Mindfulness (2012) 3:30–43
DOI 10.1007/s12671-011-0078-x

ORIGINAL PAPER

A Preliminary Investigation of the Process of Mindfulness

Shannon M. Erisman · Lizabeth Roemer

Published online: 11 October 2011

Abstract Given the recent proliferation of mindfulness and acceptance-based therapies, there is a growing need for clarification of the construct of mindfulness and how to evaluate its progression during these treatments. Although mindfulness has been conceptualized as a process, it has been primarily operationalized as an outcome; therefore, important aspects of this construct may be overlooked in current research. This two-part study presents a theoretical examination of mindfulness as a process, along with the preliminary development of a new, process-oriented mindfulness questionnaire (Mindfulness Process Questionnaire [MPQ]) to measure and further investigate this conceptualization of mindfulness. In Study 1, 410 participants from an urban university campus completed measures of mindfulness, emotional responding, and well-being. We examined the relationship between the MPQ and both the Mindful Attention Awareness Scale and the Five Facet Mindfulness Questionnaire, as well as the incremental ability of the new measure to predict outcomes of interest, including psychological symptoms, emotional processing, and well-being. Findings from Study 1 indicate that the MPQ captures a unique aspect of mindfulness, beyond what is already measured by existing mindfulness questionnaires. In Study 2, 18 participants were randomly assigned to an Acceptance-Based Behavioral Therapy condition for generalized anxiety disorder. We examined the ability of the changes in MPQ scores from pre- to posttreatment to predict changes in similar outcomes of interest, including psychological symptoms, emotional processing, and well-being. Consistent with findings from Study 1, results suggest a significant relationship between the MPQ and these outcome measures, indicating a need for further study.

Keywords Mindfulness · Emotion · Well-being · Assessment · Generalized anxiety disorder

Introduction

Mindfulness and acceptance-based interventions are continuing to gain empirical support as effective treatments for a range of psychological disorders, as well as chronic pain and stress (Baer 2003). In addition to decreasing physical and psychological suffering, mindfulness may increase well-being and quality of life, potentially through facilitating engagement in meaningful activities or relationships, and helping individuals to be aware of and maintain contact with positive emotions (Brown and Ryan 2003; Brown et al. 2007; Jimenez et al. 2010; Stryon 2005). As researchers continue to evaluate the effectiveness of mindfulness-based interventions, it is increasingly important to clarify our conceptualization and measurement of key components of these treatments, including mindfulness. Greater precision in this area would allow researchers to examine whether these interventions lead to increases in this construct, and if changes in the degree to which individuals are mindful are related to specific outcomes.

There has been considerable movement toward a shared conceptualization of mindfulness in the context of Western psychological study. Mindfulness can be defined as "an openhearted, moment-to-moment, non-judgmental awareness" (Kabat-Zinn 2005, p. 24) or the maintenance of awareness on the present moment, with the quality of that awareness being one of acceptance and compassion (Bishop et al. 2004).

S. M. Erisman (✉) · L. Roemer
Department of Psychology, University of Massachusetts–Boston,
100 Morrissey Boulevard,
Boston, MA 02125, USA
e-mail: shannon.erisman@gmail.com

Shapiro and Carlson note that mindfulness is both a process and an outcome, and therefore define mindfulness as "the awareness that arises through intentionally attending in an open, caring, and nonjudgmental way" (Shapiro and Carlson 2009, p. 4). Mindfulness is a way of relating to oneself and the world that is characterized by curiosity, openness, and acceptance. Mindfulness is a skill that can be cultivated through repeated practice, such as through mindfulness meditation, in which individuals continually bring attention to their breath while maintaining an open and gentle awareness of the present moment.

Mindfulness-based interventions are being successfully applied to specific psychiatric disorders and to psychological symptoms more generally, including stress, depression, and anxiety. In a recent meta-analysis, authors examined the efficacy of mindfulness-based therapies for anxiety and depression in both psychiatric and medical populations. Results suggest that mindfulness-based interventions were efficacious in reducing symptoms of anxiety and depression, with maintenance of effects demonstrated at follow-up (median follow-up period=12 weeks; Hofmann et al. 2010). For instance, mindfulness-based stress reduction, although not a psychological intervention, has been associated with reductions in self-reported depression and anxiety symptoms, results that were maintained at a 3-year follow-up assessment (Kabat-Zinn et al. 1992; Miller et al. 1995). Segal et al. (2002) developed mindfulness-based cognitive therapy (MBCT) for individuals with a history of depression, with results supporting the efficacy of this treatment in preventing relapse for individuals who reported more than two previous depressive episodes (Teasdale et al. 2000; Ma and Teasdale 2004). In more recent studies, results suggest that MBCT may also be beneficial for individuals with current, treatment-resistant (Kenny and Williams 2007) or chronic depression (Barnhofer et al. 2009). A randomized controlled trial found that a treatment that incorporates mindfulness practice led to significant reductions in self-reported symptoms of worry, stress, and depression among individuals with generalized anxiety disorder (GAD) (Roemer et al. 2008). Although variability exists across these treatments (Chiesa and Malinowski 2011), existing evidence suggests that the use of mindfulness techniques may facilitate significant symptom reductions for individuals reporting symptoms of stress, depression, and anxiety.

In addition to symptom reduction, the development of nonjudgmental awareness of each passing moment may facilitate more adaptive responding to emotions, rather than reacting to internal experiences with distress or avoidance. Mindfulness may allow an individual to remain in contact with emotional experiences as they arise, thereby decreasing fear of unwanted or painful emotions. Ortner et al. (2007) found that participants randomly assigned to a mindfulness meditation condition demonstrated less emotional interference in response to unpleasant pictures compared to participants who received relaxation meditation training, suggesting that mindfulness practice reduced reactivity to distressing stimuli. Mindfulness practice may also lead to more adaptive and effective regulation of emotional responses. This may occur through appropriate engagement with emotions, rather than over- or under-engagement with emotional experiences (Hayes and Feldman 2004). Correlational studies have found significant relationships between reports of mindfulness and effective emotion regulation (e.g., Baer et al. 2006; Coffey and Hartman 2008; Jimenez et al. 2010). Also, in a recent experimental study, participants randomly assigned to a brief mindfulness manipulation reported a trend toward more effective emotion regulation in response to an affectively mixed film clip, compared to participants in the control condition (with a medium to large effect size in a small sample; Erisman and Roemer 2010).

In addition, the cultivation of a mindfulness practice may facilitate increased well-being and quality of life through increasing awareness and engagement with pleasant events, as well as deepening the experience of the associated positive affect. Correlational studies provide preliminary evidence for the relationship between mindfulness and well-being (Baer et al. 2008; Brown and Ryan 2003; Ortner et al. 2007). In experimental studies, participants assigned to mindfulness conditions reported higher levels of positive affect in response to neutral slides (Arch and Craske 2006) and higher levels of positive affect after a positive film clip (Erisman and Roemer 2010), suggesting a causal relationship between mindfulness and increased positive affect.

Due to the importance of mindfulness and its potential role in psychological interventions, a number of self-report state and trait measures have already been developed in an attempt to accurately capture this construct. Trait measures of mindfulness include the Cognitive and Affective Mindfulness Scale–Revised (CAMS-R; Feldman et al. 2007), Five Facet Mindfulness Questionnaire (FFMQ; Baer et al. 2006), Freiburg Mindfulness Inventory (FMI; Buchheld et al. 2001), Kentucky Inventory of Mindfulness Scale (KIMS; Baer et al. 2004), Mindful Attention Awareness Scale (MAAS; Brown and Ryan 2003), and the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto et al. 2008). These measures assess the extent to which individuals tend to be aware of internal and external cues in the present moment. The Toronto Mindfulness Scale (TMS; Lau et al. 2006) is the only measure that examines state levels of mindfulness, such as sensitivity to changes in mindfulness after formal practice. Whereas some of these measures conceptualize mindfulness as containing a single factor (e.g., attention and awareness; MAAS), other measures (e.g., FFMQ) were constructed as multi-faceted assessments of mindfulness. For instance, the FFMQ includes the following facets: nonreactivity, observing, acting with awareness, describing, and nonjudging; and

the FMI contains the following factors: present-moment disidentified (i.e., acknowledgement that one is not equal to one's thoughts), awareness, nonjudgment, diminished emotional reactivity, and insight regarding personal experience.

Despite the proliferation of measures assessing mindfulness, all of the aforementioned questionnaires evaluate mindfulness as an outcome, rather than a process. This type of mindfulness assessment does not address the paradoxical effect of engagement in mindfulness practice, which is the realization of how often one is *not* mindful (Germer 2005). Therefore, the practice of mindfulness and the awareness it cultivates may affect self-assessment of one's level of mindfulness in a reverse direction. For instance, someone who has a limited awareness of mindfulness may respond similarly to an item such as *I find myself doing things without paying attention* as someone who has a regular mindfulness practice and therefore is more aware of how often s/he is inattentive. The emphasis in teaching mindfulness is perhaps more accurately thought of as cultivating the ability to repeatedly redirect attention back to an open, curious awareness of the present moment, knowing that a constant state of mindfulness is not attainable. Therefore, we created the Mindfulness Process Questionnaire (MPQ) in order to assess how often mindfulness is intentionally employed, and the frequency with which mindlessness is noticed and mindfulness is practiced in response to that observation. In other words, this new, process-oriented measure of mindfulness allows the participant to note the extent to which they attempt to engage in mindfulness, rather than their "success" at being mindful (e.g., item 5 on the MPQ: *When I notice that I'm not engaged in the present moment I can gently bring myself back*).

We present a two-part examination of this process-oriented conceptualization of mindfulness, in which we investigate whether the MPQ is a unique predictor of outcome beyond existing mindfulness measures (Study 1), and whether changes in MPQ scores from pre- to posttreatment in a treatment study predict changes in similar outcomes (Study 2). In Study 1, we were interested in whether a newly developed, process-oriented mindfulness measure would predict outcomes of interest above and beyond existing outcome-oriented mindfulness measures. We selected the MAAS and the FFMQ as the outcome-oriented mindfulness measures to include in our analyses. Both measures have consistently demonstrated a relationship to clinically relevant processes, including negative associations with neuroticism, depression, dissociation, thought suppression, and anxiety, and positive associations with well-being and self-esteem (Brown and Ryan 2003; Baer et al. 2006), yet they offer different approaches to the measurement of mindfulness. We investigated the relationship between our new process measure of mindfulness (MPQ) and psychological symptoms (depression, anxiety, and stress), emotional processes (distress about emotions and difficulty regulating emotions), and well-being (quality of life and subjective happiness). In the corresponding analyses, we controlled for outcome-oriented mindfulness (MAAS and FFMQ), in order to examine whether the MPQ captures a unique and clinically important phenomenon.

In Study 2, we examined changes in MPQ scores for participants in an ongoing treatment outcome study, in which participants with GAD were randomly assigned to an Acceptance-Based Behavioral Therapy (ABBT) or Applied Relaxation (AR) condition. (Data from participants in the AR condition were not examined in this study.) We examined whether changes in MPQ scores from pre- to posttreatment for participants in the ABBT condition predicted changes in measures of psychological symptoms, emotional processes, and well-being. The aim for this investigation was to explore the clinical relevance of our process of mindfulness measure.

Study 1

Method

Sample

Four hundred and ten participants were recruited from an urban university commuter campus in exchange for financial compensation or research credit in psychology courses. Participants consisted of 159 men, 247 women, and one intersex individual, whereas three participants did not respond to this item. Participants ranged in age from 18 to 65 (M=23.59, SD=7.54). In response to a racial identity question on which participants could endorse more than one category, 1% selected Alaskan Native/American Indian, 16.3% selected Asian, 17.6% selected Black, 6.6% selected Latino/nonwhite, 48% selected White, 5.1% selected Multiracial and 7.1% selected Other. Participants reported current annual household income as $0–15,000 (29%), $15,001–25,000 (13.7%), $25,001–35,000 (5.9%), $35,001–50,000 (11.7%), $50,001–75,000 (11.7%), $75,001–100,000 (8.5%), $100,001–200,000 (10.2%), or more than $200,001 (2.7%), whereas 6.6% of participants did not respond to this question.

Measures of Mindfulness

The MPQ (see Appendix 1) is an eight-item self-report measure developed for this study that assesses the extent to which mindfulness is intentionally practiced/attempted and the ability to bring compassionate awareness to the present moment after noticing attention is elsewhere or that one's awareness has a judgmental quality. Items include "I

intentionally try to be accepting of my thoughts and feelings as they occur" and "When I notice that I'm not engaged in the present moment, I can gently bring myself back." Participants respond using a 5-point scale, ranging from 1=not at all characteristic of me to 5=entirely characteristic of me.

The MAAS (Brown and Ryan 2003) is a 15-item self-report measure of present moment attention and awareness. Items reflect inattention across several domains (e.g., cognitive, emotional, physical, general), such as "I find it difficult to stay focused on what's happening in the present" or "I rush through activities without being really attentive to them." Participants are asked to endorse how frequently they have the experience described in each item on a 6-point Likert-type scale, with 6 indicating "almost never" and 1 indicating "almost always," so that high scores reflect higher levels of present moment attention. Items are averaged for an overall score. A single-factor model for the scale, along with good internal consistency (α's from 0.82–0.87), has been supported in both a college and a non-college, adult sample (Brown and Ryan 2003). Temporal stability has also been demonstrated over a 4-week period, r=0.81. The MAAS has demonstrated incremental validity through correlations with psychological symptom and well-being scales, even after controlling for potentially related constructs like emotional intelligence and neuroticism. Also, Zen practitioners score significantly higher on the MAAS than a comparison group and, among individuals receiving a mindfulness intervention, increases in MAAS scores are significantly correlated with positive outcomes (Brown and Ryan 2003). Internal consistency in the present sample was good (α=0.88).

The FFMQ (Baer et al. 2006) was developed by assessing the factor structure of existing mindfulness measures. The FFMQ consists of 39 items that assess five different facets: non-reactivity (e.g., "I watch my feelings without getting lost in them"), observing (e.g., "I notice the smells and aromas of things"), acting with awareness (e.g., "I am easily distracted"), describing (e.g., "My natural tendency is to put my experience into words"), and non-judging (e.g., "I disapprove of myself when I have irrational ideas"). Participants respond using a 5-point scale, which ranges from 1=never or very rarely true to 5=very often or always true. In this study, the FFMQ subscales were combined and total scores were calculated as an indicator of overall trait mindfulness (Baer, personal communication). Three of these facets (*actaware*, *nonjudge*, and *nonreact)* significantly predicted psychological symptoms, providing support for the incremental validity of these facets of the FFMQ (Baer et al. 2006). Baer and colleagues demonstrated the construct validity of this measure in meditating and nonmeditating samples, finding that all facets except *awareness* were significantly correlated with mediation experience. In the same study, results supported the FFMQ's incremental validity in predicting psychological well-being in the full sample (meditators and nonmeditators) for all facets except *observing* (Baer et al. 2008). Internal consistency was good in this study, α=84.

Symptom Measure

The Depression Anxiety Stress Scales (DASS-21; Lovibond and Lovibond 1995) is composed of three scales: depression, anxiety (i.e., hyperarousal), and stress (e.g., tension, irritability). Each scale consists of seven items, which are rated on a 4-point Likert-type scale from 0=did not apply to me at all to 3=applied to me very much, or most of the time. Items include "I felt down-hearted and blue" (depression), "I felt I was close to panic" (anxiety), and "I found it difficult to relax" (stress). A previous study found that the depression and anxiety subscales of the DASS were significantly negatively correlated with the MAAS, with r=−0.44 for the depression and r=−0.48 for the anxiety subscales (Roemer et al. 2009). Baer and colleagues found significant correlations among the FFMQ facets *describe*, *act aware*, *nonjudge*, and *nonreact* and the DASS total score in a sample of highly educated participants (correlations from r=−0.26 to r=−0.47), as well as the FFMQ facets *observe*, *act aware*, *nonjudge*, and *nonreact* and the DASS in a sample of meditators, with correlations ranging from r=−0.30 to r=−0.58 (Baer et al. 2008). Internal consistency in the present sample for the depression, anxiety, and stress scales was good (α=0.88, 0.81, and 0.80, respectively).

Measures of Emotion

The Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer 2004) assesses six facets of difficulties in regulating emotion: nonacceptance of emotional responses, difficulties engaging in goal-directed behavior (when upset), impulse control difficulties (when upset), lack of emotional awareness, limited access to effective emotion regulation strategies, and lack of emotional clarity. The scale consists of 36 items, to which participants respond using a 5-point Likert-type scale, from 1=almost never to 5=almost always. Items include "When I'm upset, I feel guilty for feeling that way" (nonacceptance), "When I'm upset, I have difficulty getting work done" (goals), "When I'm upset, I feel out of control" (impulsivity), "I pay attention to how I feel" (reverse scored, awareness), "When I'm upset, it takes me a long time to feel better" (strategies), and "I have no idea how I am feeling" (clarity). Preliminary findings indicate good reliability and validity (Gratz and Roemer 2004). Studies have found significant correlations between DERS scores and reports of chronic worry and symptoms of GAD (Salters-Pedneault et al. 2006; Roemer

et al. 2009), suggesting a relationship between the DERS and certain psychological symptoms. In addition, the DERS has been found to be significantly correlated with the MAAS ($r=-0.48$; Roemer et al. 2009), and with all facets of the FFMQ except *observe* (from $r=-0.36$, nonreact, to $r=-0.52$, nonjudge; Baer et al. 2006). In the present sample, the DERS demonstrated excellent internal consistency ($\alpha=0.93$).

The Affective Control Scale (ACS; Williams et al. 1997) measures distress about emotions, such as concern about losing control of internal experiences or behavioral reactions to emotional experiences. The ACS consists of 42 items that are rated on a 7-point scale, ranging from 1=very strongly disagree to 7=very strongly agree. The measure assesses four domains of distress about emotion: fear of anger (e.g., "I am afraid that I will hurt someone if I get really furious"), positive emotion (e.g., "I can get too carried away when I am really happy"), depression (e.g., "When I get 'the blues', I worry that they will pull me down too far"), and anxiety (e.g., "It scares me when I am nervous"). ACS total scores have demonstrated good internal consistency ($\alpha=0.94$), and discriminant and convergent validity, as well as acceptable 2-week test–retest reliability, $r=0.78$ (Berg et al. 1998; Williams et al. 1997). ACS scores have been found to be significantly correlated with reports of chronic worry and GAD symptoms (Mennin et al. 2005; Roemer et al. 2005). The ACS demonstrated excellent internal consistency in the present sample, $\alpha=0.95$.

Measures of Well-being

The Quality of Life Inventory (QOLI; Frisch et al. 1992) is a 32-item measure used to assess life satisfaction by incorporating importance and satisfaction across 16 life domains, such as work, money, health, and love. For example, the items regarding work are: "How important is work to your happiness?" and "How satisfied are you with your work? (If you are not working, say how satisfied you are about not working.)" Importance is rated from 0 (not at all important) to 2 (extremely important), and satisfaction is rated from −3 (very dissatisfied) to 3 (very satisfied). Scores are calculated by multiplying the importance and satisfaction reported in each domain and dropping domains deemed unimportant by the participant. The QOLI has demonstrated good internal consistency (α ranging from 0.83 to 0.89 in several samples) and test–retest reliability (student sample, $\alpha=0.80$ and VA sample, $\alpha=0.91$; Frisch et al. 1992). Internal consistency was good in the present sample as well ($\alpha=0.86$).

The Subjective Happiness Scale (SHS; Lyubomirsky and Lepper 1999) is a four-item scale that measures subjective well-being. The scale includes items that directly inquire about the participants' perception of their happiness in general (e.g., "In general, I consider myself," responses range from 1=not a very happy person to 7=a very happy person) and in comparison to others (e.g., "Compared to most of my peers, I consider myself," response range from 1=less happy to 7=more happy). The SHS has demonstrated high internal consistency, good test–retest reliability, and good construct validity (Lyubomirsky and Lepper 1999). Internal consistency was good in the present sample ($\alpha=0.82$).

Results

All data were screened for skewness and kurtosis in order to test assumptions of normality (Tabachnick and Fidell 2000). Two variables were positively skewed (the depression and anxiety scales of the DASS) and were corrected by square root transformation. One variable was negatively skewed (QOLI-total), and was subsequently reflected and transformed using square root transformation, which corrected the skew. This transformation resulted in a variable where higher scores reflect lower quality of life, so all subsequent analyses will be interpreted accordingly. There were no outliers in the sample on either transformed or untransformed variables. Data were not kurtotic.

Cronbach's alpha was 0.69 for the eight-item MPQ. Upon further examination of the individual items, one of the two reverse-scored items (item 7, "I don't intentionally try to be aware of the present moment") was removed based on poor item–total correlations. The seven-item version was used in all subsequent analyses ($\alpha=0.71$). Internal consistency was also examined within racial groups to investigate whether the measure was similarly consistent for these groups, in an attempt to avoid assuming that internal consistencies for the predominantly White sample would be identical across race. Similar alpha levels emerged among Asian ($\alpha=0.70$.) and Latino (White and non-White; $\alpha=0.70$) participants, while the internal consistency was slightly lower among individuals who identified as Black ($\alpha=0.67$).

Raw means and standard deviations for all study variables, as well as correlational relationships among those variables, are presented in Tables 1 and 2. MPQ scores were significantly, but moderately, correlated with MAAS ($r=0.39$) and FFMQ ($r=0.49$) scores, suggesting that these measures assess related, but distinct constructs. The MPQ, MAAS, and FFMQ were significantly correlated with all other study measures in the expected directions.

A series of multiple regressions were conducted in order to assess whether the MPQ predicted unique variance in outcomes beyond variance accounted for by the MAAS or the FFMQ. In all of the multiple regressions, the MAAS or FFMQ was entered in the first step and the MPQ was

Table 1 Means and standard deviations for Study 1 variables (n=410)

	Mean	Standard deviation
MPQ	21.53	4.73
MAAS	3.86	.86
DASS-DEP	11.19	10.01
DASS-ANX	9.82	8.99
DASS-STRESS	13.66	8.89
ACS	139.82	35.91
DERS	82.92	21.85
QOLI	2.08	1.76
SHS	18.87	4.90

MPQ Mindfulness Process Questionnaire, *MAAS* Mindful Attention Awareness Scale, *FFMQ* Five Facet Mindfulness Questionnaire, *DASS-DEP* Depression Anxiety Stress Scales–Depression Subscale, *DASS-ANX* Depression Anxiety Stress Scales–Anxiety Subscale, *DASS-STRESS* Depression Anxiety Stress Scales–Stress Subscale, *ACS* Affective Control Scale, *DERS* Difficulties in Emotion Regulation Scale, *QOLI* Quality of Life Inventory, *SHS* Subjective Happiness Scale

entered in the second step. Multiple regressions that examined symptom measures (depression, anxiety, and stress) will be presented first, followed by those that examined clinically relevant emotional processes (distress about emotion and difficulty regulating emotion) and those that examined well-being (quality of life and subjective happiness).

The first set of multiple regressions examined the ability of the MAAS and MPQ to predict DASS-depression, DASS-anxiety, and DASS-stress. These regressions were followed by an identical set of regressions, using the FFMQ instead of the MAAS in the first step. In the first of these regressions, in which MAAS and MPQ predicted DASS-depression, the full model was significant (Adj R^2=0.30, F=88.65, p<0.001). Entering MPQ scores in the second step significantly improved the model (ΔR^2=0.04, ΔF=21.30, p<0.001), and the outcome measure of mindfulness (MAAS) and the process measure of mindfulness (MPQ) both emerged as significant independent predictors in the final model. Likewise, when FFMQ was entered in the first step, the full model was significant (Adj R^2=0.25, F=69.60, p<0.001). The MPQ significantly improved the model (ΔR^2=0.03, ΔF=15.16, p<0.001), and both measures were significant independent predictors in the final model. (See Tables 3 and 4 for all statistics from these regressions.)

Similarly, in the regression that examined the effects of these variables on DASS-anxiety with MAAS entered in the first step, the full model was significant (Adj R^2=0.20, F=52.39, p<0.001). Again, entering MPQ scores in the second step significantly improved the model (ΔR^2=0.01, ΔF=3.95, p<0.05) and both measures emerged as significant independent predictors in the final model. Again, when FFMQ was entered in the first step predicting DASS-anxiety, the full model was significant (Adj R^2=0.15, F=37.49, p<0.001). Entering MPQ scores in the second step did not significantly improve the model (ΔR^2=0.01, ΔF=2.73, p=0.10), and only the FFMQ emerged as a significant independent predictor. (See Tables 3 and 4 for statistics from these regressions.)

In the regression with DASS-stress as the dependent variable and MAAS entered in the first step, the full model

Table 2 Intercorrelations between study variables for Study 1

	1	2	3	4	5	6	7	8	9	10
1. MPQ	–	0.39*	0.49*	−00.38*	−0.26*	−0.31*	−0.43*	−0.49*	−0.29*	0.43*
2. MAAS		–	0.52*	−0.52*	−0.44*	−0.52*	−0.51*	−0.53*	−0.27*	0.36*
3. FFMQ			–	−0.48*	−0.39*	−0.44*	−0.60*	−0.68*	−0.25*	0.41*
4. DASS-DEP				–	0.61*	0.72*	0.56*	0.61*	0.38*	−0.56*
5. DASS-ANX					–	0.62*	0.51*	0.50*	0.14*	−0.32*
6. DASS-STRESS						–	0.52*	0.56*	0.27*	−0.43*
7. ACS							–	0.76*	0.27*	−0.46*
8. DERS								–	0.25*	−0.50*
9. QOLI[a]									–	−0.53*
10. SHS										–

MPQ Mindfulness Process Questionnaire, *MAAS* Mindful Attention Awareness Scale, *FFMQ* Five Facet Mindfulness Questionnaire, *DASS-DEP* Depression Anxiety Stress Scales–Depression Subscale, *DASS-ANX* Depression Anxiety Stress Scales–Anxiety Subscale, *DASS-STRESS* Depression Anxiety Stress Scales–Stress Subscale, *ACS* Affective Control Scale, *DERS* Difficulties in Emotion Regulation Scale, *QOLI* Quality of Life Inventory, *SHS* Subjective Happiness Scale

[a] Transformed (reflected), so that high scores reflect low quality of life

*p<0.01

Table 3 Regressions predicting psychological symptoms for Study 1

Predictors	DASS-DEP		DASS-ANX		DASS-STRESS	
	$R^2\Delta$	Beta	$R^2\Delta$	Beta	$R^2\Delta$	Beta
Step 1 MAAS	0.27***	−0.52***	0.20***	−0.44***	0.27***	−0.52***
Step 2	0.04***		0.01*		0.01**	
MAAS		−0.44***		−0.41***		−0.47***
MPQ		−0.21***		−0.10*		−0.12**

DASS-DEP Depression Anxiety Stress Scales–Depression Subscale, *DASS-ANX* Depression Anxiety Stress Scales–Anxiety Subscale, *DASS-STRESS* Depression Anxiety Stress Scales–Stress Subscale, *MAAS* Mindfulness Attention Awareness Scale, *MPQ* Mindfulness Process Questionnaire

*$p<0.05$, **$p<0.01$, ***$p<0.001$

was also significant (Adj $R^2=0.27$, $F=78.35$, $p<0.001$). Again, entering the MPQ in the second step significantly improved the model ($\Delta R^2=0.01$, $\Delta F=7.22$, $p<0.01$) and, in the final model, both measures emerged as significant predictors. Similarly, when the FFMQ was entered in the first step, the full model was significant (Adj $R^2=0.20$, $F=51.31$, $p<0.001$). Entering the MPQ in the second step significantly improved the model ($\Delta R^2=0.01$, $\Delta F=5.79$, $p<0.05$), and both measures emerged as significant predictors. (See Tables 3 and 4 for statistics of these models.)

In the next two sets of regressions, we examined aspects of emotional responding. In the first of these multiple regressions, ACS (distress about emotions) was entered as the dependent variable. When the MAAS was entered in the first step, the overall model was significant (Adj $R^2=0.32$, $F=97.22$, $p<0.001$) and entering the MPQ in the second step significantly improved the model ($\Delta R^2=0.07$, $\Delta F=39.00$, $p<0.001$). In the final step, the general mindfulness measure (MAAS) and the process measure of mindfulness (MPQ) both emerged as significant independent predictors. Likewise, when FFMQ was entered in the first step, the full model was significant (Adj $R^2=0.38$, $F=127.79$, $p<0.001$), and entering MPQ in the second step significantly improved the model ($\Delta R^2=0.03$, $\Delta F=17.16$, $p<0.001$). The FFMQ and MPQ both emerged as significant independent predictors in the final step. (See Tables 5 and 6 for statistics.)

In the next regression, with DERS as the dependent variable and MAAS in the first step, the full model was also significant (Adj $R^2=0.37$, $F=122.51$, $p<0.001$). Again, entering the MPQ in the second step significantly improved the model ($\Delta R^2=0.10$, $\Delta F=62.22$, $p<0.001$). The MAAS and the MPQ both emerged as significant independent predictors in the final step. When the FFMQ was entered in the first step, the full model was significant (Adj $R^2=0.50$, $F=203.68$, $p<0.001$), and the MPQ entered in the second step significantly improved the model ($\Delta R^2=0.03$, $\Delta F=26.55$, $p<0.001$). Both the FFMQ and MPQ emerged as significant predictors. (See Tables 5 and 6 for statistics.)

We were also interested in whether the MPQ would predict well-being outcomes beyond variance accounted for by the MAAS and FFMQ. In the first regression we conducted to examine this hypothesis, the QOLI was entered as the dependent variable, with the MAAS entered in the first step. The full model was significant (Adj $R^2=0.11$, $F=26.01$, $p<0.001$). Entering the MPQ in the second step significantly improved the model ($\Delta R^2=0.04$, $\Delta F=18.97$, $p<0.001$). The MAAS and the MPQ both emerged as significant independent predictors in the final step. When the FFMQ was entered in the first step, the full model was

Table 4 Regressions predicting psychological symptoms for Study 1

Predictors	DASS-DEP		DASS-ANX		DASS-STRESS	
	$R^2\Delta$	Beta	$R^2\Delta$	Beta	$R^2\Delta$	Beta
Step 1 FFMQ	0.23***	−0.48***	0.15***	−0.39***	0.19***	−0.44***
Step 2	0.03***		0.01		0.01*	
FFMQ		−0.38***		−0.35***		−0.38***
MPQ		−0.19***		−0.09		−0.12*

DASS-DEP Depression Anxiety Stress Scales–Depression Subscale, *DASS-ANX* Depression Anxiety Stress Scales–Anxiety Subscale, *DASS-STRESS* Depression Anxiety Stress Scales–Stress Subscale, *FFMQ* Five Facet Mindfulness Questionnaire, *MPQ* Mindfulness Process Questionnaire

*$p<0.05$, **$p<0.01$, ***$p<0.001$

Table 5 Regressions predicting emotional responding and regulation for Study 1

Predictors	ACS		DERS	
	$R^2\Delta$	Beta	$R^2\Delta$	Beta
Step 1 MAAS	0.26***	−0.51***	0.28***	−0.53***
Step 2	0.07***		0.10***	
MAAS		−0.40***		−0.40***
MPQ		−0.28***		−0.34***

ACS Affective Control Scale, *DERS* Difficulties in Emotion Regulation Scale, *MAAS* Mindfulness Attention Awareness Scale, *MPQ* Mindfulness Process Questionnaire

*$p<0.05$, **$p<0.01$, ***$p<0.001$

significant (Adj $R^2=0.10$, $F=23.03$, $p<0.001$). Entering the MPQ in the second step significantly improved the model ($\Delta R^2=0.04$, $\Delta F=16.82$, $p<0.05$), and both the FFMQ and MPQ emerged as significant independent predictors. (See Tables 7 and 8 for statistics of these models.)

The next and final regressions conducted included the SHS as the dependent variable. With the MAAS entered in the first step, the full model was significant (Adj $R^2=0.23$, $F=60.93$, $p<0.001$), and again, entering the MPQ in the second step significantly improved the model ($\Delta R^2=0.10$, $\Delta F=53.09$, $p<0.001$). The MAAS and the MPQ both emerged as significant independent predictors in the final step. Entering the FFMQ in the first step, the overall model was significant (Adj $R^2=0.24$, $F=64.33$, $p<0.001$). The MPQ in the second step significantly improved the model ($\Delta R^2=0.07$, $\Delta F=37.70$, $p<0.001$), with both the FFMQ and the MPQ emerging as significant independent predictors. (See Tables 7 and 8 for statistics.)

Since we conducted 14 multiple regressions to test our hypotheses, we were concerned about inflating overall risk of Type I error. Therefore, we conducted a modified Bonferroni procedure as recommended by Jaccard and Wan (1996) to maintain an overall alpha of 0.05 without becoming overly conservative and inflating Type II error. Specifically, we rank ordered the significance values of the ΔR^2 values reported above from smallest to largest. We then evaluated the first significance test at 0.05/number of tests (14), following a traditional Bonferroni adjustment. The next significant test was evaluated at 0.05/number of tests – 1 (13), and so on, lowering the denominator by one at each successive step. Using this procedure, each ΔR^2 remained significant while protecting the risk of inflated Type I error, with the exception of the regression in which we examined the ability of the MPQ to predict anxiety (DASS-anxiety) beyond variance accounted for by the MAAS.

Table 6 Regressions predicting emotional responding and regulation for Study 1

Predictors	ACS		DERS	
	$R^2\Delta$	Beta	$R^2\Delta$	Beta
Step 1 FFMQ	0.36***	−0.60***	0.47***	−0.68***
Step 2	0.03***		0.03***	
FFMQ		−0.51***		−0.58***
MPQ		−0.18***		−0.21***

ACS Affective Control Scale, *DERS* Difficulties in Emotion Regulation Scale, *FFMQ* Five Facet Mindfulness Questionnaire, *MPQ* Mindfulness Process Questionnaire

*$p<0.05$, **$p<0.01$, ***$p<0.001$

Table 7 Regressions predicting well-being for Study 1

Predictors	QOLI[a]		SHS	
	$R^2\Delta$	Beta	$R^2\Delta$	Beta
Step 1 MAAS	0.07***	−0.27***	0.13***	0.36***
Step 2	0.04***		0.10***	
MAAS		−0.18***		0.23***
MPQ		−0.22***		0.34***

QOLI Quality of Life Inventory, *SHS* Subjective Happiness Scale, *MAAS* Mindfulness Attention Awareness Scale, *MPQ* Mindfulness Process Questionnaire

[a] Transformed (reflected), so that high scores reflect low quality of life

*$p<0.05$, **$p<0.01$, ***$p<0.001$

Discussion

The findings from Study 1 generally supported our hypotheses. The MPQ accounted for significant and unique variance, beyond variance shared with outcome-oriented mindfulness measures (MAAS and FFMQ), when predicting symptoms of depression (DASS-depression) and stress (DASS-stress). The MPQ approached significance in

Table 8 Regressions predicting well-being for Study 1

Predictors	QOLI[a]		SHS	
	$R^2\Delta$	Beta	$R^2\Delta$	Beta
Step 1 FFMQ	0.07***	−0.25***	0.17***	0.41***
Step 2	0.04***		0.07***	
FFMQ		−0.15**		0.26***
MPQ		−0.22***		0.30***

QOLI Quality of Life Inventory, *SHS* Subjective Happiness Scale, *FFMQ* Five Facet Mindfulness Questionnaire, *MPQ* Mindfulness Process Questionnaire

[a] Transformed (reflected), so that high scores reflect low quality of life

*$p<0.05$, **$p<0.01$, ***$p<0.001$

accounting for unique variance when predicting anxious arousal (DASS-anxiety) beyond the MAAS, but was not significant when we examined the unique variance of the MPQ beyond the FFMQ in predicting anxious arousal. The MPQ also emerged as a unique and significant predictor of emotional responses and regulation, specifically, distress about emotions (ACS) and difficulty regulating emotions (DERS), as well as measures of well-being (QOLI and SHS), beyond variance accounted for by the MAAS and FFMQ.

There are a few important limitations in this preliminary study. First and foremost, these correlational findings cannot speak to the causal nature of these associations. It may be that reduced symptoms, reduced reactivity to emotions, and enhanced quality of life all promote the process of mindfulness, rather than vice versa. Alternatively, these constructs may have bidirectional relationships. The limitations of self-report and the assessment of mindfulness will be presented in the General Discussion.

The results from this study suggest that the MPQ assesses a unique facet of mindfulness that is not being captured by existing mindfulness measures. The correlations between the MAAS and MPQ (r=0.39, p<0.01) and the FFMQ and MPQ (r=0.49, p<0.01) suggest that despite a significant relationship between these measures, they likely assess overlapping, yet distinct, aspects of mindfulness. Also, the process of mindfulness (as measured by the MPQ) may be a particularly important unique contributor to emotional processes (distress about emotions and emotion regulation) and subjective happiness (given the larger amount of additional variance accounted for by the MPQ in these analyses) in comparison to psychological symptoms (depression, anxiety, and stress) and quality of life, even though the latter relationships were still significant, albeit smaller in size. These findings suggest that the MPQ captures a facet of mindfulness that has important clinical correlates. The assessment of the extent to which people are engaging in the process of mindfulness may be particularly useful in studies of the process and mechanisms of mindfulness-based therapies.

Study 2

Method

In Study 2, we examined data from a subset of participants who were enrolled in an ongoing treatment outcome study for GAD. In the treatment study, participants were randomly assigned to 16 individual sessions of AR or ABBT (Roemer and Orsillo 2007; Roemer et al. 2008), and completed questionnaire packets pre- and posttreatment. For the purposes of our study, we looked at data from participants in the ABBT condition who completed all measures of interest at pre- and posttreatment, given that mindfulness practice is a significant component of this ABBT. (See Roemer and Orsillo 2009 for a book-length description of the ABBT used in this treatment outcome study.)

Sample

At the time of this secondary data analysis, 18 participants from the ABBT condition had completed all relevant study measures. Participants ranged in age from 20 to 65 years (M=34.20, SD=13.80), and consisted of four men and 14 women. Participants self-identified as Black (1), White (16), and Other (1; White and Asian). Regarding income, four participants reported an income between $0 and $15,000, two reported income between $25,001 and $35,000, one between $35,001 and $50,000, four between $50,001 and $75,000, one between $75,001 and $100,000, and six between $100,001 and $200,000. Clinician severity ratings (CSRs) were obtained for participants, in which assessors rate symptom severity on a scale from 0 to 8, with a rating ≥4 indicating diagnostic severity. At pretreatment, the mean CSR for GAD was 5.56 (SD=0.62), which decreased to M=2.89 (SD=1.41) at posttreatment. At pretreatment, participants had a mean of 1.67 (SD=1.24) additional diagnoses, with 14 of the 18 total participants meeting criteria for at least one comorbid diagnosis. Most common comorbid diagnoses were social phobia (n=8), panic disorder (n=2 with agoraphobia and n=1 without agoraphobia), obsessive-compulsive disorder (n=3), compulsive hoarding (n=3), major depressive disorder (n=2), and posttraumatic stress disorder (n=2).

Measures

We selected outcome measures that were also examined in Study 1 to provide continuity, with the exception of the ACS, due to the addition of this measure later in the treatment outcome study. Specifically, we included the seven-item version of the MPQ (used in Study 1) due to the superior internal consistency of this version compared to the eight-item version. As in Study 1, we used the DASS-21 (Lovibond and Lovibond 1995) and the DERS (Gratz and Roemer 2004) to assess psychological symptoms, and the QOLI (Frisch et al. 1992) and the SHS (Lyubomirsky and Lepper 1999) to measure well-being.

Results

Data were analyzed for assumptions of normality (Tabachnick and Fidell 2000). MPQ and DASS-anxiety scores at posttreatment were mildly skewed, which were corrected by using square root transformation. (See Table 9 for means

Table 9 Means and standard deviations for Study 2 variables pre- and posttreatment (n=18)

	Pretreatment mean (SD)	Posttreatment mean (SD)
MPQ	15.50 (3.24)	23.58 (5.57)
DASS-DEP	12.11 (11.24)	4.67 (3.94)
DASS-ANX	10.22 (8.26)	3.22 (4.81)
DASS-STRESS	24.44 (8.50)	12.94 (5.72)
DERS	97.00 (23.82)	71.32 (17.41)
QOLI	−0.13 (2.10)	1.87 (1.55)
SHS	14.89 (4.40)	18.61 (5.02)

MPQ Mindfulness Process Questionnaire, *DASS-DEP* Depression Anxiety Stress Scales–Depression Subscale, *DASS-ANX* Depression Anxiety Stress Scales–Anxiety Subscale, *DASS-STRESS* Depression Anxiety Stress Scales–Stress Subscale, *DERS* Difficulties in Emotion Regulation Scale, *QOLI* Quality of Life Inventory, *SHS* Subjective Happiness Scale

and standard deviations for all study variables at pre- and posttreatment.) We began our analyses by conducting a paired sample t-test, examining MPQ scores at pre- and posttreatment in the ABBT condition. Results indicated a significant difference in MPQ scores from pre- to posttreatment [$t(17)=-5.15$, $p<0.01$, $d=1.77$], with participants reporting higher MPQ scores at posttreatment (M=23.58, SD=5.57) compared to pretreatment (M=15.50, SD=3.24).

Next, we conducted correlations to investigate whether changes in MPQ scores from pre- to posttreatment correlated with change in outcome measures across the same assessment points. We calculated residualized gain scores from the pre- and posttreatment administration of the MPQ, with similarly calculated residualized gain scores for each of the outcome measures. Zero-order correlations revealed significant results between changes in MPQ and changes in all other outcome measures, with the exception of the anxious arousal scale of the DASS. Correlation coefficients ranged from r=0.59 between MPQ and the SHS, and r=−0.87 between MPQ and the DERS. (See Table 10 for correlation table.)

Discussion

In Study 2, we examined whether increases in the process of mindfulness over the course of therapy were significantly related to improvements in outcomes among participants assigned to an ABBT for GAD. The findings from Study 2 generally supported our hypotheses. Change in MPQ scores from pre- to posttreatment were significantly correlated with change in psychological symptoms (depression and stress), emotion regulation, and well-being (quality of life and subjective happiness), whereas the correlation between change in MPQ and change in DASS-anxiety was the only nonsignificant finding.

While these results provide support for the relevance of the MPQ to clinical outcomes, there are limitations to consider. As with all treatment studies, it is possible that social desirability contributed to the reporting of decreased symptoms after the course of psychological treatment, particularly given the amount of time the participant is encouraged to devote to the treatment in the form of attending sessions and between session activities, including monitoring worksheets and frequent mindfulness practice. Further, while our analysis of the MPQ in a treatment outcome study provided information about the clinical utility of this measure, additional research should assess whether the MPQ represents a mechanism of change in mindfulness- and acceptance-based treatments by assessing temporal course of change. Also, it would be useful to determine the extent to which our conceptualization of the process of mindfulness is responsible for improvements in

Table 10 Correlations among residualized gain scores for Study 2 variables (n=18)

	1	2	3	4	5	6	7
1. MPQ	–	−0.77**	−0.41	−0.63**	−0.87**	0.69**	0.59**
2. DASS-DEP		–	0.41	0.53*	0.87**	−0.57*	−0.56*
3. DASS-ANX			–	0.07	0.38	−0.48*	−0.14
4. DASS-STRESS				–	0.70**	−0.49*	−0.40
5. DERS					–	−0.64**	−0.65**
6. QOLI						–	0.66**
7. SHS							–

MPQ Mindfulness Process Questionnaire, *DASS-DEP* Depression Anxiety Stress Scales–Depression Subscale, *DASS-ANX* Depression Anxiety Stress Scales–Anxiety Subscale, *DASS-STRESS* Depression Anxiety Stress Scales–Stress Subscale, *DERS* Difficulties in Emotion Regulation Scale, *QOLI* Quality of Life Inventory, *SHS* Subjective Happiness Scale

*p<0.05, **p<0.01

clinical outcome, compared to other components of the treatment package. Lastly, while our results from Study 2 suggest that the MPQ is a clinically useful instrument, it does not inform our understanding of the MPQ as a measure that assesses a unique aspect of mindfulness. Nonetheless, the high correlations between changes in MPQ scores and measures of clinically relevant phenomena provide preliminary evidence for the clinical importance of this construct.

General Discussion

We believe that one aspect of mindfulness — perhaps one of the most important — has not yet been captured by a self-report questionnaire, despite the proliferation of mindfulness measures in the literature. Our goal was to take the first step towards developing a conceptualization and assessment of the process, rather than the outcome of mindfulness. While much work remains to be done in developing this measure, the results support our hypothesis that the MPQ measures a unique and clinically relevant aspect of mindfulness, and is worthy of further investigation. In Study 1, we found that the MPQ predicted levels of depression and stress, distress about emotions, difficulties in emotion regulation, and quality of life and subjective happiness, beyond variance already accounted for by existing mindfulness measures (MAAS and FFMQ). In Study 2, we found that changes in MPQ scores were significantly correlated with changes in clinically relevant outcomes from pre- to posttreatment for participants randomly assigned to an ABBT condition for GAD. Specifically, changes in MPQ scores were significantly correlated with changes in depression and stress symptoms, difficulties in emotion regulation, quality of life, and subjective happiness from pre- to posttreatment.

While limitations specific to each individual study were previously noted, there are a few important limitations to discuss that are relevant to the overall study design. First, self-report assessments of a complex construct such as mindfulness are likely to overlook important aspects of the experience. Reporting on phenomena that require individuals to reflect on their levels of attention or awareness (which requires attention and awareness) is a psychologically complex task that may not be adequately captured by self-report. Self-report assessments of constructs like emotion regulation present similar challenges. On the other hand, individuals' subjective experiences of these phenomena are clinically relevant, suggesting that these assessments are meaningful, even if they do not provide a comprehensive measurement of the constructs in question.

Second, while the current findings indicate that the MPQ shows adequate internal consistency (for a brief measure) and provide some evidence of its incremental validity, further research on its psychometric properties, such as test–retest reliability and discriminant validity, is needed. Also, although the sample in Study 1 (but not Study 2) was racially and economically diverse, it will be important to examine the psychometric properties within specific cultural groups to ensure its validity with people from differing backgrounds. It will also be important to examine its relationship to constructs of interest within specific cultural groups.

Despite these limitations, the findings from this study represent a novel and promising contribution to the growing literature on the assessment of mindfulness. The unique relationship between the process of mindfulness and symptoms of depression and stress demonstrated in Study 1 is consistent with theoretical and empirical accounts of the effects of mindfulness-based treatments for a range of psychopathology (Baer 2003; Brown et al. 2007; Hofmann et al. 2010). The precise ways in which mindfulness may be related to lower levels of psychological symptoms is outside the scope of this paper (see Roemer and Orsillo 2009; Segal et al. 2002, for in depth reviews). However, the emergence of the process of mindfulness as a unique predictor of these symptoms suggests that the awareness of being in a mindless state followed by repeated, intentional attempts to engage in mindfulness may be one important mechanism that explains this relationship. Also, the significant relationship between changes in MPQ scores and changes in levels of depression and stress in Study 2 provides additional preliminary support for the idea that the MPQ captures a potential mechanism of change within acceptance- and mindfulness-based psychotherapies.

Our findings regarding responses to emotional experiences supported our hypotheses. Specifically, we predicted that the MPQ would predict distress about emotions and emotion regulation beyond the FFMQ in Study 1, and that change in MPQ scores would be correlated with change in emotion regulation scores in Study 2. Being more skilled at recognizing and engaging in mindfulness as a process may result in more adaptive responses to and regulation of emotional experiences in several ways. As one becomes more engaged in the process of mindfulness, such as noticing when one has become entangled with overwhelming emotions or judgment of those emotions, the ability to bring compassionate awareness to those previously mindless moments may contribute to more effective regulation (Coffey and Hartman 2008; Feldman et al. 2007; Hayes and Feldman 2004; Wupperman et al. 2008). It may also be that individuals who are skilled in this aspect of mindfulness ultimately experience less distress about their emotions, knowing that there are numerous moments that one can recognize a mindless (non-aware or judgmental) state and practice mindfulness instead. Intentionally engaging in an

open and accepting stance towards even distressing and overwhelming emotions may provide individuals with the experiential knowledge that all emotional experiences rise and fall eventually, and that repeated attempts at mindfulness even in those moments may result in less suffering.

We also found that this process-oriented measure of mindfulness emerged as a significant and unique predictor of quality of life and subjective happiness in Study 1, and that change in this mindfulness measure was significantly correlated with change in well-being for participants in Study 2. Repeatedly engaging in mindfulness when mindlessness is noticed may lead to greater clarity of what is meaningful to an individual, making it possible to choose different actions that may be more consistent with how one wants to live in various life domains (e.g., friends, work, community; Shapiro et al. 2006). In addition, intentionally shifting from mindlessness to mindfulness while engaging in pleasant or even neutral activities may facilitate a deeper, more meaningful experience of those events (Stryon 2005), resulting in greater positive affect and subjective happiness.

Although the preponderance of the results supported our hypotheses, our predictions regarding the relationship of the MPQ with the anxious arousal scale of the DASS in Study 1 and Study 2 were not confirmed by our findings. Specifically, the MPQ did not emerge as a unique predictor beyond the FFMQ in predicting DASS-anxiety in Study 1, and changes in MPQ scores were not significantly correlated with DASS-anxiety in Study 2. As noted in the Measures section, the items that compose the anxiety scale of the DASS assess anxious arousal. In reference to Study 1, it could be that the awareness of being engaged in the process of mindfulness (measured by the MPQ) simply is not significantly related to reports of anxious arousal beyond variance accounted for by the FFMQ. In Study 2, significant relationships regarding anxious arousal may not have emerged because this symptom is not a central component of GAD. In other words, anxious arousal may be a less relevant outcome measure for participants with GAD. Clearly, more work is needed to elucidate the nature of these relationships.

As psychological interventions that contain mindfulness and acceptance-based components continue to gain empirical support and theoretical attention, it is increasingly important to provide an accurate and meaningful assessment of constructs of interest, such as mindfulness. These studies present the first steps in a preliminary investigation of this new measure. The results of this work suggest the importance of describing and measuring the process of mindfulness, as the field of psychology continues to incorporate mindfulness into clinical interventions and examine mindfulness in research settings. As such, the MPQ provides a way to capture an aspect of mindfulness that is not yet represented in the literature, and it may be that this aspect (the process of mindfulness) is a particularly important contributor to the psychological effects of mindfulness.

Acknowledgement This work was supported by the National Institute of Mental Health Grant MH074589 to the second author.

Appendix 1

Mindfulness Process Questionnaire

You will find below a series of statements that describe how people may react to the uncertainties of life. Please use the scale below to describe to what extent each item is characteristic of you (please write the number that describes you best in the space before each item).

1	2	3	4	5
not at all characteristic of me	a little characteristic of me	somewhat characteristic of me	very characteristic of me	entirely characteristic of me

1. ____ When I feel myself getting caught up in my thoughts or feelings, I am able to bring my mind back to what's happening right now.
2. ____ I don't consciously try to be accepting of whatever thoughts and feelings I have.
3. ____ I try to be open to whatever happens, as it's happening, instead of having my mind wander to other things.
4. ____ I intentionally try to be accepting of my thoughts and feelings as they occur.
5. ____ When I notice that I'm not engaged in the present moment I can gently bring myself back.
6. ____ If I notice that I'm being hard on myself for the thoughts and feelings I'm experiencing, I try to be kind to myself instead.
[a]7. ____ I don't intentionally try to be aware of the present moment.
8. ____ If I notice that I'm being critical of my thoughts or feelings, I try to be more accepting of them instead.

[a]This item was dropped to improve internal consistency, resulting in a seven-item measure.

References

Arch, J., & Craske, M. (2006). Mechanisms of mindfulness: emotion regulation following a focused breathing induction. *Behaviour Research and Therapy, 44*, 1849–1858.

Baer, R. A. (2003). Mindfulness training as a clinical intervention: a conceptual and empirical review. *Clinical Psychology: Science and Practice, 10*, 125–142.

Baer, R. A., Smith, G. T., & Allen, K. B. (2004). Assessment of mindfulness by self-report: the Kentucky Inventory of Mindfulness Skills. *Assessment, 11*, 191–206.

Baer, R. A., Smith, G. T., Hopkins, J., Krietemeyer, J., & Toney, L. (2006). Using self-report assessment methods to explore facets of mindfulness. *Assessment, 13*, 27–45.

Baer, R. A., Smith, G. T., Lykins, E., Button, D., Krietemeyer, J., Sauer, S., et al. (2008). Construct validity of the Five Facet Mindfulness Questionnaire in meditating and nonmeditating samples. *Assessment, 15*, 329–342.

Barnhofer, T., Crane, C., Hargus, E., Amarasinghe, M., Winder, R., & Williams, J. M. G. (2009). Mindfulness-based cognitive therapy as a treatment for chronic depression: a preliminary study. *Behaviour Research and Therapy, 47*, 366–373.

Berg, C. Z., Shapiro, N., Chambless, D. L., Ahrens, A. H. (1998). Are emotions frightening: II. An analogue study of fear of emotion, interpersonal conflict, and panic onset. *Behaviour Research and Therapy, 35*, 3–15.

Bishop, S. R., Lau, M., Shapiro, S., Carlson, L., Anderson, N. D., Carmody, J., et al. (2004). Mindfulness: A proposed operational definition. *Clinical Psychology: Science and Practice, 11*, 230–241.

Brown, K. W., & Ryan, R. M. (2003). The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology, 34*, 822–848.

Brown, K. W., Ryan, R. M., & Creswell, J. D. (2007). Mindfulness: theoretical foundations and evidence for its salutary effects. *Psychological Inquiry, 18*, 211–237.

Buchheld, M., Grossman, P., & Walach, H. (2001). Measuring mindfulness in insight meditation (Vipassana) and meditation-based psychotherapy: the development of the Freiburg Mindfulness Inventory (FMI). *Journal for Meditation and Meditation Research, 1*, 11–34.

Cardaciotto, L., Herbert, J. D., Forman, E. M., Moitra, E., & Farrow, V. (2008). The assessment of present-moment awareness and acceptance: The Philadelphia Mindfulness Scale. *Assessment, 15*, 204–223.

Chiesa, A., & Malinowski, P. (2011). Mindfulness-based approaches: are they all the same? *Journal of Clinical Psychology, 67*, 404–424.

Coffey, K. A., & Hartman, M. (2008). Mechanisms of action in the inverse relationship between mindfulness and psychological distress. *Complimentary Health Practice Review, 13*, 79–91.

Erisman, S. M., & Roemer, L. (2010). A preliminary investigation of the effects of experimentally induced mindfulness on emotional responding to film clips. *Emotion, 10*, 72–82.

Feldman, G., Hayes, A., Kumar, S., Greeson, J., & Laurenceau, J.-P. (2007). Mindfulness and emotion regulation: the development and initial validation of the Cognitive and Affective Mindfulness Scale-Revised (CMS-R). *Journal of Psychopathology and Behavioral Assessment, 29*, 177–190.

Frisch, M. B., Cornell, J., Villanueva, M., & Retzlaff, P. J. (1992). Clinical validation of the Quality of Life Inventory: a measure of life satisfaction for use in treatment planning and outcome assessment. *Psychological Assessment, 4*, 92–101.

Germer, C. K. (2005). What is mindfulness? In C. K. Germer, R. D. Siegel, & P. R. Fulton (Eds.), *Mindfulness and psychotherapy* (pp. 1–27). New York: The Guilford Press.

Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment, 26*, 41–55.

Hayes, A. M., & Feldman, G. (2004). Clarifying the construct of mindfulness in the context of emotion regulation and the process of change in therapy. *Clinical Psychology: Science and Practice, 11*, 255–262.

Hofmann, S. G., Sawyer, A. T., Witt, A. A., & Oh, D. (2010). The effect of mindfulness-based therapy on anxiety and depression: a meta-analytic review. *Journal of Consulting and Clinical Psychology, 78*, 169–183.

Jaccard, J., & Wan, C. K. (1996). *LISREL approaches to interaction effects in multiple regression*. Thousand Oaks, CA: Sage Publications.

Jimenez, S. S., Niles, B. L., & Park, C. L. (2010). A mindfulness model of affect regulation and depressive symptoms: positive emotions, mood regulation expectancies, and self-acceptance as regulatory mechanisms. *Personality and Individual Differences, 49*, 645–650.

Kabat-Zinn, J. (2005). *Coming to our senses: Healing ourselves and the world through mindfulness*. New York: Hyperion.

Kabat-Zinn, J., Massion, A. O., Kristeller, J., Peterson, L. G., Fletcher, K. E., Pbert, L., et al. (1992). Effectiveness of a meditation-based stress reduction program. *The American Journal of Psychiatry, 149*, 936–943.

Kenny, M. A., & Williams, J. M. G. (2007). Treatment-resistant depressed patients show a good response to mindfulness-based cognitive therapy. *Behaviour Research and Therapy, 45*, 617–625.

Lau, M., Bishop, S. R., Segal, Z. V., Buis, T., Anderson, N. D., & Carlson, L. (2006). The Toronto Mindfulness Scale: development and validation. *Journal of Clinical Psychology, 62*, 1445–1467.

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales* (2nd ed.). Sydney: Psychology Foundation of Australia.

Lyubomirsky, S., & Lepper, H. S. (1999). A measure of subjective happiness: preliminary reliability and construct validation. *Social Indicators Research, 46*, 137–155.

Ma, S. H., & Teasdale, J. D. (2004). Mindfulness-based cognitive therapy for depression: replication and exploration of differential relapse prevention effects. *Journal of Consulting and Clinical Psychology, 72*, 31–40.

Mennin, D. S., Heimberg, R. G., Turk, C. L., & Fresco, D. M. (2005). Preliminary evidence for an emotion dysregulation model of generalized anxiety disorder. *Behaviour Research and Therapy, 43*, 1281–1310.

Miller, J. J., Fletcher, K., & Kabat-Zinn, J. (1995). Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *General Hospital Psychiatry, 17*, 192–200.

Ortner, C. N. M., Kilner, S. J., & Zelazo, P. D. (2007). Mindfulness meditation and reduced emotional interference on a cognitive task. *Motivation and Emotion, 31*, 271–283.

Roemer, L., & Orsillo, S. M. (2007). An open trial of an acceptance-based behavior therapy for generalized anxiety disorder. *Behavior Therapy, 38*, 72–85.

Roemer, L., & Orsillo, S. M. (2009). *Mindfulness and acceptance-based behavioral therapies in practice*. New York: Guilford.

Roemer, L., Salters, K., Raffa, S. D., & Orsillo, S. M. (2005). Fear and avoidance of internal experiences in GAD: preliminary tests of a conceptual model. *Cognitive Therapy and Research, 29*, 71–88.

Roemer, L., Orsillo, S. M., & Salters-Pedneault, K. (2008). Efficacy of an acceptance-based behavior therapy for generalized anxiety disorder: evaluation in a randomized controlled trial. *Journal of Consulting and Clinical Psychology, 76*, 1083–1089.

Roemer, L., Lee, J. K., Salters-Pedneault, K., Erisman, S. M., Orsillo, S. M., & Mennin, D. S. (2009). Mindfulness and emotion regulation difficulties in generalized anxiety disorder: preliminary evidence for independent and overlapping contributions. *Behavior Therapy, 40*, 142–154.

Salters-Pedneault, K., Roemer, L., Tull, M. T., Rucker, L., & Mennin, D. S. (2006). Emotion in chronic worry and GAD: evidence of regulation deficits. *Cognitive Therapy and Research, 30*, 469–480.

Segal, Z. V., Williams, J. M. G., & Teasdale, J. D. (2002). *Mindfulness-based cognitive therapy for depression: A new approach to preventing relapse*. New York: The Guilford Press.

Shapiro, S. L., & Carlson, L. E. (2009). *The art and science of mindfulness: Integrating mindfulness into psychology and the*

helping professions. Washington, DC: American Psychological Association.

Shapiro, S. L., Carlson, L. E., Astin, J. A., & Freedman, B. (2006). Mechanisms of mindfulness. *Journal of Clinical Psychology, 62*, 373–386.

Stryon, C. W. (2005). Positive psychology: awakening to the fullness of life. In C. K. Germer, R. D. Siegel, & P. R. Fulton (Eds.), *Mindfulness and psychotherapy* (pp. 262–282). New York: The Guilford Press.

Tabachnick, B. G., & Fidell, L. S. (2000). *Using multivariate statistics*. Boston: Allyn and Bacon.

Teasdale, J. D., Segal, Z. V., & Williams, J. M. G. (2000). Prevention of relapse/recurrence in major depression by mindfulness-based cognitive therapy. *Journal of Consulting and Clinical Psychology, 68*, 615–623.

Williams, K. E., Chambless, D. L., & Ahrens, A. (1997). Are emotions frightening? An extension of the fear of fear construct. *Behaviour Research and Therapy, 35*, 239–248.

Wupperman, P., Neumann, C. S., & Axelrod, S. R. (2008). Do deficits in mindfulness underlie borderline personality features and core difficulties? *Journal of Personality Disorders, 22*, 466–482.