigenvalues greater than 1.0 were found, which accounted for 64% of the variance, although the scree plot indicated a four-factor solution. A second factor analysis specifying four factors yielded a clear four-factor solution that was compatible with the four mindfulness skills and accounted for 43% of the variance after factor extraction. Only one item had a loading of less than .40 on the factor for which it was intended and most items had adequate to good factor loading. Three Observe items had

moderate negative loadings on the Accept Without Judgment factor, but were not eliminated to retain thorough coverage of the Observe skill.

The 39-item final version of the KIMS was tested on a sample of 215 undergraduate psychology students at the University of Kentucky. The demographics of the sample were similar to the previous sample. A second sample included 26 adults diagnosed with borderline personality disorder (BPD) who attended outpatient DBT programs. The mean age of this sample was 36 years and ranged from 20 to 52 years old with an average of 14 years of education. The sample was composed of Caucasian individuals and included one male. Diagnoses of BPD were longstanding and most participants had additional Axis I diagnoses, such as major depression and posttraumatic stress disorder. Alpha coefficients of the scales of the KIMS for the student sample were Observe = .85, Describe = .86, Act With Awareness = .76, and Accept Without Judgment = .87.

A confirmatory factor analysis was completed which combined the student sample with the BPD sample for a total of 241 participants with a range of ages and psychological symptoms. The comparative fit index (CFI) and the root mean square error of approximation (RMSEA) were chosen as fit indices. A hypothesized four-factor model led to the following results: CFI = .95, RMSEA = .07 (90% CI: .05 to .08). Loadings on factors ranged from .62 to .91. A one-factor model was also tested which provided a much poorer fit to the data: CFI = .41, RMSEA = .22 (90% CI: .21 to .23). Therefore, Baer et al. (2004) concluded that the KIMS is a multidimensional measure.

Test-retest reliability was conducted with 49 participants from the student sample of 215 that were given the KIMS twice with the second assessment 14 to 17 days

preceding the first. Test-retest correlations were separately computed for the Observe, Describe, Act With Awareness, and Accept Without Judgment scales and were .65, .81, .86, and .83, respectively, which is evidence of adequate to good test-retest reliability. Paired samples t-tests were completed and displayed no significant differences between scores at the first and second administrations of the KIMS.

Baer et al. (2004) also investigated the construct validity of the KIMS which was assessed by correlations with other measures and constructs related to mindfulness. Correlations between the KIMS and the NEO-FFI were examined and Neuroticism was found to be negatively correlated with Describe ($r = -.41, p < .001$), Act With Awareness ($r = -.31, p < .001$), and Accept Without Judgment ($r = -.42, p < .001$), but not with Observe, which in general indicates an inverse relationship between mindfulness skills and negative affect. Extraversion was significantly correlated only with Describe ($r = .36, p < .001$), which Baer et al. (2004) suggested may be due to a connection between the ability to put experiences into words and talkativeness or sociability. Openness was expected to be correlated with mindfulness, but significant results were only found for Observe ($r = .50, p < .001$). Baer et al. infer that individuals who score higher on openness are more attentive to their experiences, but are lacking in describing, maintaining a nonjudgmental stance, or acting with awareness. Agreeableness was significantly related with Act With Awareness only ($r = .27, p < .01$). Conscientiousness was correlated with Describe ($r = .37, p < .001$) and Act With Awareness ($r = .44, p < .001$). The authors conclude that the relationship between mindfulness and openness be further examined by using the NEO PI-R and separate scores in each domain.

Scores on the Global Severity Index (GSI) were negatively correlated with Describe ($r = -.33, p < .001$), Act With Awareness ($r = -.38, p < .001$) and Accept Without Judgment ($r = -.29, p < .001$). GSI scores were not related to the Observe scale, thus noticing is not connected with psychological symptoms. A measure of emotional intelligence, the Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey & Palfai, 1995) was strongly correlated with the Describe scale ($r = .54, p < .001$). Accept Without Judgment was not significantly correlated with any of the TMMS subscales, indicating to that emotional intelligence is not connected with a tendency to evaluate internal experiences.

The KIMS was further examined to determine if there were any correlations between the scales and demographic variables. Baer et al. (2004) determined there were no significant differences for gender, race, and age and year in school. The Observe scale was correlated with meditation experience ($r = .29, p < .001$) in spite of the fact that 87% of participants reported *none* or *a little* meditation experience. The authors suggest that this correlation be examined more closely with a sample that has more complete representation of meditation experience.

Bear et al (2004) also compared the KIMS with the MAAS. A sample of 115 students with similar demographics of the previous student samples completed both measurements. It was expected that the MAAS would correlate strongly with the Act With Awareness scale of the KIMS, correlate moderately with Describe and Accept Without Judgment and would not be correlated with Observe. The authors predicted this pattern of correlations due to MAAS items concerning awareness of present-moment experience and acting without deliberate attention. As expected, the MAAS was not

correlated significantly with Observe, however, significant correlations were found between the MAAS and Describe ($r = .24, p < .05$), Accept Without Judgment ($r = .30, p < .001$), and Act With Awareness ($r = .57, p < .0001$).

Cognitive and Affective Mindfulness Scale Revised (CAMS-R)

The CAMS-R is a revised version of the CAMS which was created by Kumar, Feldman & Hayes (2005). The CAMS is an 18-item measure which purports to measure individual differences in mindfulness while using general language that does not require any type of meditation training and was expected to be used with a range of samples (Feldman, Hayes, Kumar, Greeson, & Laurenceau, in press). Kumar et al. (2005) intended to capture a broad conceptualization of mindfulness with the initial measure, which was tested on a small sample of individuals diagnosed with depression who were participating in integrative psychotherapy that incorporated mindfulness training in the treatment. The CAMS was determined to be sensitive to change and contained appropriate concurrent validity, but was lacking in internal consistency and items were lacking in direct assessment of mindfulness (Feldman et al., in press). The factor structure was not tested initially with the small sample, but an exploratory factor analysis was completed with a larger student sample that supported a four-factor structure that is consistent with the theory of mindfulness, although primary loadings of specific items was not replicated between samples.

The CAMS-R was designed to improve the psychometric properties of the original CAMS, but to retain the comprehensive coverage of mindfulness, everyday language and brevity of the scale (Feldman et al., in press). A pool of 35 items was created by experts in mindfulness meditation, emotion regulation, and questionnaire

development with the intention of representing the four factors of attention regulation, present moment orientation, awareness of experience, and nonjudgmental stance. Item content included attitudes towards the experience of thoughts and feelings, although responses to external experiences or physical sensations were not reflected in item content. The pool included the 18 items of the original CAMS and both forward- and reverse-scored items.

A sample of 548 university students was asked to rate the item pool as how much they feel each item relates to them on a Likert-type scale from 1 (*Rarely/Not at all*) to 4 (*Almost always*). The sample was split into 2 groups: Sample 1, which was used to test the preliminary models and Sample 2, which was used to conduct a confirmatory factor analysis. Sample 1 consisted of 250 students of which 64.2% were women and 35.8% were men with a mean age of 19.31 ($SD = 2.66$). Ethnicity of Sample 1 was reported as 55.7% White/Caucasian, 18.4% Hispanic/Latino, 8.8% Black/African-American, 6.1% Asian-American, 11.0% Other/Mixed Heritage. Sample 2 was made up of 298 students of which 60.5% were women with a mean age of 18.74 ($SD = 1.92$). Sample 2 reported ethnic identification as follows: 55.7% White/Caucasian, 20.8% Hispanic/Latino, 7.2% Black/African-American, 6.8% Asian-American, and 9.5% Other/Mixed Heritage.

The authors examined a correlation matrix of the pool of 35 items and removed items with low correlations and redundant items. Twenty items were kept and tested using CFA and CFI, RMSEA, SRMR, and χ^2 were used as indices to assess goodness of fit. The 20 items were divided into four theoretically-derived categories (attention, present-focus, awareness and acceptance). A CFA model was tested with a second-order latent factor (mindfulness) and the four first-order latent factors, which were tested

simultaneously. The authors reported the 20-item model provided a relatively poor fit to the data [$\chi^2(160) = 388.09, p < .00001$; RMSEA = .073; SRMR = .075; CFI = .85]. Items were eliminated after examining the item loadings of the 20-item model and determining items that had poor loadings on their hypothesized factor, high cross-loadings on non-hypothesized factors, or were redundant with other items. All items were allowed to load on a single first-order factor and measurement error was not permitted to be correlated. The resulting model provided a good fit to the data [$\chi^2(50) = 81.04, p = .004$; RMSEA = .050; SRMR = .051; CFI = .95]. The final scale consisted of 12 items retained from the original 35 and 6 from the original CAMS.

A confirmatory factor analysis was completed using a second sample (Sample 2). Goodness of fit was found to be acceptable [$\chi^2(50) = 110.58, p < .0001$; RMSEA = .064; SRMR = .052; CFI = .92]. The loading pattern was determined to be similar to the first sample. Skew and kurtosis were examined for each of the 12 items for both samples and were found to not significantly differ from normally distributed population scores. The 12 items were found to have acceptable levels of internal consistency for both samples (Sample 1 $\alpha = .74$; Sample 2 $\alpha = .77$). Factor intercorrelations ranged from .23 to .89 for both samples. Subscale reliabilities were reported as ranging between .42 and .81. Intercorrelations, which were allowed to covary, between latent variables ranged from medium to large and correlations between unweighted scale scores were small to medium.

Feldman et al. (in press) concluded the 12-item CAMS-R satisfactorily sampled the four domains of mindfulness (attention, present-focus, awareness, non-judgment) and overall had acceptable levels of internal consistency. Items include 'I can tolerate

emotional pain' (Acceptance), 'I am preoccupied by the past' (Present Focus), 'I try to notice my thoughts without judging them' (Awareness) and 'I am easily distracted' (Attention). The results of the confirmatory factor analysis were replicated in another study examining adults diagnosed with inflammatory bowel disease (McPhail et al., 2005). The authors maintained the data supported a single mindfulness score rather than four subscale scores. First-order factor covariances indicated considerable interrelationship between the constructs purported to be measured by the subscales. The authors explained the low internal consistency of the subscales may be due to the conceptual breadth of the items, the brevity of the scales, and the four-point Likert type scale which may have restricted the variance for each item and reduced inter-item correlation. Feldman et al. (in press) assert the CAMS-R "shows promise as a measure that broadly captures the construct of mindful approaches to thoughts and feelings."

Feldman et al. (in press) also compared the CAMS-R with 2 other existing mindfulness measures and found that it positively correlated with the MAAS ($r = .51, p < .001$) and the FMI ($r = .66, p < .001$). Feldman et al. reported scores on the CAMS-R displayed small associations with age ($r = .13, ns$) and gender ($r = .19, p = .007$). Men endorsed slightly higher levels of mindfulness than women [$M_{Men} = 32.71 (SD = 5.05)$; $M_{Women} = 30.51 (SD = 5.90)$]. Internal consistency was found to be acceptable ($\alpha = .76$). Feldman et al. reported high mindfulness scores were significantly correlated with lower distress scores reported by subscales of the MASQ (Watson et al., 1995a,b), with correlations ranging from $-.23$ to $-.44$ ($ps < .001$). Significant correlations in the expected direction were also found between the CAMS-R and well-being (Ryff & Keyes, 1995; $r =$

.47, $p < .001$), experiential avoidance ($r = -.52, p < .001$), thought suppression ($r = -.47, p < .001$), worry ($r = -.46, p < .001$), and rumination ($r = -.30, p < .001$).

Feldman et al. analyzed possible confounding constructs for four items (Item 2, 3, 5, 7) that demonstrated low loadings on their first-order factors. A series of separate multiple regression analyses were conducted where two predictors, a measure of mindfulness (FMI) and a possibly confounding construct (worry, rumination, clarity of feelings, or mood repair), were compared with one of the four CAMS-R items with a relatively low loading. Feldman et al. found that worry ($B = .025, SE = .004, p < .001$) uniquely accounted for variance in Item 2. Rumination ($B = .021, SE = .004, p < .001$) uniquely explained variance in Item 7. The authors found that clarity of feelings ($B = .049, SE = .009, p < .001$) and mindfulness ($B = .024, SE = .006, p < .001$) were both significant independent predictors of Item 5. Mindfulness was also a significant predictor of Item 3 ($B = .037, SE = .006, p < .001$). A 10-item version of the CAMS-R that omits items 2 and 7 was tested and was found to be highly correlated with the 12-item version ($r = .97$). The authors further noted that there were no significant differences in the correlations between the 10-item CAMS-R and 12-item CAMS-R and the criterion variables.

Toronto Mindfulness Scale (TMS)

The TMS was created by Lau et al. (2006) to measure mindfulness after meditation as a state-like construct and consists of 13 items. Lau et al. intended to capture mindfulness defined as a two part construct: "The intentional self-regulation of attention to facilitate greater awareness of bodily sensations, thoughts, and emotions; and a specific quality of attention characterized by endeavoring to connect with each object in one's

awareness (e.g., each bodily sensation, thought, or emotion) with curiosity, acceptance, and openness to experience” (p. 1447).

To develop the measure, 42 statements were created that reflect the operational definition of mindfulness as established by Bishop et al. (2004). The items were intended to reflect “the subjective aspects of attentional self-regulation and a quality of nonelaborative attention characterized by curiosity, acceptance, and openness to experience” (Lau et al., 2006, p. 1449). The directions instruct responders to consider the preceding meditation session and rate how much each of the 42 statements describe their experience on a 5-point Likert-type scale from 0 ‘not at all’ to 4 ‘very much’.

A sample of 390 participants was recruited for testing internal consistency, factor structure, construct and criterion validity that was made up of 176 men and 214 women with a mean age of 40.8 years ($SD = 13.3$). Subjects who had no meditation experience were also recruited for comparison purposes ($n = 158$). Individuals with meditation experience ($n = 232$), which was defined as at least 8 weeks of daily meditation practice, were enlisted from a variety of places, including a local Buddhist meditation center, a meditation retreat and individuals who had completed a MBSR program. Participants were instructed to pay attention to their breathing for 15 minutes and then complete the TMS.

Items with extreme kurtosis and skewness were removed, and another item was removed due to low correlation with other items ($r = .28$). The 35 items that remained displayed high internal consistency ($\alpha = .95$) and an average item-total correlation of .53. An exploratory factor analysis was completed and a two factor model was retained. Twenty items were removed during the course of the factor analysis for multiple or

insufficient loadings, resulting in a 15-item measure with two factors, Curiosity and Decentering that account for 66% and 29% of the variance, respectively. A confirmatory factor analysis yielded mixed results for the two-factor model. Two items were removed for covariance which resulted in a significant chi-square test, $\chi^2(64) = 138.24, p < .0001$. Factor loadings were found to be statistically significant, ranging from .56 to .82. Reliability estimates of the composites were reported by the authors as .86 and .87 for the scales. A unidimensional model was determined to be inferior to the two-factor model, $\chi^2(1) = 349.74, p < .0001$, providing further evidence for the previous findings. Items include 'I remained curious about the nature of each experience as it rose' (Curiosity) and 'I was more concerned with being open to my experiences than controlling or changing them' (Decentering).

A sample of 165 participants was used to correlate the TMS with other measures. The mean age was 42.1 years ($SD = 13.3$) and 52.7% of the sample were female. Experience in meditation was reported from no experience to 15 years ($M = 2.9, SD = 5.7$). The Tellegen Absorption Scale correlated positively with both Curiosity ($r = .31, p < .001$) and Decentering ($r = .22, p < .01$), as did the Awareness of Surroundings subscale of the Situational Self-Awareness Scale (SSAS; Govern & Marsch, 2001) with correlations reported as .16 ($p < .05$) and .21 ($p < .01$), respectively. The Psychological Mindedness Scale (Conte et al., 1990) and the Reflection subscale of the RRQ were positively correlated with Curiosity ($r = .23, p < .01$; $r = .22, p < .01$) and Decentering ($r = .42, p < .001$; $r = .19, p < .05$). The Cognitive Failures Questionnaire (Broadbent, Cooper, Fitzgerald & Parkes, 1982) and the Openness subscale of the NEO-FFI were correlated solely with the Decentering subscale ($r = -.16, p < .05$ and $r = .23, p < .01$,

respectively. Interestingly, only Curiosity correlated positively with the Internal State Awareness subscale of the SSAS ($r = .41, p < .001$) and the Self-Consciousness subscale of the SSAS ($r = .31, p < .001$).

The authors utilized the same sample to compare TMS scores of meditators to non-meditators. A 2x2 between subjects MANOVA was conducted on the subscales Curiosity and Decentering with type of meditation (mindfulness meditation or Shambhala Buddhist meditation) and length of experience as independent variables. Lau et al. (2006) found a significant Type \times Experience interaction, $F(2,218) = 3.73, p = .025$. The subscales were examined individually and it was determined that the Curiosity subscale had a unique contribution to the interaction effect, $F(1,219) = 7.31, p = .007$. After a simple effects analysis of the data, Lau et al. concluded that those with over 1 year of meditation experience had significantly higher scores on the Curiosity subscale than those with under 1 year of experience ($p = .027$). Additionally, a multivariate effect was discovered for meditation experience, $F(2,218) = 12.75, p < .001$. Using a stepdown analysis, it was determined that Decentering scores were significantly higher for those with more meditation experience, $F(1,218) = 25.27, p < .001$.

Lau et al. (2006) also examined the TMS and its sensitivity to change. A sample of 99 participants was employed from MBSR programs in Massachusetts and Canada. Participants were diagnosed with a variety of conditions and ranged in age from 19 to 79 years ($M = 46.68, SD = 13.32$). The gender of the sample was reported as 67.5% female. Paired t -tests were conducted to determine changes in TMS scores from pre- to post-MBSR. Significant changes were found with the Curiosity and the Decentering subscales, $t(98) = 3.41, p < .01, d = .42$; $t(98) = 5.07, p < .001, d = .60$, respectively. Increases in

TMS scores were examined as predictors for clinical outcome measures using a hierarchical linear regression analysis while controlling for pretreatment clinical outcome scores. The outcome measures used were the Perceived Stress Scale (PSS; Cohen, Kamarck & Mermelstein, 1983) and the Brief Symptom Inventory (BSI; Derogatis, 1993). After removing variance for posttreatment BSI scores associated with pretreatment BSI, the remaining variance was found to be predictable by increases in the Decentering subscale ($r_p = -.22$), but not by the Curiosity subscale. Similar results were discovered for PSS outcome scores, with Curiosity failing to predict lower PSS scores, while higher Decentering scores did predict lower PSS scores ($r_p = -.36$). The Decentering subscale was determined to be a valid predictor of psychological distress.

Southampton Mindfulness Questionnaire (SMQ)

The SMQ, also referred to in some literature as the Mindfulness Questionnaire (MQ), is a 16-item self-report measure with items scored on a 7 point Likert scale from 0 (*disagree totally*) to 6 (*agree totally*). The total measure has a range of scores from 0 to 96. The SMQ is based on 4 related facets of mindfulness: decentered awareness of cognitions, letting cognitions pass, allowing attention to remain with difficult cognitions, and accepting difficult thoughts and images (Chadwick, Hember, Mead, Lilley, & Dagnan, 2007). Each of the 4 facets of mindfulness as defined by the SMQ has a bipolar component: decentered awareness of cognitions versus reaction to cognitions, letting cognitions pass versus rumination and worry, allowing attention to remain with difficult cognitions versus avoidance, and accepting difficult thoughts and images versus judging cognitions. Sample SMQ items include 'I am able just to notice them without reacting' (Decentered Awareness), 'I keep thinking about the thought or image after it's gone'

(Letting Go of Reacting), 'I accept myself the same whatever the thought/image is about' (Acceptance) and 'I am able to accept the experience' (Opening Awareness to Difficult Experience). Chadwick et al. (2007) assert that the SMQ examines the individual's mindful responding to distressing thoughts and images, which are part of a cognitive behavioral conceptualization of mental health issues.

The SMQ was determined by an expert of MBCT and a meditation teacher to have face validity as a measure of mindfulness. Initial psychometric testing was completed by administering the SMQ along with the MAAS and a subjective mood rating scale to a non-student community sample ($N = 134$). Participants were gathered using convenience and snowball sampling techniques, such as utilizing mailing lists for meditators. A between-groups design was implemented, comparing meditators ($n = 83$) and non-meditators ($n = 51$). Of the meditator group, 50 were women and the mean age was 47 with a range from 31 to 72 years of age. Of the non-meditator group, 38 were women with a mean age of 47 and a range from 23 to 71 years of age. Meditators had an average experience of meditating of 123 months ($SD = 95$), 3.7 days of meditating per week ($SD = 2.4$) and 25.3 minutes per meditation period ($SD = 17.2$). Sixty-eight percent of meditators and 24% of non-meditators practiced some form of Yoga, Tai Chi or Qigong. A second sample was also tested that consisted of 25 meditation naïve participants from a UK NHS Trust that were enrolled in a MBSR-based course headed by an experienced meditator who had participated in a weeklong training in MBSR. Gender and race of the participants were not reported. The course entailed of two hour weekly sessions for a total of six weeks, with daily mediation practice assigned.

The total sample had a mean score of 54.2 ($SD = 15.2$) on the SMQ and 60.1 ($SD = 10.5$) on the MAAS. There was no significant difference in scores between men and women ($t = -2.56$, $df = 48$, $p = 0.14$) and no correlation with age ($r = 0.02$, $n = 129$, $p = 0.88$). There were no discernible differences found between mindful and unmindful items. The SMQ was found to have a Cronbach's alpha of 0.89 and the corrected item-total correlations have a mean of 0.56 with a range of 0.38 to 0.74. The Cronbach's alpha for the MAAS was calculated as 0.86. SMQ scores were correlated significantly with MAAS scores ($r = 0.57$, $p < 0.001$), which is evidence of concurrent validity.

Postdictive validity was determined by comparing total scores on the SMQ for meditators ($N = 83$, $M = 57.4$, $SD = 14.3$) and non-meditators ($N = 51$, $M = 48.5$, $SD = 15.2$). A one-tailed independent t-test was significant ($t = 3.40$, $df = 132$, $p = .0005$). Within the meditation group, an independent t-test determined a significant difference in SMQ scores ($t = 2.48$, $df = 81$, $p = .015$) between individuals who meditate more than twice per week ($M = 60.71$, $SD = 14.36$) and individuals who meditate twice per week or less ($M = 53.05$, $SD = 13.31$). Chadwick et al. (2007) also reported a positive correlation between mood ($r = .26$, $n = 83$, $p < .0001$) with practice over the past month, but not with time since first meditation experience. There was a significant positive correlation between rating of pleasantness of mood and SMQ score ($r = .48$, $n = 127$, $p < .001$) which was interpreted as further evidence of validity. A partial correlation determined that the practice of yoga or other types of mindfulness practice did not significantly affect SMQ scores.

Of the sample which completed six weeks of MBSR, 21 of the 25 participants attended at least four sessions. The mean SMQ score at session 1 was 48.2 ($SD = 18.7$),

which was judged to be comparable to non-meditators in the first sample. At the start of session 3, the mean SMQ score was 51.7 ($SD = 15.8$) and at the end of session 6 the mean score was 59.6 ($SD = 16.7$). A repeated measures ANOVA determined there was a significant interaction between time and SMQ score ($F = 8.579$, $df = 19$, $p = .001$). Paired samples t -tests showed no statistical significance between SMQ scores at session 1 and session 3 ($t = -1.414$, $df = 19$, $p = .173$), a statistically significant difference between session 1 and session 6 ($t = -3.350$, $df = 19$, $p = .003$), and between session 3 and session 6 ($t = -3.186$, $df = 19$, $p = .005$). Therefore, Chadwick et al. (2007) assert that attendance of the MBSR program increased mindfulness as measured by the SMQ. They concluded that the SMQ has a good internal consistency and correlated significantly with the MAAS, another measure of mindfulness. The SMQ detected differences between meditators and non-meditators, as well as increases in mindfulness skills over the course of mindfulness training and was significantly correlated with mood rating. Chadwick et al. concluded that the SMQ evaluates the degree to which individuals can experience unpleasant thoughts and images with decentered awareness and suggest the SMQ may be useful for cognitive therapy and research.

Experiences Questionnaire (EQ)

The EQ is a 20-item self report questionnaire developed by Fresco et al. (in press) that measures an individual's ability to decenter, which is defined as the ability to view thoughts and feelings as impermanent and temporary. Cognitive therapy has highlighted decentering as an important mechanism of change and stresses that clients learn how thoughts and feelings do not always accurately represent reality (Safran and Segal, 1990). Inability to decenter is believed to be related to psychological and social dysfunction,

namely depression (Fresco et al., in press). The EQ was created to operationalize changes due to MBCT (Fresco et al., in press). Items were written to assess three facets of decentering: the ability to view one's self as separate from one's thoughts, the ability to non-judgmentally observe one's negative experiences without habitually reacting, and the capacity for self-compassion (Fresco et al., in press). Two subscales were constructed in the EQ; one which measured changes due to MBCT, including decentering and one which measured rumination, which was used as a control against response bias (Fresco et al., in press). Items are rated on a 5 point Likert-type scale from 1 (*never*) to 5 (*all the time*).

Initial psychometric properties were tested for the EQ using a student sample enrolled in university introductory psychology courses. The first sample ($n = 1150$) consisted of 765 women (66.5%) and 385 men (33.5%) with a mean age of 19.1 years ($SD = 4.1$). The second sample ($n = 519$) was made up of 335 women (64.5%) and 184 men (35.5%) with a mean age of 19.3 years ($SD = 2.4$).

A confirmatory factor analysis was completed using Sample 1, although the data did not fit the expected three factor structure, thus an exploratory factor analysis was performed. The data most strongly supported a two-factor model ($\chi^2[151] = 742.22$; $\chi^2/df = 4.92$; RMSEA = .06), although a three-factor model ($\chi^2[133] = 408.46$; $\chi^2/df = 3.07$; RMSEA = .05) was also considered, but the third factor had low item representation and interpretability. The Decentering factor showed good internal consistency in Sample 1 ($\alpha = .83$). The Rumination factor was adequate ($\alpha = .70$). To confirm the two-factor model, a CFA was completed using Sample 2, but was found to provide a poor fit to the data ($\chi^2[147] = 558.06$; $\chi^2/df = 3.80$; RMSEA = .08; SRMR = .09). The model was run again

with only the decentering items, allowing items to intercorrelate and was determined to provide a good fit to the data ($\chi^2[41] = 103.79$; $\chi^2/df = 2.53$; RMSEA = .06; SRMR = .04) with good internal consistency ($\alpha = .80$). Gender differences were also examined with this model and none of the items were found to load unequally between groups. Factor analyses resulted in the authors' retention of 11 items of the Decentering scale which includes items such as 'I can slow my thinking at times of stress', 'I can actually see that I am not my thoughts' and 'I view things from a wider perspective'.

The concurrent and discriminant validity of the 11-item Decentering scale was determined by Fresco et al. (in press) by comparison to measures of depressive rumination, experiential avoidance, cognitive reappraisal, and emotion suppression. The participants were 61 college students of which 56% were female and 88 % were Caucasian. The average age of the sample was 19.81 years ($SD = 2.87$). The Emotion Regulation Questionnaire (Gross & John, 2003) was found to correlate positively with the decentering items ($r = .25, p < .05$). The AAQ, the Ruminative Responses Subscale of the Response Styles Questionnaire (Nolen-Hoeksema & Morrow, 1991), the Beck Depression Inventory – II (Beck, Steer & Brown, 1996) and the Mood and Anxiety Symptom Questionnaire Short Form (Watson & Clark, 1991) had negative statistically significant correlations with the decentering scale with values ranging from $-.31$ to $-.49$. Individuals diagnosed with major depression were compared with persons without clinical diagnoses and were found to report significantly lower levels of decentering ($F[1,59] = 5.77, p = .02, d = .68$).

Fresco et al. (in press) further evaluated the factor structure and clinical validity of the EQ using a sample of individuals with major depression in remission. Data for 145

individuals with major depression in remission was obtained from Teasdale et al. (2000) who had examined the efficacy of MBCT. Participant data was utilized from another MBCT trial of Ma and Teasdale (2004). The depression in remission group total 220 individuals of which 165 were female (75%) with a mean age of 43.7 years ($SD = 9.6$). Participants were from parts of Canada and Cambridge, England. The control group consisted of 50 individuals of which 37 were female (74%) with a mean age of 44.5 ($SD = 8.9$) who received treatment-as-usual prior to and during the data collection. The unifactorial model was found to provide a good fit to the data ($\chi^2[41] = 61.87$; $\chi^2/df = 1.51$; CFI = .97, RMSEA = .06; SRMR = .05) with good internal consistency ($\alpha = .90$). The depression group ($M = 1.81$, $SD = .54$) scored significantly lower than the control group ($M = 2.47$, $SD = .42$) with a large effect size ($F[1,117] = 50.32$, $p < .0001$; Cohen's $d = 1.31$). Fresco et al. (in press) found amount of decentering was negatively correlated with self-report ($r = -.46$) and clinician assessment ($r = -.31$) of depressive symptoms.

Fresco et al. (in press) conclude that the Experiences Questionnaire is a unifactorial measure that taps into the construct of decentering. The measure has been tested on a variety of samples including a student sample and a clinical sample, expanding the generalizability of the measure. Adequate to good internal consistency has been demonstrated, as well as preliminary convergent and discriminant validity. The authors presumed the EQ is a reliable and valid measure of decentering, although comparisons to other measures of mindfulness will need to be established in the future.

Future Areas of Research

Baer, Smith, Hopkins, Krietemeyer and Toney (2006) examined a number of mindfulness measures, including the MAAS, the FMI, the KIMS, the CAMS and the

MQ, to determine the facet structure of mindfulness captured by the new measures. The sample included 613 undergraduate psychology students with an age range of 18 to 57 ($M = 20.5$) of which 70% were female and 90% were Caucasian. All examined measures had good internal consistency, ranging from .81 to .87, and were positively correlated with each other. Baer et al. also found the measures correlated in predicted directions with other variables.

Using the same sample and a combined data set of 112 items from all 5 measures, an exploratory factor analysis was run by Baer et al. (2006). Five factors were suggested by the scree plot and another factor analysis was conducted that confirmed this model with 33% of the variance accounted for. Four of the 5 factors were determined to be similar to those found in the KIMS (Baer et al., 2004). The additional fifth factor included many items from the FMI and the MQ and appeared to involve a nonreactive stance toward internal experience. Items with the highest loadings for each factor were selected with eight items for four factors (observing, acting with awareness, nonjudging, describing) and seven items for the nonreactivity factor. The five facet scales displayed adequate to good internal consistency, with alpha values ranging from .75 (nonreactivity) to .91 (describing). Correlations between the five factors were modest, but significant, varying from .15 to .34. A regression analysis was also conducted by Baer and colleagues with systematic variance values from .56 to .75 that provide evidence of variance distinct to each facet.

A confirmatory factor analysis was run on this newly created measure, the Five Facet Mindfulness Questionnaire (FFMQ) with a sample of 268 undergraduate psychology students of which 77% were female and 90% were Caucasian with a mean

age of 18.9 years. The FFMQ includes 39 items that are rated on a 5 point Likert-type scale from 1 (*Never or very rarely true*) to 5 (*Very often or always true*). Baer et al. (2006) found a hierarchical model with the five factors as indicators of an overall mindfulness factor was a good fit with CFI and NNFI values greater than .90, but the observe factor loaded nonsignificantly on the overall factor. An alternative hierarchical model was tested where describe, act with awareness, nonjudge, and nonreact were defined as facets of an overall mindfulness construct with observe excluded from the model. The model fit well (CFI = .97, NNFI = .96, RMSEA = .06) and no loss of fit was observed when compared with a four-factor nonhierarchical model ($\chi^2 = 3.08$, ns). The observe facet was included in the factor model that was retested using a sample with meditation experience and was found to load significantly with a value of .34 with an overall five-factor hierarchical model found to be a good fit (CFI = .96, NNFI = .94, RMSEA = .07).

Using data from both previous samples, Baer et al. (2006) examined relationships between mindfulness facets and other constructs. Constructs that are believed to incorporate aspects of mindfulness were expected to positively correlate with the five factors and constructs that suggest an absence of mindfulness were expected to be negatively correlated. Openness, was expected to be most strongly correlated with the observe facet which was found to be true ($r = .42, p < .001$). Unexpectedly, observe was also found to correlate with dissociation ($r = .27, p < .001$), absent-mindedness ($r = .16, p < .001$), psychological symptoms ($r = .17, p < .001$), and thought suppression, ($r = .16, p < .001$). As expected, the describe facet was strongly correlated with emotional intelligence ($r = .60, p < .001$) and alexithymia ($r = -.68, p < .001$). The nonreact factor

was most highly correlated with self-compassion ($r = .53, p < .001$). As expected, the act with awareness facet was most strongly correlated with dissociation ($r = -.62, p < .001$) and absent-mindedness ($r = -.61, p < .001$). Nonjudge had the strongest correlations of all five facets with psychological symptoms ($r = -.50, p < .001$), neuroticism ($r = -.55, p < .001$), thought suppression ($r = -.56, p < .001$), difficulties in emotion regulation ($r = -.52, p < .001$) and experiential avoidance ($r = -.49, p < .001$). The unexpected findings with the observe factor were found to be nonsignificant when tested with a sample that had meditation experience. The authors suggested that the observe facet may be more sensitive to meditation experience than the other facets of the FFMQ.

The FFMQ may be the most promising mindfulness measure in terms of capturing all facets of the construct. A strength of this particular measure is its derivation from other mindfulness measures which enabled the authors to combine the factors that each measure tapped into, resulting in a five factor model that is currently the most comprehensive measure of mindfulness. As Baer et al. (2006) suggested additional research is needed to validate the FFMQ with a variety of samples and to continue to strengthen its psychometric properties.

Currently, all existing mindfulness measures show good psychometric properties and many have been correlated with a number of theoretically-linked constructs including openness to experience, psychopathology, emotional intelligence, experiential avoidance and rumination. Certain measures tap into selective factors of mindfulness and thus the uses of these measures are limited, such as the SMQ and the EQ which are both unifactorial measures of decentering or nonreactivity to thoughts and feelings. The authors of the FMI had concerns about the validity of the measure with nonmeditator samples

(Walach et al., 2006), but Baer and colleagues (2006) found the FMI to be valid with meditator and nonmeditator samples, removing possible restrictions for that measure. The CAMS-R and the EQ have not been compared with meditators and non-meditators; this type of evaluation would help strengthen their validity. To reiterate the main conclusions of Baer et al. (2006), many of the current mindfulness measures have yet to be examined with clinical samples, which is important as mindfulness-based interventions are used with those who have mental health disorders. Also, an objective measure of mindfulness would be beneficial to aid laboratory studies of mindfulness-based strategies for coping with stressors and balance the subjective assessment of the construct, as only self-report assessments currently exist. All measures may benefit from further research to clarify the multifaceted conceptualization of mindfulness and reduce the effect of confounding variables.

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